

2023 REGIONAL FLOOD PLAN REGION 6 SAN JACINTO

July 2023

PREPARED FOR THE SAN JACINTO
REGIONAL FLOOD PLANNING GROUP

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**Appendix 5-4AL:
Halls Bayou CDBG-MIT Application 1 Projects**

Appendix K

Excerpt from CDBG-MIT Project Evaluations – Mainstem Hardy West 2
Memo by LAN dated November 2021

1.1 Mainstem – Hardy West 2

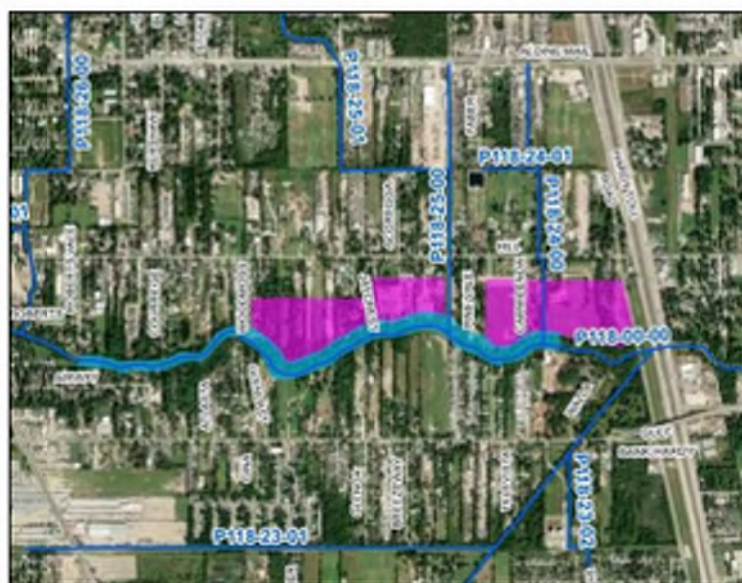


FIGURE 1: MAINSTEM HARDY WEST 2 CHANNEL IMPROVEMENTS PROJECT LOCATION

Proposed channel improvements for Mainstem Hardy West include a 20-foot channel widening on the north bank of Halls Bayou from RS 71854.2 to RS 69527.2 and a 100-foot widening on the north bank of Halls Bayou from RS 69610 to RS 65434.6; this provides a 10-year Level-of-Service (LOS). This option was created to reduce right-of-way (ROW) acquisition needs while still providing water surface elevation (WSE) benefits. The proposed channel improvements would require approximately 1.1 acres of ROW acquisition of residential property. Channel improvements were incorporated into the Hardy West Alternatives Analysis Alternative 3 Proposed Conditions model. The 100- and 500-year events show maximum depth reductions of up to 1.2 feet and 0.7 feet at RS 71854.2, respectively, compared to the Hardy West Baseline Conditions model. There are no adverse impacts when compared to the Baseline Conditions WSEs. The reduction in WSE results in the following performance metrics when compared to the Baseline Conditions model:

TABLE 1: MAINSTEM HARDY WEST 2 PERFORMANCE METRICS VERSUS BASELINE CONDITIONS

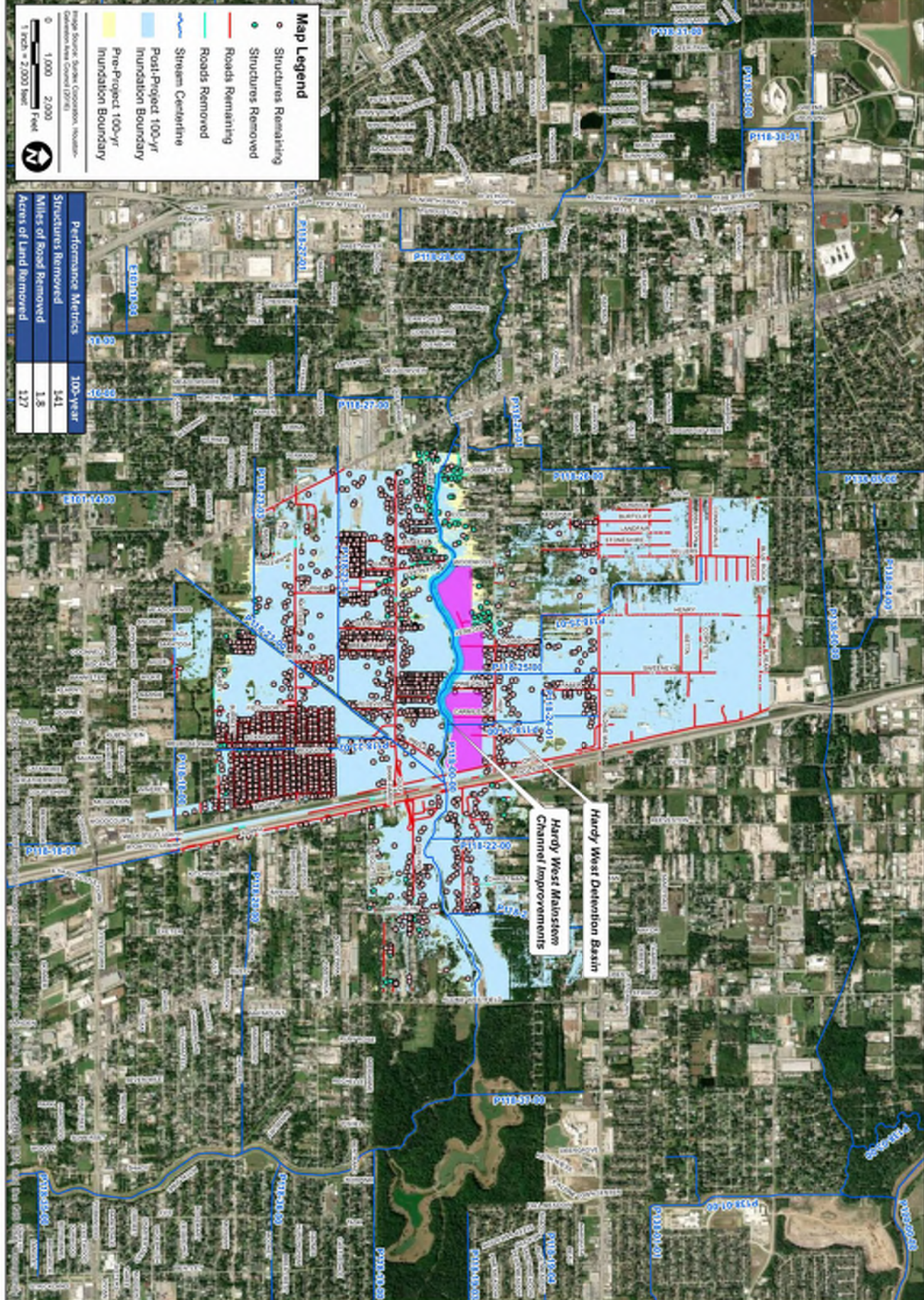
Performance Metrics	10-year	50-year	100-year	500-year
Structures No Longer in Floodplain	159	258	141	60
Structural Flooding Removed (Based on FFE)	39	231	272	83
Miles of Roadway Removed	1.8	1.9	1.8	1.0
Acres of Land Removed	171	162	127	79

The estimated opinion of probable cost is **\$7.3 Million** which includes proposed improvements, ROW, planning/engineering/construction costs, and contingency.

The Hardy West Mainstem channel improvements provide additional benefit to the surrounding area when combined with the Hardy West Proposed Alternative 3 detention basin completed in the Alternatives Analysis. The reduction in WSE results in the following performance metrics when compared to the Hardy West Alternatives Analysis Alternative 3 Stand-alone model:

TABLE 2: MAINSTEM HARDY WEST PERFORMANCE METRICS VERSUS HARDY WEST ALTERNATIVE 3

Performance Metrics	10-year	50-year	100-year	500-year
Structures No Longer in Floodplain	28	145	77	19
Structural Flooding Removed (Based on FFE)	3	77	117	32
Miles of Roadway Removed	-	0.9	0.8	0.2
Acres of Land Removed	34	66	46	13



Map Legend



- Structures Remaining
- Structures Removed
- Roads Remaining
- Roads Removed
- Streams Centerline
- Post-Project 100-yr Inundation Boundary
- Pre-Project 100-yr Inundation Boundary

Map Scale: 1 inch = 2,000 feet

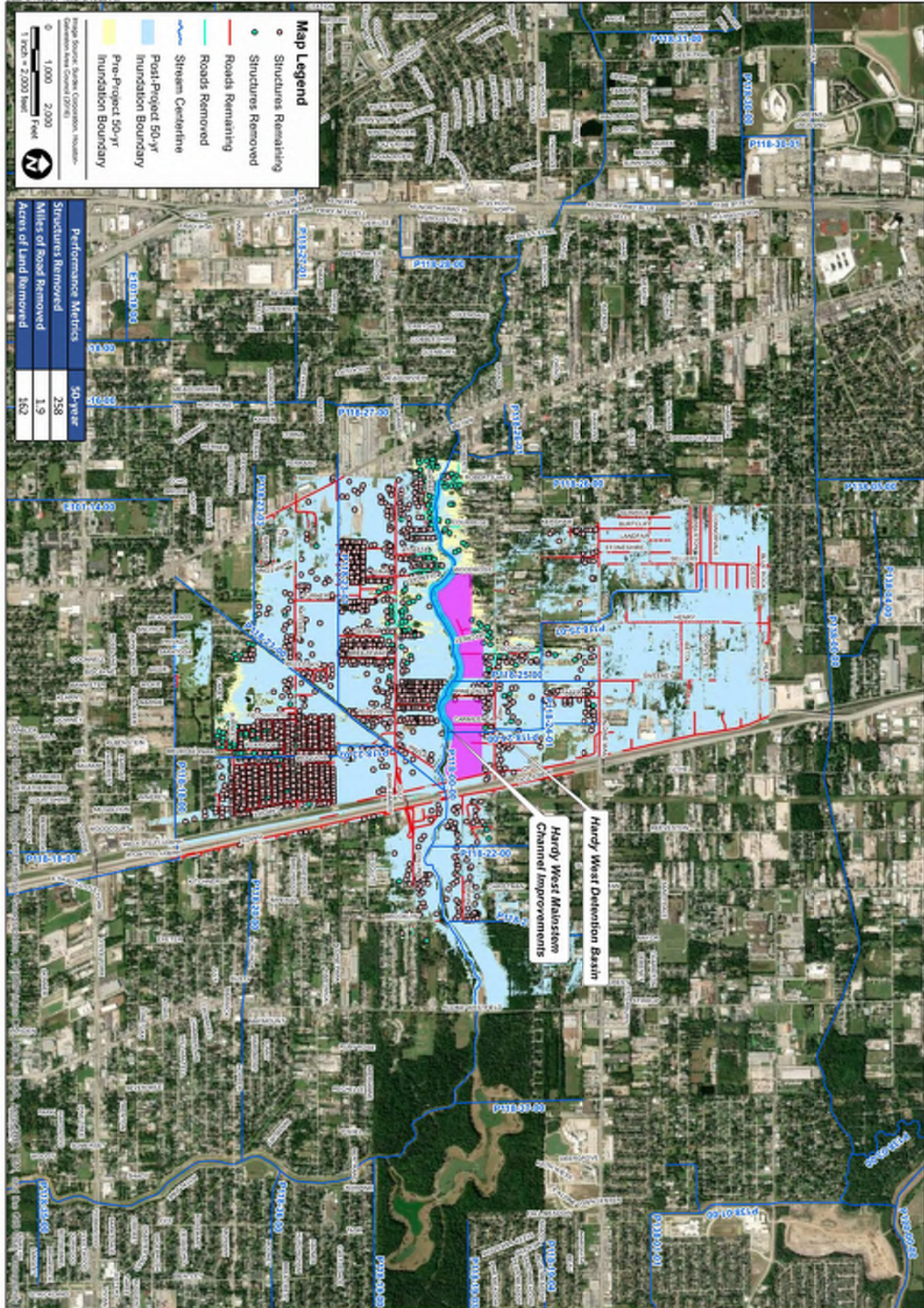
Performance Metrics

Metric	100-Year
Structures Removed	141
Miles of Road Removed	1.8
Acres of Land Removed	127

Hardy West Detention Basin
 Hardy West Mainstem Channel Improvements

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p> <p>9900 Northwest Freeway Houston, Texas 77099</p>	 <p>Lockwood, Andrews & Newman, Inc. A U.S. & CANADA COMPANY</p> <p>1930 Park St. Suite 200 Houston, TX 77056-0775 Tel: 713.866.8200 • Fax: 713.866.0200 www.lan-inc.com • info@lan-inc.com</p>	PREPARED: BJI	HALLS MAINSTEM STORMWATER DETENTION BASIN AND CHANNEL IMPROVEMENTS MAINSTEM - HARDY WEST 2 PERFORMANCE METRICS MAP (100-YEAR)
		CHECKED: CEE	
		APPROVED: CEE	

DATE: SEPT 2021
 SCALE: AS NOTED
 EXHIBIT



Map Legend


- Structures Remaining
- Structures Removed
- Roads Remaining
- Roads Removed
- Stream Centerline
- Post-Project 50-yr Inundation Boundary
- Pre-Project 50-yr Inundation Boundary

Map Source: Online Corporation, Inc. (Aerial Imagery)
 Projection: NAD 83
 Scale: 1 inch = 2,000 feet

Performance Metrics

Structures Removed	258
Miles of Road Removed	1.9
Acres of Land Removed	162

Hardy West Detention Basin
 Hardy West Mainstem
 Channel Improvements

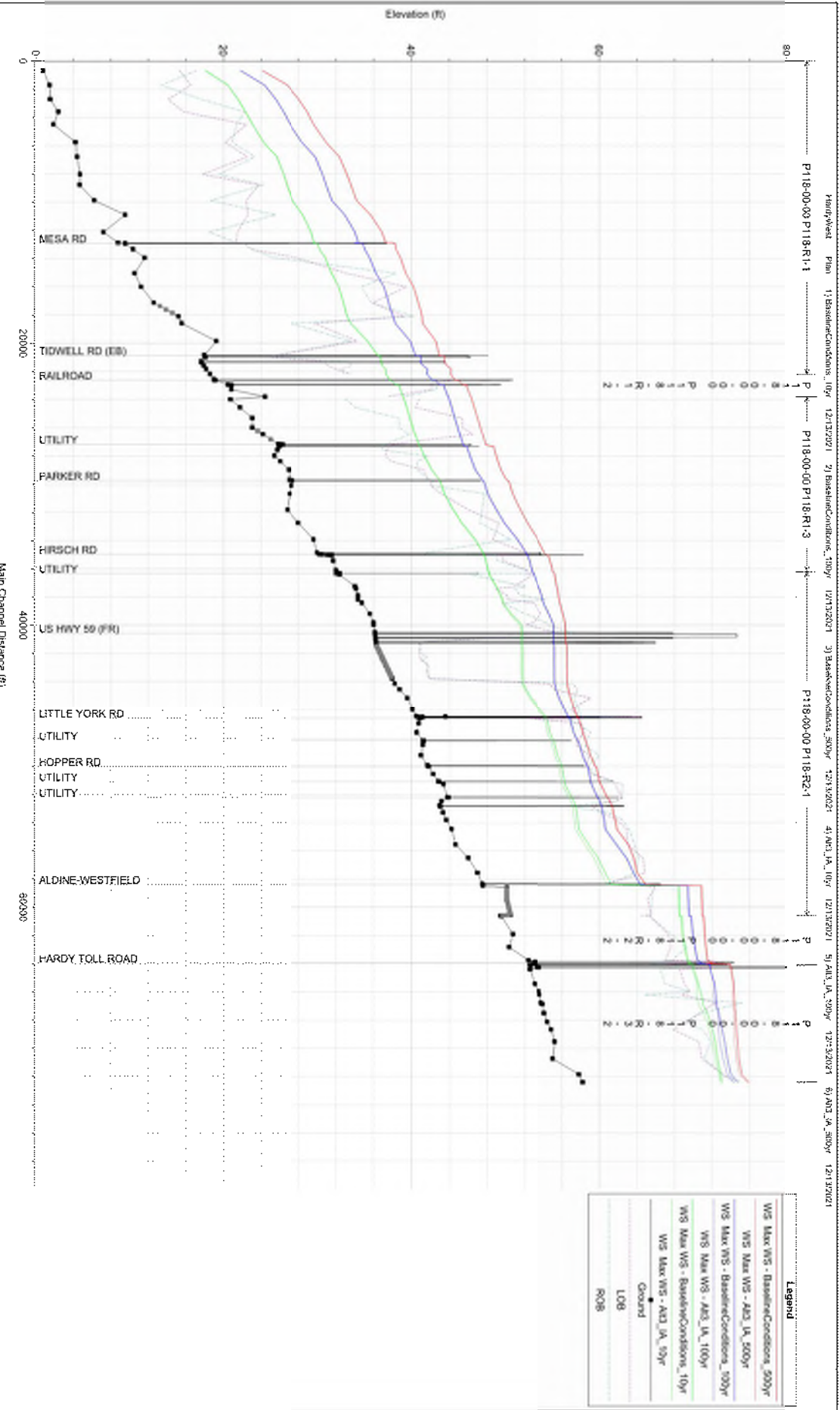
 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT 9900 Northwest Freeway Houston, Texas 77092</p>	 <p>Lockwood, Andrews & Newman, Inc. A U.S. & CANADA COMPANY 1925 Park Blvd, Suite 200 Houston, TX 77056-0775 P: 713.866.8800 • F: 713.866.0888 www.lan-inc.com • info@lan-inc.com</p>	PREPARED: BJI	<p>HALLS MAINSTEM STORMWATER DETENTION BASIN AND CHANNEL IMPROVEMENTS</p> <p>MAINSTEM - HARDY WEST 2 PERFORMANCE METRICS MAP (50-YEAR)</p>
		CHECKED: CEE	
		APPROVED: CEE	

DATE: SEPT 2021
 SCALE: AS NOTED
 EXHIBIT

Appendix L

Impact Analysis Baseline Conditions vs. Recommended Alternative Water
Surface Profile Comparisons

1 in Horiz = 5560 ft 1 in Vert = 10 ft



Appendix M

Waters of the United States Report

Appendix N

Threatened & Endangered Species Habitat Assessment

Appendix O

Phase 1 Environmental Site Assessment Report

Appendix P

Cultural Resource Desktop Assessment

Appendix Q

Detailed Hydraulic Calculations

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min.Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	2188.56	58.25	70.47		70.71	0.000633	3.92	558.38	73.03	0.25
P118-00-00	P118-R3-2	71854.2	Max WS	2186.46	57.83	70.32		70.43	0.000357	2.65	826.05	130.42	0.19
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	2211.19	55.05	70.03		70.12	0.000215	2.33	947.22	122.71	0.15
P118-00-00	P118-R3-2	69527.2	Max WS	2207.13	55.28	69.81		69.89	0.000166	2.16	1021.25	124.49	0.13
P118-00-00	P118-R3-2	68670	Max WS	2203.61	54.88	69.5		69.66	0.000392	3.15	726.23	111.84	0.2
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	2202.16	54.47	69.32		69.47	0.000322	3.06	720.75	95.38	0.18
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2234.31	54.14	68.97		69.2	0.000559	3.86	613.08	163.13	0.23
P118-00-00	P118-R3-2	66869	Max WS	2229.93	53.96	68.4		68.71	0.000955	4.49	496.38	71.51	0.3
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2293.68	53.79	68.41		68.63	0.000591	3.75	611.67	80.86	0.24
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2291.28	53.6	68.13		68.36	0.000555	3.86	662.42	143.48	0.23
P118-00-00	P118-R3-2	65955.8	Max WS	2289.71	53.52	67.86		68.11	0.000829	4.07	562.81	83.39	0.28
P118-00-00	P118-R3-2	65434.6	Max WS	2287.24	53.1	67.45		67.71	0.000718	4.13	561.78	127.15	0.26
P118-00-00	P118-R3-2	64399.74	Max WS	2336.28	52.59	66.58		66.88	0.000865	4.42	528.6	69.97	0.28
P118-00-00	P118-R3-2	64273.7	Max WS	2336.26	53.55	66.57	59.86	66.79	0.000737	3.76	621.75	100.05	0.27
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	2335.94	53.3	66.53		66.74	0.000675	3.63	643.05	102.05	0.26
P118-00-00	P118-R3-2	64200	Max WS	2335.94	53.3	66.53		66.74	0.000676	3.63	642.68	102.01	0.26
P118-00-00	P118-R2-2	64100	Max WS	2512.13	52.61	66.54		66.61	0.000183	2.24	1123.06	142.26	0.14
P118-00-00	P118-R2-2	64094	Max WS	2512.17	52.61	66.53	58.44	66.61	0.000183	2.24	1122.93	142.26	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	2512.13	52.56	66.5		66.58	0.000182	2.23	1125.29	142.4	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	2512.13	52.78	66.39	59.67	66.58	0.00054	3.54	719.92	122.61	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	2512	53.04	66.1		66.33	0.0007	3.84	655.54	117.62	0.26
P118-00-00	P118-R2-2	63959.7	Max WS	2512.07	53.06	66.23	58.41	66.31	0.00019	2.27	1108.96	140.77	0.14
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	2512	53.16	66.19		66.28	0.0002	2.31	1086.01	139.16	0.15
P118-00-00	P118-R2-2	63756.7	Max WS	2520.95	52.4	65.89		66.25	0.00101	4.84	521.28	68.38	0.31
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	2575.78	50.35	65.13		65.46	0.000755	4.6	560.23	63.26	0.27
P118-00-00	P118-R2-2	61905.2	Max WS	2689.88	50.77	63.96		64.34	0.001634	4.91	547.63	106.54	0.38
P118-00-00	P118-R2-2	60625.3	Max WS	2689.33	49.52	63.32		63.61	0.000668	4.32	622.59	73.42	0.26
P118-00-00	P118-R2-1	60595.74	Max WS	2733.25	49.48	62.32		62.81	0.001281	5.62	486.07	61.15	0.35
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2733.25	49.68	62.29		62.7	0.001067	5.16	529.6	67.69	0.33
P118-00-00	P118-R2-1	60571.6*	Max WS	2733.07	49.89	62.25		62.61	0.000905	4.79	570.93	73.38	0.3
P118-00-00	P118-R2-1	60559.5*	Max WS	2733.06	50.09	62.22		62.53	0.000771	4.47	611.79	78.14	0.28
P118-00-00	P118-R2-1	60547.5*	Max WS	2733.06	50.3	62.19		62.46	0.000673	4.19	652.61	83.63	0.26
P118-00-00	P118-R2-1	60535.46	Max WS	2733.05	50.5	62.16		62.4	0.000593	3.94	693.49	88.95	0.25
P118-00-00	P118-R2-1	60536.4*	Max WS	2732.89	50.45	62.09		62.35	0.000645	4.03	678.57	90.18	0.26
P118-00-00	P118-R2-1	60257.3*	Max WS	2732.74	50.4	62.02		62.29	0.000697	4.1	665.86	91.5	0.27
P118-00-00	P118-R2-1	60118.3*	Max WS	2732.73	50.35	61.95		62.22	0.000745	4.17	656.09	92.86	0.28
P118-00-00	P118-R2-1	59979.2*	Max WS	2732.58	50.3	61.88		62.16	0.000785	4.21	649.23	94.27	0.28
P118-00-00	P118-R2-1	59840.2*	Max WS	2732.44	50.25	61.81		62.08	0.000817	4.23	645.31	95.75	0.29
P118-00-00	P118-R2-1	59701.1*	Max WS	2732.43	50.2	61.73		62.01	0.000838	4.24	644.41	97.26	0.29
P118-00-00	P118-R2-1	59562.1*	Max WS	2732.3	50.15	61.66		61.94	0.000846	4.23	646.66	98.83	0.29
P118-00-00	P118-R2-1	59423.1	Max WS	2732.29	50.1	61.59		61.86	0.000842	4.19	652.3	100.48	0.29
P118-00-00	P118-R2-1	59307.4*	Max WS	2732.18	50.1	61.53		61.79	0.000834	4.14	659.73	102.94	0.29
P118-00-00	P118-R2-1	59191.8*	Max WS	2732.18	50.11	61.46		61.72	0.000818	4.08	669.42	105.41	0.29
P118-00-00	P118-R2-1	59076.2*	Max WS	2732.17	50.11	61.4		61.65	0.000792	4	682.29	107.95	0.28
P118-00-00	P118-R2-1	58960.5*	Max WS	2732.16	50.11	61.35		61.59	0.00076	3.92	697.34	110.49	0.27
P118-00-00	P118-R2-1	58844.9*	Max WS	2732.16	50.11	61.3		61.52	0.00072	3.82	715.58	113.04	0.27
P118-00-00	P118-R2-1	58729.3*	Max WS	2732.15	50.12	61.25		61.46	0.000677	3.71	735.95	115.66	0.26
P118-00-00	P118-R2-1	58613.7	Max WS	2732.14	50.12	61.21		61.41	0.00063	3.6	759.61	118.38	0.25
P118-00-00	P118-R2-1	58463.86	Max WS	2735.62	47.59	61.04	55.08	61.26	0.000646	3.76	727.54	107.49	0.25
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	6.58	67.59	68.85		68.85	0.000167	0.58	11.37	17.3	0.13
P118-21-00	P118-21-00	2416.26	Max WS	6.71	67.5	68.84		68.84	0.000325	0.55	12.22	16.18	0.11
P118-21-00	P118-21-00	2398.13	Max WS	7.14	67.44	68.83		68.84	0.000263	0.52	13.67	16.63	0.1
P118-21-00	P118-21-00	2389.56	Max WS	7.59	67.41	68.83		68.83	0.000105	0.54	14.1	16.64	0.1
P118-21-00	P118-21-00	2343.79	Max WS	8.54	67.54	68.78		68.81	0.000772	1.31	6.53	8.88	0.27

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	9.21	67.47	68.72		68.75	0.002132	1.39	6.63	8.65	0.28
P118-21-00	P118-21-00	2208.42	Max WS	10.4	67.31	68.34		68.4	0.005055	1.92	5.42	8.42	0.42
P118-21-00	P118-21-00	2195.48	Max WS	10.4	67.34	68.27		68.34	0.003263	2.17	4.8	9.19	0.53
P118-21-00	P118-21-00	2169.49	Max WS	10.53	66.56	68.24		68.26	0.00034	1.1	9.54	8.58	0.18
P118-21-00	P118-21-00	2167.76	Max WS	10.51	66.37	68.25		68.26	0.000182	0.86	12.21	10.07	0.14
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	8.45	65.03	66.83		66.85	0.000273	0.91	9.26	9.61	0.16
P118-21-00	P118-21-00	2100.84	Max WS	8.45	64.78	66.83		66.83	0.000346	0.71	11.92	10.69	0.12
P118-21-00	P118-21-00	1662.37	Max WS	37.76	63.91	66.34		66.39	0.001375	1.77	21.29	13.42	0.25
P118-21-00	P118-21-00	1144.5	Max WS	57.64	62.63	65.55		65.62	0.001407	2.04	28.32	14.27	0.25
P118-21-00	P118-21-00	595.53	Max WS	78.69	61.49	63.94		64.1	0.003903	3.16	24.91	14.43	0.42
P118-21-00	P118-21-00	549.31*	Max WS	80.65	61.18	63.75		63.91	0.003983	3.22	25.08	14.33	0.43
P118-21-00	P118-21-00	503.08*	Max WS	82.61	60.87	63.54		63.71	0.004091	3.28	25.21	14.25	0.43
P118-21-00	P118-21-00	456.86*	Max WS	84.56	60.57	63.33		63.51	0.004373	3.35	25.21	14.48	0.45
P118-21-00	P118-21-00	410.63*	Max WS	41.05	60.26	63.11		63.15	0.001153	1.58	25.9	17.15	0.23
P118-21-00	P118-21-00	364.41*	Max WS	41.89	59.95	63.07		63.1	0.000804	1.39	30.21	18.73	0.19
P118-21-00	P118-21-00	318.18*	Max WS	42.74	59.64	63.04		63.07	0.000557	1.24	34.5	19.16	0.16
P118-21-00	P118-21-00	271.96*	Max WS	43.6	59.34	63.02		63.04	0.000416	1.15	37.98	18.86	0.14
P118-21-00	P118-21-00	225.73*	Max WS	44.46	59.03	63.01		63.03	0.000342	1.1	40.26	17.99	0.13
P118-21-00	P118-21-00	179.51	Max WS	45.32	58.72	62.99		63.01	0.000316	1.11	41.01	16.73	0.12
P118-21-00	P118-21-00	159.41*	Max WS	45.31	57.98	62.99		63	0.000182	0.91	49.66	17.32	0.1
P118-21-00	P118-21-00	139.31*	Max WS	45.31	57.24	62.98		62.99	0.000113	0.77	58.78	17.9	0.07
P118-21-00	P118-21-00	119.21*	Max WS	45.31	55.51	62.98		62.99	0.000075	0.66	68.25	18.45	0.06
P118-21-00	P118-21-00	99.11*	Max WS	45.31	55.77	62.98		62.99	0.000051	0.58	78.13	18.98	0.05
P118-21-00	P118-21-00	79.01	Max WS	45.32	55.03	62.98		62.98	0.000037	0.51	88.39	19.51	0.04
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	71.59		71.59	0.000037	0.31	31.89	18.19	0.04
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	71.59		71.59	0.000089	0.42	23.85	17.37	0.06
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.24	70.08	71.59	70.24	71.59	0.000132	0.48	21.25	16.98	0.08
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.24	70.2	71.57		71.58	0.000203	0.56	18.39	16.41	0.09
P118-23-00	P118-23-00 R2	7726.83	Max WS	10.65	70.16	71.57		71.57	0.000303	0.65	16.45	15.8	0.11
P118-23-00	P118-23-00 R2	7654.51	Max WS	13.25	69.97	71.54		71.55	0.000283	0.7	19.06	15.53	0.11
P118-23-00	P118-23-00 R2	7632.63	Max WS	14.27	69.88	71.53		71.54	0.000301	0.73	19.41	15.19	0.11
P118-23-00	P118-23-00 R2	7614.73	Max WS	14.97	68.92	71.53		71.54	0.00016	0.62	24.3	15.09	0.09
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	14.97	69.39	71.34		71.35	0.00023	0.68	21.88	15.48	0.1
P118-23-00	P118-23-00 R2	7567.5	Max WS	15.61	69.56	71.33		71.34	0.000311	0.78	20.14	14.79	0.12
P118-23-00	P118-23-00 R2	7426.94	Max WS	19.31	68.48	71.28		71.29	0.000306	0.85	22.72	13.98	0.12
P118-23-00	P118-23-00 R2	7369.89	Max WS	21.47	68.06	71.27		71.28	0.000266	0.84	25.66	14.31	0.11
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	21.47	69.59	71.12		71.18	0.001727	2.03	10.57	14.83	0.29
P118-23-00	P118-23-00 R2	7313.37	Max WS	22.04	69.5	71.15		71.16	0.000489	0.95	23.3	18.1	0.15
P118-23-00	P118-23-00 R2	7305.97	Max WS	22.33	69.12	71.15		71.16	0.000288	0.82	27.29	17.47	0.12
P118-23-00	P118-23-00 R2	7294.91	Max WS	22.73	69.43	71.14		71.15	0.000302	0.88	25.8	19.11	0.12
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	22.73	69.34	71.02		71.04	0.000652	1.25	18.17	16.84	0.18
P118-23-00	P118-23-00 R2	7237.19	Max WS	23.84	69.28	71.01		71.03	0.000586	1.01	23.57	19.09	0.16
P118-23-00	P118-23-00 R2	6786.22	Max WS	44.32	68.02	70.76		70.78	0.000442	1.11	39.96	22.73	0.15
P118-23-00	P118-23-00 R2	6723.56	Max WS	47.38	67.37	70.75		70.76	0.000165	0.78	60.45	27.62	0.09
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	47.37	67.54	70.03		70.15	0.004999	2.87	16.5	13.25	0.45
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	52.76	67.16	69.82		69.86	0.000869	1.55	34.12	19.28	0.2
P118-23-00	P118-23-00 R2	6402.43	Max WS	58.8	67.03	69.65		69.69	0.00108	1.75	33.66	18.55	0.23
P118-23-00	P118-23-00 R2	6356.93	Max WS	61.57	66.97	69.59	67.93	69.64	0.001169	1.82	33.83	18.62	0.24
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	61.56	66.93	69.55		69.6	0.001141	1.8	34.16	18.74	0.24
P118-23-00	P118-23-00 R2	6293.27	Max WS	63.11	66.88	69.51		69.56	0.001167	1.83	34.56	18.89	0.24
P118-23-00	P118-23-00 R2	5958.59	Max WS	76.59	66.24	69.14		69.18	0.000951	1.68	45.55	24.71	0.22
P118-23-00	P118-23-00 R2	5652.94	Max WS	88.29	65.7	68.67		68.76	0.00172	2.33	37.87	19.04	0.29
P118-23-00	P118-23-00 R2	5045.34	Max WS	87.92	63.97	67.97		68.01	0.00073	1.75	50.24	19.85	0.19
P118-23-00	P118-23-00 R2	4947.92	Max WS	93.92	63.84	67.93	64.95	67.96	0.000345	1.33	70.51	24.11	0.14
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	93.87	63.87	67.92		67.94	0.000229	1.15	81.76	24.65	0.11
P118-23-00	P118-23-00 R2	4783.1	Max WS	91.7	63.65	67.8		67.86	0.000852	1.83	49.98	18.9	0.2
P118-23-00	P118-23-00 R2	4580.38	Max WS	97.41	63.02	67.67	64.46	67.71	0.000514	1.58	61.71	20.68	0.16
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	97.29	63.16	67.65		67.69	0.000434	1.49	65.23	21.46	0.15
P118-23-00	P118-23-00 R2	4459.75	Max WS	101.43	63.55	67.58		67.63	0.000737	1.78	56.96	21.63	0.19
P118-23-00	P118-23-00 R2	4370.6	Max WS	104.67	63.42	67.5		67.55	0.000902	1.87	55.85	23.66	0.22
P118-23-00	P118-23-00 R2	4330.88	Max WS	106.09	62.88	67.51		67.52	0.000056	0.61	173.08	49.8	0.06
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-23-00	P118-23-00 R2	4269.23	Max WS	106.04	63.31	67.5		67.51	0.000055	0.59	178.99	55.45	0.06
P118-23-00	P118-23-00 R2	4229.24	Max WS	107.28	63.34	67.49		67.5	0.000223	1.07	100.04	35.63	0.11
P118-23-00	P118-23-00 R2	3733.5	Max WS	120.24	62.43	67.27		67.32	0.000502	1.64	73.26	24.02	0.17
P118-23-00	P118-23-00 R2	3187.46	Max WS	85.46	62.36	66.98		67	0.000216	1.06	80.87	28.08	0.11
P118-23-00	P118-23-00 R2	3150.64	Max WS	86.18	61.93	66.98	63.48	66.99	0.000182	1	86.11	28.17	0.1
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	86.17	61.56	66.95		66.97	0.00021	1.02	84.83	30.43	0.11
P118-23-00	P118-23-00 R2	3104.46	Max WS	86.59	61.63	66.94		66.96	0.000313	1.25	69.47	22.99	0.13
P118-23-00	P118-23-00 R2	2750.53	Max WS	93.01	60.59	66.87		66.88	0.000132	0.96	97.25	25.38	0.09
P118-23-00	P118-23-00 R2	2741.93	Max WS	93.14	60.44	66.87	61.92	66.88	0.000116	0.92	101.66	25.32	0.08
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	93.14	60.52	66.87		66.88	0.000104	0.87	107.66	27.57	0.08
P118-23-00	P118-23-00 R2	2716.57	Max WS	93.3	60.68	66.86		66.88	0.000113	0.89	104.66	27.34	0.08
P118-23-00	P118-23-00 R2	2615.37	Max WS	95.16	60.75	66.85		66.86	0.000122	0.94	101.66	25.75	0.08
P118-23-00	P118-23-00 R2	2244.98	Max WS	101.16	60.53	66.81		66.82	0.000086	0.84	120.59	27.69	0.07
P118-23-00	P118-23-00 R2	2221.06	Max WS	101.95	60.56	66.81	61.78	66.82	0.000097	0.88	116.07	27.23	0.07
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	101.94	60.59	66.8		66.81	0.00009	0.84	120.66	29.07	0.07
P118-23-00	P118-23-00 R2	2042.36	Max WS	103.88	59.78	66.79		66.8	0.000097	0.82	127.26	34.14	0.07
P118-23-00	P118-23-00 R2	1922.11	Max WS	103.87	59.56	66.78		66.79	0.000057	0.7	148.31	33.85	0.06
P118-23-00	P118-23-00 R2	1892.63	Max WS	113.87	59.68	66.77	61.52	66.78	0.00009	0.84	135.73	33.59	0.07
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	113.87	59.86	66.74		66.76	0.00017	1.09	104.19	27.02	0.1
P118-23-00	P118-23-00 R2	1829.45	Max WS	113.85	59.87	66.74		66.76	0.000117	0.93	121.89	30.92	0.08
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	113.82	59.04	66.73		66.74	0.000045	0.67	169.85	34.07	0.05
P118-23-00	P118-23-00 R1	1513.84	Max WS	157.47	59.85	66.69		66.71	0.000123	1.07	146.95	30.8	0.09
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	157.47	59.99	66.69	61.28	66.7	0.000087	0.85	185.78	44.16	0.07
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	157.52	58.36	66.68		66.69	0.000045	0.69	229.08	48.58	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	157.75	57.88	66.68		66.69	0.00005	0.69	227.01	45.19	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	162.13	57.45	66.66		66.67	0.000056	0.82	196.76	31.19	0.06
P118-23-00	P118-23-00 R1	649.49	Max WS	166.34	57.03	66.64		66.65	0.000055	0.83	201.01	31.58	0.06
P118-23-00	P118-23-00 R1	242.54	Max WS	166.09	55.82	66.63	57.88	66.63	0.000019	0.53	316	52.77	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	166.19	55.57	66.62		66.62	0.000017	0.51	332.11	88.29	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	176.06	55.13	66.62		66.62	0.000012	0.42	436.2	115.23	0.03
P118-23-00	P118-23-00 R3	58.33	Max WS	176.06	53.78	66.62		66.62	0.000008	0.4	594.34	83.5	0.02
P118-23-02	P118-23-02	4138.85	Max WS	21.77	67.78	69.87		69.9	0.00101	1.29	16.84	17.29	0.21
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	21.64	66.69	69.7		69.7	0.000107	0.56	38.61	20.91	0.07
P118-23-02	P118-23-02	3782.06	Max WS	79.94	66.66	69.55		69.63	0.001822	2.25	35.55	19.99	0.3
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	80.03	66.22	69.57		69.58	0.000369	0.79	236.17	266.69	0.11
P118-23-02	P118-23-02	3692.61	Max WS	79.93	66.22	69.53		69.58	0.001057	1.87	42.77	210.78	0.23
P118-23-02	P118-23-02	3049.5	Max WS	79.83	65.47	68.99		69.03	0.000666	1.63	49.33	23.04	0.19
P118-23-02	P118-23-02	2386.67	Max WS	79.83	65.13	68.15		68.24	0.001745	2.41	33.15	15.34	0.29
P118-23-02	P118-23-02	2372.17	Max WS	79.83	65.16	68.13		68.21	0.001543	2.27	35.16	16.52	0.27
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	79.83	65.26	68.1		68.18	0.001656	2.33	34.27	21.03	0.28
P118-23-02	P118-23-02	2278.1	Max WS	79.82	65.19	68.06		68.14	0.001544	2.28	35.07	16.19	0.27
P118-23-02	P118-23-02	1453.34	Max WS	79.78	63.69	67.12		67.17	0.000817	1.79	44.46	18.33	0.2
P118-23-02	P118-23-02	1445.67	Max WS	79.78	63.66	67.12	65.1	67.16	0.000715	1.66	48	20.58	0.19
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	43.77	63.56	66.85		66.87	0.000363	1.08	40.37	19.88	0.13
P118-23-02	P118-23-02	1392.09	Max WS	43.77	63.36	66.84		66.86	0.000331	1.09	40.17	17.97	0.13
P118-23-02	P118-23-02	1317.96	Max WS	43.76	62.91	66.82		66.84	0.000276	1.03	42.38	17.55	0.12
P118-23-02	P118-23-02	1171.38	Max WS	43.76	61.86	66.8		66.81	0.000165	0.86	51.06	18.66	0.09
P118-23-02	P118-23-02	1083.7	Max WS	43.76	62.56	66.78		66.79	0.000142	0.81	54.24	19.71	0.09
P118-23-02	P118-23-02	215.24	Max WS	43.7	60.16	66.71		66.72	0.000033	0.47	92.07	23.9	0.04
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	68.9		68.9	0.000019	0.23	42.73	23.89	0.03
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.99	66.34	68.9		68.9	0.000019	0.23	42.61	23.87	0.03
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.96	66.13	68.89		68.89	0.000025	0.26	37.61	21.06	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	14.9	65.84	68.88		68.88	0.000048	0.37	39.78	21.71	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	14.83	65.5	68.87		68.87	0.000032	0.32	45.97	23.1	0.04
P118-25-00	P118-25-00 R2	2473.31	Max WS	14.85	65.47	68.87	66.31	68.87	0.000029	0.32	46.64	22.26	0.04
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	14.83	65.47	68.87		68.87	0.000031	0.33	45.42	21.8	0.04
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-25-00	P118-25-00 R2	2414.49	Max WS	14.8	65.38	68.87		68.87	0.000026	0.3	49.45	23.92	0.04
P118-25-00	P118-25-00 R2	2046.09	Max WS	14.71	64.63	68.86		68.86	0.000011	0.22	67.9	27.67	0.02
P118-25-00	P118-25-00 R1	1929.3	Max WS	58.03	64.22	68.83		68.85	0.000195	0.95	61.26	22.79	0.1
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	57.77	64.03	68.78		68.79	0.000116	0.79	73.36	24.26	0.08
P118-25-00	P118-25-00 R1	1208.56	Max WS	59.15	63.03	68.75		68.76	0.000072	0.67	87.77	25.19	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	59.2	63.01	68.75	64.41	68.75	0.00008	0.7	84.27	24.11	0.07
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	59.24	62.94	68.74		68.75	0.000083	0.71	82.92	23.59	0.07
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	59.39	62.83	68.74		68.74	0.000066	0.65	90.72	25.29	0.06
P118-25-00	P118-25-00 R1	980.2	Max WS	60.01	62.34	68.73		68.73	0.000047	0.56	106.91	29.74	0.05
P118-25-00	P118-25-00 R1	963.63	Max WS	60.13	62.25	68.73		68.73	0.00002	0.41	147.59	36.05	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	60.41	62.25	68.73	63.5	68.73	0.000021	0.41	147.8	36.05	0.04
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	60.09	61.68	68.45		68.46	0.00002	0.39	153.22	39.85	0.04
P118-25-00	P118-25-00 R1	886.91	Max WS	60.3	61.68	68.45		68.46	0.000018	0.4	150.35	39.85	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	60.51	61.16	68.45		68.46	0.000023	0.44	137.51	30.83	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	61.99	60.25	68.44		68.45	0.000018	0.4	154.26	34.78	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	62.84	58.25	68.44		68.44	0.000008	0.29	213.77	38.62	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	62.83	58.04	68.44		68.44	0.000007	0.29	219.73	38.93	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	62.83	57.84	68.44		68.44	0.000007	0.28	225.69	39.25	0.02
P118-25-00	P118-25-00 R1	185.81*	Max WS	62.83	57.63	68.44		68.44	0.000006	0.27	231.68	39.54	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	62.83	57.43	68.44		68.44	0.000006	0.26	237.68	39.83	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	62.82	57.22	68.44		68.44	0.000005	0.26	243.73	40.12	0.02
P118-25-00	P118-25-00 R1	119.80*	Max WS	62.82	57.02	68.44		68.44	0.000005	0.25	249.74	40.38	0.02
P118-25-00	P118-25-00 R1	97.8	Max WS	62.82	56.81	68.43	58.54	68.43	0.000005	0.25	255.46	40.63	0.02
P118-25-01	P118-25-01	5341.48	Max WS	25.87	70.47	72.33		72.36	0.001152	1.31	19.74	18.19	0.22
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	25.42	68.9	71.6		71.62	0.000574	1.06	24.07	17.82	0.16
P118-25-01	P118-25-01	4162.47	Max WS	30.8	69.44	71.36		71.39	0.000847	1.23	25.08	20.2	0.19
P118-25-01	P118-25-01	4134.04	Max WS	31.28	69.38	71.34	70.24	71.36	0.000792	1.2	26.02	20.56	0.19
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	31.27	69.25	71.31		71.33	0.000716	1.16	26.96	20.83	0.18
P118-25-01	P118-25-01	4047.7	Max WS	31.94	69.28	71.28		71.3	0.000707	1.16	27.46	20.95	0.18
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	39.77	67.84	71.05		71.07	0.000336	0.96	41.41	23.82	0.13
P118-25-01	P118-25-01	3312.44	Max WS	44.38	67.48	70.95		70.96	0.00034	0.97	45.92	26.49	0.13
P118-25-01	P118-25-01	3014.68	Max WS	49.43	67.53	70.87		70.88	0.000203	0.85	58.48	27.94	0.1
P118-25-01	P118-25-01	2924.04	Max WS	51.8	67.71	70.84		70.86	0.000226	0.88	58.9	28.83	0.11
P118-25-01	P118-25-01	2763.33	Max WS	54.32	66.67	70.81		70.82	0.000182	0.84	64.38	28.24	0.1
P118-25-01	P118-25-01	2728.92	Max WS	54.98	66.5	70.76		70.82	0.000522	1.85	29.64	21.01	0.18
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	54.98	66.31	70.75		70.79	0.000349	1.63	33.79	26.13	0.15
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	54.98	66.04	70.75		70.77	0.000256	1.04	52.65	20.42	0.11
P118-25-01	P118-25-01	1881.88	Max WS	81.8	66.57	70.28		70.34	0.001116	1.97	41.59	19.36	0.24
P118-25-01	P118-25-01	1384.48	Max WS	81.72	66.19	69.7		69.76	0.001192	1.99	41.09	19.92	0.24
P118-25-01	P118-25-01	1245.83	Max WS	81.68	66.34	69.52		69.59	0.001279	2.06	39.56	19.05	0.25
P118-25-01	P118-25-01	584.11	Max WS	43.44	65.88	68.95		68.96	0.000258	0.95	45.57	21.1	0.11
P118-25-01	P118-25-01	60.05	Max WS	43.42	63.5	68.86		68.87	0.000114	0.73	59.51	21.26	0.08

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4112.31	58.25	72.99		73.45	0.001022	5.48	766.79	219.33	0.32
P118-00-00	P118-R3-2	71854.2	Max WS	3805.44	57.83	72.86		73.02	0.000384	3.24	1175.47	153.09	0.2
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3813.12	55.05	72.52		72.65	0.000285	2.92	1429.22	374.54	0.17
P118-00-00	P118-R3-2	69527.2	Max WS	3782.11	55.28	72.24		72.36	0.000208	2.76	1778.76	520	0.15
P118-00-00	P118-R3-2	68670	Max WS	3599.52	54.88	71.92		72.13	0.000408	3.76	1286.83	296.7	0.21
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3661.22	54.47	71.69		71.92	0.000385	3.93	1211.64	342.85	0.21
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3598.01	54.14	71.35		71.65	0.00062	4.54	1167.93	332	0.25
P118-00-00	P118-R3-2	66869	Max WS	3487.75	53.96	70.73		71.13	0.00104	5.09	745.45	159.5	0.32
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3519.35	53.79	70.76		71.04	0.000655	4.26	875.03	138.78	0.26
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3325.46	53.6	70.55		70.8	0.000472	4.15	1152.65	227.52	0.22
P118-00-00	P118-R3-2	65955.8	Max WS	3208.56	53.52	70.37		70.59	0.000699	3.77	1014.46	278.2	0.26
P118-00-00	P118-R3-2	65434.6	Max WS	3187.52	53.1	70.04		70.29	0.000515	4.1	1090.03	214.6	0.23
P118-00-00	P118-R3-2	64399.74	Max WS	3485.17	52.59	69.29		69.64	0.0007	4.75	853.03	165.29	0.27
P118-00-00	P118-R3-2	64273.7	Max WS	3485.47	53.55	69.34	61.37	69.55	0.000549	3.74	938.55	138.34	0.24
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3484.98	53.3	69.3		69.51	0.000504	3.63	969.14	144.18	0.23
P118-00-00	P118-R3-2	64200	Max WS	3484.98	53.3	69.3		69.51	0.000504	3.63	968.76	144.1	0.23
P118-00-00	P118-R2-2	64100	Max WS	4103.46	52.61	69.3		69.41	0.000186	2.67	1555.35	2182.14	0.15
P118-00-00	P118-R2-2	64094	Max WS	4103.45	52.61	69.3	59.72	69.41	0.000186	2.67	1555.18	2179.04	0.15
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	4103.45	52.56	69.28		69.39	0.000185	2.67	1559.31	2260.98	0.15
P118-00-00	P118-R2-2	64010.4	Max WS	4103.46	52.78	69.14	61.51	69.4	0.00047	4.11	1091.37	1855.58	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	4103.46	53.04	68.76		69.06	0.000592	4.41	1003.24	836.47	0.26
P118-00-00	P118-R2-2	63959.7	Max WS	4103.43	53.06	68.92	59.67	69.04	0.000201	2.73	1515.07	1467.09	0.15
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	4103.46	53.16	68.88		69	0.000212	2.78	1486.9	1041.1	0.16
P118-00-00	P118-R2-2	63756.7	Max WS	4112.33	52.4	68.52		68.98	0.00111	5.49	860.96	205	0.33
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3935.4	50.35	67.68		68.11	0.000996	5.23	759.55	108.26	0.32
P118-00-00	P118-R2-2	61905.2	Max WS	4292.51	50.77	66.68		67.06	0.001136	4.97	863.79	126.11	0.33
P118-00-00	P118-R2-2	60625.3	Max WS	4317.62	49.52	65.95		66.34	0.001125	5.02	859.51	121.4	0.33
P118-00-00	P118-R2-1	60595.74	Max WS	4361.45	49.48	64.41		65.16	0.001746	6.99	623.76	71.75	0.42
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	4361.45	49.68	64.38		65.01	0.001429	6.39	682.91	79.19	0.38
P118-00-00	P118-R2-1	60571.6*	Max WS	4361.44	49.89	64.35		64.89	0.001213	5.91	737.6	86.24	0.36
P118-00-00	P118-R2-1	60559.5*	Max WS	4361.44	50.09	64.31		64.78	0.001051	5.53	788.84	92.5	0.33
P118-00-00	P118-R2-1	60547.5*	Max WS	4361.43	50.3	64.27		64.69	0.000909	5.21	837.34	96.75	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	4361.41	50.5	64.24		64.61	0.000756	4.92	887.05	97.42	0.29
P118-00-00	P118-R2-1	60536.4*	Max WS	4361.43	50.45	64.15		64.54	0.000808	4.99	873.75	99.12	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	4361.43	50.4	64.07		64.47	0.000859	5.06	862.73	100.95	0.3
P118-00-00	P118-R2-1	60118.3*	Max WS	4361.4	50.35	63.99		64.39	0.000906	5.1	854.82	102.94	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	4361.42	50.3	63.9		64.31	0.000943	5.13	849.85	104.76	0.32
P118-00-00	P118-R2-1	59840.2*	Max WS	4361.4	50.25	63.81		64.22	0.000975	5.14	847.89	106.92	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	4361.4	50.2	63.73		64.14	0.001009	5.14	849.09	110.22	0.33
P118-00-00	P118-R2-1	59562.1*	Max WS	4361.4	50.15	63.64		64.05	0.001036	5.11	853.47	113.95	0.33
P118-00-00	P118-R2-1	59423.1	Max WS	4361.39	50.1	63.55		63.95	0.001056	5.06	861.17	118.2	0.33
P118-00-00	P118-R2-1	59307.4*	Max WS	4361.4	50.1	63.48		63.87	0.000967	5	871.47	114.08	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	4361.4	50.11	63.41		63.78	0.000942	4.93	885.08	116.39	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	4361.4	50.11	63.34		63.7	0.000908	4.83	902.09	118.79	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	4361.4	50.11	63.28		63.63	0.00087	4.73	921.36	121.23	0.3
P118-00-00	P118-R2-1	58844.9*	Max WS	4361.4	50.11	63.22		63.56	0.000825	4.62	943.93	123.71	0.29
P118-00-00	P118-R2-1	58729.3*	Max WS	4361.39	50.12	63.17		63.49	0.000779	4.5	968.74	126.24	0.29
P118-00-00	P118-R2-1	58613.7	Max WS	4361.39	50.12	63.13		63.42	0.000729	4.37	996.92	128.8	0.28
P118-00-00	P118-R2-1	58463.86	Max WS	4364.96	47.59	62.92	57.17	63.25	0.000809	4.64	940.6	119.91	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	4.54	67.59	69.05		69.05	0.000035	0.31	15.05	19.78	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.84	67.5	69.04		69.04	0.000124	0.37	15.78	18.39	0.07
P118-21-00	P118-21-00	2398.13	Max WS	6.99	67.44	69.04		69.04	0.000132	0.4	17.31	18.44	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.08	67.41	69.04		69.04	0.000064	0.46	17.74	18.45	0.08
P118-21-00	P118-21-00	2343.79	Max WS	10.02	67.54	69		69.03	0.000503	1.16	8.62	10.12	0.22

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-21-00	P118-21-00	2303.58	Max WS	12.03	67.47	68.94		68.97	0.001744	1.38	8.69	9.75	0.26
P118-21-00	P118-21-00	2208.42	Max WS	14.69	67.31	68.71		68.75	0.002767	1.66	8.86	10.58	0.32
P118-21-00	P118-21-00	2195.48	Max WS	14.69	67.34	68.68		68.72	0.001051	1.64	8.98	11.04	0.32
P118-21-00	P118-21-00	2169.49	Max WS	14.69	66.56	68.68		68.7	0.000244	1.09	13.53	9.51	0.16
P118-21-00	P118-21-00	2167.76	Max WS	14.69	66.37	68.69		68.7	0.000142	0.87	16.92	11.29	0.13
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	14.66	65.03	67.76		67.77	0.000102	0.72	20.26	14.22	0.11
P118-21-00	P118-21-00	2100.84	Max WS	14.66	64.78	67.76		67.76	0.000163	0.62	23.65	14.63	0.09
P118-21-00	P118-21-00	1662.37	Max WS	71.37	63.91	67.34		67.4	0.001129	1.96	36.35	16.71	0.23
P118-21-00	P118-21-00	1144.5	Max WS	109.34	62.63	66.53		66.63	0.001557	2.51	43.64	17.09	0.28
P118-21-00	P118-21-00	595.53	Max WS	38.29	61.49	65.42		65.43	0.0002	0.76	50.37	26.84	0.1
P118-21-00	P118-21-00	549.31*	Max WS	39.03	61.18	65.41		65.42	0.000151	0.65	59.73	32.91	0.09
P118-21-00	P118-21-00	503.08*	Max WS	39.91	60.87	65.41		65.42	0.000103	0.57	69.54	35.16	0.07
P118-21-00	P118-21-00	456.86*	Max WS	40.72	60.57	65.41		65.41	0.000073	0.52	78.38	35.57	0.06
P118-21-00	P118-21-00	410.63*	Max WS	41.45	60.26	65.4		65.41	0.000055	0.48	85.74	35.01	0.05
P118-21-00	P118-21-00	364.41*	Max WS	42.32	59.95	65.4		65.41	0.000044	0.47	90.99	33.01	0.05
P118-21-00	P118-21-00	318.18*	Max WS	42.52	59.64	65.4		65.4	0.000036	0.45	94.14	30.43	0.05
P118-21-00	P118-21-00	271.96*	Max WS	43.37	59.34	65.4		65.4	0.000033	0.46	94.94	27.6	0.04
P118-21-00	P118-21-00	225.73*	Max WS	44.14	59.03	65.4		65.4	0.000033	0.47	93.44	24.8	0.04
P118-21-00	P118-21-00	179.51	Max WS	44.94	58.72	65.39		65.4	0.000037	0.5	89.62	22	0.04
P118-21-00	P118-21-00	159.41*	Max WS	44.46	57.98	65.39		65.4	0.000027	0.45	99.38	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	43.55	57.24	65.39		65.4	0.00002	0.4	109.58	23.06	0.03
P118-21-00	P118-21-00	119.21*	Max WS	43.55	56.51	65.39		65.4	0.000015	0.36	120.09	23.6	0.03
P118-21-00	P118-21-00	99.11*	Max WS	43.58	55.77	65.39		65.39	0.000012	0.33	130.97	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	43.83	55.03	65.39		65.39	0.00001	0.31	142.2	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.87		72.87	0.000007	0.17	57.68	21.97	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.87		72.87	0.000011	0.2	48.81	21.54	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.87	70.24	72.87	0.000015	0.23	45.96	21.5	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.87		72.87	0.000018	0.25	42.63	21	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.24	70.16	72.87		72.87	0.000025	0.28	40.14	20.69	0.04
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.18	69.97	72.86		72.86	0.000042	0.38	42.96	20.73	0.05
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.11	69.88	72.86		72.86	0.000052	0.42	43	20.39	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.44	68.92	72.86		72.86	0.000043	0.41	47.78	20.28	0.05
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.44	69.39	72.77		72.78	0.000043	0.41	47.75	20.6	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.67	69.56	72.77		72.78	0.000057	0.46	45.2	20.03	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.69	68.48	72.76		72.76	0.000086	0.58	47.64	173.7	0.07
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.8	68.06	72.75		72.76	0.000092	0.62	51.06	46.13	0.07
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.8	69.59	72.57		72.6	0.000403	1.54	20.7	19.85	0.16
P118-23-00	P118-23-00 R2	7313.37	Max WS	32.88	69.5	72.59		72.59	0.000101	0.62	53.2	23.35	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.43	69.12	72.59		72.59	0.000085	0.6	55.97	22.39	0.07
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.19	69.43	72.58		72.59	0.000082	0.7	48.82	22.12	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.18	69.34	72.4		72.41	0.000172	0.99	34.61	41.6	0.1
P118-23-00	P118-23-00 R2	7237.19	Max WS	36.29	69.28	72.4		72.41	0.000124	0.67	53.98	24.82	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	75.18	68.02	72.31		72.32	0.000177	0.91	87.8	113.88	0.1
P118-23-00	P118-23-00 R2	6723.56	Max WS	80.99	67.37	72.31		72.31	0.000094	0.73	110.26	36.34	0.07
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	80.27	67.54	71.13		71.22	0.002169	2.37	33.83	19.41	0.32
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	90.03	67.16	71.04		71.07	0.000518	1.47	61.04	24.95	0.17
P118-23-00	P118-23-00 R2	6402.43	Max WS	100.75	67.03	70.93		70.97	0.000625	1.65	61.07	24.11	0.18
P118-23-00	P118-23-00 R2	6356.93	Max WS	105.7	66.97	70.89	68.38	70.94	0.000663	1.71	61.88	24.23	0.19
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	105.66	66.93	70.87		70.92	0.000636	1.68	62.88	24.48	0.18
P118-23-00	P118-23-00 R2	6293.27	Max WS	108.45	66.88	70.85		70.9	0.000644	1.7	63.89	24.72	0.19
P118-23-00	P118-23-00 R2	5958.59	Max WS	132.68	66.24	70.66		70.7	0.000459	1.47	90.12	34.47	0.16
P118-23-00	P118-23-00 R2	5652.94	Max WS	52.13	65.7	70.48		70.49	0.000081	0.66	78.6	26.08	0.07
P118-23-00	P118-23-00 R2	5045.34	Max WS	51.55	63.97	70.45		70.45	0.00003	0.47	110.27	28.49	0.04
P118-23-00	P118-23-00 R2	4947.92	Max WS	54.7	63.84	70.45	64.58	70.45	0.000017	0.39	141.84	32.57	0.03
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	54.62	63.87	70.44		70.44	0.000014	0.35	154.4	33.19	0.03
P118-23-00	P118-23-00 R2	4783.1	Max WS	56.86	63.65	70.43		70.44	0.000037	0.5	113.9	29.66	0.04
P118-23-00	P118-23-00 R2	4580.38	Max WS	65.3	63.02	70.43	64.14	70.43	0.000032	0.49	132.65	32.31	0.04
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	65.23	63.16	70.42		70.42	0.000034	0.46	140.88	40.06	0.04
P118-23-00	P118-23-00 R2	4459.75	Max WS	67.77	63.55	70.41		70.42	0.00004	0.49	137.68	41.42	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	69.96	63.42	70.41		70.41	0.000042	0.43	161.89	64.12	0.05
P118-23-00	P118-23-00 R2	4330.88	Max WS	70.74	62.88	70.41		70.41	0.000005	0.21	340.5	80.5	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc 10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	70.64	63.31	70.4		70.4	0.000004	0.19	365.03	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	71.38	63.34	70.4		70.4	0.000011	0.32	225.73	50.94	0.03
P118-23-00	P118-23-00 R2	3733.5	Max WS	97.38	62.41	70.38		70.39	0.000037	0.59	165.83	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	303.54	62.36	70.23		70.27	0.000246	1.56	194.5	40.23	0.13
P118-23-00	P118-23-00 R2	3150.64	Max WS	312.23	61.93	70.22	64.92	70.26	0.000301	1.52	205.39	52.14	0.14
P118-23-00	P118-23-00 R2	3133.39											
P118-23-00	P118-23-00 R2	3126.39	Max WS	312.23	61.56	70.21		70.24	0.000261	1.43	217.58	54.7	0.13
P118-23-00	P118-23-00 R2	3104.46	Max WS	313.09	61.63	70.19		70.23	0.000424	1.68	186.22	51.43	0.16
P118-23-00	P118-23-00 R2	2750.53	Max WS	320.73	60.59	70.07		70.12	0.000243	1.65	194.26	34.23	0.12
P118-23-00	P118-23-00 R2	2741.93	Max WS	320.89	60.44	70.07	63.61	70.31	0.000228	1.62	198.53	34.28	0.12
P118-23-00	P118-23-00 R2	2733.96											
P118-23-00	P118-23-00 R2	2725.96	Max WS	320.88	60.52	70.07		70.1	0.000217	1.48	216.16	42.36	0.12
P118-23-00	P118-23-00 R2	2716.57	Max WS	321.08	60.68	70.07		70.1	0.00023	1.49	215.88	44.57	0.12
P118-23-00	P118-23-00 R2	2615.37	Max WS	323.11	60.75	70.04		70.08	0.000234	1.62	199.84	36.21	0.12
P118-23-00	P118-23-00 R2	2244.98	Max WS	329.31	60.53	69.96		70	0.000376	1.49	221.13	35.64	0.11
P118-23-00	P118-23-00 R2	2221.06	Max WS	330.11	60.56	69.96	63.24	69.99	0.000193	1.52	216.7	36.69	0.11
P118-23-00	P118-23-00 R2	2198.07											
P118-23-00	P118-23-00 R2	2187.07	Max WS	330.11	60.59	69.93		69.96	0.00017	1.46	225.89	37.2	0.1
P118-23-00	P118-23-00 R2	2042.36	Max WS	332.13	59.78	69.91		69.94	0.000187	1.22	272.67	67.27	0.11
P118-23-00	P118-23-00 R2	1922.11	Max WS	332.13	59.56	69.89		69.91	0.000176	1.17	284.64	72.85	0.1
P118-23-00	P118-23-00 R2	1892.63	Max WS	342.13	59.68	69.88	63.04	69.91	0.000171	1.28	268.21	58.31	0.1
P118-23-00	P118-23-00 R2	1882.46											
P118-23-00	P118-23-00 R2	1863.46	Max WS	342.13	59.86	69.77		69.81	0.000274	1.68	203.52	38.81	0.13
P118-23-00	P118-23-00 R2	1829.45	Max WS	342.13	59.87	69.78		69.8	0.000207	1.22	280.26	75.5	0.11
P118-23-00	P118-23-00 R2	1800											
P118-23-00	P118-23-00 R2	1611.06	Max WS	376.19	59.04	69.73		69.76	0.000161	1.26	299.15	62.07	0.1
P118-23-00	P118-23-00 R1	1513.84	Max WS	412.76	59.85	69.66		69.7	0.000199	1.52	312.4	988.37	0.11
P118-23-00	P118-23-00 R1	1490											
P118-23-00	P118-23-00 R1	1454.72	Max WS	416.41	59.99	69.67	62.64	69.68	0.000083	0.79	1192.41	990.93	0.07
P118-23-00	P118-23-00 R1	1414.55											
P118-23-00	P118-23-00 R1	1380.55	Max WS	415.79	58.36	69.64		69.65	0.000039	0.61	1653.17	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	435.2	57.88	69.64		69.65	0.000052	0.8	1159.51	890.55	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	512.36	57.45	69.6		69.61	0.00011	1.08	1159.03	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	576.33	57.03	69.51		69.55	0.000225	1.74	428.11	440.86	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	608.37	55.82	69.45	59.97	69.46	0.000069	0.84	1768.77	1821.6	0.07
P118-23-00	P118-23-00 R1	200											
P118-23-00	P118-23-00 R1	169.28	Max WS	606.96	55.57	69.42		69.43	0.000044	0.86	2216.45	2231.92	0.06
P118-23-00	P118-23-00 R1	106.82	Max WS	616.43	55.13	69.41		69.43	0.000036	0.93	910.65	175.37	0.05
P118-23-00	P118-23-00 R3	58.33	Max WS	616.23	53.78	69.41		69.42	0.000036	1.04	827.38	83.5	0.05
P118-23-02	P118-23-02	4138.85	Max WS	38.16	67.78	70.9		70.91	0.000365	0.99	71.15	555.77	0.13
P118-23-02	P118-23-02	4137											
P118-23-02	P118-23-02	3790.71	Max WS	37.86	66.69	70.82		70.83	0.000094	0.53	70.85	358.75	0.07
P118-23-02	P118-23-02	3782.06	Max WS	137.74	66.66	70.75		70.8	0.001022	1.82	132.21	286.43	0.24
P118-23-02	P118-23-02	3748.42											
P118-23-02	P118-23-02	3714.78	Max WS	137.6	66.22	70.74		70.74	0.000095	0.38	1047.71	1226.97	0.05
P118-23-02	P118-23-02	3692.61	Max WS	137.01	66.23	70.72		70.77	0.000863	1.84	74.26	1081.03	0.21
P118-23-02	P118-23-02	3049.5	Max WS	133.98	65.47	70.27		70.31	0.000596	1.62	113.57	140.5	0.18
P118-23-02	P118-23-02	2386.67	Max WS	44.53	65.13	69.78		69.79	0.00011	0.7	63.88	55.47	0.08
P118-23-02	P118-23-02	2372.17	Max WS	44.59	65.16	69.78		69.79	0.000133	0.6	74.22	84.55	0.08
P118-23-02	P118-23-02	2357.89											
P118-23-02	P118-23-02	2303.61	Max WS	44.45	65.26	69.77		69.77	0.000087	0.68	64.94	342.08	0.07
P118-23-02	P118-23-02	2278.1	Max WS	44.42	65.19	69.77		69.77	0.000086	0.67	66.64	55.66	0.07
P118-23-02	P118-23-02	1453.34	Max WS	38.05	63.69	69.73		69.73	0.000019	0.37	102.82	182.96	0.03
P118-23-02	P118-23-02	1445.67	Max WS	38.05	63.66	69.73	64.65	69.73	0.000016	0.33	116.51	201.96	0.03
P118-23-02	P118-23-02	1430.58											
P118-23-02	P118-23-02	1415.48	Max WS	38.04	63.56	69.72		69.72	0.000017	0.33	115.48	503.27	0.03
P118-23-02	P118-23-02	1392.09	Max WS	38.04	63.36	69.72		69.72	0.000018	0.35	107.7	298.58	0.04
P118-23-02	P118-23-02	1317.96	Max WS	38.04	62.91	69.72		69.72	0.000017	0.36	106.68	408.31	0.03
P118-23-02	P118-23-02	1171.38	Max WS	38.02	61.86	69.72		69.72	0.000013	0.32	119.1	501.17	0.03
P118-23-02	P118-23-02	1083.7	Max WS	38	62.56	69.72		69.72	0.000013	0.3	127.2	614.08	0.03
P118-23-02	P118-23-02	215.24	Max WS	37.54	60.16	69.71		69.71	0.000005	0.21	181.11	921.48	0.02
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	70.8		70.8	0.000002	0.1	95.92	33.25	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.96	66.34	70.8		70.8	0.000002	0.1	95.9	33.25	0.01
P118-25-00	P118-25-00 R2	3203											
P118-25-00	P118-25-00 R2	3202											
P118-25-00	P118-25-00 R2	2930.66	Max WS	10.01	66.13	70.8		70.8	0.000003	0.12	85.4	29.11	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	13.93	65.84	70.8		70.8	0.000004	0.15	92.84	33.01	0.02
P118-25-00	P118-25-00 R2	2494.17	Max WS	9.73	65.5	70.8		70.8	0.000002	0.09	102.89	35.73	0.01
P118-25-00	P118-25-00 R2	2473.31	Max WS	9.32	65.47	70.8	66.16	70.8	0.000002	0.09	102.93	35.01	0.01
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline											
P118-25-00	P118-25-00 R2	2465.6	Max WS	9.42	65.47	70.8		70.8	0.000002	0.09	102.44	37.73	0.01
P118-25-00	P118-25-00 R2	2465											
P118-25-00	P118-25-00 R2	2464											

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc 10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	11.77	65.38	70.79		70.79	0.000002	0.11	108.31	35.28	0.01
P118-25-00	P118-25-00 R2	2046.09	Max WS	0.68	64.63	70.8		70.8	0	0	136.73	40.52	0
P118-25-00	P118-25-00 R1	1929.3	Max WS	61.56	64.22	70.8		70.8	0.000043	0.54	113.72	31.5	0.05
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	60.17	64.03	70.78		70.78	0.000028	0.47	129.05	31.81	0.04
P118-25-00	P118-25-00 R1	1208.56	Max WS	54.22	63.03	70.77		70.77	0.000015	0.37	145.2	30.27	0.03
P118-25-00	P118-25-00 R1	1188.81	Max WS	52.2	63.01	70.77	64.32	70.77	0.000016	0.37	139.73	29.97	0.03
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	52.2	62.94	70.76		70.77	0.000016	0.38	137.59	29.45	0.03
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	51.91	62.83	70.76		70.76	0.000013	0.35	148.65	31.37	0.03
P118-25-00	P118-25-00 R1	980.2	Max WS	51.6	62.34	70.76		70.76	0.000009	0.29	175.08	35.75	0.02
P118-25-00	P118-25-00 R1	963.63	Max WS	51.59	62.25	70.76		70.76	0.000004	0.24	218.65	42.78	0.02
P118-25-00	P118-25-00 R1	950.55	Max WS	51.85	62.25	70.76	63.42	70.76	0.000005	0.23	233.99	77.17	0.02
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	51.85	61.68	70.75		70.76	0.000004	0.2	258.4	61.23	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	52.1	61.68	70.75		70.76	0.000003	0.23	230.88	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	50.12	61.16	70.75		70.76	0.000005	0.23	217.14	37.72	0.02
P118-25-00	P118-25-00 R1	490.93	Max WS	48.54	60.25	70.75		70.75	0.000003	0.2	244.96	43.91	0.01
P118-25-00	P118-25-00 R1	251.81	Max WS	29.74	58.25	70.75		70.75	0.000001	0.1	310.55	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	26.6	58.04	70.75		70.75	0	0.08	316.91	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	23.32	57.84	70.75		70.75	0	0.07	323.25	44.07	0
P118-25-00	P118-25-00 R1	185.81*	Max WS	20.42	57.63	70.75		70.75	0	0.06	329.58	44.05	0
P118-25-00	P118-25-00 R1	163.80*	Max WS	17.42	57.43	70.75		70.75	0	0.05	335.9	44.04	0
P118-25-00	P118-25-00 R1	141.80*	Max WS	14.54	57.22	70.75		70.75	0	0.04	342.23	44.03	0
P118-25-00	P118-25-00 R1	119.80*	Max WS	11.35	57.02	70.75		70.75	0	0.03	348.49	44.01	0
P118-25-00	P118-25-00 R1	97.8	Max WS	8.66	56.81	70.75	57.43	70.75	0	0.02	354.83	44	0
P118-25-01	P118-25-01	5341.48	Max WS	50.33	70.47	73.19		73.22	0.000727	1.33	37.98	24.77	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50	68.9	72.74		72.76	0.000338	1.03	48.76	25.37	0.13
P118-25-01	P118-25-01	4162.47	Max WS	60.69	69.44	72.62		72.64	0.000365	1.09	55.76	28.46	0.14
P118-25-01	P118-25-01	4134.04	Max WS	61.66	69.38	72.61	70.57	72.63	0.000347	1.07	57.55	28.94	0.13
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	61.65	69.25	72.59		72.61	0.000322	1.04	59.08	29.27	0.13
P118-25-01	P118-25-01	4047.7	Max WS	62.96	69.28	72.58		72.59	0.000319	1.05	60.13	29.41	0.13
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.46	67.84	72.46		72.47	0.000214	0.96	81.34	33.08	0.11
P118-25-01	P118-25-01	3312.44	Max WS	87.59	67.48	72.39		72.4	0.000207	0.95	92.11	37.52	0.11
P118-25-01	P118-25-01	3014.68	Max WS	97.58	67.53	72.33		72.35	0.000158	0.92	105.75	36.51	0.1
P118-25-01	P118-25-01	2924.04	Max WS	102.23	67.71	72.32		72.33	0.000169	0.95	107.95	37.84	0.1
P118-25-01	P118-25-01	2763.33	Max WS	106.95	66.67	72.29		72.3	0.000158	0.95	112.57	37.03	0.1
P118-25-01	P118-25-01	2728.92	Max WS	108.13	66.5	72.21		72.31	0.000601	2.54	42.63	25.86	0.21
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	108.08	66.31	72.03		72.12	0.000506	2.38	45.33	30.25	0.19
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	108.01	66.04	72.06		72.09	0.000295	1.31	82.54	25.26	0.13
P118-25-01	P118-25-01	1881.88	Max WS	159.77	66.57	71.57		71.65	0.001044	2.28	69.94	24.55	0.24
P118-25-01	P118-25-01	1384.48	Max WS	158.46	66.19	71.07		71.14	0.000965	2.19	72.33	25.68	0.23
P118-25-01	P118-25-01	1245.83	Max WS	146.11	66.34	70.95		71.02	0.00084	2.08	70.39	24.18	0.21
P118-25-01	P118-25-01	584.11	Max WS	68.67	65.88	70.84		70.85	0.000095	0.75	91.45	27.93	0.07
P118-25-01	P118-25-01	60.05	Max WS	60.88	63.5	70.8		70.8	0.000045	0.57	107.05	26.62	0.05

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4976.11	58.25	74.29		74.69	0.002224	5.3	1643.03	976.82	0.31
P118-00-00	P118-R3-2	71854.2	Max WS	4834.27	57.83	73.71		73.91	0.000435	3.66	1789.82	1118.57	0.22
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4780.31	55.05	73.31		73.48	0.000326	3.31	1763.73	447.2	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	4688.46	55.28	73.02		73.16	0.000238	3.1	2180.58	520	0.17
P118-00-00	P118-R3-2	68670	Max WS	4245.99	54.88	72.7		72.94	0.000422	4.02	1524.75	309.65	0.22
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	4258.12	54.47	72.46		72.72	0.000397	4.17	1486.08	357.09	0.21
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3976.4	54.14	72.2		72.49	0.000541	4.48	1455.24	342.82	0.24
P118-00-00	P118-R3-2	66869	Max WS	3718.04	53.96	71.72		72.06	0.00086	4.73	911.61	174.26	0.29
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3693.54	53.79	71.75		71.99	0.000542	3.96	1019.07	153.47	0.24
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3382.76	53.6	71.61		71.81	0.000336	3.72	1394.92	227.52	0.19
P118-00-00	P118-R3-2	65955.8	Max WS	3234.61	53.52	71.53		71.67	0.000394	3.13	1336.26	278.2	0.2
P118-00-00	P118-R3-2	65434.6	Max WS	2915.19	53.1	71.38		71.53	0.000273	3.21	1377.96	214.6	0.17
P118-00-00	P118-R3-2	64399.74	Max WS	3936.19	52.59	70.75		71.06	0.00054	4.57	1112.77	191.68	0.24
P118-00-00	P118-R3-2	64273.7	Max WS	3946.41	53.55	70.79	61.89	70.98	0.000408	3.52	1173.84	173.59	0.21
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3946.41	53.3	70.76		70.95	0.000378	3.44	1190.25	154.49	0.2
P118-00-00	P118-R3-2	64200	Max WS	3946.49	53.3	70.76		70.94	0.000378	3.44	1189.94	154.48	0.2
P118-00-00	P118-R2-2	64100	Max WS	5348.02	52.61	70.74		70.89	0.000202	3.04	1811.53	7983.66	0.16
P118-00-00	P118-R2-2	64094	Max WS	5347.97	52.61	70.74	60.57	70.88	0.000202	3.04	1811.34	7981	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5347.97	52.56	70.71		70.86	0.000201	3.04	1815.29	8036.59	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5347.84	52.78	70.55	62.7	70.87	0.000502	4.64	1285.89	7629.92	0.24
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5347.7	53.04	69.79		70.19	0.000697	5.13	1144.86	3118.64	0.28
P118-00-00	P118-R2-2	63959.7	Max WS	5347.26	53.06	70	60.51	70.16	0.000249	3.2	1693.48	5221.41	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5347.35	53.16	69.94		70.11	0.000262	3.26	1661.09	4476.37	0.18
P118-00-00	P118-R2-2	63756.7	Max WS	5350.73	52.4	69.53		70.11	0.001234	6.24	1066.74	205	0.36
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4547.59	50.35	68.92		69.34	0.000857	5.23	944.06	165.27	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	4997.8	50.77	68.13		68.48	0.000857	4.75	1052.88	132.2	0.3
P118-00-00	P118-R2-2	60625.3	Max WS	5262.25	49.52	67.49		67.88	0.000894	5.03	1046.77	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5266.52	49.48	66.32		67.01	0.001268	6.74	832.31	129.08	0.37
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5344.38	49.68	66.25		66.86	0.001109	6.3	887.7	126.54	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5394.72	49.89	66.21		66.74	0.000979	5.89	948.43	129.42	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5430.81	50.09	66.17		66.65	0.00088	5.54	1008.66	134.7	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	5461.07	50.3	66.13		66.56	0.000808	5.25	1065.65	141.22	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5484.02	50.5	66.09		66.48	0.000752	5	1119.65	148.56	0.29
P118-00-00	P118-R2-1	60536.4*	Max WS	5491.89	50.45	66.02		66.41	0.000803	5.03	1112.96	152.58	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5491.9	50.4	65.94		66.34	0.000848	5.05	1108.8	156.57	0.3
P118-00-00	P118-R2-1	60118.3*	Max WS	5491.92	50.35	65.87		66.26	0.000886	5.05	1107.93	160.59	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5491.9	50.3	65.79		66.18	0.000918	5.04	1109.96	164.54	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	5491.88	50.25	65.71		66.1	0.000941	5.02	1114.9	168.53	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5492.03	50.2	65.63		66.02	0.000955	4.98	1123.57	172.54	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5494.69	50.15	65.56		65.93	0.00096	4.93	1134.93	176.57	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5499.03	50.1	65.47		65.85	0.000967	4.89	1148.71	180.81	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5499.02	50.1	65.39		65.76	0.000976	4.87	1147.73	195.96	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5499.02	50.11	65.32		65.68	0.000963	4.83	1142.01	180.7	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	5499.01	50.11	65.25		65.6	0.000889	4.78	1151.57	152.72	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	5498.95	50.11	65.18		65.53	0.000823	4.7	1169.77	149.67	0.3
P118-00-00	P118-R2-1	58844.9*	Max WS	5498.95	50.11	65.13		65.46	0.000757	4.61	1192.82	147.39	0.29
P118-00-00	P118-R2-1	58729.3*	Max WS	5498.95	50.12	65.08		65.4	0.00065	4.5	1221.75	138.97	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	5498.92	50.12	65.05		65.34	0.000609	4.38	1256.33	141.61	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	5605.12	47.59	64.84	58.09	65.19	0.000701	4.74	1196.04	569.68	0.28
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-4.44	67.88	69.46		69.46	0.00331	-0.55	8.33	18.17	0.1
P118-21-00	P118-21-00	2493.18	Max WS	2.5	67.95	69.48		69.48	0.000708	0.24	11.67	25.85	0.05
P118-21-00	P118-21-00	2450.3	Max WS	1.53	67.59	69.5		69.5	0.000001	0.07	24.84	22.8	0.01
P118-21-00	P118-21-00	2416.26	Max WS	3.47	67.5	69.5		69.5	0.000011	0.14	25.8	24.46	0.02
P118-21-00	P118-21-00	2398.13	Max WS	5.2	67.44	69.5		69.5	0.000021	0.2	26.51	21.6	0.03
P118-21-00	P118-21-00	2389.56	Max WS	6.83	67.41	69.49		69.5	0.000013	0.25	27.03	21.84	0.04
P118-21-00	P118-21-00	2343.79	Max WS	9.72	67.54	69.48		69.49	0.00012	0.69	14.12	12.62	0.11

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	12.72	67.47	69.46		69.47	0.000492	0.89	14.36	12.05	0.14
P118-21-00	P118-21-00	2208.42	Max WS	16.69	67.33	69.4		69.42	0.000526	0.95	17.6	14.25	0.15
P118-21-00	P118-21-00	2195.48	Max WS	16.69	67.34	69.4		69.41	0.000211	0.92	18.15	15.73	0.15
P118-21-00	P118-21-00	2169.49	Max WS	16.69	66.56	69.4		69.41	0.000094	0.8	20.87	11.15	0.1
P118-21-00	P118-21-00	2167.76	Max WS	16.69	66.37	69.4		69.41	0.000058	0.65	25.73	13.32	0.08
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	16.63	65.03	68.55		68.55	0.000036	0.5	33.03	18.35	0.07
P118-21-00	P118-21-00	2100.84	Max WS	16.62	64.78	68.55		68.55	0.000066	0.45	36.58	18.1	0.06
P118-21-00	P118-21-00	1662.37	Max WS	100.98	63.91	68.21		68.27	0.000859	1.93	52.31	19.94	0.21
P118-21-00	P118-21-00	1144.5	Max WS	157.6	62.63	67.57		67.67	0.001196	2.5	63.03	20.08	0.25
P118-21-00	P118-21-00	595.53	Max WS	-3.2	61.49	67.06		67.06	0	-0.03	118.2	47.22	0
P118-21-00	P118-21-00	549.31*	Max WS	15.6	61.18	67.06		67.06	0.000003	-0.12	128.41	44.42	0.01
P118-21-00	P118-21-00	503.08*	Max WS	-28.47	60.87	67.06		67.06	0.000007	-0.21	136.35	41.62	0.02
P118-21-00	P118-21-00	456.86*	Max WS	-40.81	60.57	67.06		67.06	0.000012	-0.29	141.87	38.81	0.03
P118-21-00	P118-21-00	410.63*	Max WS	-52.77	60.26	67.06		67.06	0.000017	-0.37	145.15	36.01	0.03
P118-21-00	P118-21-00	364.41*	Max WS	-65.59	59.95	67.06		67.06	0.000024	-0.45	145.91	33.21	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-78.51	59.64	67.05		67.06	0.000032	-0.55	144.45	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-92.01	59.34	67.05		67.06	0.000043	-0.66	140.59	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	-105.44	59.03	67.05		67.06	0.00006	-0.79	134.44	24.8	0.06
P118-21-00	P118-21-00	179.51	Max WS	-115.01	58.72	67.05		67.06	0.00009	-0.91	126	22	0.07
P118-21-00	P118-21-00	159.41*	Max WS	-123.67	57.98	67.05		67.06	0.000083	-0.9	136.71	22.53	0.06
P118-21-00	P118-21-00	139.31*	Max WS	-125.2	57.24	67.06		67.07	0.000069	-0.85	148.04	23.06	0.06
P118-21-00	P118-21-00	119.21*	Max WS	-102.29	55.51	67.08		67.09	0.000037	-0.64	159.96	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	82.22	55.77	67.11		67.11	0.00002	-0.48	172.4	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-67.03	55.03	67.16		67.16	0.000011	-0.36	185.68	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.17		74.17	0.000002	0.11	91.39	37.04	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.17		74.17	0.000003	0.13	80.15	31.57	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.57	70.08	74.17	70.24	74.17	0.000004	0.14	76.79	26.25	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.57	70.2	74.17		74.17	0.000004	0.14	73.05	28.13	0.02
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.58	70.16	74.17		74.17	0.000006	0.16	70.41	28.12	0.02
P118-23-00	P118-23-00 R2	7654.51	Max WS	17.88	69.97	74.16		74.17	0.000012	0.24	73.34	25.91	0.03
P118-23-00	P118-23-00 R2	7632.63	Max WS	20.34	69.88	74.16		74.16	0.000015	0.28	72.93	25.49	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.04	68.92	74.16		74.16	0.000015	0.28	78.4	32.31	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	21.91	69.39	74.08		74.08	0.000014	0.28	94.71	224.64	0.03
P118-23-00	P118-23-00 R2	7567.5	Max WS	23.46	69.56	74.08		74.08	0.000019	0.31	74.54	488.19	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	32.29	68.48	74.07		74.08	0.000032	0.42	77.06	1148.67	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	37.47	68.06	74.07		74.07	0.000038	0.47	80.57	1082.09	0.05
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	37.47	69.59	73.83		73.86	0.000171	1.27	29.56	524.39	0.11
P118-23-00	P118-23-00 R2	7313.37	Max WS	38.84	69.5	73.85		73.85	0.000037	0.45	85.41	577.53	0.05
P118-23-00	P118-23-00 R2	7305.97	Max WS	39.54	69.12	73.84		73.85	0.000035	0.45	86.94	503.38	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	40.49	69.43	73.84		73.85	0.000036	0.59	68.92	503.86	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	40.49	69.34	73.59		73.59	0.000004	0.46	132.19	163.7	0.05
P118-23-00	P118-23-00 R2	7237.19	Max WS	43.15	69.28	73.59		73.59	0.000044	0.48	119.42	147.21	0.05
P118-23-00	P118-23-00 R2	6786.22	Max WS	92.39	68.02	73.56		73.56	0.000063	0.56	434.28	1378.44	0.06
P118-23-00	P118-23-00 R2	6723.56	Max WS	99.75	67.37	73.55		73.56	0.000057	0.62	160.66	46.46	0.06
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	93.76	67.54	71.9		71.95	0.001117	1.81	51.84	27.58	0.23
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	108.76	67.16	71.84		71.87	0.000335	1.32	82.55	28.72	0.14
P118-23-00	P118-23-00 R2	6402.43	Max WS	125.67	67.03	71.76		71.8	0.000429	1.52	82.59	27.68	0.16
P118-23-00	P118-23-00 R2	6356.93	Max WS	133.49	66.97	71.73	68.62	71.77	0.000467	1.59	83.72	27.83	0.16
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	133.47	66.93	71.71		71.75	0.00045	1.57	84.97	28.13	0.16
P118-23-00	P118-23-00 R2	6293.27	Max WS	137.84	66.88	71.7		71.74	0.000461	1.6	86.32	28.38	0.16
P118-23-00	P118-23-00 R2	5958.59	Max WS	57.09	66.24	71.61		71.61	0.000036	0.45	126.25	42.05	0.05
P118-23-00	P118-23-00 R2	5652.94	Max WS	55.37	65.7	71.59		71.6	0.000004	0.5	110.32	32.44	0.05
P118-23-00	P118-23-00 R2	5045.34	Max WS	46.79	63.97	71.58		71.58	0.000012	0.32	144.63	31.87	0.03
P118-23-00	P118-23-00 R2	4947.92	Max WS	50.9	63.84	71.58	64.53	71.58	0.000009	0.28	184.27	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	50.69	63.87	71.57		71.57	0.000006	0.26	193.27	34.77	0.02
P118-23-00	P118-23-00 R2	4783.1	Max WS	73.33	63.65	71.56		71.57	0.000003	0.47	154.64	37.16	0.04
P118-23-00	P118-23-00 R2	4580.38	Max WS	113.88	63.02	71.55	64.61	71.55	0.000056	0.63	180.63	46.95	0.06
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	113.6	63.16	71.53		71.54	0.000052	0.57	199.06	58.28	0.05
P118-23-00	P118-23-00 R2	4459.75	Max WS	131.02	63.55	71.53		71.53	0.000065	0.67	195.33	52.65	0.06
P118-23-00	P118-23-00 R2	4370.6	Max WS	143.17	63.42	71.52		71.53	0.000054	0.61	233.96	65.06	0.06
P118-23-00	P118-23-00 R2	4330.88	Max WS	146.93	62.88	71.52		71.52	0.000014	0.32	461.32	125.25	0.03
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc 50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	146.21	63.31	71.49		71.49	0.000008	0.33	448.01	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	149.86	63.34	71.49		71.49	0.000023	0.53	281.39	51.14	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	177.04	62.41	71.45		71.47	0.000067	0.87	202.63	34.28	0.06
P118-23-00	P118-23-00 R2	3187.46	Max WS	224.59	62.36	71.41		71.42	0.000007	0.93	241.94	40.27	0.07
P118-23-00	P118-23-00 R2	3150.64	Max WS	230.89	61.93	71.41	64.5	71.42	0.000072	0.86	267.26	52.14	0.07
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	230.88	61.56	71.4		71.41	0.000063	0.81	283.68	55.63	0.06
P118-23-00	P118-23-00 R2	3104.46	Max WS	234.01	61.63	71.4		71.41	0.000096	0.94	249.45	52.53	0.08
P118-23-00	P118-23-00 R2	2750.53	Max WS	281.14	60.59	71.35		71.37	0.000103	1.18	238.31	34.6	0.08
P118-23-00	P118-23-00 R2	2741.93	Max WS	282.07	60.44	71.35	63.38	71.37	0.000098	1.16	242.91	34.96	0.08
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	282.07	60.52	71.33		71.35	0.000086	1.04	270.44	42.97	0.07
P118-23-00	P118-23-00 R2	2716.57	Max WS	283.81	60.68	71.33		71.35	0.000098	1.02	278.16	52.19	0.08
P118-23-00	P118-23-00 R2	2615.37	Max WS	303.3	60.75	71.31		71.34	0.000113	1.22	247.94	37.87	0.08
P118-23-00	P118-23-00 R2	2244.98	Max WS	316.52	60.53	71.28		71.3	0.000093	1.18	267.97	35.71	0.08
P118-23-00	P118-23-00 R2	2221.06	Max WS	314.98	60.56	71.27	63.17	71.3	0.000098	1.19	264.97	36.69	0.08
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	314.98	60.59	71.25		71.27	0.000087	1.15	275.05	37.2	0.07
P118-23-00	P118-23-00 R2	2042.36	Max WS	324.94	59.78	71.25		71.26	0.000073	0.9	362.34	67.27	0.07
P118-23-00	P118-23-00 R2	1922.11	Max WS	317.75	59.56	71.24		71.25	0.000063	0.83	382.78	72.85	0.06
P118-23-00	P118-23-00 R2	1892.63	Max WS	322.39	59.68	71.24	62.92	71.25	0.000072	0.91	356.02	66.31	0.07
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	322.37	59.86	71.14		71.16	0.000121	1.26	256.76	38.81	0.09
P118-23-00	P118-23-00 R2	1829.45	Max WS	342.85	59.87	71.14		71.16	0.000077	0.89	383.39	75.5	0.07
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	423.53	59.04	71.11		71.13	0.000093	1.1	384.85	62.07	0.08
P118-23-00	P118-23-00 R1	1513.84	Max WS	904.89	59.85	71.09		71.1	0.000105	1.29	2334.74	1069.22	0.09
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	911.81	59.99	71.08	64.45	71.09	0.000066	0.87	2593.32	990.93	0.07
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	911	58.36	71.07		71.07	0.000042	0.77	2982.2	933.17	0.06
P118-23-00	P118-23-00 R1	1354.02	Max WS	941.95	57.88	71.07		71.07	0.000045	0.86	2986.35	916.81	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	1120.95	57.45	71.03		71.04	0.000119	1.32	2220.4	742.6	0.09
P118-23-00	P118-23-00 R1	649.49	Max WS	1284.73	57.03	70.95		70.98	0.000184	1.78	1717.97	449.67	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	1389.68	55.82	70.91	62.08	70.91	0.000054	0.78	6557.99	5005.87	0.06
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1383.87	55.57	70.88		70.89	0.000039	0.83	7712.25	5271.03	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1390.64	55.13	70.86		70.9	0.000103	1.73	1164.51	175.37	0.09
P118-23-00	P118-23-00 R3	58.31	Max WS	1387.1	53.78	70.85		70.9	0.00012	2.06	947.16	83.5	0.1
P118-23-02	P118-23-02	4138.85	Max WS	59.95	67.78	71.49		71.49	0.000232	0.88	244.23	1025.96	0.11
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	58.56	66.69	71.43		71.43	0.000106	0.6	102.7	895.79	0.08
P118-23-02	P118-23-02	3782.06	Max WS	214.41	66.66	71.41		71.43	0.000571	1.41	542.69	1021.66	0.17
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	214.41	66.22	71.41		71.41	0.000055	0.29	1879.14	1255.44	0.04
P118-23-02	P118-23-02	3692.61	Max WS	212.59	66.22	71.39		71.46	0.001216	2.18	97.73	1239.14	0.27
P118-23-02	P118-23-02	3049.5	Max WS	31.79	65.47	71.2		71.2	0.000007	0.15	757.86	1158.19	0.02
P118-23-02	P118-23-02	2386.67	Max WS	36.5	65.13	71.19		71.19	0.000005	0.16	1018.99	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	37.96	65.16	71.19		71.19	0.000004	0.12	1124.33	1094.25	0.01
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	37.93	65.26	71.18		71.19	0.000023	0.38	101.11	1060.82	0.04
P118-23-02	P118-23-02	2278.1	Max WS	42.4	65.19	71.18		71.18	0.000007	0.22	914.76	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	170.79	63.69	71.16		71.16	0.000057	0.71	1019.45	964.79	0.06
P118-23-02	P118-23-02	1445.67	Max WS	172.23	63.66	71.16	65.83	71.16	0.000043	0.67	1108.91	961.46	0.05
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	172.11	63.56	71.15		71.15	0.000028	0.53	1436.3	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	175.67	63.36	71.15		71.15	0.000025	0.4	1315.02	958.94	0.04
P118-23-02	P118-23-02	1317.96	Max WS	183.06	62.91	71.15		71.15	0.000022	0.46	1493.5	1032.32	0.04
P118-23-02	P118-23-02	1171.38	Max WS	201.42	61.86	71.14		71.15	0.000085	0.94	554.21	1207.52	0.07
P118-23-02	P118-23-02	1083.7	Max WS	218.14	62.56	71.14		71.14	0.000025	0.5	1705.92	1249.68	0.04
P118-23-02	P118-23-02	215.24	Max WS	482.39	60.16	71.11		71.11	0.000051	0.75	2131.55	1102.12	0.06
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	71.92		71.92	0.000001	0.07	136.52	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	71.92		71.92	0.000001	0.07	136.49	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	38.15	66.13	71.91		71.92	0.000014	0.32	119.71	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	73.76	65.84	71.9		71.9	0.000045	0.57	129.21	33.01	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	86.87	65.5	71.89		71.89	0.000051	0.61	141.85	35.73	0.05
P118-25-00	P118-25-00 R2	2473.31	Max WS	87.1	65.47	71.89	67.2	71.89	0.000051	0.62	141.02	35.01	0.05
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	86.86	65.47	71.88		71.89	0.000052	0.61	143.42	37.73	0.05
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	86.68	65.38	71.88		71.88	0.000045	0.59	146.59	35.28	0.05
P118-25-00	P118-25-00 R2	2046.09	Max WS	84.99	64.63	71.87		71.87	0.000026	0.47	179.89	40.52	0.04
P118-25-00	P118-25-00 R1	1929.3	Max WS	219.98	64.22	71.82		71.85	0.000287	1.46	150.35	38.77	0.13
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	204.83	64.03	71.73		71.76	0.000172	1.28	160.38	33.08	0.1
P118-25-00	P118-25-00 R1	1208.56	Max WS	96.76	63.03	71.73		71.73	0.000028	0.56	174.14	30.27	0.04
P118-25-00	P118-25-00 R1	1188.81	Max WS	90	63.01	71.73	64.76	71.73	0.000027	0.53	168.38	29.97	0.04
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	30.65	62.94	71.72		71.72	0.000003	0.19	165.63	29.45	0.01
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	22.79	62.83	71.72		71.72	0.000002	0.13	179.47	33.01	0.01
P118-25-00	P118-25-00 R1	980.2	Max WS	26.76	62.34	71.71		71.72	0.000001	0.13	209.17	35.75	0.01
P118-25-00	P118-25-00 R1	963.63	Max WS	27.83	62.25	71.71		71.72	0.000001	0.11	252.02	44.17	0.01
P118-25-00	P118-25-00 R1	950.55	Max WS	27.91	62.25	71.71	63.17	71.71	0.000001	0.1	320.73	94.16	0.01
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	27.68	61.68	71.71		71.71	0.000001	0.09	335.48	86	0.01
P118-25-00	P118-25-00 R1	886.91	Max WS	27.77	61.68	71.71		71.71	0.000001	0.11	264.39	51.01	0.01
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	20.49	61.16	71.71		71.71	0	0.08	253.26	37.72	0.01
P118-25-00	P118-25-00 R1	490.93	Max WS	-2.7	60.25	71.71		71.71	0	-0.01	287.16	44.02	0
P118-25-00	P118-25-00 R1	251.81	Max WS	-19.22	58.25	71.71		71.71	0	-0.05	352.79	44.09	0
P118-25-00	P118-25-00 R1	229.81*	Max WS	-22	58.04	71.71		71.71	0	-0.06	359.14	44.08	0
P118-25-00	P118-25-00 R1	207.81*	Max WS	-24.61	57.84	71.71		71.71	0	-0.07	365.46	44.07	0
P118-25-00	P118-25-00 R1	185.81*	Max WS	-27.4	57.63	71.71		71.71	0	-0.07	371.77	44.05	0
P118-25-00	P118-25-00 R1	163.80*	Max WS	-30.04	57.43	71.71		71.71	0	-0.08	378.07	44.04	0
P118-25-00	P118-25-00 R1	141.80*	Max WS	-32.71	57.22	71.71		71.71	0	-0.09	384.39	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	-35.58	57.02	71.71		71.71	0	-0.09	390.64	44.01	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	-37.86	56.81	71.71	58.15	71.71	0	-0.1	396.98	44	0.01
P118-25-01	P118-25-01	5341.48	Max WS	11.16	70.47	74.69		74.69	0.000004	0.14	82.19	34.43	0.02
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	162.1	68.9	74.36		74.4	0.000549	1.65	98.26	36.01	0.18
P118-25-01	P118-25-01	4162.47	Max WS	174.91	69.44	74.19		74.23	0.000503	1.62	108.18	38.67	0.17
P118-25-01	P118-25-01	4134.04	Max WS	178.42	69.38	74.17	71.4	74.21	0.000496	1.61	110.55	39.17	0.17
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	178.41	69.25	74.12		74.16	0.000484	1.6	111.53	39.33	0.17
P118-25-01	P118-25-01	4047.7	Max WS	178.02	69.28	74.1		74.14	0.000467	1.58	112.62	39.35	0.16
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	196.3	67.84	73.93		73.96	0.000326	1.43	137.32	42.25	0.14
P118-25-01	P118-25-01	3312.44	Max WS	198.05	67.48	73.85		73.87	0.000263	1.28	154.9	48.46	0.13
P118-25-01	P118-25-01	3014.68	Max WS	200.57	67.53	73.78		73.8	0.000202	1.22	164.65	44.96	0.11
P118-25-01	P118-25-01	2924.04	Max WS	201.26	67.71	73.76		73.78	0.000193	1.19	168.98	46.19	0.11
P118-25-01	P118-25-01	2763.33	Max WS	187.37	66.67	73.74		73.76	0.000153	1.09	172.51	44.92	0.1
P118-25-01	P118-25-01	2728.92	Max WS	189.94	66.5	73.6		73.78	0.000784	3.44	55.18	29.03	0.25
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	189.95	66.31	72.89		73.09	0.000926	3.58	53.05	33.01	0.26
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	191.17	66.04	72.97		73.02	0.000454	1.79	107.03	27.97	0.16
P118-25-01	P118-25-01	1881.88	Max WS	209.54	66.57	72.58		72.65	0.000747	2.16	96.92	28.62	0.21
P118-25-01	P118-25-01	1384.48	Max WS	211.85	66.19	72.25		72.31	0.000624	2.01	105.51	30.63	0.19
P118-25-01	P118-25-01	1245.83	Max WS	201.15	66.34	72.16		72.22	0.000577	1.97	102.27	28.54	0.18
P118-25-01	P118-25-01	584.11	Max WS	170.52	65.88	71.93		71.96	0.000247	1.39	122.72	29.02	0.12
P118-25-01	P118-25-01	60.05	Max WS	140.7	63.5	71.86		71.88	0.000121	1.04	135.64	27.03	0.08

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-00-00	P118-R3-2	72405.2	Max WS	5480	58.25	74.68		75.04	0.00268	5.19	2033.22	1015.13	0.31
P118-00-00	P118-R3-2	71854.2	Max WS	5011.97	57.83	73.97		74.17	0.000414	3.64	2154.2	1571.98	0.21
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4987.33	55.05	73.57		73.74	0.000321	3.34	1879.3	447.2	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	4907.32	55.28	73.28		73.42	0.000236	3.14	2316.66	520	0.17
P118-00-00	P118-R3-2	68670	Max WS	4363.36	54.88	72.98		73.21	0.000401	3.99	1611.32	309.65	0.21
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68131	Max WS	4208.25	54.47	72.77		73	0.00035	3.98	1593.89	359.56	0.2
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3655.18	54.14	72.57		72.78	0.000398	3.92	1581.87	347.48	0.21
P118-00-00	P118-R3-2	66869	Max WS	3301.07	53.96	72.25		72.48	0.000573	3.9	1005.67	184.95	0.24
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3400.2	53.79	72.25		72.43	0.000401	3.43	1097.94	161.74	0.2
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3085.05	53.6	72.15		72.29	0.000234	3.2	1517.37	227.52	0.16
P118-00-00	P118-R3-2	65955.8	Max WS	2978.88	53.52	72.1		72.2	0.000258	2.65	1494.09	278.2	0.16
P118-00-00	P118-R3-2	65434.6	Max WS	2653.42	53.1	72		72.1	0.000187	2.74	1510.92	214.6	0.14
P118-00-00	P118-R3-2	64399.74	Max WS	4122.19	52.59	71.42		71.71	0.000476	4.46	1245.49	203.85	0.23
P118-00-00	P118-R3-2	64273.7	Max WS	4165.17	53.55	71.45	62.14	71.63	0.000361	3.44	1289.78	175.97	0.2
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4159.45	53.3	71.43		71.6	0.000336	3.36	1293.74	156.88	0.19
P118-00-00	P118-R3-2	64200	Max WS	4159.45	53.3	71.43		71.6	0.000336	3.36	1293.47	156.88	0.19
P118-00-00	P118-R2-2	64100	Max WS	6030.02	52.61	71.39		71.56	0.000214	3.25	1928.96	8776.63	0.16
P118-00-00	P118-R2-2	64094	Max WS	6030.1	52.61	71.39	61.02	71.55	0.000214	3.25	1928.76	8775.63	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	6030.01	52.56	71.36		71.52	0.000213	3.24	1932.5	8793.97	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	6030.08	52.78	71.18	63.28	71.54	0.000528	4.94	1372.65	8425.08	0.25
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	6029.8	53.04	70.18		70.65	0.000779	5.56	1198.34	4434.67	0.3
P118-00-00	P118-R2-2	63959.7	Max WS	6030.09	53.06	70.42	60.95	70.61	0.000281	3.47	1765.82	7545.17	0.18
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	6030.02	53.16	70.35		70.55	0.000296	3.54	1731.01	6955	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	6032.54	52.4	69.89		70.56	0.001361	6.72	1140.9	205	0.38
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4922.3	50.35	69.32		69.77	0.000875	5.4	1012.23	170.49	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	5279.34	50.77	68.6		68.95	0.000796	4.73	1115.09	132.2	0.29
P118-00-00	P118-R2-2	60625.3	Max WS	5657.69	49.52	67.96		68.37	0.000875	5.33	1103.39	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5612.47	49.48	66.83		67.52	0.001197	6.76	898.8	131.55	0.36
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5779.07	49.68	66.73		67.37	0.001093	6.45	950.52	133.8	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5886.41	49.89	66.67		67.24	0.000989	6.1	1009.34	133.7	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5950.49	50.09	66.63		67.14	0.000898	5.77	1070.74	138.07	0.32
P118-00-00	P118-R2-1	60547.5*	Max WS	6001.9	50.3	65.58		67.05	0.000829	5.48	1129.86	143.97	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	6042.79	50.5	65.54		66.96	0.000775	5.23	1186.5	150.86	0.3
P118-00-00	P118-R2-1	60396.4*	Max WS	6054.05	50.45	65.46		66.89	0.000823	5.26	1181.36	154.86	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	6056.04	50.4	66.39		66.82	0.000864	5.27	1178.86	158.85	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	6056.01	50.35	66.31		66.74	0.000898	5.27	1179.82	162.87	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	6056.03	50.3	66.23		66.66	0.000924	5.25	1183.74	166.83	0.32
P118-00-00	P118-R2-1	59840.2*	Max WS	6057.18	50.25	66.16		66.58	0.000943	5.21	1190.6	170.83	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	6063.44	50.2	66.08		66.49	0.000954	5.17	1200.99	174.84	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	6075.9	50.15	66		66.41	0.000961	5.12	1213.87	178.94	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	6087.5	50.1	65.91		66.32	0.00098	5.11	1228.06	181.05	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	6087.53	50.1	65.83		66.23	0.000987	5.07	1233.88	196.49	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	6087.51	50.11	65.75		66.15	0.000992	5.04	1229.97	211.94	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	6087.39	50.11	65.68		66.06	0.000989	4.99	1222.29	182.51	0.32
P118-00-00	P118-R2-1	58960.5*	Max WS	6087.48	50.11	65.6		65.98	0.000979	4.93	1235.88	168.69	0.32
P118-00-00	P118-R2-1	58844.9*	Max WS	6087.46	50.11	65.53		65.9	0.000888	4.85	1255.07	162.36	0.31
P118-00-00	P118-R2-1	58729.3*	Max WS	6087.41	50.12	65.47		65.83	0.000796	4.76	1279.17	156.43	0.29
P118-00-00	P118-R2-1	58613.7	Max WS	6087.35	50.12	65.43		65.76	0.000663	4.64	1310.81	144.23	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	6253.85	47.59	65.18	58.52	65.58	0.000778	5.08	1259.2	789.32	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-7.27	67.88	69.55		69.56	0.005941	-0.79	10.25	20.32	0.14
P118-21-00	P118-21-00	2493.18	Max WS	-5.07	67.95	69.6		69.6	0.001608	-0.4	15.24	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	-1.14	67.59	69.64		69.64	0	-0.04	28.05	23.59	0.01
P118-21-00	P118-21-00	2416.26	Max WS	0.64	67.5	69.64		69.64	0	0.02	29.27	25.46	0
P118-21-00	P118-21-00	2398.11	Max WS	2.49	67.44	69.64		69.64	0.000004	0.08	29.61	22.71	0.01
P118-21-00	P118-21-00	2389.56	Max WS	4.34	67.41	69.64		69.64	0.000004	0.14	30.18	23.06	0.02
P118-21-00	P118-21-00	2343.79	Max WS	7.59	67.54	69.63		69.63	0.000053	0.48	16.01	13.58	0.08

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc 100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	11.09	67.47	69.62		69.62	0.000274	0.68	16.28	12.83	0.11
P118-21-00	P118-21-00	2208.42	Max WS	15.73	67.31	69.58		69.59	0.000321	0.78	20.17	15.11	0.12
P118-21-00	P118-21-00	2195.48	Max WS	15.72	67.34	69.58		69.59	0.000137	0.74	21.18	18.42	0.12
P118-21-00	P118-21-00	2169.49	Max WS	15.72	66.56	69.58		69.58	0.000065	0.69	22.96	12.49	0.09
P118-21-00	P118-21-00	2167.76	Max WS	15.72	66.37	69.58		69.58	0.000004	0.56	28.12	13.84	0.07
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	15.72	65.03	68.82		68.82	0.000025	0.41	38.45	22.03	0.05
P118-21-00	P118-21-00	2100.84	Max WS	15.72	64.78	68.82		68.82	0.000042	0.38	41.67	19.43	0.05
P118-21-00	P118-21-00	1662.37	Max WS	114.39	63.91	68.49		68.55	0.000826	1.97	59.01	28.59	0.21
P118-21-00	P118-21-00	1144.5	Max WS	180.95	62.63	67.8		67.91	0.001373	2.68	67.58	21.61	0.27
P118-21-00	P118-21-00	595.53	Max WS	-41.74	61.49	67.49		67.49	0.000017	-0.3	138.33	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-56.19	61.18	67.49		67.49	0.000024	-0.38	147.32	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-70.11	60.87	67.48		67.49	0.000029	-0.46	154.05	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-83.33	60.57	67.48		67.49	0.000035	-0.53	158.38	38.81	0.05
P118-21-00	P118-21-00	410.63*	Max WS	-97.07	60.26	67.48		67.49	0.000042	-0.61	160.46	36.01	0.05
P118-21-00	P118-21-00	364.41*	Max WS	-112.74	59.95	67.48		67.49	0.000052	-0.71	160.01	33.21	0.06
P118-21-00	P118-21-00	318.18*	Max WS	-128.32	59.64	67.48		67.49	0.000065	-0.82	157.34	30.41	0.06
P118-21-00	P118-21-00	271.96*	Max WS	-144.55	59.34	67.48		67.49	0.000084	-0.95	152.27	27.6	0.07
P118-21-00	P118-21-00	225.73*	Max WS	-160.56	59.03	67.47		67.49	0.00011	-1.11	144.9	24.8	0.08
P118-21-00	P118-21-00	179.51	Max WS	-172.72	58.72	67.47		67.49	0.000166	-1.28	135.25	22	0.09
P118-21-00	P118-21-00	159.41*	Max WS	-183.64	57.98	67.47		67.5	0.000152	-1.26	146.23	22.53	0.09
P118-21-00	P118-21-00	139.31*	Max WS	-181.86	57.24	67.49		67.51	0.000121	-1.15	157.83	23.06	0.08
P118-21-00	P118-21-00	119.21*	Max WS	-147.72	56.51	67.51		67.52	0.000066	-0.87	170.07	23.6	0.06
P118-21-00	P118-21-00	99.11*	Max WS	-94.23	55.77	67.55		67.56	0.000022	-0.51	183.08	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-82.43	55.03	67.61		67.61	0.000014	-0.42	196.77	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.56		74.56	0.000001	0.1	106.84	42.38	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.56		74.56	0.000002	0.11	94.44	41.42	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.61	70.08	74.56	70.24	74.56	0.000003	0.12	92.07	55.3	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.56		74.56	0.000003	0.13	86.48	39.43	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.69	70.16	74.56		74.56	0.000004	0.14	83.59	38.4	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.46	69.97	74.55		74.56	0.000009	0.22	83.76	30.72	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.11	69.88	74.55		74.56	0.000012	0.25	83.18	44.04	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.93	68.92	74.55		74.55	0.000011	0.26	101.94	143.15	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.87	69.39	74.53		74.53	0.000008	0.22	235.98	418.14	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.55	69.56	74.53		74.53	0.000014	0.29	86.31	781.5	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.12	68.48	74.53		74.53	0.000025	0.38	88.77	1398.96	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.72	68.06	74.52		74.53	0.000003	0.43	92.24	1326.68	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.63	69.59	74.27		74.27	0.000014	0.28	552.56	1048.41	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.1	69.5	74.27		74.27	0.000029	0.42	97.57	1013.38	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	41.84	69.12	74.27		74.27	0.000029	0.42	98.98	993.45	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	42.85	69.43	74.27		74.27	0.000003	0.57	75.7	947.97	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.68	69.34	73.98		73.98	0.000023	0.37	330.82	854.88	0.04
P118-23-00	P118-23-00 R2	7237.19	Max WS	45.43	69.28	73.98		73.98	0.00003	0.39	250.88	775.78	0.04
P118-23-00	P118-23-00 R2	6786.22	Max WS	96.38	68.02	73.97		73.97	0.000027	0.37	794.93	1815.73	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	104	67.37	73.96		73.97	0.000049	0.57	181.07	52.84	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	86.35	67.54	72.2		72.23	0.000653	1.42	60.62	31	0.18
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	86.05	67.16	72.17		72.19	0.000155	0.93	92.32	30.24	0.09
P118-23-00	P118-23-00 R2	6402.43	Max WS	90.11	67.03	72.15		72.16	0.000158	0.96	93.5	29.35	0.1
P118-23-00	P118-23-00 R2	6356.93	Max WS	92.94	66.97	72.14	68.26	72.15	0.00016	0.98	95.27	29.55	0.1
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	92.33	66.93	72.12		72.13	0.000152	0.96	96.63	29.84	0.09
P118-23-00	P118-23-00 R2	6293.27	Max WS	38.53	66.88	72.12		72.12	0.000025	0.39	98.61	30.21	0.04
P118-23-00	P118-23-00 R2	5958.59	Max WS	45.31	66.24	72.11		72.11	0.000019	0.3	150.73	58.14	0.03
P118-23-00	P118-23-00 R2	5652.94	Max WS	46.3	65.7	72.1		72.1	0.000024	0.36	129.27	44.52	0.04
P118-23-00	P118-23-00 R2	5045.34	Max WS	35.99	63.97	72.09		72.09	0.000005	0.22	161.01	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	39.66	63.84	72.09	64.4	72.09	0.000004	0.19	205.86	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	39.42	63.87	72.09		72.09	0.000003	0.19	211.29	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	53.07	63.65	72.08		72.09	0.000011	0.3	174.04	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	72.54	63.02	72.08	64.21	72.08	0.000015	0.35	205.68	46.95	0.03
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	72.48	63.16	72.07		72.08	0.000013	0.31	230.49	58.28	0.03
P118-23-00	P118-23-00 R2	4459.75	Max WS	83.36	63.55	72.07		72.07	0.000017	0.37	224.07	52.65	0.03
P118-23-00	P118-23-00 R2	4370.6	Max WS	92.62	63.42	72.07		72.07	0.000014	0.34	269.72	65.06	0.03
P118-23-00	P118-23-00 R2	4330.88	Max WS	95.72	62.88	72.07		72.07	0.000004	0.18	529.98	125.25	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	95.58	63.31	72.06		72.06	0.000003	0.19	491.13	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	102.03	63.34	72.06		72.06	0.000008	0.33	310.49	51.14	0.02
P118-23-00	P118-23-00 R2	3733.5	Max WS	152.57	62.41	72.04		72.04	0.000038	0.69	222.57	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	206.62	62.36	72.01		72.02	0.000045	0.78	265.97	40.27	0.05
P118-23-00	P118-23-00 R2	3150.64	Max WS	211.25	61.93	72.01	64.38	72.01	0.000043	0.71	298.44	52.14	0.05
P118-23-00	P118-23-00 R2	3133.39											
P118-23-00	P118-23-00 R2	3126.39	Max WS	211.2	61.56	72		72.01	0.000037	0.67	317.02	55.63	0.05
P118-23-00	P118-23-00 R2	3104.46	Max WS	214.28	61.63	72		72.01	0.000056	0.76	281.04	52.53	0.06
P118-23-00	P118-23-00 R2	2750.51	Max WS	264.25	60.59	71.96		71.98	0.000071	1.02	259.63	34.6	0.07
P118-23-00	P118-23-00 R2	2741.93	Max WS	265.11	60.44	71.96	63.28	71.98	0.000068	1	264.46	34.96	0.06
P118-23-00	P118-23-00 R2	2733.96											
P118-23-00	P118-23-00 R2	2725.96	Max WS	265.15	60.52	71.96		71.97	0.000057	0.89	297.16	42.97	0.06
P118-23-00	P118-23-00 R2	2716.57	Max WS	266.44	60.68	71.96		71.97	0.000061	0.86	310.65	52.19	0.06
P118-23-00	P118-23-00 R2	2615.37	Max WS	281.07	60.75	71.94		71.96	0.000074	1.03	271.77	37.87	0.07
P118-23-00	P118-23-00 R2	2244.98	Max WS	289.16	60.53	71.92		71.93	0.000061	0.99	290.93	35.71	0.06
P118-23-00	P118-23-00 R2	2221.06	Max WS	287.28	60.56	71.92	63.02	71.93	0.000063	1	288.6	36.69	0.06
P118-23-00	P118-23-00 R2	2198.07											
P118-23-00	P118-23-00 R2	2187.07	Max WS	287.23	60.59	71.89		71.91	0.000057	0.96	299	37.2	0.06
P118-23-00	P118-23-00 R2	2042.36	Max WS	302.39	59.78	71.89		71.9	0.000044	0.75	405.78	67.27	0.05
P118-23-00	P118-23-00 R2	1922.11	Max WS	299.65	59.56	71.89		71.9	0.000039	0.7	429.98	72.85	0.05
P118-23-00	P118-23-00 R2	1892.63	Max WS	305.04	59.68	71.89	62.85	71.89	0.000045	0.76	399.07	66.31	0.05
P118-23-00	P118-23-00 R2	1882.46											
P118-23-00	P118-23-00 R2	1863.46	Max WS	305.01	59.86	71.79		71.81	0.000082	1.08	282.08	38.81	0.07
P118-23-00	P118-23-00 R2	1829.45	Max WS	334.79	59.87	71.79		71.8	0.00005	0.77	432.47	75.5	0.06
P118-23-00	P118-23-00 R2	1800											
P118-23-00	P118-23-00 R2	1611.06	Max WS	438.99	59.04	71.77		71.78	0.000073	1.03	425.44	62.07	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	1191.18	59.85	71.75		71.76	0.000093	1.28	3039.33	1069.22	0.08
P118-23-00	P118-23-00 R1	1490											
P118-23-00	P118-23-00 R1	1454.72	Max WS	1199.71	59.99	71.74	65.02	71.75	0.000062	0.91	3246.18	990.93	0.07
P118-23-00	P118-23-00 R1	1414.55											
P118-23-00	P118-23-00 R1	1380.55	Max WS	1199.49	58.36	71.73		71.73	0.000043	0.83	3598.46	933.17	0.06
P118-23-00	P118-23-00 R1	1354.02	Max WS	1235.63	57.88	71.73		71.73	0.000046	0.93	3591.78	916.81	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	1459.34	57.45	71.69		71.7	0.000118	1.4	2710.4	742.6	0.09
P118-23-00	P118-23-00 R1	649.49	Max WS	1684.62	57.03	71.61		71.64	0.000207	1.99	2011.34	449.67	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	1854.04	55.82	71.56	62.98	71.56	0.000042	0.74	10035.05	5530.57	0.05
P118-23-00	P118-23-00 R1	200											
P118-23-00	P118-23-00 R1	169.28	Max WS	1852.71	55.57	71.54		71.54	0.00003	0.78	11308.02	5564.53	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1862.01	55.13	71.51		71.57	0.000146	2.15	1278.56	175.37	0.11
P118-23-00	P118-23-00 R1	58.31	Max WS	1861.66	53.78	71.48		71.57	0.000183	2.63	1000.44	83.5	0.13
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	71.87		71.87	0.000002	0.09	446.25	1195.57	0.01
P118-23-02	P118-23-02	4137											
P118-23-02	P118-23-02	3790.71	Max WS	14.29	66.69	71.87		71.87	0.000003	0.11	203.34	1149.63	0.01
P118-23-02	P118-23-02	3782.06	Max WS	36.2	66.66	71.86		71.87	0.000005	0.14	1062.06	1188.49	0.02
P118-23-02	P118-23-02	3748.42											
P118-23-02	P118-23-02	3714.78	Max WS	36.2	66.22	71.86		71.86	0.000001	0.04	2452.39	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	36.19	66.22	71.86		71.86	0.000001	0.06	2200.7	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	36.08	65.47	71.86		71.86	0.000002	0.08	1534.83	1169.17	0.01
P118-23-02	P118-23-02	2386.67	Max WS	84.43	65.13	71.86		71.86	0.000006	0.21	1736.99	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	88.08	65.16	71.86		71.86	0.000005	0.17	1855.26	1094.25	0.02
P118-23-02	P118-23-02	2337.89											
P118-23-02	P118-23-02	2303.61	Max WS	87.16	65.26	71.84		71.84	0.000005	0.18	2020.35	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	93.77	65.19	71.84		71.84	0.000009	0.27	1607.11	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	292.45	63.69	71.81		71.81	0.000058	0.77	1650.65	964.79	0.06
P118-23-02	P118-23-02	1445.67	Max WS	294.61	63.66	71.81	66.55	71.81	0.000048	0.75	1737.82	961.46	0.05
P118-23-02	P118-23-02	1430.58											
P118-23-02	P118-23-02	1415.48	Max WS	294.37	63.56	71.81		71.81	0.000033	0.61	2065.1	962.09	0.05
P118-23-02	P118-23-02	1392.09	Max WS	300.16	63.36	71.81		71.81	0.000026	0.42	1941.79	958.97	0.04
P118-23-02	P118-23-02	1317.96	Max WS	317.46	62.91	71.8		71.8	0.000024	0.52	2167.96	1032.32	0.04
P118-23-02	P118-23-02	1171.38	Max WS	359.07	61.86	71.8		71.8	0.000025	0.54	2476.95	1228.5	0.04
P118-23-02	P118-23-02	1083.7	Max WS	388.16	62.56	71.8		71.8	0.000027	0.56	2530.16	1249.68	0.04
P118-23-02	P118-23-02	215.24	Max WS	752.14	60.16	71.76		71.77	0.000056	0.82	2855.17	1102.12	0.06
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.52		72.52	0	0.06	158.87	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.52		72.52	0	0.06	158.82	37.24	0.01
P118-25-00	P118-25-00 R2	3203											
P118-25-00	P118-25-00 R2	3202											
P118-25-00	P118-25-00 R2	2930.66	Max WS	48.74	66.13	72.51		72.51	0.000015	0.35	138.28	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	98.9	65.84	72.49		72.5	0.000053	0.66	148.86	33.01	0.06
P118-25-00	P118-25-00 R2	2494.17	Max WS	121.3	65.5	72.48		72.49	0.000065	0.74	162.98	35.73	0.06
P118-25-00	P118-25-00 R2	2473.31	Max WS	122.95	65.47	72.48	67.49	72.49	0.000067	0.76	161.71	35.01	0.06
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline											
P118-25-00	P118-25-00 R2	2465.6	Max WS	123.01	65.47	72.47		72.48	0.000067	0.74	165.67	37.73	0.06
P118-25-00	P118-25-00 R2	2465											
P118-25-00	P118-25-00 R2	2464											

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc 100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	126.22	65.38	72.47		72.48	0.000064	0.75	167.33	35.28	0.06
P118-25-00	P118-25-00 R2	2046.09	Max WS	141.91	64.63	72.44		72.45	0.00005	0.7	203.33	40.52	0.05
P118-25-00	P118-25-00 R1	1929.3	Max WS	263.65	64.22	72.39		72.43	0.000273	1.52	173.25	39.73	0.13
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	232.37	64.03	72.33		72.36	0.000157	1.29	180.17	33.08	0.1
P118-25-00	P118-25-00 R1	1208.56	Max WS	171.98	63.03	72.31		72.32	0.000068	0.9	191.76	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	168.22	63.01	72.31	65.45	72.32	0.000071	0.91	185.84	29.97	0.06
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	167.92	62.94	72.3		72.31	0.000074	0.92	182.75	29.45	0.07
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	163.35	62.83	72.3		72.31	0.000058	0.82	198.68	33.01	0.06
P118-25-00	P118-25-00 R1	980.2	Max WS	158.98	62.34	72.29		72.3	0.000038	0.69	229.84	35.75	0.05
P118-25-00	P118-25-00 R1	963.63	Max WS	160.1	62.25	72.29		72.3	0.000018	0.59	272.3	45.01	0.04
P118-25-00	P118-25-00 R1	950.55	Max WS	160.53	62.25	72.29	64.23	72.3	0.00002	0.48	375.62	95	0.04
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	159.62	61.68	72.27		72.27	0.000015	0.46	383.47	86	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	158.03	61.68	72.27		72.27	0.000015	0.56	283.85	51.01	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	153.69	61.16	72.27		72.27	0.000021	0.56	274.2	37.72	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	120.83	60.25	72.26		72.27	0.00001	0.39	311.52	44.02	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	75.21	58.25	72.27		72.27	0.000002	0.2	377.25	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	68.7	58.04	72.27		72.27	0.000002	0.38	383.6	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	61.97	57.84	72.27		72.27	0.000001	0.16	389.93	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	55.12	57.63	72.27		72.27	0.000001	0.14	396.24	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	48.18	57.43	72.27		72.27	0.000001	0.12	402.54	44.04	0.01
P118-25-00	P118-25-00 R1	141.80*	Max WS	41.02	57.22	72.27		72.27	0.000001	0.1	408.86	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	33.4	57.02	72.27		72.27	0	0.08	415.1	44.01	0
P118-25-00	P118-25-00 R1	97.8	Max WS	26.67	56.81	72.27	57.92	72.27	0	0.06	421.44	44	0
P118-25-01	P118-25-01	5341.48	Max WS	12.64	70.47	75.27		75.27	0.000003	0.12	102.64	36	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	216.81	68.9	74.9		74.95	0.000591	1.82	118.84	39.61	0.19
P118-25-01	P118-25-01	4162.47	Max WS	236.85	69.44	74.71		74.76	0.000561	1.83	129.24	41.29	0.18
P118-25-01	P118-25-01	4134.04	Max WS	241.91	69.38	74.69	71.74	74.74	0.000563	1.84	131.83	42.25	0.18
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	241.92	69.25	74.64		74.69	0.00055	1.82	132.73	42.16	0.18
P118-25-01	P118-25-01	4047.7	Max WS	242.21	69.28	74.62		74.67	0.000532	1.82	133.41	41.34	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	259.91	67.84	74.43		74.47	0.000376	1.64	158.52	43.67	0.15
P118-25-01	P118-25-01	3312.44	Max WS	263.23	67.48	74.33		74.36	0.000306	1.47	178.63	50.07	0.14
P118-25-01	P118-25-01	3014.68	Max WS	248.51	67.53	74.26		74.28	0.000214	1.33	186.54	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	247.11	67.71	74.24		74.27	0.000201	1.29	191.44	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	207.7	66.67	74.23		74.25	0.000129	1.07	194.5	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	209.81	66.5	74.05		74.22	0.003673	3.34	62.77	29.03	0.4
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	207.48	66.31	73.23		73.44	0.000917	3.7	56.1	34.1	0.26
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	210.51	66.04	73.32		73.37	0.000429	1.8	116.88	28.63	0.16
P118-25-01	P118-25-01	1881.88	Max WS	224.05	66.57	72.98		73.05	0.000628	2.06	108.69	30.23	0.19
P118-25-01	P118-25-01	1384.48	Max WS	223.75	66.19	72.71		72.77	0.000497	1.86	120.2	32.97	0.17
P118-25-01	P118-25-01	1245.83	Max WS	223.3	66.34	72.64		72.7	0.000502	1.92	116.33	30.26	0.17
P118-25-01	P118-25-01	584.11	Max WS	157.53	65.88	72.48		72.5	0.000146	1.14	138.71	29.02	0.09
P118-25-01	P118-25-01	60.05	Max WS	127.1	63.5	72.44		72.45	0.000071	0.84	151.42	27.03	0.06

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch. El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.9		76.09	0.002681	4.28	3401.19	1384.28	0.25
P118-00-00	P118-R3-2	71854.2	Max WS	6551.92	57.83	75.11		75.31	0.000392	3.83	4301.5	2152.67	0.21
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5817.65	55.05	74.75		74.92	0.000282	3.39	2405.52	447.2	0.18
P118-00-00	P118-R3-2	69527.2	Max WS	4954.44	55.28	74.57		74.67	0.000153	2.72	2987.01	520	0.14
P118-00-00	P118-R3-2	68670	Max WS	3803.78	54.88	74.43		74.55	0.000185	2.95	2061.84	309.65	0.15
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3511.65	54.47	74.37		74.47	0.000145	2.78	2179.6	369.7	0.13
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3069.18	54.14	74.3		74.4	0.000153	2.67	2203.9	365.8	0.13
P118-00-00	P118-R3-2	66869	Max WS	2867.21	53.96	74.18		74.28	0.00022	2.64	1383.32	207.29	0.15
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2933.22	53.79	74.18		74.26	0.000171	2.35	1454.55	199.14	0.14
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2799.22	53.6	74.12		74.2	0.000107	2.39	1966.39	227.52	0.11
P118-00-00	P118-R3-2	65955.8	Max WS	2751.68	53.52	74.11		74.15	0.0001	1.88	2052.89	278.2	0.1
P118-00-00	P118-R3-2	65434.6	Max WS	2482.26	53.1	74.06		74.12	0.000092	2.1	1952.9	214.6	0.1
P118-00-00	P118-R3-2	64399.74	Max WS	4340.35	52.59	73.71		73.9	0.000265	3.73	1717.48	206.63	0.17
P118-00-00	P118-R3-2	64273.7	Max WS	4569.55	53.55	73.7	62.57	73.84	0.000207	2.99	1689.76	218.1	0.16
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4569.45	53.3	73.67		73.8	0.000197	2.96	1647	173.2	0.15
P118-00-00	P118-R3-2	64200	Max WS	4569.45	53.3	73.66		73.8	0.000198	2.96	1646.84	173.2	0.15
P118-00-00	P118-R2-2	64100	Max WS	8201.58	52.61	73.54		73.75	0.000229	3.74	2322.99	9451.92	0.17
P118-00-00	P118-R2-2	64094	Max WS	8201.57	52.61	73.54	62.3	73.75	0.000229	3.74	2322.77	9451.78	0.17
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	8201.55	52.56	73.47		73.69	0.00023	3.74	2320.37	9450.25	0.17
P118-00-00	P118-R2-2	64010.4	Max WS	8201.56	52.78	73.24	64.92	73.72	0.000056	5.66	1657.73	9443.65	0.27
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	8200.87	53.04	71.18		71.89	0.001055	6.87	1335.57	8174.14	0.35
P118-00-00	P118-R2-2	63959.7	Max WS	8200.83	53.06	71.54	62.2	71.83	0.000387	4.28	1963.98	8689.05	0.22
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	8200.83	53.16	71.44		71.74	0.00041	4.37	1920.99	8564.6	0.22
P118-00-00	P118-R2-2	63756.7	Max WS	8207.02	52.4	70.79		71.77	0.0018	8.2	1326.86	205	0.44
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	6164.8	50.35	70.33		70.89	0.000967	6.06	1197.67	185	0.32
P118-00-00	P118-R2-2	61905.2	Max WS	6032.14	50.77	69.78		70.13	0.000687	4.75	1270.79	132.2	0.27
P118-00-00	P118-R2-2	60625.3	Max WS	6558.06	49.52	69.17		69.59	0.000794	5.25	1250.03	121.4	0.29
P118-00-00	P118-R2-1	60595.74	Max WS	6447.58	49.48	68.23		68.87	0.000975	6.61	1083.52	131.55	0.33
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	6715.3	49.68	68.12		68.73	0.000921	6.42	1143.13	139.91	0.33
P118-00-00	P118-R2-1	60571.6*	Max WS	6969.49	49.89	68.01		68.6	0.000884	6.25	1199.39	148.28	0.32
P118-00-00	P118-R2-1	60559.5*	Max WS	7174.33	50.09	67.93		68.48	0.000843	6.06	1257.03	149.97	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	7317.57	50.3	67.87		68.38	0.000797	5.83	1319.42	151.77	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	7410.47	50.5	67.82		68.29	0.000752	5.59	1383.22	157.41	0.3
P118-00-00	P118-R2-1	60536.4*	Max WS	7421.47	50.45	67.75		68.22	0.000782	5.59	1384.49	161.46	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	7422.49	50.4	67.68		68.15	0.000806	5.57	1388.68	165.48	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	7425.39	50.35	67.62		68.08	0.000823	5.54	1396.52	169.88	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	7437.01	50.3	67.55		68.01	0.000837	5.5	1407.5	175.83	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	7448.06	50.25	67.48		67.93	0.000843	5.44	1421.92	178.16	0.31
P118-00-00	P118-R2-1	59701.1*	Max WS	7473.78	50.2	67.41		67.85	0.000846	5.39	1438.04	179.13	0.31
P118-00-00	P118-R2-1	59562.1*	Max WS	7508.96	50.15	67.34		67.77	0.000847	5.34	1454.87	180.09	0.31
P118-00-00	P118-R2-1	59423.1	Max WS	7533.26	50.1	67.25		67.69	0.00089	5.38	1469.56	181.05	0.31
P118-00-00	P118-R2-1	59307.4*	Max WS	7547.74	50.1	67.18		67.62	0.000886	5.33	1498.04	196.49	0.31
P118-00-00	P118-R2-1	59191.8*	Max WS	7548.25	50.11	67.11		67.54	0.000878	5.26	1517.79	211.94	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	7552.08	50.11	67.05		67.46	0.000867	5.2	1529.85	227.38	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	7561.29	50.11	66.98		67.39	0.000851	5.12	1533.35	242.82	0.31
P118-00-00	P118-R2-1	58844.9*	Max WS	7561.15	50.11	66.92		67.32	0.000835	5.05	1529.82	241.41	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	7560.68	50.12	66.86		67.25	0.000814	4.97	1539.64	224.04	0.3
P118-00-00	P118-R2-1	58613.7	Max WS	7567.46	50.12	66.81		67.18	0.000789	4.88	1558.75	218.64	0.29
P118-00-00	P118-R2-1	58463.86	Max WS	8433.21	47.59	66.6	59.84	66.99	0.000713	5.29	3575.71	2401.13	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-11.68	67.88	69.65		69.66	0.010549	-1.11	12.14	21.34	0.19
P118-21-00	P118-21-00	2493.18	Max WS	8.75	67.95	69.73		69.74	0.002599	-0.56	19.38	31.49	0.09
P118-21-00	P118-21-00	2450.3	Max WS	-4.82	67.59	69.79		69.79	0.000004	-0.17	31.8	24.34	0.02
P118-21-00	P118-21-00	2416.26	Max WS	-3.71	67.5	69.79		69.79	0.000006	-0.12	33.26	25.7	0.02
P118-21-00	P118-21-00	2398.13	Max WS	-1.83	67.44	69.79		69.79	0.000001	-0.06	33.2	23.22	0.01
P118-21-00	P118-21-00	2389.56	Max WS	0.43	67.41	69.79		69.79	0	0.01	34.05	25.61	0
P118-21-00	P118-21-00	2343.79	Max WS	3.33	67.54	69.79		69.79	0.000007	0.19	18.48	17	0.03

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-21-00	P118-21-00	2303.58	Max WS	7.17	67.47	69.79		69.79	0.000084	0.39	18.58	14.2	0.06
P118-21-00	P118-21-00	2208.42	Max WS	12.75	67.31	69.77		69.77	0.000159	0.55	23.19	17.33	0.08
P118-21-00	P118-21-00	2195.48	Max WS	12.74	67.34	69.77		69.77	0.000062	0.51	24.91	20.99	0.08
P118-21-00	P118-21-00	2169.49	Max WS	12.74	66.56	69.77		69.77	0.000034	0.51	25.48	13.98	0.06
P118-21-00	P118-21-00	2167.76	Max WS	12.74	66.37	69.77		69.77	0.00002	0.41	30.82	14.78	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	12.74	65.03	69.27		69.27	0.000011	0.25	49.97	32.03	0.04
P118-21-00	P118-21-00	2100.84	Max WS	12.74	64.78	69.27		69.27	0.000019	0.25	51.85	26.23	0.03
P118-21-00	P118-21-00	1662.37	Max WS	149	63.91	68.92		68.99	0.00087	2.21	74.59	45.51	0.22
P118-21-00	P118-21-00	1144.5	Max WS	-7.03	62.63	68.77		68.77	0.000001	-0.08	89.31	23	0.01
P118-21-00	P118-21-00	595.53	Max WS	-181.76	61.49	68.76		68.77	0.000103	-0.93	198.51	47.22	0.08
P118-21-00	P118-21-00	549.31*	Max WS	-192.7	61.18	68.76		68.78	0.000098	-0.95	204.08	44.42	0.08
P118-21-00	P118-21-00	503.08*	Max WS	-204.51	60.87	68.76		68.78	0.000097	-1	207.34	41.62	0.08
P118-21-00	P118-21-00	456.86*	Max WS	-218.14	60.57	68.77		68.78	0.000101	-1.06	208.13	38.81	0.08
P118-21-00	P118-21-00	410.63*	Max WS	-233.04	60.26	68.76		68.79	0.000109	-1.14	206.65	36.01	0.08
P118-21-00	P118-21-00	364.41*	Max WS	-249.94	59.95	68.76		68.79	0.000123	-1.24	202.62	33.21	0.09
P118-21-00	P118-21-00	318.18*	Max WS	-266.26	59.64	68.76		68.79	0.000141	-1.36	196.36	30.43	0.09
P118-21-00	P118-21-00	271.96*	Max WS	-282.58	59.34	68.76		68.79	0.000168	-1.51	187.88	27.6	0.1
P118-21-00	P118-21-00	225.73*	Max WS	-297.39	59.03	68.75		68.8	0.000207	-1.69	176.72	24.8	0.11
P118-21-00	P118-21-00	179.51	Max WS	-308.01	58.72	68.75		68.81	0.000312	-1.88	163.49	22	0.12
P118-21-00	P118-21-00	159.41*	Max WS	-319.11	57.98	68.76		68.82	0.000277	-1.82	175.33	22.53	0.12
P118-21-00	P118-21-00	139.31*	Max WS	-307.75	57.24	68.79		68.83	0.000215	-1.64	187.88	23.06	0.1
P118-21-00	P118-21-00	119.21*	Max WS	-238.45	55.51	68.83		68.85	0.000108	-1.18	201.23	23.5	0.07
P118-21-00	P118-21-00	99.11*	Max WS	-172.45	55.77	68.86		68.87	0.000048	-0.8	214.54	24.13	0.05
P118-21-00	P118-21-00	79.01	Max WS	-106.37	55.03	68.87		68.87	0.000016	-0.47	227.95	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.24		75.24	0.000001	0.08	141.89	144.02	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.24		75.24	0.000001	0.09	126.6	153.68	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.24	70.25	75.24	0.000001	0.1	146.4	141.01	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.81	70.2	75.24		75.24	0.000002	0.1	137.72	169.56	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.22	70.16	75.24		75.24	0.000002	0.12	114.83	125	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.09	69.97	75.24		75.24	0.000006	0.2	103.49	156.93	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.56	69.88	75.24		75.24	0.000008	0.23	127.98	287.1	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	26.97	68.92	75.24		75.24	0.000006	0.19	387.27	696.07	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	26.95	69.39	75.24		75.24	0.000002	0.12	1009.66	1723.23	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.15	69.56	75.24		75.24	0.000012	0.26	169.5	2070.87	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.72	68.48	75.23		75.23	0.00002	0.37	154.89	2260.75	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	49.06	68.06	75.23		75.23	0.000027	0.44	112.16	2119.47	0.04
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	48.01	69.59	74.86		74.86	0.000004	0.16	1291.07	1551.54	0.01
P118-23-00	P118-23-00 R2	7313.37	Max WS	49.8	69.5	74.86		74.87	0.000028	0.42	145.17	1653.55	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	50.7	69.12	74.86		74.87	0.000028	0.42	160.45	1679.02	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	51.94	69.43	74.86		74.86	0.000004	0.17	1284.22	1719.67	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	51.95	69.34	74.86		74.86	0.000003	0.16	1455.15	1868.16	0.01
P118-23-00	P118-23-00 R2	7237.19	Max WS	55.43	69.28	74.86		74.86	0.000008	0.22	800.99	1987.12	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	119.9	68.02	74.86		74.86	0.000007	0.22	1788.89	2339.98	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	129.51	67.37	74.85		74.86	0.000039	0.56	232.66	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	33.17	67.54	74.1		74.1	0.000011	0.23	141.98	52.89	0.03
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	35.8	67.16	74.1		74.1	0.000006	0.21	171.34	46.02	0.02
P118-23-00	P118-23-00 R2	6402.43	Max WS	38.74	67.03	74.1		74.1	0.000007	0.23	168.65	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	40.08	66.97	74.1	67.65	74.1	0.000008	0.23	172.96	47.47	0.02
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	40.07	66.93	74.09		74.1	0.000008	0.22	181.32	53.71	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	41.16	66.88	74.09		74.1	0.000009	0.23	176.14	52.38	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	74.96	66.24	74.09		74.09	0.000008	0.26	283.17	68.26	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	95.92	65.7	74.08		74.09	0.00002	0.37	258.78	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	60.57	63.97	74.08		74.08	0.000005	0.27	224.29	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	59.19	63.84	74.08	64.62	74.08	0.000003	0.2	289.23	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	59.2	63.87	74.07		74.07	0.000003	0.21	280.39	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	66.32	63.65	74.07		74.07	0.000006	0.27	247.94	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	72.78	63.02	74.07	64.21	74.07	0.000005	0.24	299.19	46.95	0.02
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	72.76	63.16	74.07		74.07	0.000004	0.21	346.8	58.28	0.02
P118-23-00	P118-23-00 R2	4459.75	Max WS	77.97	63.55	74.07		74.07	0.000005	0.24	329.24	52.65	0.02
P118-23-00	P118-23-00 R2	4370.6	Max WS	82	63.42	74.07		74.07	0.000003	0.21	399.76	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	83.08	62.88	74.07		74.07	0.000001	0.11	780.27	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions Trunc 500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	82.98	63.31	74.06		74.06	0.000001	0.13	643.55	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	88.8	63.34	74.06		74.06	0.000002	0.22	413.02	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	146.92	62.41	74.05		74.05	0.000016	0.5	291.65	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	187.36	62.36	74.04		74.04	0.000017	0.54	347.84	40.27	0.03
P118-23-00	P118-23-00 R2	3150.64	Max WS	190.29	61.93	74.04	64.25	74.04	0.000014	0.47	404.48	52.14	0.03
P118-23-00	P118-23-00 R2	3133.39											
P118-23-00	P118-23-00 R2	3126.39	Max WS	190.31	61.56	74.04		74.04	0.000012	0.44	430.25	55.63	0.03
P118-23-00	P118-23-00 R2	3104.46	Max WS	193.05	61.63	74.04		74.04	0.000017	0.5	388.07	52.53	0.03
P118-23-00	P118-23-00 R2	2750.53	Max WS	236.98	60.59	74.02		74.03	0.000029	0.72	330.82	34.6	0.04
P118-23-00	P118-23-00 R2	2741.93	Max WS	237.78	60.44	74.02	63.11	74.03	0.000028	0.71	336.39	34.96	0.04
P118-23-00	P118-23-00 R2	2733.96											
P118-23-00	P118-23-00 R2	2725.96	Max WS	237.81	60.52	74.02		74.02	0.000021	0.62	385.7	42.97	0.04
P118-23-00	P118-23-00 R2	2716.57	Max WS	239.14	60.68	74.02		74.02	0.00002	0.57	418.2	52.19	0.04
P118-23-00	P118-23-00 R2	2615.37	Max WS	253.93	60.75	74.01		74.02	0.000029	0.73	350.08	37.87	0.04
P118-23-00	P118-23-00 R2	2244.98	Max WS	298.8	60.53	73.99		74.01	0.000034	0.82	365.05	35.71	0.05
P118-23-00	P118-23-00 R2	2221.06	Max WS	301.63	60.56	73.99	63.09	74	0.000036	0.83	364.75	36.69	0.05
P118-23-00	P118-23-00 R2	2198.07											
P118-23-00	P118-23-00 R2	2187.07	Max WS	301.61	60.59	73.98		73.99	0.000033	0.8	376.4	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	356.4	59.78	73.97		73.98	0.000025	0.65	545.69	67.27	0.04
P118-23-00	P118-23-00 R2	1922.11	Max WS	389.21	59.56	73.97		73.97	0.000025	0.67	581.44	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	406.64	59.68	73.96	63.34	73.97	0.000032	0.76	535.9	66.31	0.05
P118-23-00	P118-23-00 R2	1882.46											
P118-23-00	P118-23-00 R2	1863.46	Max WS	406.59	59.86	73.89		73.91	0.000007	1.12	363.69	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	452.41	59.87	73.9		73.91	0.000034	0.77	591.33	75.5	0.05
P118-23-00	P118-23-00 R2	1800											
P118-23-00	P118-23-00 R2	1611.06	Max WS	637.16	59.04	73.87		73.89	0.000068	1.15	555.77	62.07	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	2080.82	59.85	73.86		73.87	0.000058	1.19	5298.44	1069.22	0.07
P118-23-00	P118-23-00 R1	1490											
P118-23-00	P118-23-00 R1	1454.72	Max WS	2095.81	59.99	73.86	66.43	73.86	0.000044	0.94	5340.58	990.93	0.06
P118-23-00	P118-23-00 R1	1414.55											
P118-23-00	P118-23-00 R1	1380.55	Max WS	2095.75	58.36	73.85		73.85	0.000036	0.91	5573.23	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	2155.53	57.88	73.84		73.85	0.00004	1.02	5532.15	916.81	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	2564.75	57.45	73.81		73.82	0.000097	1.5	4285.72	742.6	0.09
P118-23-00	P118-23-00 R1	649.49	Max WS	3039.19	57.03	73.72		73.76	0.000224	2.4	2962.31	449.67	0.13
P118-23-00	P118-23-00 R1	242.54	Max WS	3617.97	55.82	73.68	65.47	73.68	0.000016	0.55	22834.35	6691.01	0.03
P118-23-00	P118-23-00 R1	200											
P118-23-00	P118-23-00 R1	169.28	Max WS	3617.84	55.57	73.67		73.67	0.000014	0.61	23360.54	5675.65	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	3625.96	55.13	73.63		73.77	0.000781	3.35	1649.31	175.37	0.16
P118-23-00	P118-23-00 R3	58.33	Max WS	3618.88	53.78	73.53		73.78	0.000426	4.41	1171.42	83.5	0.2
P118-23-02	P118-23-02	4138.85	Max WS	10.29	67.78	73.94		73.94	0	0.01	3735.43	1274.25	0
P118-23-02	P118-23-02	4137											
P118-23-02	P118-23-02	3790.71	Max WS	85.64	66.69	73.94		73.94	0.000001	0.09	3588.47	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	115.25	66.66	73.94		73.94	0.000002	0.11	3637.77	1251.96	0.01
P118-23-02	P118-23-02	3748.42											
P118-23-02	P118-23-02	3714.78	Max WS	115.29	66.22	73.94		73.94	0.000001	0.05	5057.88	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	119.62	66.22	73.94		73.94	0.000001	0.08	4800.76	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	260.91	65.47	73.94		73.94	0.000005	0.19	3961.03	1169.75	0.02
P118-23-02	P118-23-02	2386.67	Max WS	434.23	65.13	73.93		73.93	0.000015	0.38	3961.9	1074.84	0.03
P118-23-02	P118-23-02	2372.17	Max WS	438.25	65.16	73.93		73.93	0.000012	0.33	4120.21	1094.25	0.03
P118-23-02	P118-23-02	2357.89											
P118-23-02	P118-23-02	2303.61	Max WS	438.3	65.26	73.93		73.93	0.000012	0.35	4238.27	1060.82	0.03
P118-23-02	P118-23-02	2278.1	Max WS	445.54	65.19	73.93		73.93	0.000017	0.45	3819.19	1058.12	0.03
P118-23-02	P118-23-02	1453.34	Max WS	732.83	63.69	73.91		73.91	0.000004	0.78	3672.35	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	735.74	63.66	73.91	68.3	73.91	0.000037	0.78	3752.62	961.46	0.05
P118-23-02	P118-23-02	1430.58											
P118-23-02	P118-23-02	1415.48	Max WS	735.74	63.56	73.9		73.9	0.000029	0.69	4077.79	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	746.54	63.36	73.9		73.9	0.00002	0.41	3948.06	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	781.78	62.91	73.9		73.9	0.000018	0.53	4328.4	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	857.49	61.86	73.89		73.9	0.000017	0.52	5048.92	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	904.71	62.56	73.89		73.89	0.000017	0.53	5147.64	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	1443.55	60.16	73.87		73.87	0.000035	0.73	5177.95	1102.12	0.05
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	74.3		74.3	0	0.04	225.35	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.3		74.3	0	0.04	225.23	37.24	0
P118-25-00	P118-25-00 R2	3203											
P118-25-00	P118-25-00 R2	3202											
P118-25-00	P118-25-00 R2	2930.66	Max WS	45.98	66.13	74.3		74.3	0.000005	0.24	193.69	31.01	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	83.82	65.84	74.29		74.3	0.000014	0.4	208.31	33.03	0.03
P118-25-00	P118-25-00 R2	2494.17	Max WS	98.11	65.5	74.29		74.29	0.000015	0.43	227.69	35.73	0.03
P118-25-00	P118-25-00 R2	2473.31	Max WS	99.78	65.47	74.29	67.31	74.29	0.000016	0.44	225.16	35.01	0.03
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline											
P118-25-00	P118-25-00 R2	2465.6	Max WS	99.81	65.47	74.29		74.29	0.000015	0.43	234.23	37.73	0.03
P118-25-00	P118-25-00 R2	2465											
P118-25-00	P118-25-00 R2	2464											

Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions Trunc_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch B (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	103.81	65.38	74.29		74.29	0.000016	0.45	231.53	35.28	0.03
P118-25-00	P118-25-00 R2	2046.09	Max WS	104.88	64.63	74.28		74.28	0.000011	0.38	277.79	40.52	0.03
P118-25-00	P118-25-00 R1	1929.3	Max WS	273.87	64.22	74.26		74.28	0.0001	1.11	247.3	39.73	0.08
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	227.33	64.03	74.24		74.25	0.000062	0.93	243.29	33.08	0.06
P118-25-00	P118-25-00 R1	1208.56	Max WS	177.13	63.03	74.23		74.24	0.000034	0.71	250.01	30.27	0.04
P118-25-00	P118-25-00 R1	1188.81	Max WS	173.86	63.01	74.23	65.5	74.24	0.000035	0.71	243.53	29.97	0.04
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	173.79	62.94	74.23		74.23	0.000037	0.73	239.56	29.45	0.04
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	169.39	62.83	74.23		74.23	0.000028	0.65	262.37	33.01	0.04
P118-25-00	P118-25-00 R1	980.2	Max WS	151.61	62.34	74.23		74.23	0.000016	0.51	298.99	35.75	0.03
P118-25-00	P118-25-00 R1	963.63	Max WS	150.87	62.25	74.23		74.23	0.000008	0.44	339.97	45.01	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	151.31	62.25	74.23	64.17	74.23	0.000007	0.32	559.36	95	0.02
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	151.17	61.68	74.21		74.21	0.000005	0.32	550.25	86	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	151.21	61.68	74.21		74.21	0.000007	0.43	351.75	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	151.63	61.16	74.21		74.21	0.000011	0.44	347.38	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	136.23	60.25	74.21		74.21	0.000006	0.34	396.96	44.02	0.02
P118-25-00	P118-25-00 R1	251.81	Max WS	97.93	58.25	74.21		74.21	0.000002	0.21	462.82	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	93.12	58.04	74.21		74.21	0.000002	0.2	469.14	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	88.17	57.84	74.21		74.21	0.000001	0.19	475.45	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	83.13	57.63	74.21		74.21	0.000001	0.17	481.73	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	78.06	57.43	74.21		74.21	0.000001	0.16	488	44.04	0.01
P118-25-00	P118-25-00 R1	141.80*	Max WS	72.88	57.22	74.21		74.21	0.000001	0.15	494.29	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	67.47	57.02	74.21		74.21	0.000001	0.13	500.52	44.01	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	62.85	56.81	74.21	58.54	74.21	0.000001	0.12	506.84	44	0.01
P118-25-01	P118-25-01	5341.48	Max WS	19.19	70.47	76		76	0.000003	0.15	129.03	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	324.46	68.9	75.5		75.58	0.000779	2.26	143.27	42.03	0.22
P118-25-01	P118-25-01	4162.47	Max WS	331.67	69.44	75.27		75.34	0.000664	2.17	152.7	42.02	0.2
P118-25-01	P118-25-01	4134.04	Max WS	337.72	69.38	75.25	72.15	75.32	0.000662	2.17	155.7	43.02	0.2
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	337.12	69.25	75.18		75.26	0.000653	2.16	156.23	43.02	0.2
P118-25-01	P118-25-01	4047.7	Max WS	337.17	69.28	75.16		75.23	0.000639	2.16	156.2	42.03	0.2
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	327.69	67.84	74.96		75.01	0.000391	1.8	182.03	44.03	0.16
P118-25-01	P118-25-01	3312.44	Max WS	323.03	67.48	74.87		74.91	0.0003	1.57	206.04	51.15	0.14
P118-25-01	P118-25-01	3014.68	Max WS	288.73	67.53	74.81		74.84	0.000195	1.36	211.98	45.99	0.11
P118-25-01	P118-25-01	2924.04	Max WS	278.98	67.71	74.8		74.82	0.000172	1.28	217.84	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	206.01	66.67	74.8		74.82	0.000087	0.94	220.2	44.92	0.07
P118-25-01	P118-25-01	2728.92	Max WS	187.55	66.5	74.73		74.81	0.001238	2.27	82.58	29.03	0.24
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	185.16	66.31	74.44		74.52	0.001454	2.25	82.39	37.04	0.27
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	184.51	66.04	74.44		74.46	0.000164	1.23	149.95	30.71	0.1
P118-25-01	P118-25-01	1881.88	Max WS	153.61	66.57	74.37		74.38	0.000112	1	154.18	34	0.08
P118-25-01	P118-25-01	1384.48	Max WS	133.5	66.19	74.34		74.35	0.000058	0.76	176.24	35.03	0.06
P118-25-01	P118-25-01	1245.83	Max WS	132.38	66.34	74.33		74.34	0.000062	0.75	175.69	37.72	0.06
P118-25-01	P118-25-01	584.11	Max WS	88.25	65.88	74.31		74.31	0.000018	0.46	191.75	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	168.99	63.5	74.28		74.29	0.000056	0.84	200.98	27.03	0.05

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	2188.56	58.25	70.23		70.48	0.000695	4.05	540.72	72.44	0.26
P118-00-00	P118-R3-2	71854.2	Max WS	2186.48	57.83	70.06		70.18	0.000406	2.76	791.41	128.92	0.2
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	2211.24	55.05	69.73		69.82	0.000239	2.43	910.15	120.32	0.16
P118-00-00	P118-R3-2	69527.2	Max WS	2207.46	55.28	69.48		69.56	0.000186	2.25	980.32	122.5	0.14
P118-00-00	P118-R3-2	68670	Max WS	2204.65	54.88	69.13		69.3	0.000458	3.32	684.43	108.98	0.22
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	2203.9	54.47	68.92		69.08	0.000375	3.22	685.19	81.31	0.2
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2237.81	54.14	68.49		68.75	0.000656	4.1	546.87	96.43	0.25
P118-00-00	P118-R3-2	66869	Max WS	2236.99	53.96	67.77		68.15	0.001223	4.94	452.52	67.9	0.34
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2236.98	53.79	67.82		68.06	0.000684	3.96	565.05	76.62	0.26
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2236.36	53.6	67.49		67.74	0.000661	4.08	593.32	90.47	0.25
P118-00-00	P118-R3-2	65955.8	Max WS	2236.18	53.52	67.16		67.46	0.00093	4.4	508.71	72.39	0.29
P118-00-00	P118-R3-2	65434.6	Max WS	2235.99	53.1	66.71		67.01	0.000799	4.44	503.28	60.82	0.27
P118-00-00	P118-R3-2	64399.74	Max WS	2061.69	52.59	66.02		66.29	0.000681	4.18	493.1	57.45	0.25
P118-00-00	P118-R3-2	64273.7	Max WS	2061.64	53.55	66.01	59.44	66.22	0.0007	3.63	567.64	92.14	0.26
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	2061.64	53.3	65.98		66.17	0.000652	3.51	587.65	95.44	0.25
P118-00-00	P118-R3-2	64200	Max WS	2061.64	53.3	65.97		66.16	0.000653	3.51	587.32	95.39	0.25
P118-00-00	P118-R2-2	64100	Max WS	2241.27	52.61	65.98		66.05	0.000177	2.15	1044.81	137.31	0.14
P118-00-00	P118-R2-2	64094	Max WS	2241.27	52.61	65.98	58.19	66.05	0.000177	2.15	1044.68	137.3	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	2241.27	52.56	65.95		66.02	0.000176	2.14	1047.75	137.5	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	2241.27	52.78	65.84	59.29	66.02	0.000558	3.43	655.07	109.6	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	2241.27	53.04	65.57		65.78	0.000683	3.72	602.72	98.88	0.26
P118-00-00	P118-R2-2	63959.7	Max WS	2241.27	53.06	65.69	58.17	65.77	0.000383	2.17	1033.82	136.41	0.14
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	2241.25	53.16	65.65		65.73	0.000194	2.21	1011.86	134.82	0.14
P118-00-00	P118-R2-2	63756.7	Max WS	2250.32	52.4	65.37		65.7	0.000939	4.62	487.07	64.5	0.3
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	2299.66	50.35	64.68		64.97	0.00069	4.32	531.97	61.65	0.26
P118-00-00	P118-R2-2	61905.2	Max WS	2421.54	50.77	63.39		63.78	0.001845	4.96	488.2	102.44	0.4
P118-00-00	P118-R2-2	60625.3	Max WS	2419.8	49.52	62.71		62.98	0.000659	4.18	578.71	71.04	0.26
P118-00-00	P118-R2-1	60595.74	Max WS	2466.64	49.48	61.73		62.19	0.001268	5.47	450.67	58.57	0.35
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2466.54	49.68	61.69		62.08	0.001062	5.03	490.13	64.83	0.32
P118-00-00	P118-R2-1	60571.6*	Max WS	2466.54	49.89	61.65		61.99	0.000906	4.67	527.84	70.39	0.3
P118-00-00	P118-R2-1	60559.5*	Max WS	2466.44	50.09	61.62		61.91	0.000782	4.36	565.44	75.76	0.28
P118-00-00	P118-R2-1	60547.5*	Max WS	2466.34	50.3	61.58		61.84	0.000686	4.09	602.7	81.19	0.26
P118-00-00	P118-R2-1	60535.46	Max WS	2466.33	50.5	61.55		61.78	0.000605	3.85	640.12	86.47	0.25
P118-00-00	P118-R2-1	60536.4*	Max WS	2466.24	50.45	61.48		61.72	0.000664	3.95	624.31	87.44	0.26
P118-00-00	P118-R2-1	60257.3*	Max WS	2466.14	50.4	61.41		61.66	0.000724	4.04	610.56	88.5	0.27
P118-00-00	P118-R2-1	60118.3*	Max WS	2466.14	50.35	61.33		61.6	0.00078	4.11	599.6	89.68	0.28
P118-00-00	P118-R2-1	59979.2*	Max WS	2465.95	50.3	61.26		61.53	0.000831	4.17	591.4	90.99	0.29
P118-00-00	P118-R2-1	59840.2*	Max WS	2465.6	50.25	61.18		61.45	0.000874	4.21	586.02	92.46	0.29
P118-00-00	P118-R2-1	59701.1*	Max WS	2465.6	50.2	61.1		61.37	0.000902	4.22	583.6	93.71	0.3
P118-00-00	P118-R2-1	59562.1*	Max WS	2465.59	50.15	61.02		61.29	0.000918	4.22	584.19	95.14	0.3
P118-00-00	P118-R2-1	59423.1	Max WS	2465.59	50.1	60.94		61.21	0.000919	4.19	588.02	96.72	0.3
P118-00-00	P118-R2-1	59307.4*	Max WS	2465.63	50.1	60.86		61.13	0.000922	4.16	592.94	99.26	0.3
P118-00-00	P118-R2-1	59191.8*	Max WS	2465.67	50.11	60.79		61.05	0.000914	4.11	600.05	101.73	0.3
P118-00-00	P118-R2-1	59076.2*	Max WS	2465.6	50.11	60.72		60.98	0.000889	4.04	610.3	103.98	0.29
P118-00-00	P118-R2-1	58960.5*	Max WS	2465.65	50.11	60.66		60.9	0.000857	3.96	622.74	106.38	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	2465.6	50.11	60.6		60.83	0.000816	3.86	638.3	108.96	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	2465.63	50.12	60.54		60.76	0.000765	3.76	655.98	110.91	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	2465.59	50.12	60.49		60.7	0.000706	3.64	677.14	112.84	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	2469.12	47.59	60.32	54.66	60.54	0.000714	3.79	651.37	102.51	0.27
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	6.58	67.59	68.85		68.85	0.000167	0.58	11.37	17.3	0.13
P118-21-00	P118-21-00	2416.26	Max WS	6.71	67.5	68.84		68.84	0.000325	0.55	12.22	16.18	0.11
P118-21-00	P118-21-00	2398.13	Max WS	7.14	67.44	68.83		68.84	0.000263	0.52	13.67	15.63	0.1
P118-21-00	P118-21-00	2389.56	Max WS	7.59	67.47	68.83		68.83	0.000105	0.54	14.1	16.64	0.1
P118-21-00	P118-21-00	2343.79	Max WS	8.54	67.54	68.78		68.81	0.000772	1.31	6.53	8.88	0.27

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Ait1_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	9.21	67.47	68.72		68.75	0.002132	1.39	6.63	8.65	0.28
P118-21-00	P118-21-00	2208.42	Max WS	10.4	67.33	68.34		68.4	0.005055	1.92	5.42	8.42	0.42
P118-21-00	P118-21-00	2195.48	Max WS	10.4	67.34	68.27		68.34	0.003263	2.17	4.8	9.19	0.53
P118-21-00	P118-21-00	2169.49	Max WS	10.53	66.56	68.24		68.26	0.00034	1.1	9.54	8.58	0.18
P118-21-00	P118-21-00	2167.76	Max WS	10.51	66.37	68.25		68.26	0.000182	0.86	12.21	10.07	0.14
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	8.45	65.03	66.83		66.85	0.000273	0.91	9.26	9.61	0.16
P118-21-00	P118-21-00	2100.84	Max WS	8.45	64.78	66.83		66.83	0.000346	0.71	11.92	10.69	0.12
P118-21-00	P118-21-00	1662.37	Max WS	37.76	63.91	66.34		66.39	0.001375	1.77	21.29	13.42	0.25
P118-21-00	P118-21-00	1144.5	Max WS	57.64	62.63	65.55		65.62	0.001406	2.04	28.32	14.27	0.25
P118-21-00	P118-21-00	595.53	Max WS	78.69	61.49	63.94		64.1	0.003903	3.16	24.91	14.41	0.42
P118-21-00	P118-21-00	549.31*	Max WS	80.65	61.18	63.75		63.91	0.003983	3.22	25.08	14.33	0.43
P118-21-00	P118-21-00	503.08*	Max WS	82.61	60.87	63.54		63.71	0.004091	3.28	25.21	14.25	0.43
P118-21-00	P118-21-00	456.86*	Max WS	84.56	60.57	63.39		63.51	0.004373	3.35	25.21	14.48	0.45
P118-21-00	P118-21-00	410.63*	Max WS	86.52	60.26	63.1		63.28	0.00519	3.36	25.76	17.07	0.48
P118-21-00	P118-21-00	364.41*	Max WS	88.48	59.95	62.85		63.03	0.005202	3.38	26.2	17.32	0.48
P118-21-00	P118-21-00	318.18*	Max WS	90.43	59.64	62.6		62.78	0.005073	3.42	26.45	16.83	0.48
P118-21-00	P118-21-00	271.96*	Max WS	48.38	59.34	62.47		62.52	0.001142	1.71	28.22	16.42	0.23
P118-21-00	P118-21-00	225.73*	Max WS	49.34	59.03	62.43		62.47	0.000895	1.62	30.45	15.82	0.21
P118-21-00	P118-21-00	179.51	Max WS	50.3	58.72	62.39		62.43	0.000791	1.6	31.49	14.8	0.19
P118-21-00	P118-21-00	159.41*	Max WS	50.28	57.98	62.37		62.4	0.000409	1.27	39.62	15.54	0.14
P118-21-00	P118-21-00	139.31*	Max WS	50.28	57.24	62.37		62.39	0.000234	1.04	48.29	16.25	0.11
P118-21-00	P118-21-00	119.21*	Max WS	50.28	55.51	62.37		62.38	0.000145	0.88	57.35	16.92	0.08
P118-21-00	P118-21-00	99.11*	Max WS	50.28	55.77	62.36		62.37	0.000095	0.75	66.87	17.53	0.07
P118-21-00	P118-21-00	79.01	Max WS	50.28	55.03	62.36		62.37	0.000066	0.66	76.76	18.14	0.06
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	71.59		71.59	0.000037	0.31	31.89	18.19	0.04
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	71.59		71.59	0.000089	0.42	23.85	17.37	0.06
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.24	70.08	71.59	70.24	71.59	0.000132	0.48	21.25	16.98	0.08
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.24	70.2	71.57		71.58	0.000203	0.56	18.39	16.41	0.09
P118-23-00	P118-23-00 R2	7726.83	Max WS	10.65	70.16	71.57		71.57	0.000303	0.65	16.45	15.8	0.11
P118-23-00	P118-23-00 R2	7654.51	Max WS	13.25	69.97	71.54		71.55	0.000283	0.7	19.06	15.53	0.11
P118-23-00	P118-23-00 R2	7632.63	Max WS	14.27	69.88	71.53		71.54	0.000301	0.73	19.41	15.19	0.11
P118-23-00	P118-23-00 R2	7614.73	Max WS	14.97	68.92	71.53		71.54	0.00016	0.62	24.3	15.09	0.09
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	14.97	69.39	71.34		71.35	0.00023	0.68	21.88	15.48	0.1
P118-23-00	P118-23-00 R2	7567.5	Max WS	15.61	69.56	71.33		71.34	0.000311	0.78	20.14	14.79	0.12
P118-23-00	P118-23-00 R2	7426.94	Max WS	19.31	68.48	71.28		71.29	0.000306	0.85	22.72	13.98	0.12
P118-23-00	P118-23-00 R2	7369.89	Max WS	21.47	68.06	71.27		71.28	0.000266	0.84	25.66	14.31	0.11
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	21.47	69.59	71.12		71.18	0.001727	2.03	10.57	14.83	0.29
P118-23-00	P118-23-00 R2	7313.37	Max WS	22.04	69.5	71.15		71.16	0.000489	0.95	23.3	18.1	0.15
P118-23-00	P118-23-00 R2	7305.97	Max WS	22.33	69.12	71.15		71.16	0.000288	0.82	27.29	17.47	0.12
P118-23-00	P118-23-00 R2	7294.91	Max WS	22.73	69.43	71.14		71.15	0.000302	0.88	25.8	19.11	0.12
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	22.73	69.34	71.02		71.04	0.000652	1.25	18.17	16.84	0.18
P118-23-00	P118-23-00 R2	7237.19	Max WS	23.84	69.28	71.01		71.03	0.000586	1.01	23.57	19.09	0.16
P118-23-00	P118-23-00 R2	6786.22	Max WS	44.32	68.02	70.76		70.78	0.000442	1.11	39.96	22.73	0.15
P118-23-00	P118-23-00 R2	6723.56	Max WS	47.38	67.37	70.75		70.76	0.000165	0.78	60.45	27.62	0.09
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	47.37	67.54	70.03		70.15	0.004999	2.87	16.5	13.25	0.45
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	52.76	67.16	69.82		69.86	0.000869	1.55	34.12	19.28	0.2
P118-23-00	P118-23-00 R2	6402.43	Max WS	58.8	67.03	69.65		69.69	0.00108	1.75	33.66	18.55	0.23
P118-23-00	P118-23-00 R2	6356.93	Max WS	61.57	66.97	69.59	67.93	69.64	0.001169	1.82	33.83	18.62	0.24
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	61.56	66.93	69.55		69.6	0.001141	1.8	34.16	18.74	0.24
P118-23-00	P118-23-00 R2	6293.27	Max WS	63.11	66.88	69.51		69.56	0.001167	1.83	34.56	18.89	0.24
P118-23-00	P118-23-00 R2	5958.59	Max WS	76.6	66.24	69.14		69.18	0.000951	1.68	45.54	24.71	0.22
P118-23-00	P118-23-00 R2	5652.94	Max WS	88.31	65.7	68.67		68.76	0.001722	2.33	37.86	19.04	0.29
P118-23-00	P118-23-00 R2	5045.34	Max WS	88.05	63.97	67.97		68.01	0.000734	1.75	50.2	19.84	0.19
P118-23-00	P118-23-00 R2	4947.92	Max WS	94.08	63.84	67.93	64.95	67.96	0.000347	1.34	70.45	24.1	0.14
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	94.09	63.87	67.91		67.93	0.00023	1.15	81.7	24.64	0.11
P118-23-00	P118-23-00 R2	4783.1	Max WS	98.03	63.65	67.8		67.86	0.000979	1.97	49.87	18.87	0.21
P118-23-00	P118-23-00 R2	4580.38	Max WS	104.85	63.02	67.64	64.55	67.69	0.000612	1.72	61.1	20.58	0.18
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	104.82	63.16	67.62		67.66	0.000519	1.62	64.55	21.35	0.16
P118-23-00	P118-23-00 R2	4459.75	Max WS	109.64	63.55	67.53		67.59	0.000905	1.96	55.91	21.42	0.21
P118-23-00	P118-23-00 R2	4370.6	Max WS	113.61	63.42	67.43		67.5	0.00115	2.1	54.19	23.27	0.24
P118-23-00	P118-23-00 R2	4330.88	Max WS	115.11	62.88	67.45		67.45	0.00007	0.68	169.73	49.6	0.06
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	115.11	63.31	67.43		67.44	0.00007	0.66	175.21	55.22	0.07
P118-23-00	P118-23-00 R2	4229.24	Max WS	116.49	63.34	67.41		67.43	0.000283	1.2	97.47	35.26	0.13
P118-23-00	P118-23-00 R2	3733.5	Max WS	129.22	62.41	67.14		67.19	0.000656	1.85	69.97	23.52	0.19
P118-23-00	P118-23-00 R2	3187.46	Max WS	138.91	62.36	66.75		66.8	0.000715	1.87	74.31	26.98	0.2
P118-23-00	P118-23-00 R2	3150.64	Max WS	140.06	61.93	66.73	63.91	66.77	0.000604	1.77	79.14	27.09	0.18
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	139.68	61.56	66.67		66.72	0.00073	1.83	76.38	28.81	0.2
P118-23-00	P118-23-00 R2	3104.46	Max WS	140.16	61.63	66.62		66.7	0.0011	2.25	62.32	21.86	0.23
P118-23-00	P118-23-00 R2	2750.53	Max WS	102.85	60.59	66.43		66.46	0.000222	1.19	86.5	24.03	0.11
P118-23-00	P118-23-00 R2	2741.93	Max WS	102.99	60.44	66.43	62.03	66.45	0.00019	1.13	90.93	24.01	0.1
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	102.99	60.52	66.43		66.45	0.000174	1.07	95.91	26.28	0.1
P118-23-00	P118-23-00 R2	2716.57	Max WS	103.17	60.68	66.43		66.45	0.00019	1.11	93.02	25.89	0.1
P118-23-00	P118-23-00 R2	2615.37	Max WS	105.24	60.75	66.4		66.42	0.000203	1.16	90.46	24.41	0.11
P118-23-00	P118-23-00 R2	2244.98	Max WS	111.94	60.53	66.34		66.36	0.000143	1.04	107.85	26.41	0.09
P118-23-00	P118-23-00 R2	2221.06	Max WS	112.8	60.56	66.34	61.87	66.35	0.000162	1.09	103.51	25.82	0.1
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	112.81	60.59	66.32		66.34	0.000153	1.05	107.13	27.66	0.09
P118-23-00	P118-23-00 R2	2042.36	Max WS	114.97	59.78	66.3		66.31	0.000173	1.03	111.09	32.23	0.1
P118-23-00	P118-23-00 R2	1922.11	Max WS	114.96	59.56	66.29		66.3	0.000095	0.87	132.09	32.09	0.08
P118-23-00	P118-23-00 R2	1892.63	Max WS	124.94	59.68	66.28	61.62	66.29	0.000151	1.04	119.58	31.55	0.09
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	124.94	59.86	66.23		66.26	0.000295	1.37	90.87	25.25	0.13
P118-23-00	P118-23-00 R2	1829.45	Max WS	124.92	59.87	66.23		66.25	0.000202	1.17	106.62	28.95	0.11
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	124.94	59.04	66.21		66.22	0.000072	0.82	152.67	32.25	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	174.27	59.85	66.15		66.18	0.000209	1.33	130.62	29.39	0.11
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	174.21	59.99	66.15	61.39	66.17	0.000161	1.07	162.11	42.82	0.1
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	174.26	58.36	66.14		66.15	0.000066	0.85	205.42	39.2	0.07
P118-23-00	P118-23-00 R1	1354.02	Max WS	174.54	57.88	66.14		66.15	0.00007	0.85	204.21	38.44	0.07
P118-23-00	P118-23-00 R1	1010.56	Max WS	178.91	57.45	66.11		66.12	0.000086	0.99	179.82	30.02	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	169.67	57.03	66.08		66.09	0.000073	0.92	183.66	30.36	0.07
P118-23-00	P118-23-00 R1	242.54	Max WS	169.64	55.82	66.06	57.91	66.07	0.000026	0.59	289.33	46.44	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	169.64	55.57	66.05		66.06	0.000023	0.56	300.61	46.75	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	179.63	55.13	66.05		66.06	0.000018	0.48	382.83	79.91	0.04
P118-23-00	P118-23-00 R3	58.31	Max WS	179.58	53.78	66.05		66.06	0.00001	0.44	547.02	83.5	0.03
P118-23-02	P118-23-02	4138.85	Max WS	21.72	67.78	69.87		69.9	0.001005	1.29	16.84	17.3	0.21
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	21.68	66.69	69.7		69.7	0.000108	0.56	38.61	20.91	0.07
P118-23-02	P118-23-02	3782.06	Max WS	79.99	66.66	69.55		69.63	0.001825	2.25	35.55	19.99	0.3
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	80.07	66.22	69.57		69.58	0.00037	0.79	236.13	266.67	0.11
P118-23-02	P118-23-02	3692.61	Max WS	79.96	66.22	69.53		69.58	0.001058	1.87	42.77	210.76	0.23
P118-23-02	P118-23-02	3049.5	Max WS	79.82	65.47	68.99		69.03	0.000666	1.63	49.32	23.03	0.19
P118-23-02	P118-23-02	2386.67	Max WS	79.81	65.13	68.15		68.24	0.001743	2.41	33.16	15.34	0.29
P118-23-02	P118-23-02	2372.17	Max WS	79.81	65.16	68.13		68.21	0.001541	2.27	35.17	16.52	0.27
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	79.81	65.26	68.1		68.18	0.001654	2.33	34.28	21.04	0.28
P118-23-02	P118-23-02	2278.1	Max WS	79.81	65.19	68.06		68.14	0.001542	2.27	35.08	16.19	0.27
P118-23-02	P118-23-02	1453.34	Max WS	79.79	63.69	67.12		67.17	0.000815	1.79	44.5	18.33	0.2
P118-23-02	P118-23-02	1445.67	Max WS	79.79	63.66	67.12	65.1	67.16	0.000713	1.66	48.06	20.59	0.19
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	74.5	63.56	66.5		66.58	0.00175	2.22	33.63	18.54	0.29
P118-23-02	P118-23-02	1392.09	Max WS	74.31	63.36	66.46		66.54	0.001561	2.21	33.57	16.67	0.28
P118-23-02	P118-23-02	1317.96	Max WS	49.48	62.91	66.41		66.44	0.000576	1.4	35.38	16.22	0.17
P118-23-02	P118-23-02	1171.38	Max WS	49.47	61.86	66.35		66.37	0.000334	1.15	43.09	17.27	0.13
P118-23-02	P118-23-02	1083.7	Max WS	49.47	62.56	66.33		66.35	0.000292	1.09	45.55	18.35	0.12
P118-23-02	P118-23-02	215.24	Max WS	49.46	60.16	66.19		66.19	0.000062	0.62	79.83	22.36	0.06
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	68.19		68.2	0.000075	0.37	26.81	20.96	0.06
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	68.17		68.18	0.000079	0.38	26.4	20.88	0.06
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.99	66.13	68.15		68.15	0.000098	0.43	23.24	17.8	0.07
P118-25-00	P118-25-00 R2	2636.62	Max WS	16.93	65.84	68.09		68.1	0.000244	0.7	24.27	17.79	0.11
P118-25-00	P118-25-00 R2	2494.17	Max WS	16.93	65.5	68.07		68.07	0.000149	0.58	29.01	19.06	0.08
P118-25-00	P118-25-00 R2	2473.31	Max WS	16.93	65.47	68.06	66.35	68.07	0.000136	0.57	29.89	19.19	0.08
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	16.93	65.47	68.05		68.06	0.00014	0.58	29.12	18.26	0.08
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	16.93	65.38	68.05		68.05	0.000117	0.54	31.59	19.71	0.07
P118-25-00	P118-25-00 R2	2046.09	Max WS	16.91	64.63	68.02		68.02	0.000004	0.36	46.6	23.26	0.05
P118-25-00	P118-25-00 R1	1929.3	Max WS	98.26	64.22	67.83		67.92	0.001737	2.44	40.32	18.89	0.29
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	60.22	64.03	67.5		67.53	0.000471	1.33	45.2	19.65	0.15
P118-25-00	P118-25-00 R1	1208.56	Max WS	66	63.03	67.36		67.39	0.000301	1.18	56.1	20.57	0.13
P118-25-00	P118-25-00 R1	1188.81	Max WS	65.99	63.01	67.36	64.5	67.38	0.000326	1.22	53.96	19.5	0.13
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	65.97	62.94	67.34		67.37	0.000329	1.24	53.32	18.85	0.13
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	65.93	62.83	67.33		67.35	0.000266	1.13	58.45	20.68	0.12
P118-25-00	P118-25-00 R1	980.2	Max WS	65.83	62.34	67.3		67.32	0.000184	0.96	68.67	23.94	0.1
P118-25-00	P118-25-00 R1	963.63	Max WS	65.86	62.25	67.31		67.32	0.00007	0.66	100.51	30.57	0.06
P118-25-00	P118-25-00 R1	950.55	Max WS	65.83	62.25	67.3	63.55	67.31	0.00007	0.66	100.35	30.55	0.06
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	65.57	61.68	67.09		67.09	0.000069	0.64	103.24	33.04	0.06
P118-25-00	P118-25-00 R1	886.91	Max WS	65.54	61.68	67.08		67.09	0.000069	0.64	103.12	33.03	0.06
P118-25-00	P118-25-00 R1	839.05	Max WS	105.27	61.16	63.06		63.6	0.018944	5.89	17.87	13.61	0.91
P118-25-00	P118-25-00 R1	805	Max WS	34.99	58.35	60.66		60.67	0.000784	0.88	39.79	27.32	0.13
P118-25-00	P118-25-00 R1	772	Max WS	34.99	56	60.65	56.2	60.65	0.000003	0.11	325.77	70	0.01
P118-25-01	P118-25-01	5341.48	Max WS	25.87	70.47	72.29		72.32	0.001286	1.36	18.97	17.88	0.23
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	25.41	68.9	71.57		71.59	0.000611	1.08	23.51	17.61	0.16
P118-25-01	P118-25-01	4162.47	Max WS	30.77	69.44	71.34		71.36	0.000894	1.25	24.58	20.04	0.2
P118-25-01	P118-25-01	4134.04	Max WS	31.26	69.38	71.32	70.24	71.34	0.000833	1.22	25.53	20.4	0.19
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	31.25	69.25	71.28		71.3	0.000756	1.18	26.43	20.66	0.18
P118-25-01	P118-25-01	4047.7	Max WS	31.91	69.28	71.25		71.27	0.000745	1.18	26.95	20.79	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	39.73	67.84	71.03		71.05	0.000346	0.97	40.94	23.69	0.13
P118-25-01	P118-25-01	3312.44	Max WS	44.34	67.48	70.93		70.94	0.000349	0.98	45.44	26.35	0.13
P118-25-01	P118-25-01	3014.68	Max WS	49.39	67.53	70.85		70.86	0.000207	0.85	58.01	27.85	0.1
P118-25-01	P118-25-01	2924.04	Max WS	51.75	67.71	70.83		70.84	0.000231	0.89	58.41	28.72	0.11
P118-25-01	P118-25-01	2763.33	Max WS	54.28	66.67	70.8		70.81	0.000186	0.85	63.9	28.14	0.1
P118-25-01	P118-25-01	2728.92	Max WS	54.93	66.5	70.75		70.8	0.00053	1.86	29.48	20.95	0.18
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	54.93	66.31	70.73		70.77	0.000353	1.63	33.64	26.08	0.15
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	54.93	66.04	70.73		70.75	0.00026	1.05	52.31	20.35	0.12
P118-25-01	P118-25-01	1881.88	Max WS	81.75	66.57	70.26		70.32	0.001143	1.98	41.21	19.28	0.24
P118-25-01	P118-25-01	1384.48	Max WS	81.67	66.19	69.68		69.75	0.001218	2	40.74	19.85	0.25
P118-25-01	P118-25-01	1245.83	Max WS	81.65	66.34	69.51		69.57	0.001308	2.08	39.22	18.98	0.26
P118-25-01	P118-25-01	584.11	Max WS	81.48	65.88	68.62		68.69	0.001433	2.1	38.84	20.04	0.27
P118-25-01	P118-25-01	60.05	Max WS	81.36	63.5	68.03		68.08	0.000945	1.89	43.13	18.15	0.22

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq-ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4046.38	58.25	72.46		72.97	0.001084	5.71	708.66	77.9	0.33
P118-00-00	P118-R3-2	71854.2	Max WS	4040.22	57.83	72.31		72.52	0.000531	3.69	1095.39	141.53	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3989.72	55.05	71.82		71.99	0.000416	3.34	1210.79	203.62	0.21
P118-00-00	P118-R3-2	69527.2	Max WS	3984.38	55.28	71.39		71.55	0.000317	3.24	1340.89	463.08	0.19
P118-00-00	P118-R3-2	68670	Max WS	3971.31	54.88	70.76		71.11	0.000793	4.83	952.21	270.5	0.29
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3220.87	54.47	70.65		70.88	0.000426	3.87	927.5	225.05	0.21
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3134.9	54.14	70.21		70.54	0.000721	4.61	846.63	225.54	0.27
P118-00-00	P118-R3-2	66869	Max WS	2886.31	53.96	69.54		69.92	0.001063	4.96	583.72	98.48	0.32
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2844.3	53.79	69.61		69.86	0.000612	3.99	723.87	121.08	0.25
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2147.92	53.6	69.58		69.72	0.000285	3.02	933.79	222.33	0.17
P118-00-00	P118-R3-2	65955.8	Max WS	1272.36	53.52	69.65		69.69	0.000165	1.7	815.24	240.25	0.12
P118-00-00	P118-R3-2	65434.6	Max WS	38.51	53.1	69.7		69.7	0	0.05	1017.2	214.6	0
P118-00-00	P118-R3-2	64399.74	Max WS	3248.35	52.59	68.81		69.15	0.000727	4.68	775.6	156.57	0.27
P118-00-00	P118-R3-2	64273.7	Max WS	3219.14	53.55	68.84	61.04	69.05	0.000575	3.69	872.89	124.89	0.24
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3218.28	53.3	68.8		69	0.000525	3.58	900.29	130.68	0.23
P118-00-00	P118-R3-2	64200	Max WS	3218.22	53.3	68.8		69	0.000526	3.58	899.92	130.61	0.23
P118-00-00	P118-R2-2	64100	Max WS	3727.72	52.61	68.8		68.9	0.000182	2.56	1467.6	1394.64	0.14
P118-00-00	P118-R2-2	64094	Max WS	3727.17	52.61	68.8	59.43	68.9	0.000182	2.56	1467.44	1394.13	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	3727.17	52.56	68.78		68.88	0.00018	2.55	1471.46	1404.5	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	3726.42	52.78	68.65	61.11	68.88	0.000463	3.94	1023.4	892.95	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	3725.97	53.04	68.35		68.62	0.000571	4.2	946.47	591.9	0.25
P118-00-00	P118-R2-2	63959.7	Max WS	3726.13	53.06	68.5	59.39	68.6	0.000189	2.59	1447.24	877.56	0.15
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	3726.13	53.16	68.45		68.56	0.000199	2.64	1420.26	803.37	0.15
P118-00-00	P118-R2-2	63756.7	Max WS	3732.73	52.4	68.11		68.54	0.001095	5.28	777.31	205	0.33
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3679.94	50.35	67.24		67.65	0.000977	5.15	715.79	91.86	0.31
P118-00-00	P118-R2-2	61905.2	Max WS	3933.06	50.77	66.28		66.64	0.00113	4.84	813.27	123.19	0.33
P118-00-00	P118-R2-2	60625.3	Max WS	3940.41	49.52	65.56		65.92	0.001124	4.85	811.68	121.4	0.33
P118-00-00	P118-R2-1	60595.74	Max WS	3984.51	49.48	64.15		64.83	0.001563	6.58	605.86	70.23	0.39
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3983.63	49.68	64.13		64.69	0.001282	6.01	663.14	77.69	0.36
P118-00-00	P118-R2-1	60571.6*	Max WS	3983.35	49.89	64.1		64.58	0.001089	5.56	716.26	84.61	0.34
P118-00-00	P118-R2-1	60559.5*	Max WS	3983.27	50.09	64.06		64.48	0.00094	5.2	766.29	90.58	0.32
P118-00-00	P118-R2-1	60547.5*	Max WS	3983.23	50.3	64.03		64.4	0.000804	4.89	814.28	94.22	0.29
P118-00-00	P118-R2-1	60535.46	Max WS	3983.23	50.5	64		64.33	0.000678	4.61	864.06	96.46	0.27
P118-00-00	P118-R2-1	60536.4*	Max WS	3983.22	50.45	63.93		64.27	0.000725	4.68	851.19	98.13	0.28
P118-00-00	P118-R2-1	60257.3*	Max WS	3983.22	50.4	63.85		64.2	0.000769	4.74	840.7	99.83	0.29
P118-00-00	P118-R2-1	60118.3*	Max WS	3983.22	50.35	63.78		64.13	0.000808	4.78	833.37	101.6	0.29
P118-00-00	P118-R2-1	59979.2*	Max WS	3983.23	50.3	63.7		64.06	0.00084	4.8	829.09	103.44	0.3
P118-00-00	P118-R2-1	59840.2*	Max WS	3983.21	50.25	63.62		63.98	0.000863	4.81	827.96	105.37	0.3
P118-00-00	P118-R2-1	59701.1*	Max WS	3983.21	50.2	63.55		63.91	0.000876	4.8	830.03	107.26	0.3
P118-00-00	P118-R2-1	59562.1*	Max WS	3983.22	50.15	63.48		63.83	0.000877	4.77	835.33	109.11	0.3
P118-00-00	P118-R2-1	59423.1	Max WS	3983.21	50.1	63.41		63.75	0.000867	4.72	844.05	110.93	0.3
P118-00-00	P118-R2-1	59307.4*	Max WS	3983.24	50.1	63.34		63.68	0.000849	4.65	855.91	113.28	0.3
P118-00-00	P118-R2-1	59191.8*	Max WS	3983.22	50.11	63.28		63.6	0.000824	4.58	870.28	115.66	0.29
P118-00-00	P118-R2-1	59076.2*	Max WS	3983.24	50.11	63.22		63.54	0.000792	4.49	888.03	118.12	0.29
P118-00-00	P118-R2-1	58960.5*	Max WS	3983.23	50.11	63.17		63.47	0.000756	4.39	908.02	120.62	0.28
P118-00-00	P118-R2-1	58844.9*	Max WS	3983.23	50.11	63.12		63.41	0.000715	4.28	931.28	123.14	0.27
P118-00-00	P118-R2-1	58729.3*	Max WS	3983.23	50.12	63.08		63.35	0.000673	4.16	956.77	125.72	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	3983.26	50.12	63.04		63.29	0.000628	4.04	985.57	128.32	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	3986.9	47.59	62.86	56.75	63.14	0.000688	4.27	933.91	119.54	0.27
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	4.54	67.59	69.05		69.05	0.000035	0.31	15.05	19.78	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.84	67.5	69.04		69.04	0.000124	0.37	15.78	18.39	0.07
P118-21-00	P118-21-00	2398.13	Max WS	6.99	67.44	69.04		69.04	0.000132	0.4	17.31	18.44	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.08	67.41	69.04		69.04	0.000064	0.46	17.74	18.45	0.08
P118-21-00	P118-21-00	2343.79	Max WS	10.02	67.54	69		69.03	0.000503	1.16	8.62	10.12	0.22

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Ait1 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-21-00	P118-21-00	2303.58	Max WS	12.03	67.47	68.94		68.97	0.001743	1.38	8.69	9.75	0.26
P118-21-00	P118-21-00	2208.42	Max WS	14.69	67.33	68.71		68.75	0.002669	1.66	8.86	10.58	0.32
P118-21-00	P118-21-00	2195.48	Max WS	14.69	67.34	68.68		68.72	0.001051	1.64	8.98	11.04	0.32
P118-21-00	P118-21-00	2169.49	Max WS	14.69	66.56	68.68		68.7	0.000244	1.09	13.53	9.51	0.16
P118-21-00	P118-21-00	2167.76	Max WS	14.69	66.37	68.69		68.7	0.000142	0.87	16.92	11.29	0.13
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	14.67	65.03	67.76		67.77	0.000102	0.72	20.3	14.23	0.11
P118-21-00	P118-21-00	2100.84	Max WS	14.67	64.78	67.76		67.76	0.000163	0.62	23.69	14.64	0.09
P118-21-00	P118-21-00	1662.37	Max WS	71.39	63.91	67.34		67.4	0.001122	1.96	36.45	16.73	0.23
P118-21-00	P118-21-00	1144.5	Max WS	109.67	62.63	66.55		66.64	0.001541	2.5	43.9	17.13	0.28
P118-21-00	P118-21-00	595.53	Max WS	149.19	61.49	65.11		65.29	0.002947	3.4	43.93	18.18	0.39
P118-21-00	P118-21-00	549.31*	Max WS	37.6	61.18	65.06		65.07	0.000216	0.77	48.94	27.4	0.1
P118-21-00	P118-21-00	503.08*	Max WS	38.43	60.87	65.05		65.06	0.000151	0.67	57.72	30.87	0.09
P118-21-00	P118-21-00	456.86*	Max WS	39.28	60.57	65.05		65.05	0.000105	0.59	66.21	32.12	0.07
P118-21-00	P118-21-00	410.63*	Max WS	40.1	60.26	65.04		65.05	0.000077	0.54	73.63	32.07	0.06
P118-21-00	P118-21-00	364.41*	Max WS	40.94	59.95	65.04		65.04	0.000061	0.52	79.29	31.25	0.06
P118-21-00	P118-21-00	318.18*	Max WS	41.8	59.64	65.04		65.04	0.000051	0.5	83.16	29.94	0.05
P118-21-00	P118-21-00	271.96*	Max WS	42.64	59.34	65.04		65.04	0.000045	0.5	84.92	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	43.49	59.03	65.03		65.04	0.000044	0.52	84.43	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	44.34	58.72	65.03		65.03	0.000047	0.54	81.61	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	44.3	57.98	65.03		65.03	0.000034	0.49	91.17	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	44.29	57.24	65.03		65.03	0.000026	0.44	101.17	23.06	0.04
P118-21-00	P118-21-00	119.21*	Max WS	44.27	56.51	65.03		65.03	0.00002	0.4	111.48	23.5	0.03
P118-21-00	P118-21-00	99.11*	Max WS	44.21	55.77	65.03		65.03	0.000015	0.36	122.17	24.07	0.03
P118-21-00	P118-21-00	79.01	Max WS	44.11	55.03	65.03		65.03	0.000012	0.33	133.23	24.43	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.86		72.86	0.000007	0.17	57.3	21.92	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.85		72.86	0.000011	0.21	48.44	21.48	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.85	70.24	72.86	0.000015	0.23	45.59	21.43	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.85		72.85	0.000019	0.25	42.27	20.94	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.24	70.16	72.85		72.85	0.000026	0.28	39.78	20.63	0.04
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.22	69.97	72.84		72.85	0.000044	0.38	42.59	20.66	0.05
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.16	69.88	72.84		72.84	0.000053	0.43	42.64	20.32	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.51	68.92	72.84		72.84	0.000044	0.41	47.42	20.21	0.05
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.5	69.39	72.76		72.76	0.000045	0.41	47.36	20.53	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.74	69.56	72.75		72.76	0.000058	0.46	44.82	19.96	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.81	68.48	72.74		72.74	0.000089	0.59	47.25	116.79	0.07
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.95	68.06	72.73		72.74	0.000095	0.63	50.67	43.19	0.07
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.95	69.59	72.54		72.58	0.000416	1.55	20.55	19.77	0.16
P118-23-00	P118-23-00 R2	7313.37	Max WS	33.04	69.5	72.57		72.57	0.000104	0.63	52.71	23.28	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.59	69.12	72.56		72.57	0.000087	0.61	55.5	22.32	0.07
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.36	69.43	72.56		72.57	0.000084	0.71	48.48	22.08	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.35	69.34	72.37		72.39	0.000179	1	34.34	41.24	0.1
P118-23-00	P118-23-00 R2	7237.19	Max WS	36.48	69.28	72.38		72.38	0.00013	0.68	53.41	24.73	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	75.72	68.02	72.28		72.3	0.000185	0.93	86.28	98.89	0.1
P118-23-00	P118-23-00 R2	6723.56	Max WS	81.59	67.37	72.28		72.29	0.000098	0.75	109.28	36.18	0.08
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	81.59	67.54	71.07		71.17	0.000241	2.49	32.73	18.84	0.33
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	91.95	67.16	70.97		71.01	0.000583	1.55	59.35	24.62	0.18
P118-23-00	P118-23-00 R2	6402.43	Max WS	103.57	67.03	70.85		70.9	0.000724	1.75	59.05	23.75	0.2
P118-23-00	P118-23-00 R2	6356.93	Max WS	108.91	66.97	70.8	68.41	70.86	0.000776	1.82	59.7	23.85	0.2
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	108.91	66.93	70.78		70.83	0.000748	1.8	60.57	24.07	0.2
P118-23-00	P118-23-00 R2	6293.27	Max WS	111.89	66.88	70.75		70.8	0.000761	1.82	61.46	24.29	0.2
P118-23-00	P118-23-00 R2	5958.59	Max WS	137.9	66.24	70.52		70.56	0.000569	1.62	85.35	33.33	0.18
P118-23-00	P118-23-00 R2	5652.94	Max WS	160.58	65.7	70.23		70.31	0.000971	2.22	72.28	25.11	0.23
P118-23-00	P118-23-00 R2	5045.34	Max WS	52	63.97	70.08		70.08	0.00004	0.52	99.96	27.2	0.05
P118-23-00	P118-23-00 R2	4947.92	Max WS	55.19	63.84	70.08	64.58	70.08	0.000022	0.42	129.99	31.32	0.04
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	55.08	63.87	70.06		70.06	0.000018	0.39	142.13	31.84	0.03
P118-23-00	P118-23-00 R2	4783.1	Max WS	57.19	63.65	70.06		70.06	0.000049	0.56	102.95	28.12	0.05
P118-23-00	P118-23-00 R2	4580.38	Max WS	64.72	63.02	70.05	64.13	70.05	0.000038	0.53	120.98	29.5	0.05
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	64.7	63.16	70.04		70.04	0.000038	0.51	126.94	33.64	0.05
P118-23-00	P118-23-00 R2	4459.75	Max WS	67.27	63.55	70.03		70.04	0.000044	0.54	123.79	34.03	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	69.39	63.42	70.03		70.03	0.000054	0.5	138.44	52.91	0.05
P118-23-00	P118-23-00 R2	4330.88	Max WS	70.2	62.88	70.03		70.03	0.000005	0.23	311.83	70.38	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	70.13	63.31	70.02		70.02	0.000004	0.21	336.25	74.78	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	70.91	63.34	70.02		70.02	0.000013	0.34	206.54	49.07	0.03
P118-23-00	P118-23-00 R2	3733.5	Max WS	94.47	62.41	70		70	0.000044	0.62	152.7	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	294.88	62.36	69.82		69.87	0.000298	1.65	178.26	39.39	0.14
P118-23-00	P118-23-00 R2	3150.64	Max WS	302.63	61.93	69.81	64.88	69.85	0.000343	1.64	184.51	46.27	0.14
P118-23-00	P118-23-00 R2	3133.39											
P118-23-00	P118-23-00 R2	3126.39	Max WS	302.62	61.56	69.79		69.83	0.000345	1.55	194.73	54.01	0.14
P118-23-00	P118-23-00 R2	3104.46	Max WS	303.29	61.63	69.76		69.82	0.000577	1.84	164.56	50.19	0.18
P118-23-00	P118-23-00 R2	2750.53	Max WS	309.87	60.59	69.62		69.66	0.000288	1.73	178.76	33.71	0.13
P118-23-00	P118-23-00 R2	2741.93	Max WS	310.01	60.44	69.62	63.54	69.66	0.000268	1.69	183.02	33.71	0.13
P118-23-00	P118-23-00 R2	2733.96											
P118-23-00	P118-23-00 R2	2725.96	Max WS	309.99	60.52	69.62		69.65	0.000267	1.57	197.12	41.84	0.13
P118-23-00	P118-23-00 R2	2716.57	Max WS	310.16	60.68	69.61		69.65	0.000289	1.58	195.78	44.1	0.13
P118-23-00	P118-23-00 R2	2615.37	Max WS	312.06	60.75	69.58		69.62	0.000271	1.7	183.69	34.43	0.13
P118-23-00	P118-23-00 R2	2244.98	Max WS	318.2	60.53	69.5		69.53	0.000204	1.56	204.58	34.93	0.11
P118-23-00	P118-23-00 R2	2221.06	Max WS	318.98	60.56	69.49	63.19	69.53	0.000223	1.6	199.76	35.27	0.12
P118-23-00	P118-23-00 R2	2198.07											
P118-23-00	P118-23-00 R2	2187.07	Max WS	318.95	60.59	69.46		69.5	0.0002	1.53	208.61	36.78	0.11
P118-23-00	P118-23-00 R2	2042.36	Max WS	320.92	59.78	69.44		69.47	0.00026	1.33	240.76	67.27	0.12
P118-23-00	P118-23-00 R2	1922.11	Max WS	320.93	59.56	69.42		69.44	0.000174	1.27	252.21	55.46	0.11
P118-23-00	P118-23-00 R2	1892.63	Max WS	330.92	59.68	69.4	62.98	69.43	0.000204	1.37	241.25	53.72	0.11
P118-23-00	P118-23-00 R2	1882.46											
P118-23-00	P118-23-00 R2	1863.46	Max WS	330.88	59.86	69.3		69.35	0.000034	1.79	185.36	38.81	0.14
P118-23-00	P118-23-00 R2	1829.45	Max WS	330.88	59.87	69.31		69.34	0.000273	1.35	245.36	70.33	0.13
P118-23-00	P118-23-00 R2	1800											
P118-23-00	P118-23-00 R2	1611.06	Max WS	339.89	59.04	69.26		69.29	0.000158	1.26	270.61	55.29	0.1
P118-23-00	P118-23-00 R1	1513.84	Max WS	382.93	59.85	69.19		69.23	0.000236	1.56	262.72	690.34	0.12
P118-23-00	P118-23-00 R1	1490											
P118-23-00	P118-23-00 R1	1454.72	Max WS	384.11	59.99	69.19	62.52	69.21	0.000141	0.96	736.36	849.51	0.09
P118-23-00	P118-23-00 R1	1414.55											
P118-23-00	P118-23-00 R1	1380.55	Max WS	383.69	58.36	69.14		69.15	0.000061	0.71	1200.76	854.38	0.06
P118-23-00	P118-23-00 R1	1354.02	Max WS	397.32	57.88	69.14		69.15	0.000068	0.87	898.83	825.8	0.07
P118-23-00	P118-23-00 R1	1010.56	Max WS	443.28	57.45	69.08		69.1	0.000198	1.35	496.94	682.34	0.11
P118-23-00	P118-23-00 R1	649.49	Max WS	474.71	57.03	68.98		69.02	0.000199	1.6	356.56	433.7	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	499.93	55.82	68.94	59.59	68.95	0.000007	0.87	1195.58	779.96	0.07
P118-23-00	P118-23-00 R1	200											
P118-23-00	P118-23-00 R1	169.28	Max WS	499.93	55.57	68.91		68.92	0.000042	0.9	1387.21	945.16	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	508.87	55.13	68.9		68.91	0.000031	0.83	821.41	175.37	0.05
P118-23-00	P118-23-00 R3	58.31	Max WS	508.01	53.78	68.9		68.91	0.000028	0.9	785	83.5	0.05
P118-23-02	P118-23-02	4138.85	Max WS	39.47	67.78	70.87		70.89	0.00041	1.05	68.6	506.58	0.14
P118-23-02	P118-23-02	4137											
P118-23-02	P118-23-02	3790.71	Max WS	39.22	66.69	70.79		70.8	0.000105	0.56	69.65	340.29	0.07
P118-23-02	P118-23-02	3782.06	Max WS	143.12	66.66	70.7		70.76	0.001212	1.97	119.24	256.55	0.26
P118-23-02	P118-23-02	3748.42											
P118-23-02	P118-23-02	3714.78	Max WS	143.03	66.22	70.69		70.69	0.000117	0.42	985.82	1219.42	0.06
P118-23-02	P118-23-02	3692.61	Max WS	142.72	66.22	70.67		70.73	0.001005	1.97	72.53	1052.67	0.23
P118-23-02	P118-23-02	3049.5	Max WS	142.13	65.47	70.12		70.17	0.000739	1.84	99.75	120.55	0.2
P118-23-02	P118-23-02	2386.67	Max WS	43.79	65.13	69.34		69.35	0.000145	0.82	53.67	32.94	0.09
P118-23-02	P118-23-02	2372.17	Max WS	43.79	65.16	69.34		69.35	0.000131	0.75	58.36	28.85	0.09
P118-23-02	P118-23-02	2357.89											
P118-23-02	P118-23-02	2303.61	Max WS	43.78	65.26	69.33		69.34	0.000126	0.78	56.12	151.09	0.08
P118-23-02	P118-23-02	2278.1	Max WS	43.79	65.19	69.32		69.33	0.000118	0.76	57.64	32.61	0.08
P118-23-02	P118-23-02	1453.34	Max WS	43.22	63.69	69.27		69.27	0.000034	0.48	90.92	26.38	0.04
P118-23-02	P118-23-02	1445.67	Max WS	43.22	63.66	69.27	64.72	69.27	0.000028	0.43	100.35	28.41	0.04
P118-23-02	P118-23-02	1430.58											
P118-23-02	P118-23-02	1415.48	Max WS	43.21	63.56	69.26		69.26	0.000031	0.43	99.36	32.28	0.04
P118-23-02	P118-23-02	1392.09	Max WS	43.2	63.36	69.26		69.26	0.000033	0.46	93.26	32.24	0.04
P118-23-02	P118-23-02	1317.96	Max WS	43.2	62.91	69.25		69.26	0.000031	0.46	94.49	59.23	0.04
P118-23-02	P118-23-02	1171.38	Max WS	43.2	61.86	69.25		69.25	0.000022	0.41	106.4	82.33	0.04
P118-23-02	P118-23-02	1083.7	Max WS	43.18	62.56	69.25		69.25	0.00002	0.39	111.89	65.74	0.03
P118-23-02	P118-23-02	215.24	Max WS	43.2	60.16	69.24		69.24	0.000008	0.27	162.35	450.58	0.02
P118-25-00	P118-25-00 R2	3252.36	Max WS	16.17	66.34	70.47		70.47	0.000007	0.19	85.36	30.9	0.02
P118-25-00	P118-25-00 R2	3203.12	Max WS	15.98	66.34	70.46		70.47	0.000007	0.19	85.29	30.89	0.02
P118-25-00	P118-25-00 R2	3203											
P118-25-00	P118-25-00 R2	3202											
P118-25-00	P118-25-00 R2	2930.66	Max WS	10.99	66.13	70.46		70.46	0.000004	0.14	76.03	27.35	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	21.4	65.84	70.46		70.46	0.000016	0.26	81.78	32.61	0.03
P118-25-00	P118-25-00 R2	2494.17	Max WS	19.34	65.5	70.46		70.46	0.00001	0.21	90.77	35.23	0.02
P118-25-00	P118-25-00 R2	2473.31	Max WS	19.7	65.47	70.46	66.41	70.46	0.00001	0.22	91.02	35.01	0.02
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline											
P118-25-00	P118-25-00 R2	2465.6	Max WS	19.7	65.47	70.45		70.46	0.000011	0.22	89.65	36.59	0.02
P118-25-00	P118-25-00 R2	2465											
P118-25-00	P118-25-00 R2	2464											

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	18.3	65.38	70.46		70.46	0.000007	0.19	96.41	35.28	0.02
P118-25-00	P118-25-00 R2	2046.09	Max WS	13.28	64.63	70.46		70.46	0.000002	0.11	122.96	40.45	0.01
P118-25-00	P118-25-00 R1	1929.3	Max WS	161.73	64.22	70.4		70.44	0.000388	1.59	101.88	29.12	0.15
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	160.18	64.03	70.29		70.32	0.000271	1.4	114.1	29.69	0.13
P118-25-00	P118-25-00 R1	1208.56	Max WS	181.05	63.03	70.19		70.22	0.000249	1.42	127.59	30.12	0.12
P118-25-00	P118-25-00 R1	1188.81	Max WS	180.39	63.01	70.18	65.54	70.22	0.000274	1.48	122.28	28.9	0.13
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	180.39	62.94	70.16		70.2	0.000289	1.5	119.97	28.51	0.13
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	180.67	62.83	70.15		70.18	0.000235	1.39	129.96	30.06	0.12
P118-25-00	P118-25-00 R1	980.2	Max WS	177.39	62.34	70.13		70.15	0.000159	1.16	152.6	35.47	0.1
P118-25-00	P118-25-00 R1	963.63	Max WS	177.37	62.25	70.14		70.15	0.000065	0.9	196.82	41.09	0.07
P118-25-00	P118-25-00 R1	950.55	Max WS	177.19	62.25	70.13	64.32	70.15	0.000075	0.88	202.12	41.07	0.07
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	177.19	61.68	70.11		70.12	0.000061	0.79	225.67	47.5	0.06
P118-25-00	P118-25-00 R1	886.91	Max WS	177.18	61.68	70.11		70.12	0.000053	0.85	208.16	47.48	0.06
P118-25-00	P118-25-00 R1	839.05	Max WS	93.9	61.16	69.45		69.46	0.000031	0.55	170	34.01	0.04
P118-25-00	P118-25-00 R1	805	Max WS	93.31	58.35	69.46		69.46	0.000003	0.17	581.79	68.95	0.01
P118-25-00	P118-25-00 R1	772	Max WS	92.36	56	69.46	56.38	69.46	0.000001	0.1	942.07	70	0
P118-25-01	P118-25-01	5341.48	Max WS	50.49	70.47	73.17		73.2	0.000761	1.35	37.43	24.11	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50.25	68.9	72.72		72.74	0.000353	1.04	48.13	25.21	0.13
P118-25-01	P118-25-01	4162.47	Max WS	61.03	69.44	72.6		72.61	0.000384	1.11	54.93	28.26	0.14
P118-25-01	P118-25-01	4134.04	Max WS	62.01	69.38	72.58	70.58	72.6	0.000365	1.09	56.69	28.74	0.14
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	62	69.25	72.56		72.58	0.000034	1.07	58.19	29.07	0.13
P118-25-01	P118-25-01	4047.7	Max WS	63.32	69.28	72.54		72.56	0.000336	1.07	59.23	29.21	0.13
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.98	67.84	72.42		72.44	0.000225	0.98	80.18	32.84	0.11
P118-25-01	P118-25-01	3312.44	Max WS	88.17	67.48	72.35		72.37	0.000218	0.97	90.7	37.23	0.11
P118-25-01	P118-25-01	3014.68	Max WS	98.25	67.53	72.29		72.31	0.000166	0.94	104.31	36.28	0.1
P118-25-01	P118-25-01	2924.04	Max WS	102.96	67.71	72.28		72.29	0.000178	0.97	106.43	37.6	0.1
P118-25-01	P118-25-01	2763.33	Max WS	107.78	66.67	72.25		72.26	0.000166	0.97	111.03	36.78	0.1
P118-25-01	P118-25-01	2728.92	Max WS	109.07	66.5	72.16		72.27	0.000631	2.58	42.23	25.71	0.21
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	104.35	66.31	71.99		72.07	0.000486	2.32	44.93	30.11	0.18
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	109.07	66.04	72.01		72.04	0.000312	1.34	81.4	25.09	0.13
P118-25-01	P118-25-01	1881.88	Max WS	150.48	66.57	71.58		71.65	0.000918	2.14	70.17	24.58	0.22
P118-25-01	P118-25-01	1384.48	Max WS	148.95	66.19	71.17		71.23	0.000778	1.99	74.84	26.08	0.21
P118-25-01	P118-25-01	1245.83	Max WS	146.32	66.34	71.07		71.13	0.000756	2	73.24	24.6	0.2
P118-25-01	P118-25-01	584.11	Max WS	144.53	65.88	70.66		70.7	0.000476	1.67	86.38	26.65	0.16
P118-25-01	P118-25-01	60.05	Max WS	148.39	63.5	70.45		70.48	0.000345	1.52	97.83	25.99	0.14

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4889.81	58.25	73.49		74.06	0.001589	6.13	968.11	604.85	0.35
P118-00-00	P118-R3-2	71854.2	Max WS	4835.36	57.83	73.19		73.43	0.000549	3.95	1319.06	800.7	0.24
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4845.33	55.05	72.68		72.88	0.00043	3.63	1492.17	390.7	0.22
P118-00-00	P118-R3-2	69527.2	Max WS	4859.27	55.28	72.24		72.43	0.000344	3.55	1776.86	520	0.2
P118-00-00	P118-R3-2	68670	Max WS	4543.12	54.88	71.63		71.99	0.000732	4.93	1199.14	291.54	0.28
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3391.42	54.47	71.59		71.8	0.000341	3.68	1178.98	329.14	0.19
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2375.93	54.14	71.57		71.7	0.000247	2.91	1242.62	334.85	0.16
P118-00-00	P118-R3-2	66869	Max WS	2547.2	53.96	71.27		71.45	0.000465	3.45	834.53	167.63	0.22
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2519.51	53.79	71.29		71.42	0.000287	2.86	950.8	146.02	0.17
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	1685.19	53.6	71.32		71.37	0.000092	1.92	1327.72	227.52	0.1
P118-00-00	P118-R3-2	65955.8	Max WS	686.86	53.52	71.36		71.36	0.000019	0.68	1288.47	278.2	0.04
P118-00-00	P118-R3-2	65434.6	Max WS	-1150.07	53.1	71.34		71.37	0.000043	-1.27	1370.36	214.6	0.07
P118-00-00	P118-R3-2	64399.74	Max WS	3822.36	52.59	70.72		71.02	0.000513	4.45	1107.87	191.21	0.23
P118-00-00	P118-R3-2	64273.7	Max WS	4083.23	53.55	70.71	62.04	70.92	0.000449	3.68	1159.6	173.29	0.22
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4078.34	53.3	70.68		70.88	0.000416	3.59	1177.15	154.19	0.21
P118-00-00	P118-R3-2	64200	Max WS	4078.1	53.3	70.68		70.87	0.000416	3.59	1176.81	154.18	0.21
P118-00-00	P118-R2-2	64100	Max WS	5280.7	52.61	70.67		70.81	0.000202	3.03	1797.64	7778.55	0.16
P118-00-00	P118-R2-2	64094	Max WS	5280.56	52.61	70.66	60.53	70.81	0.000202	3.03	1797.45	7774.53	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5280.53	52.56	70.64		70.78	0.000201	3.02	1801.41	7839.43	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5280.5	52.78	70.47	62.64	70.79	0.000501	4.61	1275.22	7431.52	0.24
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5278.42	53.04	69.74		70.13	0.000691	5.1	1137.6	2895.59	0.28
P118-00-00	P118-R2-2	63959.7	Max WS	5279.34	53.06	69.95	60.47	70.1	0.000246	3.18	1684.07	4976.95	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5279.11	53.16	69.89		70.05	0.000259	3.24	1651.91	4349.39	0.17
P118-00-00	P118-R2-2	63756.7	Max WS	5284.69	52.4	69.47		70.05	0.001229	6.21	1056.06	205	0.36
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4508.71	50.35	68.86		69.28	0.00086	5.21	934.54	164.53	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	4968.39	50.77	68.06		68.41	0.00087	4.76	1043.77	132.2	0.3
P118-00-00	P118-R2-2	60625.3	Max WS	5218.09	49.52	67.42		67.81	0.000901	5.03	1038.33	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5210.3	49.48	66.22		66.91	0.001288	6.75	819.25	127.38	0.37
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5296.41	49.68	66.16		66.77	0.001124	6.3	876.92	125.51	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5339.08	49.89	66.13		66.66	0.000987	5.88	938.12	128.69	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5368.69	50.09	66.09		66.57	0.000885	5.53	998.25	134.13	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	5392.82	50.3	66.06		66.48	0.00081	5.23	1054.97	140.76	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5410.24	50.5	66.02		66.4	0.000753	4.97	1108.59	148.18	0.29
P118-00-00	P118-R2-1	60536.4*	Max WS	5415.1	50.45	65.95		66.33	0.000804	5.01	1101.69	152.2	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5415.1	50.4	65.87		66.26	0.00085	5.03	1097.19	156.19	0.3
P118-00-00	P118-R2-1	60118.3*	Max WS	5415.13	50.35	65.79		66.18	0.00089	5.03	1095.94	160.21	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5415.09	50.3	65.71		66.1	0.000922	5.02	1097.58	164.15	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	5415.05	50.25	65.64		66.02	0.000947	5	1102.11	168.14	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5415.04	50.2	65.56		65.94	0.000961	4.96	1110.33	172.15	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5415.86	50.15	65.48		65.85	0.000965	4.91	1121.33	176.4	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5418.08	50.1	65.4		65.77	0.000971	4.87	1134.91	180.64	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5418.09	50.1	65.32		65.68	0.000981	4.85	1132.73	195.78	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5418.05	50.11	65.24		65.6	0.000941	4.81	1128.63	174.74	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	5418	50.11	65.17		65.52	0.000864	4.75	1140.56	149.16	0.3
P118-00-00	P118-R2-1	58960.5*	Max WS	5418.06	50.11	65.11		65.45	0.000812	4.67	1159.18	148.04	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	5418.02	50.11	65.06		65.38	0.000743	4.58	1182.7	145.33	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	5418.05	50.12	65.02		65.33	0.000644	4.47	1212.35	138.48	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	5418.02	50.12	64.98		65.27	0.000603	4.35	1246.78	141.15	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	5508.61	47.59	64.78	58.03	65.12	0.000692	4.69	1185.86	543.07	0.28
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-4.57	67.88	69.47		69.47	0.003409	-0.56	8.46	19.34	0.1
P118-21-00	P118-21-00	2493.18	Max WS	-2.63	67.95	69.49		69.49	0.000754	-0.25	11.87	26.57	0.05
P118-21-00	P118-21-00	2450.3	Max WS	1.4	67.59	69.51		69.51	0.000001	0.06	25.03	22.83	0.01
P118-21-00	P118-21-00	2416.26	Max WS	3.34	67.5	69.51		69.51	0.00001	0.13	26.01	24.49	0.02
P118-21-00	P118-21-00	2398.13	Max WS	5.06	67.44	69.5		69.51	0.00002	0.19	25.7	21.66	0.03
P118-21-00	P118-21-00	2389.56	Max WS	6.69	67.41	69.5		69.5	0.000013	0.25	27.22	21.88	0.04
P118-21-00	P118-21-00	2343.79	Max WS	9.58	67.54	69.49		69.5	0.000114	0.68	14.23	12.66	0.11

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Ait1_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
P118-21-00	P118-21-00	2303.58	Max WS	12.58	67.47	69.47		69.48	0.000471	0.87	14.48	12.3	0.14	
P118-21-00	P118-21-00	2208.42	Max WS	16.55	67.31	69.42		69.43	0.000504	0.93	17.77	14.31	0.15	
P118-21-00	P118-21-00	2195.48	Max WS	16.55	67.34	69.41		69.43	0.000204	0.9	18.35	15.91	0.15	
P118-21-00	P118-21-00	2169.49	Max WS	16.55	66.56	69.41		69.42	0.000091	0.79	21.01	11.24	0.1	
P118-21-00	P118-21-00	2167.76	Max WS	16.55	66.37	69.41		69.42	0.000056	0.64	25.89	13.36	0.08	
P118-21-00	P118-21-00	2161.6	Culvert											
P118-21-00	P118-21-00	2135.78	Max WS	16.54	65.03	68.57		68.58	0.000035	0.49	33.5	18.51	0.06	
P118-21-00	P118-21-00	2100.84	Max WS	16.54	64.78	68.57		68.57	0.000063	0.45	37.03	18.22	0.06	
P118-21-00	P118-21-00	1662.37	Max WS	101.1	63.91	68.25		68.3	0.000856	1.91	52.99	20.54	0.21	
P118-21-00	P118-21-00	1144.5	Max WS	158.41	62.63	67.63		67.72	0.001154	2.47	64.11	20.23	0.24	
P118-21-00	P118-21-00	595.53	Max WS	0.38	61.49	66.92		66.92	0	0	111.71	47.22	0	
P118-21-00	P118-21-00	549.31*	Max WS	-9.85	61.18	66.92		66.92	0.000001	-0.08	122.31	44.42	0.01	
P118-21-00	P118-21-00	503.08*	Max WS	-21.44	60.87	66.92		66.92	0.000005	-0.16	130.62	41.62	0.02	
P118-21-00	P118-21-00	456.86*	Max WS	-33.1	60.57	66.92		66.92	0.000009	-0.24	136.53	38.81	0.02	
P118-21-00	P118-21-00	410.63*	Max WS	-44.06	60.26	66.92		66.92	0.000013	-0.32	140.19	36.01	0.03	
P118-21-00	P118-21-00	364.41*	Max WS	-55.1	59.95	66.92		66.92	0.000018	-0.39	141.34	33.21	0.03	
P118-21-00	P118-21-00	318.18*	Max WS	-65.77	59.64	66.92		66.92	0.000024	-0.47	140.27	30.43	0.04	
P118-21-00	P118-21-00	271.96*	Max WS	-77.14	59.34	66.92		66.92	0.000033	-0.57	136.81	27.6	0.04	
P118-21-00	P118-21-00	225.73*	Max WS	-88.15	59.03	66.91		66.92	0.000045	-0.67	131.05	24.8	0.05	
P118-21-00	P118-21-00	179.51	Max WS	-96.53	58.72	66.91		66.92	0.000068	-0.78	123	22	0.06	
P118-21-00	P118-21-00	159.41*	Max WS	-108.46	57.98	66.91		66.93	0.000068	-0.81	133.65	22.53	0.06	
P118-21-00	P118-21-00	139.31*	Max WS	-115.42	57.24	66.93		66.94	0.000062	-0.8	144.97	23.06	0.06	
P118-21-00	P118-21-00	119.21*	Max WS	-88.65	55.51	66.96		66.96	0.000003	-0.56	156.99	23.6	0.04	
P118-21-00	P118-21-00	99.11*	Max WS	-73.67	55.77	67		67	0.000017	-0.43	169.68	24.13	0.03	
P118-21-00	P118-21-00	79.01	Max WS	-61.81	55.03	67.04		67.04	0.00001	-0.34	182.89	24.66	0.02	
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.15		74.15	0.000002	0.11	90.71	36.79	0.01	
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.15		74.15	0.000003	0.13	79.58	31.02	0.01	
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.58	70.08	74.15	70.24	74.15	0.000004	0.14	76.32	25.96	0.01	
P118-23-00	P118-23-00 R2	7736.4	Bridge											
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.58	70.2	74.15		74.15	0.000004	0.15	72.54	27.48	0.02	
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.59	70.16	74.15		74.15	0.000006	0.17	69.91	27.54	0.02	
P118-23-00	P118-23-00 R2	7654.51	Max WS	17.94	69.97	74.15		74.15	0.000012	0.25	72.86	25.84	0.03	
P118-23-00	P118-23-00 R2	7632.63	Max WS	20.42	69.88	74.15		74.15	0.000016	0.28	72.46	25.42	0.03	
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.12	68.92	74.14		74.15	0.000015	0.29	77.82	31.7	0.03	
P118-23-00	P118-23-00 R2	7597.04	Culvert											
P118-23-00	P118-23-00 R2	7584.04	Max WS	22	69.39	74.06		74.06	0.000015	0.28	90.92	155.99	0.03	
P118-23-00	P118-23-00 R2	7567.5	Max WS	23.56	69.56	74.06		74.06	0.000019	0.32	74.05	486.28	0.03	
P118-23-00	P118-23-00 R2	7426.94	Max WS	32.48	68.48	74.05		74.06	0.000033	0.42	76.56	1133.49	0.04	
P118-23-00	P118-23-00 R2	7369.89	Max WS	37.7	68.06	74.05		74.05	0.000039	0.47	80.07	1057.92	0.05	
P118-23-00	P118-23-00 R2	7358.91	Culvert											
P118-23-00	P118-23-00 R2	7325.91	Max WS	37.7	69.59	73.81		73.83	0.000176	1.28	29.4	509.65	0.11	
P118-23-00	P118-23-00 R2	7313.37	Max WS	39.08	69.5	73.82		73.83	0.000038	0.46	84.79	555.68	0.05	
P118-23-00	P118-23-00 R2	7305.97	Max WS	39.78	69.12	73.82		73.83	0.000036	0.46	86.34	465.01	0.05	
P118-23-00	P118-23-00 R2	7294.91	Max WS	40.74	69.43	73.82		73.83	0.000037	0.59	68.56	486.74	0.05	
P118-23-00	P118-23-00 R2	7280.57	Culvert											
P118-23-00	P118-23-00 R2	7260.57	Max WS	40.74	69.34	73.56		73.57	0.000041	0.47	128.44	134.88	0.05	
P118-23-00	P118-23-00 R2	7237.19	Max WS	43.44	69.28	73.56		73.56	0.000046	0.49	115.91	133.41	0.05	
P118-23-00	P118-23-00 R2	6786.22	Max WS	93.29	68.02	73.53		73.54	0.000068	0.58	412.62	1359.17	0.06	
P118-23-00	P118-23-00 R2	6723.56	Max WS	100.75	67.37	73.53		73.53	0.000059	0.63	159.39	46.06	0.06	
P118-23-00	P118-23-00 R2	6675.9	Culvert											
P118-23-00	P118-23-00 R2	6655.9	Max WS	95.29	67.54	71.84		71.9	0.001234	1.89	50.34	26.93	0.24	
P118-23-00	P118-23-00 R2	6655	Lat Struct											
P118-23-00	P118-23-00 R2	6654	Lat Struct											
P118-23-00	P118-23-00 R2	6563.37	Max WS	110.22	67.16	71.78		71.81	0.000364	1.36	80.84	28.43	0.14	
P118-23-00	P118-23-00 R2	6402.43	Max WS	127.07	67.03	71.7		71.74	0.000466	1.57	80.77	27.39	0.16	
P118-23-00	P118-23-00 R2	6356.93	Max WS	134.83	66.97	71.67	68.63	71.71	0.000506	1.65	81.83	27.54	0.17	
P118-23-00	P118-23-00 R2	6337.93	Bridge											
P118-23-00	P118-23-00 R2	6324.93	Max WS	134.84	66.93	71.65		71.69	0.000488	1.62	83.07	27.84	0.17	
P118-23-00	P118-23-00 R2	6293.27	Max WS	139.17	66.88	71.63		71.67	0.0005	1.65	84.37	28.08	0.17	
P118-23-00	P118-23-00 R2	5958.59	Max WS	177.21	66.24	71.47		71.5	0.00039	1.47	120.58	40.96	0.15	
P118-23-00	P118-23-00 R2	5652.94	Max WS	139.45	65.7	71.36		71.39	0.000286	1.35	103.09	30.06	0.13	
P118-23-00	P118-23-00 R2	5045.34	Max WS	47.42	63.97	71.31		71.32	0.000014	0.35	136.19	31.47	0.03	
P118-23-00	P118-23-00 R2	4947.92	Max WS	50.41	63.84	71.31	64.53	71.31	0.000011	0.29	173.09	41.98	0.03	
P118-23-00	P118-23-00 R2	4925.91	Bridge											
P118-23-00	P118-23-00 R2	4915.91	Max WS	50.27	63.87	71.3		71.3	0.000007	0.27	183.97	34.77	0.02	
P118-23-00	P118-23-00 R2	4783.1	Max WS	65.02	63.65	71.3		71.3	0.000029	0.45	144.74	37.16	0.04	
P118-23-00	P118-23-00 R2	4580.38	Max WS	101.85	63.02	71.28	64.52	71.29	0.000056	0.61	168.14	46.95	0.06	
P118-23-00	P118-23-00 R2	4564.28	Bridge											
P118-23-00	P118-23-00 R2	4553.28	Max WS	101.65	63.16	71.27		71.27	0.000054	0.55	183.53	58.28	0.06	
P118-23-00	P118-23-00 R2	4459.75	Max WS	114.72	63.55	71.26		71.27	0.000063	0.63	181.35	52.65	0.06	
P118-23-00	P118-23-00 R2	4370.6	Max WS	123.15	63.42	71.26		71.26	0.000051	0.57	216.72	65.06	0.05	
P118-23-00	P118-23-00 R2	4330.88	Max WS	125.68	62.88	71.26		71.26	0.000013	0.29	428.08	125.25	0.03	
P118-23-00	P118-23-00 R2	4299.23	Culvert											

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq-ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	125.28	63.31	71.23		71.23	0.000007	0.29	427.9	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	127.55	63.34	71.22		71.23	0.000002	0.48	267.91	51.14	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	151.55	62.41	71.2		71.21	0.000056	0.78	193.79	34.28	0.06
P118-23-00	P118-23-00 R2	3187.46	Max WS	177.25	62.36	71.17		71.17	0.000049	0.76	232.1	40.27	0.06
P118-23-00	P118-23-00 R2	3150.64	Max WS	181.69	61.93	71.16	64.2	71.17	0.000052	0.71	254.55	52.14	0.06
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	181.7	61.56	71.16		71.17	0.000045	0.67	270.14	55.63	0.05
P118-23-00	P118-23-00 R2	3104.46	Max WS	183.64	61.63	71.16		71.16	0.000007	0.78	236.75	52.53	0.06
P118-23-00	P118-23-00 R2	2750.53	Max WS	206.98	60.59	71.13		71.14	0.000061	0.9	230.65	34.6	0.06
P118-23-00	P118-23-00 R2	2741.93	Max WS	207.51	60.44	71.13	62.89	71.14	0.000059	0.88	235.18	34.96	0.06
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	207.51	60.52	71.11		71.12	0.000052	0.8	260.89	42.97	0.06
P118-23-00	P118-23-00 R2	2716.57	Max WS	209	60.68	71.11		71.12	0.00006	0.78	266.56	52.19	0.06
P118-23-00	P118-23-00 R2	2615.37	Max WS	224.88	60.75	71.1		71.11	0.000068	0.94	239.82	37.87	0.07
P118-23-00	P118-23-00 R2	2244.98	Max WS	235.29	60.53	71.08		71.09	0.000056	0.9	260.86	35.71	0.06
P118-23-00	P118-23-00 R2	2221.06	Max WS	234.49	60.56	71.08	62.72	71.09	0.000059	0.91	257.7	36.69	0.06
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	233.57	60.59	71.06		71.07	0.000052	0.87	267.88	37.2	0.06
P118-23-00	P118-23-00 R2	2042.36	Max WS	244.31	59.78	71.05		71.06	0.000046	0.7	349.45	67.27	0.05
P118-23-00	P118-23-00 R2	1922.11	Max WS	245.63	59.56	71.05		71.06	0.000042	0.67	368.9	72.85	0.05
P118-23-00	P118-23-00 R2	1892.63	Max WS	254.35	59.68	71.05	62.54	71.05	0.000005	0.74	343.44	66.31	0.06
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	254.16	59.86	70.98		71	0.000081	1.01	250.79	38.81	0.07
P118-23-00	P118-23-00 R2	1829.45	Max WS	268.77	59.87	70.99		71	0.000052	0.72	371.6	75.5	0.06
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	340.82	59.04	70.97		70.98	0.000065	0.91	375.73	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	631.33	59.85	70.95		70.96	0.000006	0.96	2189.19	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	638.72	59.99	70.95	63.8	70.95	0.000037	0.64	2460.25	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	638.62	58.36	70.94		70.94	0.000023	0.56	2861.73	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	669.47	57.88	70.94		70.94	0.000025	0.64	2868.62	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	855.37	57.45	70.91		70.92	0.000076	1.05	2135.65	742.6	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	1040.42	57.03	70.86		70.88	0.000129	1.48	1676.57	449.67	0.09
P118-23-00	P118-23-00 R1	242.54	Max WS	1183.03	55.82	70.83	61.61	70.83	0.000044	0.7	6166.51	4885.5	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1181.56	55.57	70.81		70.81	0.000031	0.75	7321.88	5170.25	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1189.95	55.13	70.79		70.82	0.000077	1.5	1152.28	175.37	0.08
P118-23-00	P118-23-00 R3	58.31	Max WS	1187.11	53.78	70.78		70.82	0.000089	1.77	941.69	83.5	0.09
P118-23-02	P118-23-02	4138.85	Max WS	58.62	67.78	71.48		71.49	0.000224	0.86	242.61	1024.39	0.11
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	57.3	66.69	71.43		71.43	0.000101	0.59	102.59	895.06	0.08
P118-23-02	P118-23-02	3782.06	Max WS	212.66	66.66	71.41		71.43	0.000562	1.4	542.22	1021.32	0.17
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	213.01	66.22	71.41		71.41	0.000054	0.29	1878.58	1255.44	0.03
P118-23-02	P118-23-02	3692.61	Max WS	215.37	66.22	71.38		71.46	0.001244	2.21	97.62	1238.84	0.27
P118-23-02	P118-23-02	3049.5	Max WS	34.13	65.47	71.02		71.02	0.000013	0.23	364.47	1041.4	0.03
P118-23-02	P118-23-02	2386.67	Max WS	33.79	65.13	71.01		71.01	0.000006	0.18	823.36	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	33.84	65.16	71.01		71.01	0.000005	0.13	925.18	1094.25	0.01
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	33.36	65.26	71		71.01	0.000021	0.35	95.33	1047.77	0.04
P118-23-02	P118-23-02	2278.1	Max WS	31.53	65.19	71		71	0.000006	0.19	724.15	1052.03	0.02
P118-23-02	P118-23-02	1453.34	Max WS	105.06	63.69	70.99		70.99	0.000029	0.5	857.68	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	105.9	63.66	70.99	65.34	70.99	0.000022	0.47	947.86	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	105.79	63.56	70.99		70.99	0.000014	0.36	1276.1	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	107.86	63.36	70.99		70.99	0.000013	0.29	1155.55	958.63	0.03
P118-23-02	P118-23-02	1317.96	Max WS	110.3	62.91	70.98		70.99	0.000011	0.32	1323.12	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	118.82	61.86	70.98		70.99	0.000037	0.61	478.66	1203.83	0.05
P118-23-02	P118-23-02	1083.7	Max WS	127.89	62.56	70.98		70.98	0.000011	0.33	1507.11	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	290.59	60.16	70.96		70.96	0.000023	0.49	1973.51	1102.12	0.04
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	71.68		71.68	0.000001	0.08	127.68	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.97	66.34	71.68		71.68	0.000001	0.08	127.66	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	45.28	66.13	71.67		71.68	0.000024	0.4	112.26	31.01	0.04
P118-25-00	P118-25-00 R2	2636.62	Max WS	90.77	65.84	71.64		71.65	0.000084	0.75	120.86	33.01	0.07
P118-25-00	P118-25-00 R2	2494.17	Max WS	107.93	65.5	71.63		71.64	0.000096	0.81	132.5	35.73	0.07
P118-25-00	P118-25-00 R2	2473.31	Max WS	108.85	65.47	71.62	67.39	71.63	0.000098	0.83	131.83	35.01	0.08
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	108.66	65.47	71.62		71.63	0.000101	0.81	133.52	37.73	0.08
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	107.41	65.38	71.62		71.63	0.000085	0.78	137.35	35.28	0.07
P118-25-00	P118-25-00 R2	2046.09	Max WS	119.39	64.63	71.59		71.6	0.000063	0.71	168.63	40.52	0.06
P118-25-00	P118-25-00 R1	1929.3	Max WS	270.06	64.22	71.5		71.56	0.000555	1.95	138.18	38.22	0.18
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	200.18	64.03	71.35		71.38	0.000211	1.36	147.62	33.08	0.11
P118-25-00	P118-25-00 R1	1208.56	Max WS	180.71	63.03	71.3		71.32	0.000124	1.12	161.28	30.27	0.09
P118-25-00	P118-25-00 R1	1188.81	Max WS	176.64	63.01	71.3	65.51	71.32	0.000132	1.14	155.52	29.97	0.09
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	176.31	62.94	71.27		71.29	0.000138	1.16	152.57	29.45	0.09
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	176.76	62.83	71.27		71.29	0.000117	1.07	164.77	32.45	0.08
P118-25-00	P118-25-00 R1	980.2	Max WS	165.64	62.34	71.25		71.27	0.000069	0.86	192.7	35.75	0.07
P118-25-00	P118-25-00 R1	963.63	Max WS	168.04	62.25	71.26		71.26	0.000032	0.71	235.97	43.37	0.05
P118-25-00	P118-25-00 R1	950.55	Max WS	168.03	62.25	71.25	64.27	71.26	0.000041	0.65	277.62	93.36	0.06
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	167.4	61.68	71.24		71.24	0.000032	0.59	294.74	86	0.05
P118-25-00	P118-25-00 R1	886.91	Max WS	167.19	61.68	71.24		71.24	0.000026	0.67	247.71	51.01	0.04
P118-25-00	P118-25-00 R1	839.05	Max WS	166.99	61.16	71.23		71.24	0.00004	0.71	235.18	37.72	0.05
P118-25-00	P118-25-00 R1	805	Max WS	167.09	58.35	71.24		71.24	0.000005	0.25	704.5	68.95	0.01
P118-25-00	P118-25-00 R1	772	Max WS	167.19	56	71.24	56.56	71.24	0.000002	0.16	1066.62	70	0.01
P118-25-01	P118-25-01	5341.48	Max WS	11.12	70.47	74.67		74.67	0.000004	0.14	81.66	34.39	0.02
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	163.09	68.9	74.33		74.38	0.000568	1.67	97.43	35.86	0.18
P118-25-01	P118-25-01	4162.47	Max WS	176.04	69.44	74.16		74.2	0.000523	1.64	107.14	38.5	0.17
P118-25-01	P118-25-01	4134.04	Max WS	179.61	69.38	74.14	71.41	74.19	0.000515	1.64	109.48	38.99	0.17
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	179.59	69.25	74.09		74.13	0.000504	1.63	110.37	39.13	0.17
P118-25-01	P118-25-01	4047.7	Max WS	179.26	69.28	74.07		74.11	0.000487	1.61	111.43	39.16	0.17
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	197.38	67.84	73.9		73.93	0.00034	1.45	135.84	42.15	0.14
P118-25-01	P118-25-01	3312.44	Max WS	199.3	67.48	73.81		73.84	0.000276	1.3	153.06	48.33	0.13
P118-25-01	P118-25-01	3014.68	Max WS	202.4	67.53	73.74		73.76	0.000212	1.24	162.85	44.73	0.11
P118-25-01	P118-25-01	2924.04	Max WS	203.02	67.71	73.72		73.74	0.000203	1.21	167.12	46.07	0.11
P118-25-01	P118-25-01	2763.33	Max WS	190.51	66.67	73.7		73.72	0.000163	1.12	170.61	44.92	0.1
P118-25-01	P118-25-01	2728.92	Max WS	193.25	66.5	73.55		73.74	0.000834	3.53	54.74	29.03	0.25
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	155.01	66.31	72.91		73.04	0.00061	2.91	53.22	33.07	0.21
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	154.78	66.04	72.97		73	0.000299	1.45	106.82	27.96	0.13
P118-25-01	P118-25-01	1881.88	Max WS	212	66.57	72.46		72.54	0.000841	2.27	93.56	28.15	0.22
P118-25-01	P118-25-01	1384.48	Max WS	214.13	66.19	72.08		72.15	0.000726	2.13	100.51	29.93	0.2
P118-25-01	P118-25-01	1245.83	Max WS	213.67	66.34	71.98		72.05	0.000749	2.2	97.14	27.88	0.21
P118-25-01	P118-25-01	584.11	Max WS	179.32	65.88	71.69		71.73	0.000325	1.55	115.73	29.02	0.14
P118-25-01	P118-25-01	60.05	Max WS	159.2	63.5	71.58		71.6	0.000183	1.24	128.08	27.03	0.1

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min.Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	5022.71	58.25	74.05		74.53	0.002112	5.68	1413.21	944.46	0.33
P118-00-00	P118-R3-2	71854.2	Max WS	5004.25	57.83	73.52		73.75	0.000508	3.9	1602.37	923.52	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5033.84	55.05	73.03		73.23	0.000405	3.62	1635.5	447.2	0.21
P118-00-00	P118-R3-2	69527.2	Max WS	5067.66	55.28	72.62		72.8	0.000323	3.53	1972.64	520	0.19
P118-00-00	P118-R3-2	68670	Max WS	4428.01	54.88	72.14		72.44	0.000568	4.5	1351.38	305.51	0.25
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3364.66	54.47	72.09		72.27	0.000282	3.44	1354.32	354.04	0.18
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2218.01	54.14	72.1		72.19	0.000175	2.53	1419.22	341.48	0.14
P118-00-00	P118-R3-2	66869	Max WS	2518.4	53.96	71.84		71.99	0.000382	3.15	931.34	176.15	0.2
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2469.42	53.79	71.85		71.96	0.000235	2.62	1035.03	155.12	0.16
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	1714.08	53.6	71.86		71.91	0.000079	1.83	1452.4	227.52	0.09
P118-00-00	P118-R3-2	65955.8	Max WS	840.49	53.52	71.9		71.9	0.000022	0.77	1438.09	278.2	0.05
P118-00-00	P118-R3-2	65434.6	Max WS	952.33	53.1	71.89		71.91	0.000025	-0.99	1488.09	214.6	0.05
P118-00-00	P118-R3-2	64399.74	Max WS	3828.22	52.59	71.37		71.62	0.000418	4.16	1234.73	202.89	0.21
P118-00-00	P118-R3-2	64273.7	Max WS	4287.89	53.55	71.32	62.27	71.51	0.0004	3.6	1265.76	175.48	0.21
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4286.32	53.3	71.29		71.48	0.000374	3.52	1271.94	156.38	0.2
P118-00-00	P118-R3-2	64200	Max WS	4286.32	53.3	71.29		71.48	0.000374	3.52	1271.64	156.38	0.2
P118-00-00	P118-R2-2	64100	Max WS	5902.86	52.61	71.26		71.42	0.000213	3.21	1905.48	8658.24	0.16
P118-00-00	P118-R2-2	64094	Max WS	5902.75	52.61	71.26	60.93	71.42	0.000213	3.21	1905.28	8657.21	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5902.83	52.56	71.23		71.39	0.000211	3.21	1909.06	8676.51	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5902.76	52.78	71.05	63.18	71.41	0.000525	4.89	1355.22	8288.77	0.25
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5902.53	53.04	70.11		70.56	0.000764	5.49	1188.23	4152.7	0.3
P118-00-00	P118-R2-2	63959.7	Max WS	5902.72	53.06	70.34	60.87	70.53	0.000275	3.43	1752.08	7329.35	0.18
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5902.74	53.16	70.28		70.46	0.00029	3.49	1717.75	6553.94	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	5907.44	52.4	69.82		70.47	0.00134	6.64	1126.88	205	0.38
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4843.7	50.35	69.25		69.69	0.000868	5.36	999.91	169.55	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	5231.05	50.77	68.52		68.86	0.000808	4.74	1103.67	132.2	0.29
P118-00-00	P118-R2-2	60625.3	Max WS	5588.15	49.52	67.87		68.28	0.000879	5.11	1092.95	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5561.34	49.48	66.73		67.42	0.001218	6.78	885.82	131.55	0.36
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5701.93	49.68	66.64		67.27	0.001099	6.43	938.21	132.38	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5797.22	49.89	66.58		67.15	0.000989	6.07	997.64	132.89	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5853.95	50.09	66.54		67.05	0.000895	5.73	1058.98	137.43	0.32
P118-00-00	P118-R2-1	60547.5*	Max WS	5900.36	50.3	66.5		66.95	0.000825	5.44	1117.77	143.45	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5937.31	50.5	66.46		66.87	0.000771	5.19	1173.95	150.43	0.29
P118-00-00	P118-R2-1	60396.4*	Max WS	5949.75	50.45	66.38		66.8	0.00082	5.22	1168.43	154.43	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5950.85	50.4	66.3		66.73	0.000862	5.23	1165.63	158.42	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	5950.83	50.35	66.23		66.65	0.000896	5.23	1166.24	162.44	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5950.87	50.3	66.15		66.57	0.000924	5.21	1169.79	166.4	0.32
P118-00-00	P118-R2-1	59840.2*	Max WS	5951.17	50.25	66.07		66.49	0.000943	5.18	1176.3	170.4	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5955.18	50.2	66		66.4	0.000955	5.14	1186.41	174.41	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5965.1	50.15	65.92		66.32	0.000961	5.09	1199.02	178.38	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5975.98	50.1	65.83		66.23	0.000978	5.07	1213.19	181.05	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5975.99	50.1	65.75		66.14	0.000986	5.04	1217.72	196.49	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5975.98	50.11	65.67		66.06	0.000992	5	1212.5	211.94	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	5975.97	50.11	65.59		65.97	0.000988	4.95	1207.72	171.97	0.32
P118-00-00	P118-R2-1	58960.5*	Max WS	5975.96	50.11	65.52		65.89	0.000949	4.89	1222.49	164.57	0.32
P118-00-00	P118-R2-1	58844.9*	Max WS	5975.97	50.11	65.46		65.81	0.000851	4.81	1242.71	157.62	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	5975.95	50.12	65.4		65.74	0.00077	4.71	1267.64	153.22	0.29
P118-00-00	P118-R2-1	58613.7	Max WS	5975.91	50.12	65.36		65.68	0.000653	4.6	1300.47	143.73	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	6121.14	47.59	65.12	58.44	65.51	0.00076	5.01	1247.43	769.6	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-7.3	67.88	69.56		69.57	0.005966	-0.79	10.28	20.33	0.14
P118-21-00	P118-21-00	2493.18	Max WS	-5.11	67.95	69.6		69.6	0.00162	-0.4	15.29	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	-1.2	67.59	69.64		69.64	0	-0.05	28.1	23.67	0.01
P118-21-00	P118-21-00	2416.26	Max WS	0.56	67.5	69.64		69.64	0	0.02	29.33	25.48	0
P118-21-00	P118-21-00	2398.13	Max WS	2.41	67.44	69.64		69.64	0.000003	0.08	29.66	22.79	0.01
P118-21-00	P118-21-00	2389.56	Max WS	4.25	67.41	69.64		69.64	0.000004	0.14	30.23	23.09	0.02

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2343.79	Max WS	7.48	67.54	69.63		69.64	0.000051	0.47	16.04	13.61	0.08
P118-21-00	P118-21-00	2303.58	Max WS	10.99	67.47	69.62		69.63	0.000268	0.67	16.32	12.84	0.11
P118-21-00	P118-21-00	2208.42	Max WS	15.62	67.31	69.58		69.59	0.000315	0.77	20.22	15.12	0.12
P118-21-00	P118-21-00	2195.48	Max WS	15.62	67.34	69.58		69.59	0.000135	0.74	21.24	18.47	0.12
P118-21-00	P118-21-00	2169.49	Max WS	15.62	66.56	69.58		69.59	0.000064	0.68	23	12.51	0.08
P118-21-00	P118-21-00	2167.76	Max WS	15.62	66.37	69.58		69.59	0.000039	0.55	28.16	13.86	0.07
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	15.62	65.03	68.83		68.83	0.000024	0.4	38.7	22.19	0.05
P118-21-00	P118-21-00	2100.84	Max WS	15.62	64.78	68.83		68.83	0.000041	0.37	41.89	19.49	0.04
P118-21-00	P118-21-00	1662.37	Max WS	114.29	63.91	68.51		68.57	0.000808	1.95	59.52	29.17	0.21
P118-21-00	P118-21-00	1144.5	Max WS	179.96	62.63	67.85		67.95	0.001297	2.62	68.65	21.66	0.26
P118-21-00	P118-21-00	595.53	Max WS	-44.99	61.49	67.43		67.43	0.000021	-0.33	135.78	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-59.37	61.18	67.43		67.43	0.000028	-0.41	144.92	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-73.17	60.87	67.43		67.43	0.000034	-0.49	151.81	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-86.35	60.57	67.43		67.43	0.000039	-0.56	156.29	38.81	0.05
P118-21-00	P118-21-00	410.63*	Max WS	-99.5	60.26	67.43		67.43	0.000046	-0.63	158.53	36.01	0.05
P118-21-00	P118-21-00	364.41*	Max WS	-114.39	59.95	67.43		67.44	0.000056	-0.73	158.23	33.21	0.06
P118-21-00	P118-21-00	318.18*	Max WS	-129.35	59.64	67.42		67.44	0.000068	-0.83	155.72	30.41	0.06
P118-21-00	P118-21-00	271.96*	Max WS	-144.84	59.34	67.42		67.44	0.000087	-0.96	150.8	27.6	0.07
P118-21-00	P118-21-00	225.73*	Max WS	-160.25	59.03	67.42		67.44	0.000113	-1.12	143.59	24.8	0.08
P118-21-00	P118-21-00	179.51	Max WS	-171.85	58.72	67.42		67.44	0.000168	-1.28	134.09	22	0.09
P118-21-00	P118-21-00	159.41*	Max WS	-182	57.98	67.42		67.45	0.000152	-1.25	145.06	22.53	0.09
P118-21-00	P118-21-00	139.31*	Max WS	-180.41	57.24	67.43		67.45	0.000122	-1.15	156.64	23.06	0.08
P118-21-00	P118-21-00	119.21*	Max WS	-148.84	56.51	67.46		67.47	0.000068	-0.88	168.85	23.6	0.06
P118-21-00	P118-21-00	99.11*	Max WS	-92.54	55.77	67.5		67.5	0.000022	-0.51	181.81	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-81.38	55.03	67.55		67.56	0.000014	-0.42	195.47	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.55		74.55	0.000001	0.1	106.55	42.28	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.55		74.55	0.000002	0.11	94.15	41.13	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.62	70.08	74.55	70.23	74.55	0.000003	0.12	91.69	54.82	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.55		74.55	0.000003	0.13	86.21	39.27	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.7	70.16	74.55		74.55	0.000004	0.15	83.32	38.25	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.51	69.97	74.55		74.55	0.000009	0.22	83.56	29.15	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.17	69.88	74.55		74.55	0.000012	0.26	82.99	43.23	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	23	68.92	74.55		74.55	0.000011	0.26	101.14	140.48	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.94	69.39	74.52		74.52	0.000008	0.22	232.37	407.64	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.63	69.56	74.52		74.52	0.000014	0.29	86.02	771.92	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.23	68.48	74.52		74.52	0.000025	0.39	88.53	1393.15	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.85	68.06	74.52		74.52	0.00003	0.43	92	1320.18	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.8	69.59	74.26		74.26	0.000014	0.28	541.63	1036.87	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.27	69.5	74.26		74.26	0.000029	0.42	97.27	1005.43	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	42	69.12	74.26		74.26	0.000029	0.43	98.6	976.76	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	43.03	69.43	74.26		74.26	0.00003	0.57	75.53	933.49	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.9	69.34	73.97		73.97	0.000024	0.37	317.83	842.66	0.04
P118-23-00	P118-23-00 R2	7257.19	Max WS	45.68	69.28	73.97		73.97	0.000031	0.39	243.75	764.33	0.04
P118-23-00	P118-23-00 R2	6786.22	Max WS	97.15	68.02	73.95		73.95	0.000029	0.38	779.46	1794.22	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	104.84	67.37	73.95		73.95	0.00005	0.58	180.22	52.6	0.06
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	94.6	67.54	72.1		72.14	0.000882	1.64	57.74	29.94	0.21
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	112.38	67.16	72.05		72.08	0.000294	1.27	88.71	29.69	0.13
P118-23-00	P118-23-00 R2	6402.43	Max WS	132.4	67.03	71.98		72.01	0.000394	1.49	88.65	28.6	0.15
P118-23-00	P118-23-00 R2	6356.93	Max WS	141.63	66.97	71.95	68.7	71.99	0.000434	1.58	89.83	28.75	0.16
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	141.6	66.93	71.93		71.96	0.000421	1.56	91.02	29.02	0.15
P118-23-00	P118-23-00 R2	6293.27	Max WS	146.79	66.88	71.91		71.95	0.000435	1.59	92.43	29.3	0.16
P118-23-00	P118-23-00 R2	5958.59	Max WS	36.79	66.24	71.82		71.82	0.000012	0.27	135.34	43.68	0.03
P118-23-00	P118-23-00 R2	5652.94	Max WS	40.95	65.7	71.81		71.81	0.00002	0.35	117.75	35.76	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	37.21	63.97	71.8		71.81	0.000007	0.25	151.8	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	38.72	63.84	71.8	64.39	71.81	0.000004	0.2	193.74	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	38.46	63.87	71.8		71.8	0.000003	0.19	201.23	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	47.75	63.65	71.8		71.8	0.000011	0.29	163.3	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	60.64	63.02	71.79	64.09	71.79	0.000013	0.32	192.15	46.95	0.03
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	60.61	63.16	71.79		71.79	0.000012	0.28	213.7	58.28	0.03
P118-23-00	P118-23-00 R2	4459.75	Max WS	67.96	63.55	71.78		71.79	0.000014	0.33	208.94	52.65	0.03
P118-23-00	P118-23-00 R2	4370.6	Max WS	73.77	63.42	71.78		71.78	0.000012	0.29	251.05	65.06	0.03
P118-23-00	P118-23-00 R2	4330.88	Max WS	75.47	62.88	71.78		71.78	0.000003	0.15	494	125.25	0.01

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_10Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4299.23	Culvert	75.42	63.33	71.77		71.77	0.000002	0.16	469.29	76.06	0.01
P118-23-00	P118-23-00 R2	4269.23	Max WS	79.65	63.34	71.77		71.77	0.000006	0.27	295.83	51.14	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	115.53	62.41	71.76		71.76	0.000025	0.54	212.99	34.28	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	154.01	62.36	71.74		71.74	0.000028	0.6	255.16	40.27	0.04
P118-23-00	P118-23-00 R2	3187.46	Max WS	157.71	61.93	71.74	64.04	71.74	0.000028	0.55	284.44	52.14	0.04
P118-23-00	P118-23-00 R2	3150.64	Max WS										
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	157.71	61.56	71.73		71.74	0.000024	0.52	302.12	55.63	0.04
P118-23-00	P118-23-00 R2	3104.46	Max WS	159.95	61.63	71.73		71.74	0.000036	0.6	267.03	52.53	0.05
P118-23-00	P118-23-00 R2	2750.51	Max WS	192.76	60.59	71.71		71.72	0.000042	0.77	250.9	34.6	0.05
P118-23-00	P118-23-00 R2	2741.93	Max WS	193.38	60.44	71.71	62.79	71.72	0.000004	0.76	255.64	34.96	0.05
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	193.37	60.52	71.71		71.71	0.000034	0.68	286.42	42.97	0.05
P118-23-00	P118-23-00 R2	2716.57	Max WS	194.42	60.68	71.71		71.71	0.000037	0.65	297.59	52.19	0.05
P118-23-00	P118-23-00 R2	2615.37	Max WS	205.55	60.75	71.7		71.71	0.000044	0.78	262.5	37.87	0.05
P118-23-00	P118-23-00 R2	2244.98	Max WS	216.88	60.53	71.68		71.69	0.000038	0.77	282.51	35.71	0.05
P118-23-00	P118-23-00 R2	2221.06	Max WS	216.46	60.56	71.68	62.61	71.69	0.000039	0.77	279.96	36.69	0.05
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	216.47	60.59	71.67		71.67	0.000035	0.75	290.5	37.2	0.05
P118-23-00	P118-23-00 R2	2042.36	Max WS	231.32	59.78	71.66		71.67	0.000029	0.59	390.43	67.27	0.04
P118-23-00	P118-23-00 R2	1922.11	Max WS	236.7	59.56	71.66		71.67	0.000027	0.57	413.39	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	246.46	59.68	71.66	62.51	71.66	0.000033	0.64	383.99	66.31	0.05
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	246.47	59.86	71.59		71.61	0.000058	0.9	274.47	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	268.41	59.87	71.6		71.6	0.000036	0.64	417.57	75.5	0.05
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	360.5	59.04	71.58		71.59	0.000054	0.87	413.64	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	846.04	59.85	71.57		71.57	0.000056	0.98	2844.78	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	854.74	59.99	71.56	64.34	71.57	0.000037	0.69	3067.61	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	854.41	58.36	71.55		71.55	0.000025	0.62	3432.96	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	890.32	57.88	71.55		71.55	0.000027	0.71	3429.76	916.83	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	1126.91	57.45	71.52		71.53	0.000008	1.13	2589.14	742.6	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	1373.18	57.03	71.47		71.49	0.000015	1.68	1947.91	449.67	0.1
P118-23-00	P118-23-00 R1	242.54	Max WS	1598.73	55.82	71.43	62.48	71.43	0.000037	0.69	9320.48	5499.3	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1598.06	55.57	71.41		71.41	0.000027	0.73	10613.48	5546.02	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	1606.17	55.13	71.39		71.44	0.000113	1.88	1257.58	175.37	0.1
P118-23-00	P118-23-00 R1	58.31	Max WS	1605.98	53.78	71.37		71.44	0.00014	2.29	991.05	83.5	0.11
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	71.64		71.64	0.000004	0.12	322.58	1130.69	0.01
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	10.15	66.69	71.64		71.64	0.000002	0.09	136.7	1033.26	0.01
P118-23-02	P118-23-02	3782.06	Max WS	31.82	66.66	71.64		71.64	0.000007	0.16	794.78	1148.24	0.02
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	31.82	66.22	71.64		71.64	0.000001	0.04	2165.35	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	31.82	66.22	71.64		71.64	0.000001	0.06	1914.25	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	31.71	65.47	71.64		71.64	0.000002	0.09	1267.59	1166.28	0.01
P118-23-02	P118-23-02	2386.67	Max WS	54	65.13	71.63		71.63	0.000004	0.16	1491.77	1074.84	0.01
P118-23-02	P118-23-02	2372.17	Max WS	56.34	65.16	71.63		71.63	0.000003	0.12	1605.64	1094.25	0.01
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	53.77	65.26	71.62		71.62	0.000032	0.47	114.95	1060.82	0.04
P118-23-02	P118-23-02	2278.1	Max WS	58.34	65.19	71.62		71.62	0.000005	0.2	1372.47	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	187.01	63.69	71.6		71.6	0.000032	0.56	1448.52	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	188.4	63.66	71.6	65.94	71.6	0.000026	0.55	1536.58	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	187.97	63.56	71.6		71.6	0.000017	0.44	1864.54	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	191.87	63.36	71.6		71.6	0.000015	0.31	1742.04	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	202.81	62.91	71.6		71.6	0.000013	0.37	1954.23	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	229.25	61.86	71.59		71.6	0.000014	0.39	2223.9	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	248.12	62.56	71.59		71.59	0.000015	0.41	2274.27	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	485.92	60.16	71.57		71.58	0.000029	0.58	2648.23	1102.12	0.04
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.35		72.35	0.000001	0.07	152.47	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.35		72.35	0.000001	0.07	152.43	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	55.51	66.13	72.34		72.34	0.000022	0.42	132.89	31.01	0.04
P118-25-00	P118-25-00 R2	2636.62	Max WS	115.55	65.84	72.31		72.32	0.000082	0.81	142.76	33.01	0.07
P118-25-00	P118-25-00 R2	2494.17	Max WS	145.34	65.5	72.29		72.3	0.000106	0.93	156.08	35.73	0.08
P118-25-00	P118-25-00 R2	2473.31	Max WS	146.97	65.47	72.28	67.67	72.3	0.000109	0.95	154.9	35.01	0.08
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	146.97	65.47	72.27		72.29	0.00011	0.93	158.27	37.73	0.08
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_100Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch. El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-25-00	P118-25-00 R2	2464		Lat Struct									
P118-25-00	P118-25-00 R2	2414.49	Max WS	150.88	65.38	72.27		72.28	0.000104	0.94	160.32	35.28	0.08
P118-25-00	P118-25-00 R2	2046.09	Max WS	176.71	64.63	72.23		72.24	0.000088	0.91	194.6	40.52	0.07
P118-25-00	P118-25-00 R1	1929.3	Max WS	309.32	64.22	72.15		72.21	0.000447	1.89	163.65	39.73	0.16
P118-25-00	P118-25-00 R1	1929		Lat Struct									
P118-25-00	P118-25-00 R1	1928		Lat Struct									
P118-25-00	P118-25-00 R1	1565.52	Max WS	298.12	64.03	72.02		72.07	0.000308	1.76	169.75	33.08	0.14
P118-25-00	P118-25-00 R1	1208.56	Max WS	266.21	63.03	71.94		71.97	0.000194	1.47	180.54	30.27	0.11
P118-25-00	P118-25-00 R1	1188.81	Max WS	265.83	63.01	71.93	66.12	71.97	0.000213	1.52	174.56	29.97	0.11
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	264.99	62.94	71.9		71.94	0.000223	1.55	171.19	29.45	0.11
P118-25-00	P118-25-00 R1	1175		Lat Struct									
P118-25-00	P118-25-00 R1	1174		Lat Struct									
P118-25-00	P118-25-00 R1	1132.07	Max WS	272.36	62.83	71.9		71.93	0.000198	1.47	185.46	33.01	0.11
P118-25-00	P118-25-00 R1	980.2	Max WS	320.36	62.34	71.85		71.89	0.000189	1.5	214.16	35.75	0.11
P118-25-00	P118-25-00 R1	963.63	Max WS	327.18	62.25	71.86		71.89	0.000091	1.27	257.11	44.42	0.08
P118-25-00	P118-25-00 R1	950.55	Max WS	327.29	62.25	71.86	65.06	71.88	0.000107	1.09	334.4	94.41	0.09
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	325.4	61.68	71.8		71.82	0.000084	1.02	343.41	86	0.08
P118-25-00	P118-25-00 R1	886.91	Max WS	305.21	61.68	71.79		71.81	0.000068	1.14	267.25	51.01	0.07
P118-25-00	P118-25-00 R1	839.05	Max WS	304.73	61.16	71.79		71.81	0.000103	1.19	256.11	37.72	0.08
P118-25-00	P118-25-00 R1	805	Max WS	325.09	58.35	71.8		71.8	0.000018	0.47	743.39	68.95	0.02
P118-25-00	P118-25-00 R1	772	Max WS	325.29	56	71.8	56.87	71.8	0.000006	0.29	1106.16	70	0.01
P118-25-01	P118-25-01	5341.48	Max WS	12.77	70.47	75.26		75.26	0.000003	0.12	102.32	35.97	0.01
P118-25-01	P118-25-01	5341		Lat Struct									
P118-25-01	P118-25-01	5340		Lat Struct									
P118-25-01	P118-25-01	4477.47	Max WS	217.61	68.9	74.89		74.94	0.000603	1.84	118.29	39.51	0.19
P118-25-01	P118-25-01	4162.47	Max WS	237.76	69.44	74.69		74.75	0.000575	1.85	128.53	41.24	0.18
P118-25-01	P118-25-01	4134.04	Max WS	242.81	69.38	74.67	71.74	74.73	0.000576	1.85	131.08	42.19	0.19
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	242.78	69.25	74.62		74.67	0.000564	1.84	131.92	42.1	0.18
P118-25-01	P118-25-01	4047.7	Max WS	242.99	69.28	74.6		74.65	0.000545	1.83	132.59	41.28	0.18
P118-25-01	P118-25-01	4041		Lat Struct									
P118-25-01	P118-25-01	4040		Lat Struct									
P118-25-01	P118-25-01	3617.56	Max WS	260.13	67.84	74.4		74.44	0.000384	1.65	157.45	43.6	0.15
P118-25-01	P118-25-01	3312.44	Max WS	263.83	67.48	74.3		74.34	0.000314	1.49	177.38	49.99	0.14
P118-25-01	P118-25-01	3014.68	Max WS	251.12	67.53	74.23		74.26	0.000224	1.36	185.25	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	250.2	67.71	74.21		74.24	0.000211	1.32	190.08	47.25	0.12
P118-25-01	P118-25-01	2763.33	Max WS	213.75	66.67	74.2		74.22	0.00014	1.11	193.11	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	215.24	66.5	74.03		74.22	0.003955	3.45	62.32	29.03	0.42
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	169.4	66.31	73.17		73.31	0.000631	3.05	55.56	33.91	0.22
P118-25-01	P118-25-01	2541		Lat Struct									
P118-25-01	P118-25-01	2540		Lat Struct									
P118-25-01	P118-25-01	2475.84	Max WS	215.92	66.04	73.25		73.3	0.000475	1.88	114.81	28.49	0.17
P118-25-01	P118-25-01	1881.88	Max WS	227.27	66.57	72.87		72.94	0.000704	2.16	105.27	29.77	0.2
P118-25-01	P118-25-01	1384.48	Max WS	227.44	66.19	72.56		72.62	0.00057	1.97	115.39	32.17	0.18
P118-25-01	P118-25-01	1245.83	Max WS	226.75	66.34	72.48		72.54	0.00058	2.03	111.59	29.69	0.18
P118-25-01	P118-25-01	584.11	Max WS	173.75	65.88	72.28		72.31	0.000202	1.31	132.83	29.02	0.11
P118-25-01	P118-25-01	60.05	Max WS	133.36	63.5	72.23		72.24	0.000088	0.92	145.65	27.03	0.07

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.74		75.95	0.003013	4.48	3188.24	1289.12	0.27
P118-00-00	P118-R3-2	71854.2	Max WS	6408.79	57.83	74.85		75.07	0.000426	3.93	3763.37	2004.65	0.22
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5541.56	55.05	74.44		74.61	0.000286	3.34	2269.56	447.2	0.18
P118-00-00	P118-R3-2	69527.2	Max WS	4800.62	55.28	74.24		74.34	0.000161	2.74	2815.73	520	0.14
P118-00-00	P118-R3-2	68670	Max WS	4048.22	54.88	74.06		74.21	0.000237	3.27	1946.29	309.65	0.17
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3114.98	54.47	74.04		74.13	0.000127	2.56	2057.31	369.7	0.12
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2179.38	54.14	74.03		74.08	0.000085	1.96	2104.07	365.8	0.1
P118-00-00	P118-R3-2	66869	Max WS	2709.16	53.96	73.88		73.98	0.000216	2.59	1321.85	202.76	0.15
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2628.06	53.79	73.89		73.96	0.00015	2.17	1398.09	196.04	0.13
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2011.8	53.6	73.89		73.93	0.000059	1.76	1912.49	227.52	0.08
P118-00-00	P118-R3-2	65955.8	Max WS	1540.12	53.52	73.9		73.91	0.000034	1.08	1994.53	278.2	0.06
P118-00-00	P118-R3-2	65434.6	Max WS	153.21	53.1	73.91		73.91	0	0.13	1921.47	214.6	0.01
P118-00-00	P118-R3-2	64399.74	Max WS	3901.75	52.59	73.59		73.75	0.000221	3.39	1693.8	206.63	0.16
P118-00-00	P118-R3-2	64273.7	Max WS	4824.2	53.55	73.51	62.82	73.66	0.000245	3.21	1654.53	218.1	0.17
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4821.69	53.3	73.47		73.63	0.000233	3.17	1616.4	173.2	0.17
P118-00-00	P118-R3-2	64200	Max WS	4821.84	53.3	73.47		73.63	0.000233	3.18	1616.21	173.2	0.17
P118-00-00	P118-R2-2	64100	Max WS	8083.27	52.61	73.37		73.58	0.000232	3.73	2291.22	9431.67	0.17
P118-00-00	P118-R2-2	64094	Max WS	8083.23	52.61	73.37	62.23	73.58	0.000232	3.73	2291	9431.53	0.17
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	8083.26	52.56	73.31		73.52	0.000232	3.73	2289.55	9430.6	0.17
P118-00-00	P118-R2-2	64010.4	Max WS	8083.26	52.78	73.08	64.83	73.55	0.000568	5.65	1634.66	9405.95	0.27
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	8083.2	53.04	71.12		71.83	0.001041	6.81	1328.5	8131.52	0.35
P118-00-00	P118-R2-2	63959.7	Max WS	8083.26	53.06	71.49	62.14	71.76	0.000381	4.24	1953.45	8655.94	0.22
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	8083.23	53.16	71.38		71.67	0.000404	4.33	1910.89	8524.14	0.22
P118-00-00	P118-R2-2	63756.7	Max WS	8089.61	52.4	70.75		71.71	0.001778	8.13	1317.33	205	0.44
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	6089.36	50.35	70.28		70.83	0.000959	6.01	1188.79	185	0.32
P118-00-00	P118-R2-2	61905.2	Max WS	5984	50.77	69.73		70.07	0.000688	4.74	1263.71	132.2	0.27
P118-00-00	P118-R2-2	60625.3	Max WS	6507.44	49.52	69.11		69.54	0.000795	5.23	1243.54	121.4	0.29
P118-00-00	P118-R2-1	60595.74	Max WS	6397.68	49.48	68.18		68.81	0.000977	6.6	1076.24	131.55	0.33
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	6663.5	49.68	68.06		68.67	0.000923	6.41	1135.38	139.91	0.33
P118-00-00	P118-R2-1	60571.6*	Max WS	6914.31	49.89	67.96		68.54	0.000886	6.24	1191.24	148.28	0.32
P118-00-00	P118-R2-1	60559.5*	Max WS	7114.16	50.09	67.87		68.43	0.000843	6.04	1249.04	149.27	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	7252.04	50.3	67.81		68.33	0.000796	5.81	1311.52	151.45	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	7340.99	50.5	67.77		68.24	0.00075	5.57	1375.17	157.15	0.3
P118-00-00	P118-R2-1	60536.4*	Max WS	7350.3	50.45	67.7		68.17	0.000781	5.57	1376.29	161.2	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	7350.75	50.4	67.63		68.1	0.000805	5.55	1380.3	165.22	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	7352.51	50.35	67.56		68.03	0.000822	5.51	1387.95	169.32	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	7363.31	50.3	67.5		67.95	0.000836	5.47	1398.67	175.27	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	7373.47	50.25	67.43		67.88	0.000842	5.42	1412.98	178.16	0.31
P118-00-00	P118-R2-1	59701.1*	Max WS	7397.66	50.2	67.36		67.8	0.000845	5.37	1429.12	179.13	0.31
P118-00-00	P118-R2-1	59562.1*	Max WS	7430.67	50.15	67.29		67.72	0.000846	5.32	1445.98	180.09	0.31
P118-00-00	P118-R2-1	59423.1	Max WS	7453.31	50.1	67.2		67.64	0.000886	5.35	1460.82	181.05	0.31
P118-00-00	P118-R2-1	59307.4*	Max WS	7466.75	50.1	67.13		67.56	0.000883	5.3	1488.62	196.49	0.31
P118-00-00	P118-R2-1	59191.8*	Max WS	7466.54	50.11	67.06		67.49	0.000875	5.24	1507.68	211.94	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	7468.84	50.11	67		67.41	0.000864	5.17	1519.1	227.38	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	7475.73	50.11	66.94		67.34	0.000847	5.09	1521.9	242.82	0.31
P118-00-00	P118-R2-1	58844.9*	Max WS	7475.32	50.11	66.87		67.27	0.000831	5.02	1518.58	239.87	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	7474.58	50.12	66.82		67.19	0.00081	4.94	1529.32	221.8	0.3
P118-00-00	P118-R2-1	58613.7	Max WS	7479.45	50.12	66.76		67.13	0.000785	4.85	1548.79	216.98	0.29
P118-00-00	P118-R2-1	58463.86	Max WS	8291.65	47.59	66.52	59.77	66.91	0.000719	5.28	3429.64	2283.44	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-11.68	67.88	69.65		69.66	0.01056	-1.11	12.15	21.34	0.19
P118-21-00	P118-21-00	2493.18	Max WS	8.76	67.95	69.73		69.74	0.002603	-0.56	19.38	31.49	0.09
P118-21-00	P118-21-00	2450.3	Max WS	-4.83	67.59	69.79		69.79	0.000004	-0.17	31.81	24.34	0.02
P118-21-00	P118-21-00	2416.26	Max WS	-3.73	67.5	69.79		69.79	0.000006	-0.12	33.26	25.7	0.02
P118-21-00	P118-21-00	2398.13	Max WS	-1.85	67.44	69.79		69.79	0.000001	-0.06	33.21	23.22	0.01
P118-21-00	P118-21-00	2389.56	Max WS	0.42	67.41	69.79		69.79	0	0.01	34.05	25.61	0
P118-21-00	P118-21-00	2343.79	Max WS	3.31	67.54	69.79		69.79	0.000007	0.18	18.49	17	0.03

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Ait1_500dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	7.15	67.47	69.79		69.79	0.000083	0.38	18.59	14.2	0.06
P118-21-00	P118-21-00	2208.42	Max WS	12.72	67.31	69.77		69.77	0.000158	0.55	23.19	17.33	0.08
P118-21-00	P118-21-00	2195.48	Max WS	12.71	67.34	69.77		69.77	0.000062	0.51	24.92	21	0.08
P118-21-00	P118-21-00	2169.49	Max WS	12.7	66.56	69.77		69.77	0.000033	0.51	25.48	13.98	0.06
P118-21-00	P118-21-00	2167.76	Max WS	12.7	66.37	69.77		69.77	0.00002	0.41	30.82	14.78	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	12.7	65.03	69.27		69.27	0.000011	0.25	50.07	32.2	0.04
P118-21-00	P118-21-00	2100.84	Max WS	12.7	64.78	69.27		69.27	0.000019	0.24	51.93	26.24	0.03
P118-21-00	P118-21-00	1662.37	Max WS	148.75	63.91	68.92		69	0.000861	2.2	74.89	45.54	0.22
P118-21-00	P118-21-00	1144.5	Max WS	-4.74	62.63	68.71		68.71	0	-0.05	88.01	23	0
P118-21-00	P118-21-00	595.53	Max WS	-178.99	61.49	68.7		68.72	0.000104	-0.92	195.87	47.22	0.08
P118-21-00	P118-21-00	549.31*	Max WS	-189.77	61.18	68.71		68.72	0.000099	-0.95	201.59	44.42	0.08
P118-21-00	P118-21-00	503.08*	Max WS	-201.25	60.87	68.71		68.72	0.000098	-0.99	205.01	41.62	0.08
P118-21-00	P118-21-00	456.86*	Max WS	-214.63	60.57	68.71		68.73	0.000101	-1.05	205.96	38.81	0.08
P118-21-00	P118-21-00	410.63*	Max WS	-229.33	60.26	68.71		68.73	0.000109	-1.13	204.64	36.01	0.08
P118-21-00	P118-21-00	364.41*	Max WS	-246.07	59.95	68.71		68.73	0.000122	-1.23	200.77	33.21	0.09
P118-21-00	P118-21-00	318.18*	Max WS	-262.33	59.64	68.71		68.73	0.000141	-1.36	194.67	30.41	0.09
P118-21-00	P118-21-00	271.96*	Max WS	-278.68	59.34	68.7		68.74	0.000168	-1.5	186.15	27.6	0.1
P118-21-00	P118-21-00	225.73*	Max WS	-293.56	59.03	68.7		68.74	0.000206	-1.68	175.34	24.8	0.11
P118-21-00	P118-21-00	179.51	Max WS	-304.24	58.72	68.7		68.75	0.00031	-1.87	162.27	22	0.12
P118-21-00	P118-21-00	159.41*	Max WS	-315.3	57.98	68.71		68.76	0.000276	-1.81	174.08	22.53	0.11
P118-21-00	P118-21-00	139.31*	Max WS	-304.27	57.24	68.73		68.77	0.000214	-1.63	186.59	23.06	0.1
P118-21-00	P118-21-00	119.21*	Max WS	-236.32	55.51	68.77		68.8	0.000108	-1.18	199.9	23.6	0.07
P118-21-00	P118-21-00	99.11*	Max WS	-171.49	55.77	68.8		68.81	0.000048	-0.8	213.17	24.13	0.05
P118-21-00	P118-21-00	79.01	Max WS	-106.49	55.03	68.81		68.82	0.000016	-0.47	225.55	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.23		75.23	0.000001	0.08	141.63	142.59	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.23		75.23	0.000001	0.09	126.36	151.7	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.23	70.25	75.23	0.000001	0.1	145.86	139.72	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.81	70.2	75.23		75.23	0.000002	0.1	137.08	168.25	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.23	70.16	75.23		75.23	0.000002	0.12	114.62	123.66	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.17	69.97	75.23		75.23	0.000007	0.2	103.36	155.34	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.67	69.88	75.23		75.23	0.000008	0.24	127.55	284.82	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	27.08	68.92	75.23		75.23	0.000006	0.19	384.63	692.58	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	27.08	69.39	75.23		75.23	0.000002	0.12	1003.07	1718.61	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.3	69.56	75.23		75.23	0.000013	0.26	168.45	2064.3	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.96	68.48	75.23		75.23	0.00002	0.38	153.93	2251.38	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	49.36	68.06	75.23		75.23	0.000027	0.44	112.02	2111.11	0.04
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	48.44	69.59	74.86		74.86	0.000004	0.16	1277.09	1533.92	0.02
P118-23-00	P118-23-00 R2	7313.37	Max WS	50.26	69.5	74.85		74.86	0.000029	0.43	142.76	1633.34	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	51.19	69.12	74.85		74.86	0.000028	0.43	157.95	1650.44	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	52.45	69.43	74.85		74.85	0.000004	0.17	1268.69	1694.87	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	52.44	69.34	74.85		74.85	0.000004	0.17	1438.02	1852.15	0.01
P118-23-00	P118-23-00 R2	7237.19	Max WS	55.99	69.28	74.85		74.85	0.000008	0.22	791.57	1969.55	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	121.46	68.02	74.85		74.85	0.000007	0.22	1777.52	2339	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	131.25	67.37	74.84		74.85	0.000041	0.57	232.09	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	36.02	67.54	73.86		73.86	0.000017	0.28	129.47	50.99	0.03
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	38.51	67.16	73.86		73.86	0.000009	0.24	160.24	45.86	0.02
P118-23-00	P118-23-00 R2	6402.43	Max WS	41.17	67.03	73.86		73.86	0.000009	0.26	158.6	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	42.42	66.97	73.86	67.69	73.86	0.000011	0.26	161.48	47.47	0.03
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	42.32	66.93	73.85		73.85	0.000011	0.25	168.37	53.26	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	43.05	66.88	73.85		73.85	0.00001	0.26	164.03	46.57	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	54.94	66.24	73.85		73.85	0.000005	0.21	266.8	68.26	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	76.04	65.7	73.85		73.85	0.000015	0.31	241.84	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	49.14	63.97	73.84		73.84	0.000004	0.23	216.72	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	48.52	63.84	73.84	64.51	73.84	0.000002	0.17	279.26	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	48.52	63.87	73.84		73.84	0.000002	0.18	272.16	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	52.83	63.65	73.84		73.84	0.000004	0.22	239.16	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	56.19	63.02	73.84	64.03	73.84	0.000003	0.2	288.11	46.95	0.01
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	56.15	63.16	73.83		73.83	0.000003	0.17	333.06	58.28	0.01
P118-23-00	P118-23-00 R2	4459.75	Max WS	60.26	63.55	73.83		73.83	0.000003	0.19	316.84	52.65	0.01
P118-23-00	P118-23-00 R2	4370.6	Max WS	63.47	63.42	73.83		73.83	0.000002	0.17	384.45	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	64.31	62.88	73.83		73.83	0.000001	0.09	750.77	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 1
HEC-RAS Results

HFC-RAS Plan: Alt1_50Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	64.29	63.31	73.83		73.83	0.000001	0.1	625.79	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	70.01	63.34	73.83		73.83	0.000002	0.17	401.08	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	116.27	62.41	73.82		73.82	0.000011	0.41	283.75	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	152.51	62.36	73.81		73.82	0.000012	0.45	338.7	40.27	0.03
P118-23-00	P118-23-00 R2	3150.64	Max WS	155.06	61.93	73.81	64.02	73.81	0.000001	0.39	392.63	52.14	0.03
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	155.06	61.56	73.81		73.81	0.000009	0.37	417.63	55.63	0.02
P118-23-00	P118-23-00 R2	3104.46	Max WS	157.2	61.63	73.81		73.81	0.000012	0.42	376.18	52.53	0.03
P118-23-00	P118-23-00 R2	2750.53	Max WS	189.57	60.59	73.8		73.81	0.00002	0.59	323.14	34.6	0.03
P118-23-00	P118-23-00 R2	2741.93	Max WS	190.15	60.44	73.8	62.78	73.81	0.000019	0.58	328.64	34.96	0.03
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	190.15	60.52	73.8		73.8	0.000015	0.51	376.18	42.97	0.03
P118-23-00	P118-23-00 R2	2716.57	Max WS	191.28	60.68	73.8		73.8	0.000014	0.47	406.63	52.19	0.03
P118-23-00	P118-23-00 R2	2615.37	Max WS	203.63	60.75	73.79		73.8	0.000002	0.6	341.76	37.87	0.03
P118-23-00	P118-23-00 R2	2244.98	Max WS	244.1	60.53	73.78		73.79	0.000024	0.68	357.37	35.71	0.04
P118-23-00	P118-23-00 R2	2221.06	Max WS	246.89	60.56	73.78	62.79	73.79	0.000026	0.69	356.88	36.69	0.04
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	246.89	60.59	73.76		73.77	0.000023	0.67	368.51	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	295.19	59.78	73.76		73.77	0.000018	0.56	531.47	67.27	0.03
P118-23-00	P118-23-00 R2	1922.11	Max WS	328.39	59.56	73.76		73.76	0.000002	0.58	566.09	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	346.94	59.68	73.75	63.05	73.76	0.000025	0.66	522.96	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	346.92	59.86	73.7		73.71	0.000054	0.97	355.99	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	386.74	59.87	73.7		73.71	0.000027	0.67	576.24	75.5	0.04
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	558.58	59.04	73.67		73.69	0.000056	1.03	543.7	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	1703.02	59.85	73.67		73.67	0.000044	1.02	5092.69	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	1717.44	59.99	73.66	65.86	73.67	0.000033	0.8	5150.77	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	1717.64	58.36	73.65		73.66	0.000027	0.77	5395.91	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	1775.54	57.88	73.65		73.66	0.00003	0.87	5358.24	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	2186.08	57.45	73.63		73.64	0.000078	1.33	4150.28	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	2657.45	57.03	73.55		73.59	0.000185	2.16	2887.17	449.67	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	3238.21	55.82	73.52	65	73.52	0.000014	0.52	21774.49	6594.35	0.03
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	3238.86	55.57	73.51		73.51	0.000012	0.57	22455.8	5675.65	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	3248.04	55.13	73.47		73.59	0.000236	3.05	1622.53	175.37	0.15
P118-23-00	P118-23-00 R3	58.33	Max WS	3244.66	53.78	73.4		73.6	0.000353	3.99	1160.19	83.5	0.18
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	73.73		73.73	0	0.01	3464.99	1274.25	0
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	68.51	66.69	73.73		73.73	0.000001	0.08	3322.5	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	96.63	66.66	73.73		73.73	0.000001	0.1	3372.09	1251.96	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	96.63	66.22	73.73		73.73	0.000001	0.05	4791.5	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	99.99	66.22	73.73		73.73	0.000001	0.07	4534.93	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	211.05	65.47	73.73		73.73	0.000004	0.16	3713.3	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	347.35	65.13	73.72		73.72	0.000011	0.33	3735.96	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	350.65	65.16	73.72		73.72	0.000009	0.28	3890.25	1094.25	0.02
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	350.65	65.26	73.72		73.72	0.000009	0.3	4015.84	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	356.45	65.19	73.72		73.72	0.000013	0.39	3597.42	1058.12	0.03
P118-23-02	P118-23-02	1453.34	Max WS	592.57	63.69	73.7		73.7	0.000031	0.67	3475.37	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	594.83	63.66	73.7	67.82	73.7	0.000028	0.67	3556.4	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	594.94	63.56	73.7		73.7	0.000022	0.59	3882.95	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	603.26	63.36	73.7		73.7	0.000015	0.35	3753.92	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	630.39	62.91	73.69		73.69	0.000014	0.46	4119.92	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	688.57	61.86	73.69		73.69	0.000012	0.45	4801.31	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	725.17	62.56	73.69		73.69	0.000013	0.46	4896.31	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	1144.46	60.16	73.67		73.68	0.000025	0.61	4963.29	1102.12	0.04
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	74.05		74.05	0	0.05	215.95	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.05		74.05	0	0.05	215.85	37.24	0
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	52.47	66.13	74.05		74.05	0.000007	0.28	185.84	31.01	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	98.52	65.84	74.04		74.04	0.000022	0.49	199.84	33.01	0.04
P118-25-00	P118-25-00 R2	2494.17	Max WS	119.58	65.5	74.03		74.04	0.000026	0.55	218.43	35.73	0.04
P118-25-00	P118-25-00 R2	2473.31	Max WS	121.88	65.47	74.03	67.48	74.03	0.000028	0.56	216.07	35.01	0.04
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	121.88	65.47	74.03		74.03	0.000026	0.54	224.42	37.73	0.04
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 1
HEC-RAS Results

HEC-RAS Plan: Alt1_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	127.54	65.38	74.03		74.03	0.000028	0.57	222.33	35.28	0.04
P118-25-00	P118-25-00 R2	2046.09	Max WS	151.87	64.63	74.01		74.02	0.000025	0.57	266.92	40.52	0.04
P118-25-00	P118-25-00 R1	1929.3	Max WS	286.67	64.22	73.99		74.01	0.000125	1.21	236.5	39.73	0.09
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	243.57	64.03	73.96		73.98	0.000008	1.04	234.08	33.08	0.07
P118-25-00	P118-25-00 R1	1208.56	Max WS	243.52	63.03	73.94		73.95	0.000071	1.01	240.99	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	245.32	63.01	73.93	65.98	73.95	0.000078	1.05	234.53	29.97	0.07
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	245.32	62.94	73.92		73.94	0.000081	1.06	230.6	29.45	0.07
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	257.35	62.83	73.92		73.93	0.000072	1.02	252.18	33.01	0.07
P118-25-00	P118-25-00 R1	980.2	Max WS	327.2	62.34	73.89		73.91	0.000084	1.14	287.07	35.75	0.07
P118-25-00	P118-25-00 R1	963.63	Max WS	336.41	62.25	73.9		73.91	0.000043	1.02	328.34	45.01	0.06
P118-25-00	P118-25-00 R1	950.55	Max WS	336.53	62.25	73.9	65.1	73.91	0.000038	0.75	528.1	95	0.05
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	336.42	61.68	73.86		73.86	0.000032	0.75	519.8	86	0.05
P118-25-00	P118-25-00 R1	886.91	Max WS	336.42	61.68	73.85		73.86	0.000037	0.99	339.13	51.01	0.06
P118-25-00	P118-25-00 R1	839.05	Max WS	336.27	61.16	73.84		73.86	0.000058	1.01	333.7	37.72	0.06
P118-25-00	P118-25-00 R1	805	Max WS	336.33	58.35	73.85		73.86	0.000011	0.4	884.94	68.95	0.02
P118-25-00	P118-25-00 R1	772	Max WS	336.45	56	73.85	56.89	73.86	0.000004	0.27	1249.85	70	0.01
P118-25-01	P118-25-01	5341.48	Max WS	19.28	70.47	75.99		75.99	0.000003	0.15	128.73	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	327.05	68.9	75.48		75.56	0.000801	2.29	142.69	42.03	0.22
P118-25-01	P118-25-01	4162.47	Max WS	337.31	69.44	75.25		75.33	0.000699	2.22	151.81	42.02	0.21
P118-25-01	P118-25-01	4134.04	Max WS	343.68	69.38	75.23	72.18	75.3	0.000699	2.22	154.74	43.02	0.21
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	343.39	69.25	75.16		75.23	0.000693	2.21	155.07	43.02	0.21
P118-25-01	P118-25-01	4047.7	Max WS	343.74	69.28	75.13		75.21	0.00068	2.22	155.01	42.03	0.2
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	341.87	67.84	74.91		74.97	0.000442	1.9	179.83	44.03	0.17
P118-25-01	P118-25-01	3312.44	Max WS	337.89	67.48	74.8		74.85	0.000345	1.67	202.82	51.15	0.15
P118-25-01	P118-25-01	3014.68	Max WS	302.79	67.53	74.74		74.77	0.000225	1.45	208.7	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	293.6	67.71	74.73		74.75	0.0002	1.37	214.36	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	221.33	66.67	74.73		74.74	0.000105	1.02	216.82	44.92	0.08
P118-25-01	P118-25-01	2728.92	Max WS	204.03	66.5	74.63		74.74	0.001632	2.56	79.78	29.03	0.27
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	200.27	66.31	74.19		74.3	0.002514	2.75	72.88	36.93	0.34
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	203.3	66.04	74.22		74.25	0.000226	1.42	143.45	30.31	0.11
P118-25-01	P118-25-01	1881.88	Max WS	172.94	66.57	74.12		74.15	0.000168	1.19	145.85	34	0.1
P118-25-01	P118-25-01	1384.48	Max WS	155.49	66.19	74.07		74.08	0.000093	0.93	166.95	35.03	0.08
P118-25-01	P118-25-01	1245.83	Max WS	153.97	66.34	74.06		74.07	0.000101	0.93	165.5	37.72	0.08
P118-25-01	P118-25-01	584.11	Max WS	86.42	65.88	74.04		74.04	0.000019	0.47	183.76	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	134.8	63.5	74.01		74.02	0.000004	0.7	193.85	27.03	0.05

Alternative 1 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	70.47	70.23	-0.24
71854.2	70.32	70.06	-0.26
70744.2	70.03	69.73	-0.3
69527.2	69.81	69.48	-0.33
68670	69.5	69.13	-0.37
68131	69.32	68.92	-0.4
67511.6	68.97	68.49	-0.48
66869	68.4	67.77	-0.63
66774	68.41	67.82	-0.59
66190	68.13	67.49	-0.64
65955.8	67.86	67.16	-0.7
65434.6	67.45	66.71	-0.74
64399.74	66.58	66.02	-0.56
64273.7	66.57	66.01	-0.56
64220.7	66.53	65.98	-0.55
64200	66.53	65.97	-0.56
64100	66.54	65.98	-0.56
64094	66.53	65.98	-0.55
64024	66.5	65.95	-0.55
64010.4	66.39	65.84	-0.55
63960.4	66.1	65.57	-0.53
63959.7	66.23	65.69	-0.54
63856.7	66.19	65.65	-0.54
63756.7	65.89	65.37	-0.52
62823.2	65.13	64.68	-0.45
61905.2	63.96	63.39	-0.57
60625.3	63.32	62.71	-0.61
60595.74	62.32	61.73	-0.59
60583.6*	62.29	61.69	-0.6
60571.6*	62.25	61.65	-0.6
60559.5*	62.22	61.62	-0.6
60547.5*	62.19	61.58	-0.61
60535.46	62.16	61.55	-0.61
60396.4*	62.09	61.48	-0.61
60257.3*	62.02	61.41	-0.61
60118.3*	61.95	61.33	-0.62
59979.2*	61.88	61.26	-0.62
59840.2*	61.81	61.18	-0.63
59701.1*	61.73	61.1	-0.63
59562.1*	61.66	61.02	-0.64
59423.1	61.59	60.94	-0.65
59307.4*	61.53	60.86	-0.67
59191.8*	61.46	60.79	-0.67
59076.2*	61.4	60.72	-0.68

Alternative 1 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	61.35	60.66	-0.69
58844.9*	61.3	60.6	-0.7
58729.3*	61.25	60.54	-0.71
58613.7	61.21	60.49	-0.72
58463.86	61.04	60.32	-0.72
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	68.85	68.85	0
2416.26	68.84	68.84	0
2398.11	68.83	68.83	0
2389.56	68.83	68.83	0
2343.79	68.78	68.78	0
2303.58	68.72	68.72	0
2208.42	68.34	68.34	0
2195.48	68.27	68.27	0
2169.49	68.24	68.24	0
2167.76	68.25	68.25	0
2135.78	66.83	66.83	0
2100.84	66.83	66.83	0
1662.37	66.34	66.34	0
1144.5	65.55	65.55	0
595.53	63.94	63.94	0
549.31*	63.75	63.75	0
503.08*	63.54	63.54	0
456.86*	63.33	63.33	0
410.63*	63.11	63.1	-0.01
364.41*	63.07	62.85	-0.22
318.18*	63.04	62.6	-0.44
271.96*	63.02	62.47	-0.55
225.73*	63.01	62.43	-0.58
179.51	62.99	62.39	-0.6
159.41*	62.99	62.37	-0.62
139.31*	62.98	62.37	-0.61
119.21*	62.98	62.37	-0.61
99.11*	62.98	62.36	-0.62
79.01	62.98	62.36	-0.62
7756.32	71.59	71.59	0
7743.32	71.59	71.59	0
7738.5	71.59	71.59	0
7733.4	71.57	71.57	0
7726.83	71.57	71.57	0
7654.51	71.54	71.54	0
7632.63	71.53	71.53	0

Alternative 1 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	71.53	71.53	0
7584.04	71.34	71.34	0
7567.5	71.33	71.33	0
7426.94	71.28	71.28	0
7369.89	71.27	71.27	0
7325.91	71.12	71.12	0
7313.37	71.15	71.15	0
7305.97	71.15	71.15	0
7294.91	71.14	71.14	0
7260.57	71.02	71.02	0
7237.19	71.01	71.01	0
6786.22	70.76	70.76	0
6723.56	70.75	70.75	0
6655.9	70.03	70.03	0
6563.37	69.82	69.82	0
6402.43	69.65	69.65	0
6356.93	69.59	69.59	0
6324.93	69.55	69.55	0
6293.27	69.51	69.51	0
5958.59	69.14	69.14	0
5652.94	68.67	68.67	0
5045.34	67.97	67.97	0
4947.92	67.93	67.93	0
4915.91	67.92	67.91	-0.01
4783.1	67.8	67.8	0
4580.38	67.67	67.64	-0.03
4553.28	67.65	67.62	-0.03
4459.75	67.58	67.53	-0.05
4370.6	67.5	67.43	-0.07
4330.88	67.51	67.45	-0.06
4269.23	67.5	67.43	-0.07
4229.24	67.49	67.41	-0.08
3733.5	67.27	67.14	-0.13
3187.46	66.98	66.75	-0.23
3150.64	66.98	66.73	-0.25
3126.39	66.95	66.67	-0.28
3104.46	66.94	66.62	-0.32
2750.51	66.87	66.43	-0.44
2741.93	66.87	66.43	-0.44
2725.96	66.87	66.43	-0.44
2716.57	66.86	66.43	-0.43
2615.37	66.85	66.4	-0.45
2244.98	66.81	66.34	-0.47
2221.06	66.81	66.34	-0.47

Alternative 1 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	66.8	66.32	-0.48
2042.36	66.79	66.3	-0.49
1922.11	66.78	66.29	-0.49
1892.63	66.77	66.28	-0.49
1863.46	66.74	66.23	-0.51
1829.45	66.74	66.23	-0.51
1611.06	66.73	66.21	-0.52
1513.84	66.69	66.15	-0.54
1454.72	66.69	66.15	-0.54
1380.55	66.68	66.14	-0.54
1354.02	66.68	66.14	-0.54
1010.56	66.66	66.11	-0.55
649.49	66.64	66.08	-0.56
242.54	66.63	66.06	-0.57
169.28	66.62	66.05	-0.57
106.82	66.62	66.05	-0.57
58.31	66.62	66.05	-0.57
4138.85	69.87	69.87	0
3790.71	69.7	69.7	0
3782.06	69.55	69.55	0
3714.78	69.57	69.57	0
3692.61	69.53	69.53	0
3049.5	68.99	68.99	0
2386.67	68.15	68.15	0
2372.17	68.13	68.13	0
2303.61	68.1	68.1	0
2278.1	68.06	68.06	0
1453.34	67.12	67.12	0
1445.67	67.12	67.12	0
1415.48	66.85	66.5	-0.35
1392.09	66.84	66.46	-0.38
1317.96	66.82	66.41	-0.41
1171.38	66.8	66.35	-0.45
1083.7	66.78	66.33	-0.45
215.24	66.71	66.19	-0.52
3232.36	68.9	68.19	-0.71
3203.12	68.9	68.17	-0.73
2930.66	68.89	68.15	-0.74
2636.62	68.88	68.09	-0.79
2494.17	68.87	68.07	-0.8
2473.31	68.87	68.06	-0.81
2465.6	68.87	68.05	-0.82
2414.49	68.87	68.05	-0.82
2046.09	68.86	68.02	-0.84

Alternative 1 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	68.83	67.83	-1
1565.52	68.78	67.5	-1.28
1208.56	68.75	67.36	-1.39
1188.81	68.75	67.36	-1.39
1175.29	68.74	67.34	-1.4
1132.07	68.74	67.33	-1.41
980.2	68.73	67.3	-1.43
963.63	68.73	67.31	-1.42
950.55	68.73	67.3	-1.43
901.58	68.45	67.09	-1.36
886.91	68.45	67.08	-1.37
839.05	68.45	63.06	-5.39
805	#N/A	60.66	#N/A
772	#N/A	60.65	#N/A
5341.48	72.33	72.29	-0.04
4477.47	71.6	71.57	-0.03
4162.47	71.36	71.34	-0.02
4134.04	71.34	71.32	-0.02
4086.12	71.31	71.28	-0.03
4047.7	71.28	71.25	-0.03
3617.56	71.05	71.03	-0.02
3312.44	70.95	70.93	-0.02
3014.68	70.87	70.85	-0.02
2924.04	70.84	70.83	-0.01
2763.33	70.81	70.8	-0.01
2728.92	70.76	70.75	-0.01
2546.4	70.75	70.73	-0.02
2475.84	70.75	70.73	-0.02
1881.88	70.28	70.26	-0.02
1384.48	69.7	69.68	-0.02
1245.83	69.52	69.51	-0.01
584.11	68.95	68.62	-0.33
60.05	68.86	68.03	-0.83

Alternative 1 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	72.99	72.46	-0.53
71854.2	72.86	72.31	-0.55
70744.2	72.52	71.82	-0.7
69527.2	72.24	71.39	-0.85
68670	71.92	70.76	-1.16
68131	71.69	70.65	-1.04
67511.6	71.35	70.21	-1.14
66869	70.73	69.54	-1.19
66774	70.76	69.61	-1.15
66190	70.55	69.58	-0.97
65955.8	70.37	69.65	-0.72
65434.6	70.04	69.7	-0.34
64399.74	69.29	68.81	-0.48
64273.7	69.34	68.84	-0.5
64220.7	69.3	68.8	-0.5
64200	69.3	68.8	-0.5
64100	69.3	68.8	-0.5
64094	69.3	68.8	-0.5
64024	69.28	68.78	-0.5
64010.4	69.14	68.65	-0.49
63960.4	68.76	68.35	-0.41
63959.7	68.92	68.5	-0.42
63856.7	68.88	68.45	-0.43
63756.7	68.52	68.11	-0.41
62823.2	67.68	67.24	-0.44
61905.2	66.68	66.28	-0.4
60625.3	65.95	65.56	-0.39
60595.74	64.41	64.15	-0.26
60583.6*	64.38	64.13	-0.25
60571.6*	64.35	64.1	-0.25
60559.5*	64.31	64.06	-0.25
60547.5*	64.27	64.03	-0.24
60535.46	64.24	64	-0.24
60396.4*	64.15	63.93	-0.22
60257.3*	64.07	63.85	-0.22
60118.3*	63.99	63.78	-0.21
59979.2*	63.9	63.7	-0.2
59840.2*	63.81	63.62	-0.19
59701.1*	63.73	63.55	-0.18
59562.1*	63.64	63.48	-0.16
59423.1	63.55	63.41	-0.14
59307.4*	63.48	63.34	-0.14
59191.8*	63.41	63.28	-0.13
59076.2*	63.34	63.22	-0.12

Alternative 1 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	63.28	63.17	-0.11
58844.9*	63.22	63.12	-0.1
58729.3*	63.17	63.08	-0.09
58613.7	63.13	63.04	-0.09
58463.86	62.92	62.86	-0.06
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	69.05	69.05	0
2416.26	69.04	69.04	0
2398.11	69.04	69.04	0
2389.56	69.04	69.04	0
2343.79	69	69	0
2303.58	68.94	68.94	0
2208.42	68.71	68.71	0
2195.48	68.68	68.68	0
2169.49	68.68	68.68	0
2167.76	68.69	68.69	0
2135.78	67.76	67.76	0
2100.84	67.76	67.76	0
1662.37	67.34	67.34	0
1144.5	66.53	66.55	0.02
595.53	65.42	65.11	-0.31
549.31*	65.41	65.06	-0.35
503.08*	65.41	65.05	-0.36
456.86*	65.41	65.05	-0.36
410.63*	65.4	65.04	-0.36
364.41*	65.4	65.04	-0.36
318.18*	65.4	65.04	-0.36
271.96*	65.4	65.04	-0.36
225.73*	65.4	65.03	-0.37
179.51	65.39	65.03	-0.36
159.41*	65.39	65.03	-0.36
139.31*	65.39	65.03	-0.36
119.21*	65.39	65.03	-0.36
99.11*	65.39	65.03	-0.36
79.01	65.39	65.03	-0.36
7756.32	72.87	72.86	-0.01
7743.32	72.87	72.85	-0.02
7738.5	72.87	72.85	-0.02
7733.4	72.87	72.85	-0.02
7726.83	72.87	72.85	-0.02
7654.51	72.86	72.84	-0.02
7632.63	72.86	72.84	-0.02

Alternative 1 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	72.86	72.84	-0.02
7584.04	72.77	72.76	-0.01
7567.5	72.77	72.75	-0.02
7426.94	72.76	72.74	-0.02
7369.89	72.75	72.73	-0.02
7325.91	72.57	72.54	-0.03
7313.37	72.59	72.57	-0.02
7305.97	72.59	72.56	-0.03
7294.91	72.58	72.56	-0.02
7260.57	72.4	72.37	-0.03
7237.19	72.4	72.38	-0.02
6786.22	72.31	72.28	-0.03
6723.56	72.31	72.28	-0.03
6655.9	71.13	71.07	-0.06
6563.37	71.04	70.97	-0.07
6402.43	70.93	70.85	-0.08
6356.93	70.89	70.8	-0.09
6324.93	70.87	70.78	-0.09
6293.27	70.85	70.75	-0.1
5958.59	70.66	70.52	-0.14
5652.94	70.48	70.23	-0.25
5045.34	70.45	70.08	-0.37
4947.92	70.45	70.08	-0.37
4915.91	70.44	70.06	-0.38
4783.1	70.43	70.06	-0.37
4580.38	70.43	70.05	-0.38
4553.28	70.42	70.04	-0.38
4459.75	70.41	70.03	-0.38
4370.6	70.41	70.03	-0.38
4330.88	70.41	70.03	-0.38
4269.23	70.4	70.02	-0.38
4229.24	70.4	70.02	-0.38
3733.5	70.38	70	-0.38
3187.46	70.23	69.82	-0.41
3150.64	70.22	69.81	-0.41
3126.39	70.21	69.79	-0.42
3104.46	70.19	69.76	-0.43
2750.51	70.07	69.62	-0.45
2741.93	70.07	69.62	-0.45
2725.96	70.07	69.62	-0.45
2716.57	70.07	69.61	-0.46
2615.37	70.04	69.58	-0.46
2244.98	69.96	69.5	-0.46
2221.06	69.96	69.49	-0.47

Alternative 1 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	69.93	69.46	-0.47
2042.36	69.91	69.44	-0.47
1922.11	69.89	69.42	-0.47
1892.63	69.88	69.4	-0.48
1863.46	69.77	69.3	-0.47
1829.45	69.78	69.31	-0.47
1611.06	69.73	69.26	-0.47
1513.84	69.66	69.19	-0.47
1454.72	69.67	69.19	-0.48
1380.55	69.64	69.14	-0.5
1354.02	69.64	69.14	-0.5
1010.56	69.6	69.08	-0.52
649.49	69.51	68.98	-0.53
242.54	69.45	68.94	-0.51
169.28	69.42	68.91	-0.51
106.82	69.41	68.9	-0.51
58.31	69.41	68.9	-0.51
4138.85	70.9	70.87	-0.03
3790.71	70.82	70.79	-0.03
3782.06	70.75	70.7	-0.05
3714.78	70.74	70.69	-0.05
3692.61	70.72	70.67	-0.05
3049.5	70.27	70.12	-0.15
2386.67	69.78	69.34	-0.44
2372.17	69.78	69.34	-0.44
2303.61	69.77	69.33	-0.44
2278.1	69.77	69.32	-0.45
1453.34	69.73	69.27	-0.46
1445.67	69.73	69.27	-0.46
1415.48	69.72	69.26	-0.46
1392.09	69.72	69.26	-0.46
1317.96	69.72	69.25	-0.47
1171.38	69.72	69.25	-0.47
1083.7	69.72	69.25	-0.47
215.24	69.71	69.24	-0.47
3232.36	70.8	70.47	-0.33
3203.12	70.8	70.46	-0.34
2930.66	70.8	70.46	-0.34
2636.62	70.8	70.46	-0.34
2494.17	70.8	70.46	-0.34
2473.31	70.8	70.46	-0.34
2465.6	70.8	70.45	-0.35
2414.49	70.79	70.46	-0.33
2046.09	70.8	70.46	-0.34

Alternative 1 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	70.8	70.4	-0.4
1565.52	70.78	70.29	-0.49
1208.56	70.77	70.19	-0.58
1188.81	70.77	70.18	-0.59
1175.29	70.76	70.16	-0.6
1132.07	70.76	70.15	-0.61
980.2	70.76	70.13	-0.63
963.63	70.76	70.14	-0.62
950.55	70.76	70.13	-0.63
901.58	70.75	70.11	-0.64
886.91	70.75	70.11	-0.64
839.05	70.75	69.45	-1.3
805	#N/A	69.46	#N/A
772	#N/A	69.46	#N/A
5341.48	73.19	73.17	-0.02
4477.47	72.74	72.72	-0.02
4162.47	72.62	72.6	-0.02
4134.04	72.61	72.58	-0.03
4086.12	72.59	72.56	-0.03
4047.7	72.58	72.54	-0.04
3617.56	72.46	72.42	-0.04
3312.44	72.39	72.35	-0.04
3014.68	72.33	72.29	-0.04
2924.04	72.32	72.28	-0.04
2763.33	72.29	72.25	-0.04
2728.92	72.21	72.16	-0.05
2546.4	72.03	71.99	-0.04
2475.84	72.06	72.01	-0.05
1881.88	71.57	71.58	0.01
1384.48	71.07	71.17	0.1
1245.83	70.95	71.07	0.12
584.11	70.84	70.66	-0.18
60.05	70.8	70.45	-0.35

Alternative 1 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.29	73.49	-0.8
71854.2	73.71	73.19	-0.52
70744.2	73.31	72.68	-0.63
69527.2	73.02	72.24	-0.78
68670	72.7	71.63	-1.07
68131	72.46	71.59	-0.87
67511.6	72.2	71.57	-0.63
66869	71.72	71.27	-0.45
66774	71.75	71.29	-0.46
66190	71.61	71.32	-0.29
65955.8	71.53	71.36	-0.17
65434.6	71.38	71.34	-0.04
64399.74	70.75	70.72	-0.03
64273.7	70.79	70.71	-0.08
64220.7	70.76	70.68	-0.08
64200	70.76	70.68	-0.08
64100	70.74	70.67	-0.07
64094	70.74	70.66	-0.08
64024	70.71	70.64	-0.07
64010.4	70.55	70.47	-0.08
63960.4	69.79	69.74	-0.05
63959.7	70	69.95	-0.05
63856.7	69.94	69.89	-0.05
63756.7	69.53	69.47	-0.06
62823.2	68.92	68.86	-0.06
61905.2	68.13	68.06	-0.07
60625.3	67.49	67.42	-0.07
60595.74	66.32	66.22	-0.1
60583.6*	66.25	66.16	-0.09
60571.6*	66.21	66.13	-0.08
60559.5*	66.17	66.09	-0.08
60547.5*	66.13	66.06	-0.07
60535.46	66.09	66.02	-0.07
60396.4*	66.02	65.95	-0.07
60257.3*	65.94	65.87	-0.07
60118.3*	65.87	65.79	-0.08
59979.2*	65.79	65.71	-0.08
59840.2*	65.71	65.64	-0.07
59701.1*	65.63	65.56	-0.07
59562.1*	65.56	65.48	-0.08
59423.1	65.47	65.4	-0.07
59307.4*	65.39	65.32	-0.07
59191.8*	65.32	65.24	-0.08
59076.2*	65.25	65.17	-0.08

Alternative 1 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.18	65.11	-0.07
58844.9*	65.13	65.06	-0.07
58729.3*	65.08	65.02	-0.06
58613.7	65.05	64.98	-0.07
58463.86	64.84	64.78	-0.06
3067.74	71.6	71.6	0
2499.4	69.46	69.47	0.01
2493.18	69.48	69.49	0.01
2450.1	69.5	69.51	0.01
2416.26	69.5	69.51	0.01
2398.11	69.5	69.5	0
2389.56	69.49	69.5	0.01
2343.79	69.48	69.49	0.01
2303.58	69.46	69.47	0.01
2208.42	69.4	69.42	0.02
2195.48	69.4	69.41	0.01
2169.49	69.4	69.41	0.01
2167.76	69.4	69.41	0.01
2135.78	68.55	68.57	0.02
2100.84	68.55	68.57	0.02
1662.37	68.21	68.25	0.04
1144.5	67.57	67.63	0.06
595.53	67.06	66.92	-0.14
549.31*	67.06	66.92	-0.14
503.08*	67.06	66.92	-0.14
456.86*	67.06	66.92	-0.14
410.63*	67.06	66.92	-0.14
364.41*	67.06	66.92	-0.14
318.18*	67.05	66.92	-0.13
271.96*	67.05	66.92	-0.13
225.73*	67.05	66.91	-0.14
179.51	67.05	66.91	-0.14
159.41*	67.05	66.91	-0.14
139.31*	67.06	66.93	-0.13
119.21*	67.08	66.96	-0.12
99.11*	67.11	67	-0.11
79.01	67.16	67.04	-0.12
7756.32	74.17	74.15	-0.02
7743.32	74.17	74.15	-0.02
7738.5	74.17	74.15	-0.02
7733.4	74.17	74.15	-0.02
7726.83	74.17	74.15	-0.02
7654.51	74.16	74.15	-0.01
7632.63	74.16	74.15	-0.01

Alternative 1 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.16	74.14	-0.02
7584.04	74.08	74.06	-0.02
7567.5	74.08	74.06	-0.02
7426.94	74.07	74.05	-0.02
7369.89	74.07	74.05	-0.02
7325.91	73.83	73.81	-0.02
7313.37	73.85	73.82	-0.03
7305.97	73.84	73.82	-0.02
7294.91	73.84	73.82	-0.02
7260.57	73.59	73.56	-0.03
7237.19	73.59	73.56	-0.03
6786.22	73.56	73.53	-0.03
6723.56	73.55	73.53	-0.02
6655.9	71.9	71.84	-0.06
6563.37	71.84	71.78	-0.06
6402.43	71.76	71.7	-0.06
6356.93	71.73	71.67	-0.06
6324.93	71.71	71.65	-0.06
6293.27	71.7	71.63	-0.07
5958.59	71.61	71.47	-0.14
5652.94	71.59	71.36	-0.23
5045.34	71.58	71.31	-0.27
4947.92	71.58	71.31	-0.27
4915.91	71.57	71.3	-0.27
4783.1	71.56	71.3	-0.26
4580.38	71.55	71.28	-0.27
4553.28	71.53	71.27	-0.26
4459.75	71.53	71.26	-0.27
4370.6	71.52	71.26	-0.26
4330.88	71.52	71.26	-0.26
4269.23	71.49	71.23	-0.26
4229.24	71.49	71.22	-0.27
3733.5	71.45	71.2	-0.25
3187.46	71.41	71.17	-0.24
3150.64	71.41	71.16	-0.25
3126.39	71.4	71.16	-0.24
3104.46	71.4	71.16	-0.24
2750.51	71.35	71.13	-0.22
2741.93	71.35	71.13	-0.22
2725.96	71.33	71.11	-0.22
2716.57	71.33	71.11	-0.22
2615.37	71.31	71.1	-0.21
2244.98	71.28	71.08	-0.2
2221.06	71.27	71.08	-0.19

Alternative 1 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.25	71.06	-0.19
2042.36	71.25	71.05	-0.2
1922.11	71.24	71.05	-0.19
1892.63	71.24	71.05	-0.19
1863.46	71.14	70.98	-0.16
1829.45	71.14	70.99	-0.15
1611.06	71.11	70.97	-0.14
1513.84	71.09	70.95	-0.14
1454.72	71.08	70.95	-0.13
1380.55	71.07	70.94	-0.13
1354.02	71.07	70.94	-0.13
1010.56	71.03	70.91	-0.12
649.49	70.95	70.86	-0.09
242.54	70.91	70.83	-0.08
169.28	70.88	70.81	-0.07
106.82	70.86	70.79	-0.07
58.31	70.85	70.78	-0.07
4138.85	71.49	71.48	-0.01
3790.71	71.43	71.43	0
3782.06	71.41	71.41	0
3714.78	71.41	71.41	0
3692.61	71.39	71.38	-0.01
3049.5	71.2	71.02	-0.18
2386.67	71.19	71.01	-0.18
2372.17	71.19	71.01	-0.18
2303.61	71.18	71	-0.18
2278.1	71.18	71	-0.18
1453.34	71.16	70.99	-0.17
1445.67	71.16	70.99	-0.17
1415.48	71.15	70.99	-0.16
1392.09	71.15	70.99	-0.16
1317.96	71.15	70.98	-0.17
1171.38	71.14	70.98	-0.16
1083.7	71.14	70.98	-0.16
215.24	71.11	70.96	-0.15
3232.36	71.92	71.68	-0.24
3203.12	71.92	71.68	-0.24
2930.66	71.91	71.67	-0.24
2636.62	71.9	71.64	-0.26
2494.17	71.89	71.63	-0.26
2473.31	71.89	71.62	-0.27
2465.6	71.88	71.62	-0.26
2414.49	71.88	71.62	-0.26
2046.09	71.87	71.59	-0.28

Alternative 1 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	71.82	71.5	-0.32
1565.52	71.73	71.35	-0.38
1208.56	71.73	71.3	-0.43
1188.81	71.73	71.3	-0.43
1175.29	71.72	71.27	-0.45
1132.07	71.72	71.27	-0.45
980.2	71.71	71.25	-0.46
963.63	71.71	71.26	-0.45
950.55	71.71	71.25	-0.46
901.58	71.71	71.24	-0.47
886.91	71.71	71.24	-0.47
839.05	71.71	71.23	-0.48
805	#N/A	71.24	#N/A
772	#N/A	71.24	#N/A
5341.48	74.69	74.67	-0.02
4477.47	74.36	74.33	-0.03
4162.47	74.19	74.16	-0.03
4134.04	74.17	74.14	-0.03
4086.12	74.12	74.09	-0.03
4047.7	74.1	74.07	-0.03
3617.56	73.93	73.9	-0.03
3312.44	73.85	73.81	-0.04
3014.68	73.78	73.74	-0.04
2924.04	73.76	73.72	-0.04
2763.33	73.74	73.7	-0.04
2728.92	73.6	73.55	-0.05
2546.4	72.89	72.91	0.02
2475.84	72.97	72.97	0
1881.88	72.58	72.46	-0.12
1384.48	72.25	72.08	-0.17
1245.83	72.16	71.98	-0.18
584.11	71.93	71.69	-0.24
60.05	71.86	71.58	-0.28

Alternative 1 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.68	74.05	-0.63
71854.2	73.97	73.52	-0.45
70744.2	73.57	73.03	-0.54
69527.2	73.28	72.62	-0.66
68670	72.98	72.14	-0.84
68131	72.77	72.09	-0.68
67511.6	72.57	72.1	-0.47
66869	72.25	71.84	-0.41
66774	72.25	71.85	-0.4
66190	72.15	71.86	-0.29
65955.8	72.1	71.9	-0.2
65434.6	72	71.89	-0.11
64399.74	71.42	71.37	-0.05
64273.7	71.45	71.32	-0.13
64220.7	71.43	71.29	-0.14
64200	71.43	71.29	-0.14
64100	71.39	71.26	-0.13
64094	71.39	71.26	-0.13
64024	71.36	71.23	-0.13
64010.4	71.18	71.05	-0.13
63960.4	70.18	70.11	-0.07
63959.7	70.42	70.34	-0.08
63856.7	70.35	70.28	-0.07
63756.7	69.89	69.82	-0.07
62823.2	69.32	69.25	-0.07
61905.2	68.6	68.52	-0.08
60625.3	67.96	67.87	-0.09
60595.74	66.83	66.73	-0.1
60583.6*	66.73	66.64	-0.09
60571.6*	66.67	66.58	-0.09
60559.5*	66.63	66.54	-0.09
60547.5*	66.58	66.5	-0.08
60535.46	66.54	66.46	-0.08
60396.4*	66.46	66.38	-0.08
60257.3*	66.39	66.3	-0.09
60118.3*	66.31	66.23	-0.08
59979.2*	66.23	66.15	-0.08
59840.2*	66.16	66.07	-0.09
59701.1*	66.08	66	-0.08
59562.1*	66	65.92	-0.08
59423.1	65.91	65.83	-0.08
59307.4*	65.83	65.75	-0.08
59191.8*	65.75	65.67	-0.08
59076.2*	65.68	65.59	-0.09

Alternative 1 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.6	65.52	-0.08
58844.9*	65.53	65.46	-0.07
58729.3*	65.47	65.4	-0.07
58613.7	65.43	65.36	-0.07
58463.86	65.18	65.12	-0.06
3067.74	71.6	71.6	0
2499.4	69.55	69.56	0.01
2493.18	69.6	69.6	0
2450.1	69.64	69.64	0
2416.26	69.64	69.64	0
2398.11	69.64	69.64	0
2389.56	69.64	69.64	0
2343.79	69.63	69.63	0
2303.58	69.62	69.62	0
2208.42	69.58	69.58	0
2195.48	69.58	69.58	0
2169.49	69.58	69.58	0
2167.76	69.58	69.58	0
2135.78	68.82	68.83	0.01
2100.84	68.82	68.83	0.01
1662.37	68.49	68.51	0.02
1144.5	67.8	67.85	0.05
595.53	67.49	67.43	-0.06
549.31*	67.49	67.43	-0.06
503.08*	67.48	67.43	-0.05
456.86*	67.48	67.43	-0.05
410.63*	67.48	67.43	-0.05
364.41*	67.48	67.43	-0.05
318.18*	67.48	67.42	-0.06
271.96*	67.48	67.42	-0.06
225.73*	67.47	67.42	-0.05
179.51	67.47	67.42	-0.05
159.41*	67.47	67.42	-0.05
139.31*	67.49	67.43	-0.06
119.21*	67.51	67.46	-0.05
99.11*	67.55	67.5	-0.05
79.01	67.61	67.55	-0.06
7756.32	74.56	74.55	-0.01
7743.32	74.56	74.55	-0.01
7738.5	74.56	74.55	-0.01
7733.4	74.56	74.55	-0.01
7726.83	74.56	74.55	-0.01
7654.51	74.55	74.55	0
7632.63	74.55	74.55	0

Alternative 1 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.55	74.55	0
7584.04	74.53	74.52	-0.01
7567.5	74.53	74.52	-0.01
7426.94	74.53	74.52	-0.01
7369.89	74.52	74.52	0
7325.91	74.27	74.26	-0.01
7313.37	74.27	74.26	-0.01
7305.97	74.27	74.26	-0.01
7294.91	74.27	74.26	-0.01
7260.57	73.98	73.97	-0.01
7237.19	73.98	73.97	-0.01
6786.22	73.97	73.95	-0.02
6723.56	73.96	73.95	-0.01
6655.9	72.2	72.1	-0.1
6563.37	72.17	72.05	-0.12
6402.43	72.15	71.98	-0.17
6356.93	72.14	71.95	-0.19
6324.93	72.12	71.93	-0.19
6293.27	72.12	71.91	-0.21
5958.59	72.11	71.82	-0.29
5652.94	72.1	71.81	-0.29
5045.34	72.09	71.8	-0.29
4947.92	72.09	71.8	-0.29
4915.91	72.09	71.8	-0.29
4783.1	72.08	71.8	-0.28
4580.38	72.08	71.79	-0.29
4553.28	72.07	71.79	-0.28
4459.75	72.07	71.78	-0.29
4370.6	72.07	71.78	-0.29
4330.88	72.07	71.78	-0.29
4269.23	72.06	71.77	-0.29
4229.24	72.06	71.77	-0.29
3733.5	72.04	71.76	-0.28
3187.46	72.01	71.74	-0.27
3150.64	72.01	71.74	-0.27
3126.39	72	71.73	-0.27
3104.46	72	71.73	-0.27
2750.51	71.96	71.71	-0.25
2741.93	71.96	71.71	-0.25
2725.96	71.96	71.71	-0.25
2716.57	71.96	71.71	-0.25
2615.37	71.94	71.7	-0.24
2244.98	71.92	71.68	-0.24
2221.06	71.92	71.68	-0.24

Alternative 1 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.89	71.67	-0.22
2042.36	71.89	71.66	-0.23
1922.11	71.89	71.66	-0.23
1892.63	71.89	71.66	-0.23
1863.46	71.79	71.59	-0.2
1829.45	71.79	71.6	-0.19
1611.06	71.77	71.58	-0.19
1513.84	71.75	71.57	-0.18
1454.72	71.74	71.56	-0.18
1380.55	71.73	71.55	-0.18
1354.02	71.73	71.55	-0.18
1010.56	71.69	71.52	-0.17
649.49	71.61	71.47	-0.14
242.54	71.56	71.43	-0.13
169.28	71.54	71.41	-0.13
106.82	71.51	71.39	-0.12
58.31	71.48	71.37	-0.11
4138.85	71.87	71.64	-0.23
3790.71	71.87	71.64	-0.23
3782.06	71.86	71.64	-0.22
3714.78	71.86	71.64	-0.22
3692.61	71.86	71.64	-0.22
3049.5	71.86	71.64	-0.22
2386.67	71.86	71.63	-0.23
2372.17	71.86	71.63	-0.23
2303.61	71.84	71.62	-0.22
2278.1	71.84	71.62	-0.22
1453.34	71.81	71.6	-0.21
1445.67	71.81	71.6	-0.21
1415.48	71.81	71.6	-0.21
1392.09	71.81	71.6	-0.21
1317.96	71.8	71.6	-0.2
1171.38	71.8	71.59	-0.21
1083.7	71.8	71.59	-0.21
215.24	71.76	71.57	-0.19
3232.36	72.52	72.35	-0.17
3203.12	72.52	72.35	-0.17
2930.66	72.51	72.34	-0.17
2636.62	72.49	72.31	-0.18
2494.17	72.48	72.29	-0.19
2473.31	72.48	72.28	-0.2
2465.6	72.47	72.27	-0.2
2414.49	72.47	72.27	-0.2
2046.09	72.44	72.23	-0.21

Alternative 1 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	72.39	72.15	-0.24
1565.52	72.33	72.02	-0.31
1208.56	72.31	71.94	-0.37
1188.81	72.31	71.93	-0.38
1175.29	72.3	71.9	-0.4
1132.07	72.3	71.9	-0.4
980.2	72.29	71.85	-0.44
963.63	72.29	71.86	-0.43
950.55	72.29	71.86	-0.43
901.58	72.27	71.8	-0.47
886.91	72.27	71.79	-0.48
839.05	72.27	71.79	-0.48
805	#N/A	71.8	#N/A
772	#N/A	71.8	#N/A
5341.48	75.27	75.26	-0.01
4477.47	74.9	74.89	-0.01
4162.47	74.71	74.69	-0.02
4134.04	74.69	74.67	-0.02
4086.12	74.64	74.62	-0.02
4047.7	74.62	74.6	-0.02
3617.56	74.43	74.4	-0.03
3312.44	74.33	74.3	-0.03
3014.68	74.26	74.23	-0.03
2924.04	74.24	74.21	-0.03
2763.33	74.23	74.2	-0.03
2728.92	74.05	74.03	-0.02
2546.4	73.23	73.17	-0.06
2475.84	73.32	73.25	-0.07
1881.88	72.98	72.87	-0.11
1384.48	72.71	72.56	-0.15
1245.83	72.64	72.48	-0.16
584.11	72.48	72.28	-0.2
60.05	72.44	72.23	-0.21

Alternative 1 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	75.9	75.74	-0.16
71854.2	75.11	74.85	-0.26
70744.2	74.75	74.44	-0.31
69527.2	74.57	74.24	-0.33
68670	74.43	74.06	-0.37
68131	74.37	74.04	-0.33
67511.6	74.3	74.03	-0.27
66869	74.18	73.88	-0.3
66774	74.18	73.89	-0.29
66190	74.12	73.89	-0.23
65955.8	74.11	73.9	-0.21
65434.6	74.06	73.91	-0.15
64399.74	73.71	73.59	-0.12
64273.7	73.7	73.51	-0.19
64220.7	73.67	73.47	-0.2
64200	73.66	73.47	-0.19
64100	73.54	73.37	-0.17
64094	73.54	73.37	-0.17
64024	73.47	73.31	-0.16
64010.4	73.24	73.08	-0.16
63960.4	71.18	71.12	-0.06
63959.7	71.54	71.49	-0.05
63856.7	71.44	71.38	-0.06
63756.7	70.79	70.75	-0.04
62823.2	70.33	70.28	-0.05
61905.2	69.78	69.73	-0.05
60625.3	69.17	69.11	-0.06
60595.74	68.23	68.18	-0.05
60583.6*	68.12	68.06	-0.06
60571.6*	68.01	67.96	-0.05
60559.5*	67.93	67.87	-0.06
60547.5*	67.87	67.81	-0.06
60535.46	67.82	67.77	-0.05
60396.4*	67.75	67.7	-0.05
60257.3*	67.68	67.63	-0.05
60118.3*	67.62	67.56	-0.06
59979.2*	67.55	67.5	-0.05
59840.2*	67.48	67.43	-0.05
59701.1*	67.41	67.36	-0.05
59562.1*	67.34	67.29	-0.05
59423.1	67.25	67.2	-0.05
59307.4*	67.18	67.13	-0.05
59191.8*	67.11	67.06	-0.05
59076.2*	67.05	67	-0.05

Alternative 1 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	66.98	66.94	-0.04
58844.9*	66.92	66.87	-0.05
58729.3*	66.86	66.82	-0.04
58613.7	66.81	66.76	-0.05
58463.86	66.6	66.52	-0.08
3067.74	71.6	71.6	0
2499.4	69.65	69.65	0
2493.18	69.73	69.73	0
2450.1	69.79	69.79	0
2416.26	69.79	69.79	0
2398.11	69.79	69.79	0
2389.56	69.79	69.79	0
2343.79	69.79	69.79	0
2303.58	69.79	69.79	0
2208.42	69.77	69.77	0
2195.48	69.77	69.77	0
2169.49	69.77	69.77	0
2167.76	69.77	69.77	0
2135.78	69.27	69.27	0
2100.84	69.27	69.27	0
1662.37	68.92	68.92	0
1144.5	68.77	68.71	-0.06
595.53	68.76	68.7	-0.06
549.31*	68.76	68.71	-0.05
503.08*	68.76	68.71	-0.05
456.86*	68.77	68.71	-0.06
410.63*	68.76	68.71	-0.05
364.41*	68.76	68.71	-0.05
318.18*	68.76	68.71	-0.05
271.96*	68.76	68.7	-0.06
225.73*	68.75	68.7	-0.05
179.51	68.75	68.7	-0.05
159.41*	68.76	68.71	-0.05
139.31*	68.79	68.73	-0.06
119.21*	68.83	68.77	-0.06
99.11*	68.86	68.8	-0.06
79.01	68.87	68.81	-0.06
7756.32	75.24	75.23	-0.01
7743.32	75.24	75.23	-0.01
7738.5	75.24	75.23	-0.01
7733.4	75.24	75.23	-0.01
7726.83	75.24	75.23	-0.01
7654.51	75.24	75.23	-0.01
7632.63	75.24	75.23	-0.01

Alternative 1 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	75.24	75.23	-0.01
7584.04	75.24	75.23	-0.01
7567.5	75.24	75.23	-0.01
7426.94	75.23	75.23	0
7369.89	75.23	75.23	0
7325.91	74.86	74.86	0
7313.37	74.86	74.85	-0.01
7305.97	74.86	74.85	-0.01
7294.91	74.86	74.85	-0.01
7260.57	74.86	74.85	-0.01
7237.19	74.86	74.85	-0.01
6786.22	74.86	74.85	-0.01
6723.56	74.85	74.84	-0.01
6655.9	74.1	73.86	-0.24
6563.37	74.1	73.86	-0.24
6402.43	74.1	73.86	-0.24
6356.93	74.1	73.86	-0.24
6324.93	74.09	73.85	-0.24
6293.27	74.09	73.85	-0.24
5958.59	74.09	73.85	-0.24
5652.94	74.08	73.85	-0.23
5045.34	74.08	73.84	-0.24
4947.92	74.08	73.84	-0.24
4915.91	74.07	73.84	-0.23
4783.1	74.07	73.84	-0.23
4580.38	74.07	73.84	-0.23
4553.28	74.07	73.83	-0.24
4459.75	74.07	73.83	-0.24
4370.6	74.07	73.83	-0.24
4330.88	74.07	73.83	-0.24
4269.23	74.06	73.83	-0.23
4229.24	74.06	73.83	-0.23
3733.5	74.05	73.82	-0.23
3187.46	74.04	73.81	-0.23
3150.64	74.04	73.81	-0.23
3126.39	74.04	73.81	-0.23
3104.46	74.04	73.81	-0.23
2750.51	74.02	73.8	-0.22
2741.93	74.02	73.8	-0.22
2725.96	74.02	73.8	-0.22
2716.57	74.02	73.8	-0.22
2615.37	74.01	73.79	-0.22
2244.98	73.99	73.78	-0.21
2221.06	73.99	73.78	-0.21

Alternative 1 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	73.98	73.76	-0.22
2042.36	73.97	73.76	-0.21
1922.11	73.97	73.76	-0.21
1892.63	73.96	73.75	-0.21
1863.46	73.89	73.7	-0.19
1829.45	73.9	73.7	-0.2
1611.06	73.87	73.67	-0.2
1513.84	73.86	73.67	-0.19
1454.72	73.86	73.66	-0.2
1380.55	73.85	73.65	-0.2
1354.02	73.84	73.65	-0.19
1010.56	73.81	73.63	-0.18
649.49	73.72	73.55	-0.17
242.54	73.68	73.52	-0.16
169.28	73.67	73.51	-0.16
106.82	73.63	73.47	-0.16
58.31	73.53	73.4	-0.13
4138.85	73.94	73.73	-0.21
3790.71	73.94	73.73	-0.21
3782.06	73.94	73.73	-0.21
3714.78	73.94	73.73	-0.21
3692.61	73.94	73.73	-0.21
3049.5	73.94	73.73	-0.21
2386.67	73.93	73.72	-0.21
2372.17	73.93	73.72	-0.21
2303.61	73.93	73.72	-0.21
2278.1	73.93	73.72	-0.21
1453.34	73.91	73.7	-0.21
1445.67	73.91	73.7	-0.21
1415.48	73.9	73.7	-0.2
1392.09	73.9	73.7	-0.2
1317.96	73.9	73.69	-0.21
1171.38	73.89	73.69	-0.2
1083.7	73.89	73.69	-0.2
215.24	73.87	73.67	-0.2
3232.36	74.3	74.05	-0.25
3203.12	74.3	74.05	-0.25
2930.66	74.3	74.05	-0.25
2636.62	74.29	74.04	-0.25
2494.17	74.29	74.03	-0.26
2473.31	74.29	74.03	-0.26
2465.6	74.29	74.03	-0.26
2414.49	74.29	74.03	-0.26
2046.09	74.28	74.01	-0.27

Alternative 1 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 1	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	74.26	73.99	-0.27
1565.52	74.24	73.96	-0.28
1208.56	74.23	73.94	-0.29
1188.81	74.23	73.93	-0.3
1175.29	74.23	73.92	-0.31
1132.07	74.23	73.92	-0.31
980.2	74.23	73.89	-0.34
963.63	74.23	73.9	-0.33
950.55	74.23	73.9	-0.33
901.58	74.21	73.86	-0.35
886.91	74.21	73.85	-0.36
839.05	74.21	73.84	-0.37
805	#N/A	73.85	#N/A
772	#N/A	73.85	#N/A
5341.48	76	75.99	-0.01
4477.47	75.5	75.48	-0.02
4162.47	75.27	75.25	-0.02
4134.04	75.25	75.23	-0.02
4086.12	75.18	75.16	-0.02
4047.7	75.16	75.13	-0.03
3617.56	74.96	74.91	-0.05
3312.44	74.87	74.8	-0.07
3014.68	74.81	74.74	-0.07
2924.04	74.8	74.73	-0.07
2763.33	74.8	74.73	-0.07
2728.92	74.73	74.63	-0.1
2546.4	74.44	74.19	-0.25
2475.84	74.44	74.22	-0.22
1881.88	74.37	74.12	-0.25
1384.48	74.34	74.07	-0.27
1245.83	74.33	74.06	-0.27
584.11	74.31	74.04	-0.27
60.05	74.28	74.01	-0.27

Alternative 2
HEC-RAS Results

HFC-RAS Plan: Ait2_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	2190.41	58.25	70.11		70.37	0.000731	4.12	531.82	72.14	0.27
P118-00-00	P118-R3-2	71854.2	Max WS	2186.79	57.83	69.92		70.04	0.000434	2.83	773.71	128.15	0.2
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	2212.3	55.05	69.57		69.66	0.000254	2.48	890.96	119.07	0.16
P118-00-00	P118-R3-2	69527.2	Max WS	2209.11	55.28	69.31		69.39	0.000198	2.3	958.82	121.45	0.14
P118-00-00	P118-R3-2	68670	Max WS	2206.41	54.88	68.91		69.09	0.000502	3.42	661.45	107.21	0.22
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	2205.75	54.47	68.68		68.85	0.000408	3.31	666.44	80.83	0.2
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2240	54.14	68.22		68.5	0.000718	4.24	528.12	64.95	0.26
P118-00-00	P118-R3-2	66869	Max WS	2071.73	53.96	67.62		67.96	0.001113	4.68	442.33	67.03	0.32
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2136.76	53.79	67.62		67.86	0.000665	3.88	550.56	75.28	0.25
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2136.18	53.6	67.3		67.55	0.000645	3.99	576.98	89.37	0.25
P118-00-00	P118-R3-2	65955.8	Max WS	2136.01	53.52	66.99		67.28	0.000903	4.3	496.31	71.29	0.29
P118-00-00	P118-R3-2	65434.6	Max WS	2135.76	53.1	66.57		66.85	0.000723	4.32	494.96	57.56	0.26
P118-00-00	P118-R3-2	64399.74	Max WS	2005.15	52.59	65.9		66.17	0.000668	4.12	486.34	57.07	0.25
P118-00-00	P118-R3-2	64273.7	Max WS	2005.09	53.55	65.89	59.35	66.09	0.000689	3.6	556.61	90.3	0.26
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	2005.09	53.3	65.86		66.04	0.000642	3.48	576.28	93.56	0.25
P118-00-00	P118-R3-2	64200	Max WS	2005.09	53.3	65.85		66.04	0.000642	3.48	575.96	93.51	0.25
P118-00-00	P118-R2-2	64100	Max WS	2184.75	52.61	65.86		65.93	0.000176	2.12	1028.37	136.24	0.14
P118-00-00	P118-R2-2	64094	Max WS	2184.76	52.61	65.85	58.13	65.93	0.000176	2.12	1028.25	136.23	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	2184.75	52.56	65.83		65.9	0.000174	2.12	1031.39	136.44	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	2184.75	52.78	65.72	59.21	65.9	0.000557	3.4	642.53	102.66	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	2184.75	53.04	65.45		65.66	0.000676	3.69	592.06	96.97	0.26
P118-00-00	P118-R2-2	63959.7	Max WS	2184.75	53.06	65.58	58.12	65.65	0.000181	2.15	1017.98	135.48	0.14
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	2184.74	53.16	65.54		65.61	0.000192	2.19	996.25	133.89	0.14
P118-00-00	P118-R2-2	63756.7	Max WS	2193.8	52.4	65.26		65.58	0.000923	4.57	479.92	63.65	0.29
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	2249.39	50.35	64.58		64.86	0.000681	4.28	525.94	61.3	0.26
P118-00-00	P118-R2-2	61905.2	Max WS	2364.78	50.77	63.27		63.65	0.001902	4.98	475.27	101.53	0.41
P118-00-00	P118-R2-2	60625.3	Max WS	2364.58	49.52	62.57		62.84	0.00066	4.16	568.8	70.49	0.26
P118-00-00	P118-R2-1	60595.74	Max WS	2409.77	49.48	61.59		62.05	0.001268	5.44	442.71	57.98	0.35
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2409.66	49.68	61.55		61.94	0.001065	5.01	481.23	64.25	0.32
P118-00-00	P118-R2-1	60571.6*	Max WS	2409.66	49.89	61.51		61.85	0.000908	4.65	518.12	69.7	0.3
P118-00-00	P118-R2-1	60559.5*	Max WS	2409.54	50.09	61.48		61.77	0.000787	4.34	554.9	75.21	0.28
P118-00-00	P118-R2-1	60547.5*	Max WS	2409.54	50.3	61.44		61.7	0.00069	4.07	591.33	80.63	0.27
P118-00-00	P118-R2-1	60535.46	Max WS	2409.43	50.5	61.41		61.64	0.00061	3.84	627.94	85.9	0.25
P118-00-00	P118-R2-1	60536.4*	Max WS	2409.32	50.45	61.34		61.58	0.000671	3.94	611.94	86.81	0.26
P118-00-00	P118-R2-1	60257.3*	Max WS	2409.21	50.4	61.27		61.52	0.000732	4.03	597.96	87.8	0.27
P118-00-00	P118-R2-1	60118.3*	Max WS	2409.2	50.35	61.19		61.45	0.000791	4.11	586.72	88.91	0.28
P118-00-00	P118-R2-1	59979.2*	Max WS	2409.1	50.3	61.11		61.38	0.000844	4.17	578.21	90.14	0.29
P118-00-00	P118-R2-1	59840.2*	Max WS	2408.89	50.25	61.03		61.3	0.000888	4.21	572.46	91.46	0.3
P118-00-00	P118-R2-1	59701.1*	Max WS	2408.89	50.2	60.95		61.22	0.000921	4.23	569.65	92.86	0.3
P118-00-00	P118-R2-1	59562.1*	Max WS	2408.79	50.15	60.86		61.14	0.00094	4.23	569.82	94.77	0.3
P118-00-00	P118-R2-1	59423.1	Max WS	2408.78	50.1	60.79		61.06	0.000944	4.2	573.19	95.88	0.3
P118-00-00	P118-R2-1	59307.4*	Max WS	2408.69	50.1	60.71		60.98	0.000949	4.17	577.45	98.38	0.3
P118-00-00	P118-R2-1	59191.8*	Max WS	2408.68	50.11	60.63		60.9	0.000941	4.13	583.91	100.63	0.3
P118-00-00	P118-R2-1	59076.2*	Max WS	2408.68	50.11	60.56		60.82	0.000918	4.06	593.53	102.94	0.3
P118-00-00	P118-R2-1	58960.5*	Max WS	2408.6	50.11	60.49		60.74	0.000888	3.98	605.3	105.4	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	2408.6	50.11	60.43		60.67	0.000841	3.88	620.22	107.44	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	2408.6	50.12	60.37		60.6	0.000788	3.78	637.35	109.33	0.28
P118-00-00	P118-R2-1	58613.7	Max WS	2408.59	50.12	60.32		60.53	0.000726	3.66	658.02	111.14	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	2412.08	47.59	60.14	54.57	60.37	0.000736	3.81	633.5	101.31	0.27
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	6.58	67.59	68.85		68.85	0.000167	0.58	11.37	17.3	0.13
P118-21-00	P118-21-00	2416.26	Max WS	6.71	67.5	68.84		68.84	0.000325	0.55	12.22	16.18	0.11
P118-21-00	P118-21-00	2398.13	Max WS	7.14	67.44	68.83		68.84	0.000263	0.52	13.67	16.63	0.1
P118-21-00	P118-21-00	2389.56	Max WS	7.59	67.47	68.83		68.83	0.000105	0.54	14.1	16.64	0.1
P118-21-00	P118-21-00	2343.79	Max WS	8.54	67.54	68.78		68.81	0.000772	1.31	6.53	8.88	0.27

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Ait2_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	9.21	67.47	68.72		68.75	0.002132	1.39	6.63	8.65	0.28
P118-21-00	P118-21-00	2208.42	Max WS	10.4	67.31	68.34		68.4	0.005055	1.92	5.42	8.42	0.42
P118-21-00	P118-21-00	2195.48	Max WS	10.4	67.34	68.27		68.34	0.003263	2.17	4.8	9.19	0.53
P118-21-00	P118-21-00	2169.49	Max WS	10.53	66.56	68.24		68.26	0.00034	1.1	9.54	8.58	0.18
P118-21-00	P118-21-00	2167.76	Max WS	10.51	66.37	68.25		68.26	0.000182	0.86	12.21	10.07	0.14
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	8.45	65.03	66.83		66.85	0.000273	0.91	9.26	9.61	0.16
P118-21-00	P118-21-00	2100.84	Max WS	8.45	64.78	66.83		66.83	0.000346	0.71	11.92	10.69	0.12
P118-21-00	P118-21-00	1662.37	Max WS	37.76	63.91	66.34		66.39	0.001375	1.77	21.29	13.42	0.25
P118-21-00	P118-21-00	1144.5	Max WS	57.64	62.63	65.55		65.62	0.001407	2.04	28.32	14.27	0.25
P118-21-00	P118-21-00	595.53	Max WS	78.69	61.49	63.94		64.1	0.003903	3.16	24.91	14.43	0.42
P118-21-00	P118-21-00	549.31*	Max WS	80.65	61.18	63.75		63.91	0.003983	3.22	25.08	14.33	0.43
P118-21-00	P118-21-00	503.08*	Max WS	82.61	60.87	63.54		63.71	0.004091	3.28	25.21	14.25	0.43
P118-21-00	P118-21-00	456.86*	Max WS	84.56	60.57	63.33		63.51	0.004373	3.35	25.21	14.48	0.45
P118-21-00	P118-21-00	410.63*	Max WS	86.52	60.26	63.1		63.28	0.00519	3.36	25.76	17.07	0.48
P118-21-00	P118-21-00	364.41*	Max WS	88.48	59.95	62.85		63.03	0.005202	3.38	26.2	17.32	0.48
P118-21-00	P118-21-00	318.18*	Max WS	90.43	59.64	62.6		62.78	0.005073	3.42	26.45	16.82	0.48
P118-21-00	P118-21-00	271.96*	Max WS	48.25	59.34	62.34		62.39	0.00014	1.85	26.12	15.84	0.25
P118-21-00	P118-21-00	225.73*	Max WS	47.78	59.03	62.29		62.33	0.001026	1.69	28.28	15.3	0.22
P118-21-00	P118-21-00	179.51	Max WS	45.71	58.72	62.24		62.28	0.000786	1.55	29.41	14.34	0.19
P118-21-00	P118-21-00	159.41*	Max WS	45.71	57.98	62.23		62.26	0.000394	1.22	37.42	15.13	0.14
P118-21-00	P118-21-00	139.31*	Max WS	45.7	57.24	62.23		62.24	0.00022	0.99	46	15.87	0.1
P118-21-00	P118-21-00	119.21*	Max WS	45.71	55.51	62.22		62.23	0.000334	0.83	54.97	16.56	0.08
P118-21-00	P118-21-00	99.11*	Max WS	45.71	55.77	62.22		62.23	0.000087	0.71	64.4	17.2	0.06
P118-21-00	P118-21-00	79.01	Max WS	45.71	55.03	62.22		62.23	0.000059	0.62	74.21	17.83	0.05
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	71.59		71.59	0.000037	0.31	31.89	18.19	0.04
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	71.59		71.59	0.000089	0.42	23.85	17.37	0.06
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.24	70.08	71.59	70.24	71.59	0.000132	0.48	21.25	16.98	0.08
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.24	70.2	71.57		71.58	0.000203	0.56	18.39	16.41	0.09
P118-23-00	P118-23-00 R2	7726.83	Max WS	10.65	70.16	71.57		71.57	0.000303	0.65	16.45	15.8	0.11
P118-23-00	P118-23-00 R2	7654.51	Max WS	13.25	69.97	71.54		71.55	0.000283	0.7	19.06	15.53	0.11
P118-23-00	P118-23-00 R2	7632.63	Max WS	14.27	69.88	71.53		71.54	0.000301	0.73	19.41	15.19	0.11
P118-23-00	P118-23-00 R2	7614.73	Max WS	14.97	68.92	71.53		71.54	0.000316	0.62	24.3	15.09	0.09
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	14.97	69.39	71.34		71.35	0.00023	0.68	21.88	15.48	0.1
P118-23-00	P118-23-00 R2	7567.5	Max WS	15.61	69.56	71.33		71.34	0.000311	0.78	20.14	14.79	0.12
P118-23-00	P118-23-00 R2	7426.94	Max WS	19.31	68.48	71.28		71.29	0.000306	0.85	22.72	13.98	0.12
P118-23-00	P118-23-00 R2	7369.89	Max WS	21.47	68.06	71.27		71.28	0.000266	0.84	25.66	14.31	0.11
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	21.47	69.59	71.12		71.18	0.001727	2.03	10.57	14.83	0.29
P118-23-00	P118-23-00 R2	7313.37	Max WS	22.04	69.5	71.15		71.16	0.000489	0.95	23.3	18.1	0.15
P118-23-00	P118-23-00 R2	7305.97	Max WS	22.33	69.12	71.15		71.16	0.000288	0.82	27.29	17.47	0.12
P118-23-00	P118-23-00 R2	7294.91	Max WS	22.73	69.43	71.14		71.15	0.000302	0.88	25.8	19.11	0.12
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	22.73	69.34	71.02		71.04	0.000652	1.25	18.17	16.84	0.18
P118-23-00	P118-23-00 R2	7237.19	Max WS	23.84	69.28	71.01		71.03	0.000586	1.01	23.57	19.09	0.16
P118-23-00	P118-23-00 R2	6786.22	Max WS	44.32	68.02	70.76		70.78	0.000442	1.11	39.96	22.73	0.15
P118-23-00	P118-23-00 R2	6723.56	Max WS	47.38	67.37	70.75		70.76	0.000165	0.78	60.45	27.62	0.09
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	47.37	67.54	70.03		70.15	0.004999	2.87	16.5	13.25	0.45
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	52.76	67.16	69.82		69.86	0.000869	1.55	34.12	19.28	0.2
P118-23-00	P118-23-00 R2	6402.43	Max WS	58.8	67.03	69.65		69.69	0.00108	1.75	33.66	18.55	0.23
P118-23-00	P118-23-00 R2	6356.93	Max WS	61.57	66.97	69.59	67.93	69.64	0.001169	1.82	33.83	18.62	0.24
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	61.57	66.93	69.55		69.6	0.001141	1.8	34.16	18.74	0.24
P118-23-00	P118-23-00 R2	6293.27	Max WS	63.11	66.88	69.51		69.56	0.001167	1.83	34.56	18.89	0.24
P118-23-00	P118-23-00 R2	5958.59	Max WS	76.6	66.24	69.14		69.18	0.000951	1.68	45.54	24.71	0.22
P118-23-00	P118-23-00 R2	5652.94	Max WS	88.31	65.7	68.67		68.76	0.001722	2.33	37.86	19.04	0.29
P118-23-00	P118-23-00 R2	5045.34	Max WS	88.07	63.97	67.97		68.01	0.000734	1.75	50.2	19.84	0.19
P118-23-00	P118-23-00 R2	4947.92	Max WS	94.11	63.84	67.93	64.95	67.95	0.000347	1.34	70.45	24.1	0.14
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	94.09	63.87	67.91		67.93	0.00023	1.15	81.7	24.64	0.11
P118-23-00	P118-23-00 R2	4783.1	Max WS	98.05	63.65	67.8		67.86	0.00098	1.97	49.86	18.87	0.21
P118-23-00	P118-23-00 R2	4580.38	Max WS	104.86	63.02	67.64	64.55	67.69	0.000612	1.72	61.1	20.57	0.18
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	104.86	63.16	67.62		67.66	0.000519	1.62	64.54	21.35	0.16
P118-23-00	P118-23-00 R2	4459.75	Max WS	109.74	63.55	67.53		67.59	0.000907	1.96	55.9	21.41	0.21
P118-23-00	P118-23-00 R2	4370.6	Max WS	113.72	63.42	67.43		67.49	0.001154	2.1	54.17	23.26	0.24
P118-23-00	P118-23-00 R2	4330.88	Max WS	115.19	62.88	67.45		67.45	0.00007	0.68	169.7	49.6	0.06
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 2
HEC-RAS Results

HFC-RAS Plan: Alt2_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch/EI (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	115.18	63.31	67.43		67.44	0.00007	0.66	175.18	55.22	0.07
P118-23-00	P118-23-00 R2	4229.24	Max WS	116.62	63.34	67.41		67.43	0.000284	1.2	97.44	35.25	0.13
P118-23-00	P118-23-00 R2	3733.5	Max WS	130.87	62.41	67.13		67.18	0.000676	1.87	69.83	23.5	0.19
P118-23-00	P118-23-00 R2	3187.46	Max WS	139.89	62.36	66.69		66.75	0.000763	1.92	72.94	26.75	0.2
P118-23-00	P118-23-00 R2	3150.64	Max WS	140.93	61.93	66.67	63.92	66.73	0.000642	1.81	77.74	26.87	0.19
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	140.27	61.56	66.61		66.67	0.00078	1.88	74.75	28.49	0.2
P118-23-00	P118-23-00 R2	3104.46	Max WS	140.35	61.63	66.56		66.64	0.001168	2.3	61.03	21.65	0.24
P118-23-00	P118-23-00 R2	2750.53	Max WS	102.52	60.59	66.33		66.35	0.000238	1.22	84.05	23.71	0.11
P118-23-00	P118-23-00 R2	2741.93	Max WS	102.66	60.44	66.33	62.02	66.35	0.000203	1.16	88.47	23.7	0.11
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	102.66	60.52	66.33		66.35	0.000187	1.1	93.22	25.94	0.1
P118-23-00	P118-23-00 R2	2716.57	Max WS	102.85	60.68	66.32		66.34	0.000204	1.14	90.37	25.55	0.11
P118-23-00	P118-23-00 R2	2615.37	Max WS	104.91	60.75	66.3		66.32	0.000218	1.19	87.92	24.09	0.11
P118-23-00	P118-23-00 R2	2244.98	Max WS	111.58	60.53	66.23		66.25	0.000353	1.06	104.98	26.12	0.09
P118-23-00	P118-23-00 R2	2221.06	Max WS	112.45	60.56	66.23	61.87	66.25	0.000173	1.12	100.7	25.5	0.1
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	112.46	60.59	66.21		66.23	0.000164	1.08	104.1	27.34	0.1
P118-23-00	P118-23-00 R2	2042.36	Max WS	114.61	59.78	66.19		66.2	0.000188	1.07	107.5	31.79	0.1
P118-23-00	P118-23-00 R2	1922.11	Max WS	114.58	59.56	66.17		66.19	0.000101	0.89	128.48	31.68	0.08
P118-23-00	P118-23-00 R2	1892.63	Max WS	124.56	59.68	66.16	61.62	66.18	0.000163	1.07	116.01	31.08	0.1
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	124.56	59.86	66.11		66.15	0.00032	1.42	87.93	24.84	0.13
P118-23-00	P118-23-00 R2	1829.45	Max WS	124.55	59.87	66.11		66.14	0.000219	1.21	103.24	28.5	0.11
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	124.51	59.04	66.09		66.1	0.000076	0.84	148.85	31.83	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	173.79	59.85	66.03		66.06	0.000224	1.37	127.02	29.07	0.12
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	173.78	59.99	66.02	61.38	66.04	0.000176	1.11	156.82	42.51	0.1
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	160.51	58.36	66.02		66.03	0.00006	0.8	200.64	38.53	0.06
P118-23-00	P118-23-00 R1	1354.02	Max WS	160.79	57.88	66.01		66.02	0.000061	0.81	199.57	36.79	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	165.32	57.45	65.99		66	0.000078	0.94	176.26	29.77	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	169.73	57.03	65.96		65.97	0.000078	0.94	180.03	30.1	0.07
P118-23-00	P118-23-00 R1	242.54	Max WS	169.69	55.82	65.94	57.91	65.95	0.000027	0.6	283.72	46.28	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	169.71	55.57	65.93		65.94	0.000024	0.58	294.93	46.59	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	179.67	55.13	65.93		65.93	0.000019	0.49	373.33	76.73	0.04
P118-23-00	P118-23-00 R3	58.31	Max WS	179.67	53.78	65.93		65.93	0.000011	0.45	536.86	83.5	0.03
P118-23-02	P118-23-02	4138.85	Max WS	21.73	67.78	69.87		69.9	0.001006	1.29	16.84	17.3	0.21
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	21.67	66.69	69.7		69.7	0.000108	0.56	38.62	20.91	0.07
P118-23-02	P118-23-02	3782.06	Max WS	80.02	66.66	69.55		69.63	0.001826	2.25	35.55	19.99	0.3
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	80.08	66.22	69.57		69.58	0.00037	0.79	236.13	266.67	0.11
P118-23-02	P118-23-02	3692.61	Max WS	79.95	66.22	69.53		69.58	0.001058	1.87	42.77	210.76	0.23
P118-23-02	P118-23-02	3049.5	Max WS	79.82	65.47	68.99		69.03	0.000666	1.63	49.32	23.03	0.19
P118-23-02	P118-23-02	2386.67	Max WS	79.8	65.13	68.15		68.24	0.001743	2.41	33.16	15.34	0.29
P118-23-02	P118-23-02	2372.17	Max WS	79.8	65.16	68.13		68.21	0.001541	2.27	35.17	16.52	0.27
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	79.8	65.26	68.1		68.18	0.001654	2.33	34.28	21.04	0.28
P118-23-02	P118-23-02	2278.1	Max WS	79.8	65.19	68.06		68.14	0.001542	2.27	35.08	16.19	0.27
P118-23-02	P118-23-02	1453.34	Max WS	79.79	63.69	67.12		67.17	0.000815	1.79	44.51	18.33	0.2
P118-23-02	P118-23-02	1445.67	Max WS	79.79	63.66	67.12	65.1	67.16	0.000712	1.66	48.06	20.59	0.19
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	74.41	63.56	66.45		66.53	0.001887	2.27	32.71	18.35	0.3
P118-23-02	P118-23-02	1392.09	Max WS	74.13	63.36	66.41		66.49	0.00167	2.27	32.7	16.49	0.28
P118-23-02	P118-23-02	1317.96	Max WS	49.43	62.91	66.32		66.35	0.000647	1.46	33.87	15.92	0.18
P118-23-02	P118-23-02	1171.38	Max WS	49.4	61.86	66.25		66.27	0.000371	1.19	41.35	16.95	0.13
P118-23-02	P118-23-02	1083.7	Max WS	49.39	62.56	66.22		66.24	0.000327	1.13	43.65	18.04	0.13
P118-23-02	P118-23-02	215.24	Max WS	49.37	60.16	66.06		66.07	0.000067	0.64	77.14	22	0.06
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	68.28		68.28	0.000063	0.35	28.56	21.32	0.05
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.99	66.34	68.26		68.26	0.000065	0.35	28.19	21.24	0.05
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.95	66.13	68.24		68.24	0.000081	0.4	24.81	18.17	0.06
P118-25-00	P118-25-00 R2	2636.62	Max WS	14.81	65.84	68.2		68.2	0.000151	0.57	26.18	18.32	0.08
P118-25-00	P118-25-00 R2	2494.17	Max WS	14.75	65.5	68.18		68.18	0.000092	0.47	31.22	19.64	0.07
P118-25-00	P118-25-00 R2	2473.31	Max WS	14.72	65.47	68.18	66.3	68.18	0.000084	0.46	32.12	19.69	0.06
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	14.72	65.47	68.17		68.18	0.000086	0.47	31.31	18.77	0.06
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	14.72	65.38	68.17		68.17	0.000072	0.43	33.99	20.35	0.06
P118-25-00	P118-25-00 R2	2046.09	Max WS	14.55	64.63	68.15		68.15	0.000025	0.29	49.63	23.93	0.04
P118-25-00	P118-25-00 R1	1929.3	Max WS	63.3	64.22	68.09		68.12	0.000523	1.39	45.38	19.92	0.16
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	59.29	64.03	67.96		67.98	0.00027	1.08	54.74	21.32	0.12
P118-25-00	P118-25-00 R1	1208.56	Max WS	60.84	63.03	67.89		67.91	0.000156	0.9	67.42	22.33	0.09
P118-25-00	P118-25-00 R1	1188.81	Max WS	60.92	63.01	67.89	64.44	67.9	0.00017	0.94	64.79	21.26	0.09
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	60.93	62.94	67.88		67.89	0.000174	0.95	63.87	20.61	0.1
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	61.12	62.83	67.87		67.88	0.00014	0.87	70.08	22.46	0.09
P118-25-00	P118-25-00 R1	980.2	Max WS	61.75	62.34	67.86		67.87	0.000099	0.75	82.51	26.19	0.07
P118-25-00	P118-25-00 R1	963.63	Max WS	61.83	62.25	67.86		67.86	0.00004	0.52	117.91	32.69	0.05
P118-25-00	P118-25-00 R1	950.55	Max WS	62.14	62.25	67.86	63.52	67.86	0.00004	0.53	117.8	32.67	0.05
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	62.12	61.68	67.68		67.69	0.000038	0.5	123.94	36.09	0.05
P118-25-00	P118-25-00 R1	886.91	Max WS	62.32	61.68	67.68		67.69	0.000037	0.51	123.36	36.08	0.05
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	62.53	61.16	67.68		67.68	0.000039	0.55	114.65	28.33	0.05
P118-25-00	P118-25-00 R1	490.93	Max WS	63.99	60.25	67.67		67.67	0.000032	0.5	128.37	31.79	0.04
P118-25-00	P118-25-00 R1	251.81	Max WS	64.92	58.25	67.66		67.67	0.000012	0.35	184.72	35.96	0.03
P118-25-00	P118-25-00 R1	229.81*	Max WS	64.92	58.04	67.66		67.67	0.000011	0.34	190.43	36.29	0.03
P118-25-00	P118-25-00 R1	207.81*	Max WS	64.92	57.84	67.66		67.66	0.00001	0.33	196.13	36.63	0.03
P118-25-00	P118-25-00 R1	185.81*	Max WS	64.85	57.63	67.66		67.66	0.000009	0.32	201.89	36.94	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	64.85	57.43	67.66		67.66	0.000009	0.31	207.65	37.27	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	64.84	57.22	67.66		67.66	0.000008	0.3	213.46	37.58	0.02
P118-25-00	P118-25-00 R1	119.80*	Max WS	64.84	57.02	67.66		67.66	0.000007	0.3	219.25	37.86	0.02
P118-25-00	P118-25-00 R1	97.8	Max WS	64.84	56.81	67.66	58.57	67.66	0.000007	0.29	224.91	38.15	0.02
P118-25-01	P118-25-01	5341.48	Max WS	25.87	70.47	72.33		72.36	0.001152	1.31	19.74	18.19	0.22
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	25.42	68.9	71.6		71.62	0.000574	1.06	24.07	17.82	0.16
P118-25-01	P118-25-01	4162.47	Max WS	30.79	69.44	71.36		71.39	0.000847	1.23	25.08	20.2	0.19
P118-25-01	P118-25-01	4134.04	Max WS	31.29	69.38	71.34	70.24	71.36	0.000792	1.2	26.02	20.56	0.19
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	31.28	69.25	71.31		71.33	0.000716	1.16	26.96	20.83	0.18
P118-25-01	P118-25-01	4047.7	Max WS	31.93	69.28	71.28		71.3	0.000707	1.16	27.46	20.95	0.18
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	39.77	67.84	71.05		71.07	0.000336	0.96	41.41	23.82	0.13
P118-25-01	P118-25-01	3312.44	Max WS	44.37	67.48	70.95		70.96	0.00034	0.97	45.92	26.49	0.13
P118-25-01	P118-25-01	3014.68	Max WS	49.43	67.53	70.87		70.88	0.000203	0.85	58.48	27.94	0.1
P118-25-01	P118-25-01	2924.04	Max WS	51.8	67.71	70.84		70.86	0.000226	0.88	58.9	28.83	0.11
P118-25-01	P118-25-01	2763.33	Max WS	54.32	66.67	70.81		70.82	0.000182	0.84	64.38	28.24	0.1
P118-25-01	P118-25-01	2728.92	Max WS	54.98	66.5	70.76		70.82	0.000522	1.85	29.64	21.01	0.18
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	54.98	66.31	70.75		70.79	0.000349	1.63	33.79	26.13	0.15
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	54.98	66.04	70.75		70.77	0.000256	1.04	52.65	20.42	0.11
P118-25-01	P118-25-01	1881.88	Max WS	81.8	66.57	70.28		70.34	0.001116	1.97	41.59	19.36	0.24
P118-25-01	P118-25-01	1384.48	Max WS	81.74	66.19	69.7		69.76	0.001192	1.99	41.09	19.92	0.24
P118-25-01	P118-25-01	1245.83	Max WS	81.72	66.34	69.52		69.59	0.00128	2.07	39.55	19.05	0.25
P118-25-01	P118-25-01	584.11	Max WS	81.08	65.88	68.63		68.7	0.001397	2.08	39.05	20.07	0.26
P118-25-01	P118-25-01	60.05	Max WS	48.84	63.5	68.15		68.17	0.000297	1.08	45.42	18.62	0.12

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Ait2 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4034.02	58.25	72.46		72.96	0.001079	5.7	708.24	77.88	0.33
P118-00-00	P118-R3-2	71854.2	Max WS	4037.17	57.83	72.3		72.51	0.000531	3.69	1094.72	141.51	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3749.63	55.05	71.87		72.02	0.00036	3.12	1221.91	239.56	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	3723.22	55.28	71.5		71.64	0.000266	2.99	1396.88	503.02	0.17
P118-00-00	P118-R3-2	68670	Max WS	3542.06	54.88	71.02		71.29	0.00057	4.16	1025.82	283.74	0.25
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	2961.16	54.47	70.93		71.11	0.000327	3.45	991.69	241.96	0.19
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3200.69	54.14	70.49		70.8	0.000686	4.53	910.47	244.01	0.26
P118-00-00	P118-R3-2	66869	Max WS	3425.63	53.96	69.46		70.01	0.001539	5.95	575.93	88.16	0.39
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3477.9	53.79	69.46		69.85	0.000956	4.97	706.33	116.45	0.31
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2624.88	53.6	69.45		69.66	0.000449	3.76	903.53	217.95	0.21
P118-00-00	P118-R3-2	65955.8	Max WS	1713.08	53.52	69.51		69.6	0.000312	2.35	784.41	218.13	0.17
P118-00-00	P118-R3-2	65434.6	Max WS	618.96	53.1	69.54		69.55	0.000023	0.85	983.66	214.6	0.05
P118-00-00	P118-R3-2	64399.74	Max WS	3130.25	52.59	68.67		68.99	0.000713	4.59	753	153.93	0.26
P118-00-00	P118-R3-2	64273.7	Max WS	3127	53.55	68.7	60.93	68.91	0.000575	3.65	855.98	121.26	0.24
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3127	53.3	68.67		68.86	0.000525	3.55	882.84	127.04	0.23
P118-00-00	P118-R3-2	64200	Max WS	3126.99	53.3	68.66		68.86	0.000525	3.55	882.49	126.97	0.23
P118-00-00	P118-R2-2	64100	Max WS	3619.82	52.61	68.67		68.77	0.00018	2.52	1444.54	1289.82	0.14
P118-00-00	P118-R2-2	64094	Max WS	3619.77	52.61	68.67	59.35	68.76	0.00018	2.52	1444.39	1289.04	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	3619.79	52.56	68.64		68.74	0.000178	2.51	1448.35	1307.77	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	3619.72	52.78	68.51	61	68.74	0.000459	3.88	1005.08	885.49	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	3619.51	53.04	68.22		68.49	0.000567	4.15	929.06	480.86	0.25
P118-00-00	P118-R2-2	63959.7	Max WS	3619.5	53.06	68.37	59.31	68.47	0.000186	2.55	1426.8	811.71	0.15
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	3619.52	53.16	68.33		68.43	0.000196	2.6	1400.21	733.37	0.15
P118-00-00	P118-R2-2	63756.7	Max WS	3627.38	52.4	67.99		68.41	0.001095	5.22	751.5	205	0.33
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3602.2	50.35	67.11		67.52	0.000965	5.12	704.01	87.83	0.31
P118-00-00	P118-R2-2	61905.2	Max WS	3827.38	50.77	66.16		66.52	0.001125	4.79	799.02	127.36	0.33
P118-00-00	P118-R2-2	60625.3	Max WS	3831.69	49.52	65.44		65.8	0.001122	4.8	798.03	121.4	0.33
P118-00-00	P118-R2-1	60595.74	Max WS	3874.51	49.48	64.08		64.73	0.001506	6.45	600.99	69.81	0.39
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3873.86	49.68	64.06		64.6	0.001237	5.89	657.8	77.28	0.36
P118-00-00	P118-R2-1	60571.6*	Max WS	3873.66	49.89	64.03		64.49	0.00105	5.45	710.52	84.17	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	3873.6	50.09	63.99		64.4	0.000906	5.1	760.26	90.05	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	3873.58	50.3	63.96		64.32	0.000773	4.79	808.15	93.56	0.29
P118-00-00	P118-R2-1	60535.46	Max WS	3873.57	50.5	63.93		64.25	0.000654	4.52	857.88	96.2	0.27
P118-00-00	P118-R2-1	60536.4*	Max WS	3873.57	50.45	63.86		64.19	0.000699	4.58	845.17	97.86	0.27
P118-00-00	P118-R2-1	60257.3*	Max WS	3873.57	50.4	63.79		64.13	0.000742	4.64	834.84	99.56	0.28
P118-00-00	P118-R2-1	60118.3*	Max WS	3873.57	50.35	63.72		64.06	0.000779	4.68	827.7	101.33	0.29
P118-00-00	P118-R2-1	59979.2*	Max WS	3873.57	50.3	63.65		63.99	0.000808	4.7	823.69	103.11	0.29
P118-00-00	P118-R2-1	59840.2*	Max WS	3873.58	50.25	63.57		63.92	0.00083	4.71	822.71	105.04	0.3
P118-00-00	P118-R2-1	59701.1*	Max WS	3873.57	50.2	63.5		63.85	0.000842	4.7	825.02	106.98	0.3
P118-00-00	P118-R2-1	59562.1*	Max WS	3873.57	50.15	63.43		63.77	0.000843	4.66	830.61	108.85	0.3
P118-00-00	P118-R2-1	59423.1	Max WS	3873.55	50.1	63.37		63.7	0.000832	4.61	839.68	110.7	0.3
P118-00-00	P118-R2-1	59307.4*	Max WS	3873.56	50.1	63.3		63.63	0.000813	4.55	851.86	113.08	0.29
P118-00-00	P118-R2-1	59191.8*	Max WS	3873.57	50.11	63.25		63.56	0.000789	4.47	866.46	115.48	0.29
P118-00-00	P118-R2-1	59076.2*	Max WS	3873.56	50.11	63.19		63.49	0.000758	4.38	884.43	117.95	0.28
P118-00-00	P118-R2-1	58960.5*	Max WS	3873.56	50.11	63.14		63.43	0.000723	4.28	904.63	120.46	0.28
P118-00-00	P118-R2-1	58844.9*	Max WS	3873.56	50.11	63.1		63.37	0.000683	4.17	928.11	123	0.27
P118-00-00	P118-R2-1	58729.3*	Max WS	3873.56	50.12	63.05		63.31	0.000642	4.06	953.8	125.59	0.26
P118-00-00	P118-R2-1	58613.7	Max WS	3873.58	50.12	63.02		63.26	0.000599	3.94	982.8	128.2	0.25
P118-00-00	P118-R2-1	58463.86	Max WS	3877.16	47.59	62.85	56.61	63.12	0.000654	4.16	932.42	119.46	0.26
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	4.54	67.59	69.05		69.05	0.000035	0.31	15.05	19.78	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.84	67.5	69.04		69.04	0.000124	0.37	15.78	18.39	0.07
P118-21-00	P118-21-00	2398.11	Max WS	6.99	67.44	69.04		69.04	0.000132	0.4	17.31	18.44	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.08	67.41	69.04		69.04	0.000064	0.46	17.74	18.45	0.08
P118-21-00	P118-21-00	2343.79	Max WS	10.02	67.54	69		69.03	0.000503	1.16	8.62	10.12	0.22

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Ait2_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	12.03	67.47	68.94		68.97	0.001744	1.38	8.69	9.75	0.26
P118-21-00	P118-21-00	2208.42	Max WS	14.69	67.31	68.71		68.75	0.00267	1.66	8.86	10.58	0.32
P118-21-00	P118-21-00	2195.48	Max WS	14.69	67.34	68.68		68.72	0.001051	1.64	8.98	11.04	0.32
P118-21-00	P118-21-00	2169.49	Max WS	14.69	66.56	68.68		68.7	0.000244	1.09	13.53	9.51	0.16
P118-21-00	P118-21-00	2167.76	Max WS	14.69	66.37	68.69		68.7	0.000142	0.87	16.92	11.29	0.13
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	14.67	65.03	67.76		67.77	0.000101	0.72	20.31	14.23	0.11
P118-21-00	P118-21-00	2100.84	Max WS	14.67	64.78	67.76		67.76	0.000163	0.62	23.7	14.65	0.09
P118-21-00	P118-21-00	1662.37	Max WS	71.39	63.91	67.34		67.4	0.001121	1.96	36.47	16.74	0.23
P118-21-00	P118-21-00	1144.5	Max WS	109.71	62.63	66.55		66.65	0.001537	2.5	43.96	17.14	0.27
P118-21-00	P118-21-00	595.53	Max WS	148.83	61.49	65.11		65.29	0.002937	3.39	43.91	18.17	0.38
P118-21-00	P118-21-00	549.31*	Max WS	36.93	61.18	64.96		64.97	0.000232	0.8	46.26	25.7	0.1
P118-21-00	P118-21-00	503.08*	Max WS	37.66	60.87	64.95		64.96	0.000166	0.69	54.64	29.7	0.09
P118-21-00	P118-21-00	456.86*	Max WS	38.41	60.57	64.94		64.95	0.000114	0.61	62.98	31.14	0.08
P118-21-00	P118-21-00	410.63*	Max WS	39.1	60.26	64.94		64.95	0.000082	0.56	70.39	31.24	0.07
P118-21-00	P118-21-00	364.41*	Max WS	39.96	59.95	64.94		64.94	0.000064	0.52	76.12	30.53	0.06
P118-21-00	P118-21-00	318.18*	Max WS	40.75	59.64	64.94		64.94	0.000054	0.51	80.13	29.31	0.05
P118-21-00	P118-21-00	271.96*	Max WS	41.46	59.34	64.93		64.94	0.000048	0.5	82.1	27.45	0.05
P118-21-00	P118-21-00	225.73*	Max WS	42.28	59.03	64.93		64.93	0.000045	0.52	81.88	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	43.03	58.72	64.93		64.93	0.000048	0.54	79.35	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	43.03	57.98	64.93		64.93	0.000035	0.48	88.85	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	42.98	57.24	64.93		64.93	0.000026	0.44	98.8	23.06	0.04
P118-21-00	P118-21-00	119.21*	Max WS	42.89	56.51	64.93		64.93	0.000002	0.39	109.05	23.59	0.03
P118-21-00	P118-21-00	99.11*	Max WS	42.89	55.77	64.93		64.93	0.000015	0.36	119.7	23.91	0.03
P118-21-00	P118-21-00	79.01	Max WS	42.78	55.03	64.93		64.93	0.000012	0.33	130.72	24.3	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.85		72.85	0.000007	0.17	57.27	21.91	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.85		72.85	0.000012	0.21	48.42	21.48	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.85	70.24	72.85	0.000015	0.23	45.56	21.43	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.85		72.85	0.000019	0.25	42.24	20.94	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.24	70.16	72.85		72.85	0.000026	0.28	39.76	20.62	0.04
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.22	69.97	72.84		72.85	0.000044	0.38	42.57	20.65	0.05
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.16	69.88	72.84		72.84	0.000054	0.43	42.61	20.31	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.51	68.92	72.84		72.84	0.000044	0.41	47.4	20.21	0.05
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.5	69.39	72.75		72.76	0.000045	0.41	47.33	20.52	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.74	69.56	72.75		72.76	0.000058	0.46	44.79	19.95	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.8	68.48	72.74		72.74	0.000089	0.59	47.23	115.79	0.07
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.94	68.06	72.73		72.74	0.000095	0.63	50.64	43	0.07
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.94	69.59	72.54		72.58	0.000417	1.55	20.54	19.77	0.16
P118-23-00	P118-23-00 R2	7313.37	Max WS	33.03	69.5	72.56		72.57	0.000104	0.63	52.68	23.27	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.59	69.12	72.56		72.57	0.000087	0.61	55.47	22.31	0.07
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.35	69.43	72.56		72.57	0.000084	0.71	48.46	22.07	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.35	69.34	72.37		72.39	0.000179	1	34.32	41.22	0.1
P118-23-00	P118-23-00 R2	7237.19	Max WS	36.48	69.28	72.37		72.38	0.00013	0.68	53.38	24.72	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	75.71	68.02	72.28		72.3	0.000186	0.93	86.21	98.17	0.1
P118-23-00	P118-23-00 R2	6723.56	Max WS	81.57	67.37	72.28		72.29	0.000098	0.75	109.23	36.17	0.08
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	81.57	67.54	71.07		71.17	0.002411	2.49	32.71	18.83	0.33
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	91.92	67.16	70.97		71.01	0.000583	1.55	59.33	24.62	0.18
P118-23-00	P118-23-00 R2	6402.43	Max WS	103.53	67.03	70.85		70.89	0.000724	1.75	59.02	23.74	0.2
P118-23-00	P118-23-00 R2	6356.93	Max WS	108.85	66.97	70.8	68.41	70.86	0.000776	1.82	59.67	23.85	0.2
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	108.85	66.93	70.78		70.83	0.000748	1.8	60.55	24.07	0.2
P118-23-00	P118-23-00 R2	6293.27	Max WS	111.82	66.88	70.75		70.8	0.000761	1.82	61.44	24.28	0.2
P118-23-00	P118-23-00 R2	5958.59	Max WS	137.77	66.24	70.52		70.56	0.000568	1.61	85.33	33.32	0.18
P118-23-00	P118-23-00 R2	5652.94	Max WS	160.37	65.7	70.23		70.31	0.000968	2.22	72.28	25.11	0.23
P118-23-00	P118-23-00 R2	5045.34	Max WS	51.03	63.97	69.99		69.99	0.000041	0.52	97.44	26.88	0.05
P118-23-00	P118-23-00 R2	4947.92	Max WS	54.18	63.84	69.98	64.57	69.99	0.000023	0.43	127.09	31	0.04
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	54.13	63.87	69.97		69.97	0.000018	0.39	139.2	31.51	0.03
P118-23-00	P118-23-00 R2	4783.1	Max WS	56.28	63.65	69.96		69.97	0.000051	0.56	100.37	27.74	0.05
P118-23-00	P118-23-00 R2	4580.38	Max WS	63.82	63.02	69.95	64.11	69.96	0.000039	0.54	118.26	29.02	0.05
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	63.75	63.16	69.95		69.95	0.000038	0.51	123.87	32.36	0.05
P118-23-00	P118-23-00 R2	4459.75	Max WS	66.3	63.55	69.94		69.95	0.000045	0.55	120.65	33.11	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	68.5	63.42	69.94		69.94	0.000051	0.51	133.82	46.93	0.05
P118-23-00	P118-23-00 R2	4330.88	Max WS	69.24	62.88	69.94		69.94	0.000005	0.23	305.46	66.5	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 2
HEC-RAS Results

HFC RAS Plan: Alt2_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	69.2	63.31	69.93		69.93	0.000004	0.21	329.41	72.66	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	69.94	63.34	69.92		69.93	0.000014	0.35	202.03	48.2	0.03
P118-23-00	P118-23-00 R2	3733.5	Max WS	93.38	62.41	69.9		69.91	0.000046	0.62	149.49	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	294	62.36	69.72		69.77	0.000317	1.69	174.23	39.19	0.14
P118-23-00	P118-23-00 R2	3150.64	Max WS	301.74	61.93	69.71	64.87	69.75	0.000348	1.68	179.86	43.95	0.15
P118-23-00	P118-23-00 R2	3133.39											
P118-23-00	P118-23-00 R2	3126.39	Max WS	301.74	61.56	69.68		69.72	0.000376	1.6	189.02	53.83	0.15
P118-23-00	P118-23-00 R2	3104.46	Max WS	302.39	61.63	69.66		69.71	0.000634	1.9	159.17	49.88	0.19
P118-23-00	P118-23-00 R2	2750.53	Max WS	308.74	60.59	69.5		69.55	0.000305	1.77	174.74	33.57	0.14
P118-23-00	P118-23-00 R2	2741.93	Max WS	308.85	60.44	69.5	63.54	69.54	0.000284	1.73	179.01	33.56	0.13
P118-23-00	P118-23-00 R2	2733.96											
P118-23-00	P118-23-00 R2	2725.96	Max WS	308.85	60.52	69.5		69.54	0.000286	1.61	192.15	41.7	0.13
P118-23-00	P118-23-00 R2	2716.57	Max WS	309	60.68	69.49		69.53	0.00031	1.62	190.53	43.72	0.14
P118-23-00	P118-23-00 R2	2615.37	Max WS	310.85	60.75	69.46		69.5	0.000286	1.73	179.55	34.05	0.13
P118-23-00	P118-23-00 R2	2244.98	Max WS	316.72	60.53	69.37		69.41	0.000214	1.58	200.23	34.59	0.12
P118-23-00	P118-23-00 R2	2221.06	Max WS	317.42	60.56	69.36	63.18	69.4	0.000235	1.62	195.37	34.9	0.12
P118-23-00	P118-23-00 R2	2198.07											
P118-23-00	P118-23-00 R2	2187.07	Max WS	317.47	60.59	69.34		69.38	0.000211	1.56	204.06	36.58	0.12
P118-23-00	P118-23-00 R2	2042.36	Max WS	319.36	59.78	69.31		69.34	0.000241	1.37	232.92	58.38	0.12
P118-23-00	P118-23-00 R2	1922.11	Max WS	319.31	59.56	69.29		69.32	0.00016	1.3	245.9	48.71	0.1
P118-23-00	P118-23-00 R2	1892.63	Max WS	329.3	59.68	69.28	62.97	69.31	0.000208	1.4	234.81	51.09	0.12
P118-23-00	P118-23-00 R2	1882.46											
P118-23-00	P118-23-00 R2	1863.46	Max WS	329.09	59.86	69.18		69.23	0.000358	1.82	180.66	38.2	0.15
P118-23-00	P118-23-00 R2	1829.45	Max WS	329.16	59.87	69.19		69.22	0.000294	1.39	236.94	68.68	0.13
P118-23-00	P118-23-00 R2	1800											
P118-23-00	P118-23-00 R2	1611.06	Max WS	337.95	59.04	69.14		69.17	0.000157	1.28	264.03	51.8	0.1
P118-23-00	P118-23-00 R1	1513.84	Max WS	379.87	59.85	69.06		69.1	0.000246	1.59	251.77	489.07	0.12
P118-23-00	P118-23-00 R1	1490											
P118-23-00	P118-23-00 R1	1454.72	Max WS	381.47	59.99	69.07	62.51	69.08	0.000159	1.02	638.27	735.93	0.1
P118-23-00	P118-23-00 R1	1414.55											
P118-23-00	P118-23-00 R1	1380.55	Max WS	380.08	58.36	69.01		69.02	0.000072	0.76	1088.93	816.35	0.07
P118-23-00	P118-23-00 R1	1354.02	Max WS	394.45	57.88	69.01		69.02	0.000076	0.91	830.51	819.05	0.07
P118-23-00	P118-23-00 R1	1010.56	Max WS	434.48	57.45	68.94		68.97	0.000211	1.38	446.01	602.63	0.11
P118-23-00	P118-23-00 R1	649.49	Max WS	464.76	57.03	68.85		68.88	0.000206	1.61	337.7	432.38	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	486.34	55.82	68.8	59.54	68.81	0.000074	0.89	1092.54	714.12	0.07
P118-23-00	P118-23-00 R1	200											
P118-23-00	P118-23-00 R1	169.28	Max WS	486.34	55.57	68.77		68.78	0.000044	0.92	1264.56	847.23	0.06
P118-23-00	P118-23-00 R1	106.82	Max WS	496.18	55.13	68.77		68.78	0.000032	0.83	797.13	175.37	0.05
P118-23-00	P118-23-00 R3	58.33	Max WS	496.22	53.78	68.76		68.78	0.000028	0.89	773.44	83.5	0.05
P118-23-02	P118-23-02	4138.85	Max WS	39.42	67.78	70.87		70.89	0.000408	1.05	68.6	506.59	0.14
P118-23-02	P118-23-02	4137											
P118-23-02	P118-23-02	3790.71	Max WS	39.2	66.69	70.79		70.8	0.000105	0.56	69.65	340.33	0.07
P118-23-02	P118-23-02	3782.06	Max WS	143.14	66.66	70.7		70.76	0.001212	1.97	119.28	256.65	0.26
P118-23-02	P118-23-02	3748.42											
P118-23-02	P118-23-02	3714.78	Max WS	143.08	66.22	70.69		70.69	0.000117	0.42	986.02	1219.44	0.06
P118-23-02	P118-23-02	3692.61	Max WS	142.62	66.22	70.67		70.73	0.001004	1.97	72.53	1052.8	0.23
P118-23-02	P118-23-02	3049.5	Max WS	142.09	65.47	70.12		70.17	0.000738	1.84	99.8	120.59	0.2
P118-23-02	P118-23-02	2386.67	Max WS	142.04	65.13	69.3		69.42	0.001565	2.68	52.95	32.02	0.29
P118-23-02	P118-23-02	2372.17	Max WS	142.04	65.16	69.3		69.39	0.001391	2.48	57.37	27.18	0.28
P118-23-02	P118-23-02	2357.89											
P118-23-02	P118-23-02	2303.61	Max WS	142.03	65.26	69.24		69.35	0.001438	2.6	54.54	140.17	0.27
P118-23-02	P118-23-02	2278.1	Max WS	142.01	65.19	69.21		69.31	0.001373	2.56	55.48	30.83	0.27
P118-23-02	P118-23-02	1453.34	Max WS	42.24	63.69	69.14		69.15	0.000036	0.48	87.89	24.56	0.04
P118-23-02	P118-23-02	1445.67	Max WS	42.23	63.66	69.14	64.7	69.15	0.000029	0.44	96.94	27.6	0.04
P118-23-02	P118-23-02	1430.58											
P118-23-02	P118-23-02	1415.48	Max WS	42.23	63.56	69.13		69.14	0.000032	0.44	95.74	28.99	0.04
P118-23-02	P118-23-02	1392.09	Max WS	42.23	63.36	69.13		69.14	0.000035	0.47	90.06	25.79	0.04
P118-23-02	P118-23-02	1317.96	Max WS	42.23	62.91	69.13		69.13	0.000032	0.46	91.4	33.25	0.04
P118-23-02	P118-23-02	1171.38	Max WS	42.24	61.86	69.13		69.13	0.000023	0.41	103.17	49.56	0.04
P118-23-02	P118-23-02	1083.7	Max WS	42.22	62.56	69.13		69.13	0.000002	0.39	108.54	31.66	0.03
P118-23-02	P118-23-02	215.24	Max WS	42.14	60.16	69.11		69.12	0.000008	0.27	158.09	344.82	0.02
P118-25-00	P118-25-00 R2	3252.36	Max WS	16.1	66.34	69.8		69.81	0.000014	0.24	65.99	27.69	0.03
P118-25-00	P118-25-00 R2	3203.12	Max WS	16.09	66.34	69.8		69.8	0.000015	0.24	65.89	27.67	0.03
P118-25-00	P118-25-00 R2	3203											
P118-25-00	P118-25-00 R2	3202											
P118-25-00	P118-25-00 R2	2930.66	Max WS	16.08	66.13	69.8		69.8	0.000019	0.27	58.46	25.04	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	28.95	65.84	69.78		69.78	0.000056	0.47	61.48	26.62	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	28.94	65.5	69.77		69.78	0.000042	0.42	68.94	28.39	0.05
P118-25-00	P118-25-00 R2	2473.31	Max WS	28.94	65.47	69.77	66.57	69.78	0.000042	0.42	68.78	28.49	0.05
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline											
P118-25-00	P118-25-00 R2	2465.6	Max WS	28.94	65.47	69.77		69.77	0.000046	0.43	67.32	28.41	0.05
P118-25-00	P118-25-00 R2	2465											
P118-25-00	P118-25-00 R2	2464											

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	28.94	65.38	69.77		69.77	0.000036	0.4	73.18	29.86	0.04
P118-25-00	P118-25-00 R2	2046.09	Max WS	28.92	64.63	69.76		69.76	0.000019	0.3	95.29	35.79	0.03
P118-25-00	P118-25-00 R1	1929.3	Max WS	87.57	64.22	69.67		69.68	0.000205	1.07	81.62	26.03	0.11
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	87.52	64.03	69.61		69.62	0.000133	0.92	94.71	27.24	0.09
P118-25-00	P118-25-00 R1	1208.56	Max WS	89.2	63.03	69.57		69.58	0.000091	0.81	109.67	27.98	0.07
P118-25-00	P118-25-00 R1	1188.81	Max WS	89.31	63.01	69.57	64.75	69.58	0.0001	0.85	105.23	26.84	0.08
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	89.3	62.94	69.56		69.57	0.000105	0.86	103.47	26.43	0.08
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	89.48	62.83	69.56		69.57	0.000084	0.79	112.6	28	0.07
P118-25-00	P118-25-00 R1	980.2	Max WS	90.19	62.34	69.55		69.56	0.00006	0.68	132.67	33.1	0.06
P118-25-00	P118-25-00 R1	963.63	Max WS	90.3	62.25	69.55		69.56	0.000024	0.51	176.31	39.21	0.04
P118-25-00	P118-25-00 R1	950.55	Max WS	90.69	62.25	69.55	63.75	69.55	0.000028	0.51	178.66	39.2	0.04
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	90.69	61.68	69.54		69.55	0.000022	0.45	199.41	45.03	0.04
P118-25-00	P118-25-00 R1	886.91	Max WS	90.91	61.68	69.54		69.54	0.000019	0.48	188.41	45.02	0.04
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	96.24	61.16	69.54		69.54	0.000031	0.56	172.86	34.28	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	122.36	60.25	69.52		69.53	0.000039	0.63	193.96	38.95	0.05
P118-25-00	P118-25-00 R1	251.81	Max WS	134.18	58.25	69.52		69.52	0.000021	0.52	257.21	41.98	0.04
P118-25-00	P118-25-00 R1	229.81*	Max WS	134.88	58.04	69.52		69.52	0.00002	0.51	263.45	42.1	0.04
P118-25-00	P118-25-00 R1	207.81*	Max WS	135.58	57.84	69.52		69.52	0.000019	0.5	269.67	42.22	0.04
P118-25-00	P118-25-00 R1	185.81*	Max WS	135.65	57.63	69.52		69.52	0.000018	0.49	275.91	42.33	0.03
P118-25-00	P118-25-00 R1	163.80*	Max WS	135.56	57.43	69.52		69.52	0.000016	0.48	282.16	42.45	0.03
P118-25-00	P118-25-00 R1	141.80*	Max WS	135.45	57.22	69.52		69.52	0.000015	0.47	288.45	42.56	0.03
P118-25-00	P118-25-00 R1	119.80*	Max WS	132.45	57.02	69.52		69.52	0.000014	0.45	294.7	42.68	0.03
P118-25-00	P118-25-00 R1	97.8	Max WS	130.23	56.81	69.52	59.32	69.52	0.000013	0.43	301.07	42.78	0.03
P118-25-01	P118-25-01	5341.48	Max WS	50.48	70.47	73.19		73.22	0.000735	1.33	37.91	24.25	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50.18	68.9	72.74		72.75	0.000345	1.03	48.54	25.31	0.13
P118-25-01	P118-25-01	4162.47	Max WS	60.92	69.44	72.61		72.63	0.000373	1.1	55.44	28.38	0.14
P118-25-01	P118-25-01	4134.04	Max WS	61.9	69.38	72.6	70.58	72.62	0.000355	1.08	57.22	28.86	0.14
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	61.89	69.25	72.58		72.59	0.00033	1.05	58.73	29.19	0.13
P118-25-01	P118-25-01	4047.7	Max WS	63.21	69.28	72.56		72.58	0.000327	1.06	59.77	29.33	0.13
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.83	67.84	72.44		72.46	0.00022	0.98	80.83	32.98	0.11
P118-25-01	P118-25-01	3312.44	Max WS	87.99	67.48	72.37		72.39	0.000213	0.96	91.46	37.39	0.11
P118-25-01	P118-25-01	3014.68	Max WS	98.05	67.53	72.31		72.33	0.000162	0.93	105.06	36.4	0.1
P118-25-01	P118-25-01	2924.04	Max WS	102.75	67.71	72.3		72.31	0.000174	0.96	107.22	37.73	0.1
P118-25-01	P118-25-01	2763.33	Max WS	107.53	66.67	72.27		72.28	0.000163	0.96	111.82	36.91	0.1
P118-25-01	P118-25-01	2728.92	Max WS	108.79	66.5	72.18		72.29	0.000618	2.56	42.43	25.79	0.21
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	108.79	66.31	72.01		72.1	0.000521	2.41	45.12	30.18	0.19
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	108.79	66.04	72.04		72.06	0.000305	1.33	81.96	25.17	0.13
P118-25-01	P118-25-01	1881.88	Max WS	161.67	66.57	71.51		71.6	0.001126	2.36	68.61	24.33	0.25
P118-25-01	P118-25-01	1384.48	Max WS	160.08	66.19	70.97		71.05	0.001088	2.3	69.73	25.25	0.24
P118-25-01	P118-25-01	1245.83	Max WS	159.49	66.34	70.81		70.89	0.001147	2.38	66.94	23.66	0.25
P118-25-01	P118-25-01	584.11	Max WS	158.97	65.88	70.13		70.21	0.000923	2.18	72.85	24.93	0.23
P118-25-01	P118-25-01	60.05	Max WS	152.03	63.5	69.74		69.8	0.000646	1.9	79.85	24.74	0.19

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Ait2_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4920.01	58.25	73.78		74.31	0.001723	5.88	1174.13	752.96	0.34
P118-00-00	P118-R3-2	71854.2	Max WS	4841.39	57.83	73.4		73.63	0.000502	3.84	1497	876.24	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4834.24	55.05	72.94		73.23	0.000386	3.51	1597.94	425.23	0.21
P118-00-00	P118-R3-2	69527.2	Max WS	4818.4	55.28	72.56		72.73	0.000299	3.38	1943.82	520	0.19
P118-00-00	P118-R3-2	68670	Max WS	4505.44	54.88	72.08		72.4	0.000601	4.61	1333.87	301.78	0.26
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3445.95	54.47	72.03		72.22	0.000302	3.55	1332.44	353.53	0.18
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2361.35	54.14	72.02		72.33	0.000205	2.72	1393.21	340.51	0.15
P118-00-00	P118-R3-2	66869	Max WS	3610.09	53.96	71.33		71.69	0.000916	4.85	844.7	168.44	0.3
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3746.95	53.79	71.27		71.55	0.000637	4.26	948.01	145.7	0.26
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2837.09	53.6	71.26		71.41	0.000267	3.25	1313.88	227.52	0.17
P118-00-00	P118-R3-2	65955.8	Max WS	1948.5	53.52	71.3		71.36	0.00016	1.96	1272.59	278.2	0.12
P118-00-00	P118-R3-2	65434.6	Max WS	-11.53	53.1	71.35		71.35	0	-0.01	1371.23	214.6	0
P118-00-00	P118-R3-2	64399.74	Max WS	3744.61	52.59	70.7		70.98	0.000497	4.37	1103.01	190.75	0.23
P118-00-00	P118-R3-2	64273.7	Max WS	3990.47	53.55	70.68	61.95	70.88	0.000433	3.61	1155.61	173.21	0.22
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3990.47	53.3	70.66		70.85	0.000401	3.52	1173.78	154.13	0.21
P118-00-00	P118-R3-2	64200	Max WS	3989.38	53.3	70.65		70.85	0.000401	3.52	1173.46	154.1	0.21
P118-00-00	P118-R2-2	64100	Max WS	5259.38	52.61	70.64		70.78	0.000202	3.02	1793.19	7681.96	0.16
P118-00-00	P118-R2-2	64094	Max WS	5259.44	52.61	70.64	60.52	70.78	0.000202	3.02	1793	7677.58	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5259.44	52.56	70.61		70.75	0.0002	3.02	1796.97	7763.33	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5259.35	52.78	70.45	62.62	70.77	0.000501	4.61	1271.87	7361.21	0.24
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5259.33	53.04	69.72		70.12	0.00069	5.09	1135.22	2844.31	0.28
P118-00-00	P118-R2-2	63959.7	Max WS	5259.38	53.06	69.93	60.45	70.08	0.000246	3.17	1681.04	4900.68	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5259.38	53.16	69.87		70.03	0.000258	3.23	1648.94	4235.03	0.17
P118-00-00	P118-R2-2	63756.7	Max WS	5265.66	52.4	69.46		70.03	0.001229	6.2	1052.46	205	0.36
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4500.43	50.35	68.84		69.26	0.000863	5.22	930.97	164.25	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	4956.84	50.77	68.04		68.39	0.000875	4.76	1040.57	132.2	0.3
P118-00-00	P118-R2-2	60625.3	Max WS	5200.33	49.52	67.4		67.79	0.000903	5.02	1035.34	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5191.96	49.48	66.19		66.89	0.001292	6.75	815.76	126.92	0.37
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5274.9	49.68	66.14		66.75	0.001125	6.3	873.67	125.2	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5315.22	49.89	66.1		66.64	0.000988	5.87	934.9	128.45	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5343.6	50.09	66.07		66.54	0.000885	5.52	994.94	133.95	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	5366.61	50.3	66.03		66.45	0.00081	5.22	1051.52	140.61	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5383.15	50.5	66		66.38	0.000753	4.96	1104.99	148.05	0.29
P118-00-00	P118-R2-1	60536.4*	Max WS	5387.6	50.45	65.92		66.31	0.000803	5	1098.01	152.07	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5387.59	50.4	65.85		66.23	0.00085	5.02	1093.4	156.07	0.3
P118-00-00	P118-R2-1	60118.3*	Max WS	5387.56	50.35	65.77		66.16	0.00089	5.02	1092.05	160.08	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5387.55	50.3	65.69		66.08	0.000923	5.01	1093.57	164.03	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	5387.52	50.25	65.61		66	0.000948	4.99	1097.96	168.01	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5387.5	50.2	65.53		65.91	0.000962	4.96	1106.07	172.1	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5388.08	50.15	65.45		65.83	0.000966	4.91	1116.95	176.35	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5389.95	50.1	65.37		65.74	0.000971	4.87	1130.45	180.59	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5389.97	50.1	65.29		65.66	0.000981	4.84	1127.97	192.84	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5389.96	50.11	65.22		65.58	0.000933	4.8	1124.49	171.46	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	5389.96	50.11	65.15		65.5	0.000856	4.74	1137.13	148.05	0.3
P118-00-00	P118-R2-1	58960.5*	Max WS	5389.96	50.11	65.09		65.43	0.000808	4.66	1155.86	147.53	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	5389.84	50.11	65.04		65.36	0.000737	4.57	1179.54	144.69	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	5389.91	50.12	64.99		65.3	0.000642	4.46	1209.4	138.32	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	5389.91	50.12	64.96		65.25	0.000601	4.33	1243.79	141	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	5477.9	47.59	64.76	58	65.1	0.000688	4.67	1182.64	536.03	0.28
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-4.57	67.88	69.47		69.47	0.003411	-0.56	8.45	19.28	0.1
P118-21-00	P118-21-00	2493.18	Max WS	-2.63	67.95	69.49		69.49	0.000755	-0.25	11.86	26.54	0.05
P118-21-00	P118-21-00	2450.3	Max WS	1.4	67.59	69.51		69.51	0.000001	0.06	25.03	22.83	0.01
P118-21-00	P118-21-00	2416.26	Max WS	3.34	67.5	69.51		69.51	0.00001	0.13	26	24.49	0.02
P118-21-00	P118-21-00	2398.13	Max WS	5.06	67.44	69.5		69.5	0.00002	0.19	25.7	21.65	0.03
P118-21-00	P118-21-00	2389.56	Max WS	6.69	67.41	69.5		69.5	0.000013	0.25	27.21	21.88	0.04
P118-21-00	P118-21-00	2343.79	Max WS	9.58	67.54	69.49		69.5	0.000114	0.68	14.23	12.65	0.11

Alternative 2
HEC-RAS Results

HFC-RAS Plan: Alt2_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	12.58	67.47	69.47		69.48	0.000472	0.87	14.48	12.1	0.14
P118-21-00	P118-21-00	2208.42	Max WS	16.55	67.31	69.42		69.43	0.000504	0.93	17.77	14.33	0.15
P118-21-00	P118-21-00	2195.48	Max WS	16.55	67.34	69.41		69.43	0.000204	0.9	18.34	15.91	0.15
P118-21-00	P118-21-00	2169.49	Max WS	16.55	66.56	69.41		69.42	0.000091	0.79	21.01	11.24	0.1
P118-21-00	P118-21-00	2167.76	Max WS	16.55	66.37	69.41		69.42	0.000056	0.64	25.89	13.35	0.08
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	16.54	65.03	68.57		68.58	0.000035	0.49	33.49	18.51	0.06
P118-21-00	P118-21-00	2100.84	Max WS	16.54	64.78	68.57		68.57	0.000063	0.45	37.02	18.22	0.06
P118-21-00	P118-21-00	1662.37	Max WS	101.11	63.91	68.25		68.3	0.000856	1.91	52.98	20.52	0.21
P118-21-00	P118-21-00	1144.5	Max WS	158.35	62.63	67.63		67.72	0.001154	2.47	64.1	20.22	0.24
P118-21-00	P118-21-00	595.53	Max WS	1.87	61.49	66.9		66.9	0	0.02	110.54	47.22	0
P118-21-00	P118-21-00	549.31*	Max WS	-7.98	61.18	66.9		66.9	0.000001	-0.07	121.21	44.42	0.01
P118-21-00	P118-21-00	503.08*	Max WS	-19.16	60.87	66.9		66.9	0.000004	-0.15	129.6	41.62	0.01
P118-21-00	P118-21-00	456.86*	Max WS	-30.65	60.57	66.9		66.9	0.000008	-0.23	135.58	38.81	0.02
P118-21-00	P118-21-00	410.63*	Max WS	-41.51	60.26	66.89		66.9	0.000012	-0.3	139.3	36.01	0.03
P118-21-00	P118-21-00	364.41*	Max WS	-52.38	59.95	66.89		66.9	0.000017	-0.37	140.53	33.21	0.03
P118-21-00	P118-21-00	318.18*	Max WS	-62.61	59.64	66.89		66.9	0.000023	-0.45	139.52	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-73.98	59.34	66.89		66.9	0.000031	-0.54	136.14	27.6	0.04
P118-21-00	P118-21-00	225.73*	Max WS	-84.76	59.03	66.89		66.9	0.000042	-0.65	130.45	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-93.1	58.72	66.89		66.9	0.000064	-0.76	122.46	22	0.06
P118-21-00	P118-21-00	159.41*	Max WS	-106.68	57.98	66.89		66.9	0.000067	-0.8	133.1	22.53	0.06
P118-21-00	P118-21-00	139.31*	Max WS	-113.2	57.24	66.9		66.91	0.00006	-0.78	144.4	23.06	0.06
P118-21-00	P118-21-00	119.21*	Max WS	-86.79	56.51	66.93		66.94	0.000029	-0.55	156.38	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-72.59	55.77	66.97		66.97	0.000016	-0.43	169.05	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-61.48	55.03	67.02		67.02	0.00001	-0.34	182.24	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.15		74.15	0.000002	0.11	90.73	36.8	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.15		74.15	0.000003	0.13	79.59	31.04	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.58	70.08	74.15	70.24	74.15	0.000004	0.14	76.33	25.96	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.58	70.2	74.15		74.15	0.000004	0.15	72.56	27.5	0.02
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.59	70.16	74.15		74.15	0.000006	0.17	69.92	27.56	0.02
P118-23-00	P118-23-00 R2	7654.51	Max WS	17.94	69.97	74.15		74.15	0.000012	0.25	72.88	25.84	0.03
P118-23-00	P118-23-00 R2	7632.63	Max WS	20.42	69.88	74.15		74.15	0.000016	0.28	72.48	25.42	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.13	68.92	74.15		74.15	0.000015	0.29	77.83	31.72	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22	69.39	74.06		74.06	0.000015	0.28	91.01	158.12	0.03
P118-23-00	P118-23-00 R2	7567.5	Max WS	23.56	69.56	74.06		74.06	0.000019	0.32	74.06	486.34	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	32.47	68.48	74.05		74.06	0.000033	0.42	76.58	1133.98	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	37.69	68.06	74.05		74.05	0.000039	0.47	80.09	1058.66	0.05
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	37.69	69.59	73.81		73.83	0.000176	1.28	29.4	510.21	0.11
P118-23-00	P118-23-00 R2	7313.37	Max WS	39.06	69.5	73.82		73.83	0.000038	0.46	84.81	556.44	0.05
P118-23-00	P118-23-00 R2	7305.97	Max WS	39.77	69.12	73.82		73.83	0.000036	0.46	86.36	466.29	0.05
P118-23-00	P118-23-00 R2	7294.91	Max WS	40.73	69.43	73.82		73.83	0.000037	0.59	68.57	487.32	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	40.72	69.34	73.56		73.57	0.000041	0.46	128.56	135.93	0.05
P118-23-00	P118-23-00 R2	7237.19	Max WS	43.42	69.28	73.56		73.56	0.000046	0.49	116.03	133.85	0.05
P118-23-00	P118-23-00 R2	6786.22	Max WS	93.24	68.02	73.53		73.54	0.000068	0.58	413.41	1359.96	0.06
P118-23-00	P118-23-00 R2	6723.56	Max WS	100.69	67.37	73.53		73.53	0.000058	0.63	159.44	46.08	0.06
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	95.21	67.54	71.84		71.9	0.001229	1.89	50.4	26.96	0.24
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	110.14	67.16	71.79		71.81	0.000362	1.36	80.91	28.45	0.14
P118-23-00	P118-23-00 R2	6402.43	Max WS	127	67.03	71.7		71.74	0.000465	1.57	80.85	27.41	0.16
P118-23-00	P118-23-00 R2	6356.93	Max WS	134.79	66.97	71.67	68.63	71.71	0.000505	1.65	81.91	27.55	0.17
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	134.77	66.93	71.65		71.69	0.000486	1.62	83.15	27.85	0.17
P118-23-00	P118-23-00 R2	6293.27	Max WS	139.12	66.88	71.63		71.67	0.000498	1.65	84.45	28.09	0.17
P118-23-00	P118-23-00 R2	5958.59	Max WS	177.15	66.24	71.47		71.51	0.000389	1.47	120.72	40.99	0.15
P118-23-00	P118-23-00 R2	5652.94	Max WS	143.49	65.7	71.36		71.39	0.000303	1.39	103.08	30.05	0.13
P118-23-00	P118-23-00 R2	5045.34	Max WS	46.21	63.97	71.34		71.34	0.000014	0.34	137.06	31.52	0.03
P118-23-00	P118-23-00 R2	4947.92	Max WS	49.24	63.84	71.34	64.52	71.34	0.00001	0.28	174.25	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	49.05	63.87	71.33		71.33	0.000007	0.27	184.94	34.77	0.02
P118-23-00	P118-23-00 R2	4783.1	Max WS	65.72	63.65	71.32		71.33	0.000029	0.45	145.77	37.16	0.04
P118-23-00	P118-23-00 R2	4580.38	Max WS	106.34	63.02	71.31	64.56	71.31	0.00006	0.63	169.39	46.95	0.06
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	106.23	63.16	71.29		71.3	0.000058	0.57	185.06	58.28	0.06
P118-23-00	P118-23-00 R2	4459.75	Max WS	120.24	63.55	71.29		71.29	0.000068	0.66	182.69	52.65	0.06
P118-23-00	P118-23-00 R2	4370.6	Max WS	129.41	63.42	71.28		71.29	0.000056	0.59	218.35	65.06	0.06
P118-23-00	P118-23-00 R2	4330.88	Max WS	132.16	62.88	71.28		71.28	0.000014	0.31	431.24	125.25	0.03
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 2
HEC-RAS Results

HFC RAS Plan: Alt2_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	131.84	63.31	71.25		71.25	0.000007	0.31	429.67	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	134.45	63.34	71.25		71.25	0.000022	0.5	269.09	51.14	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	161.01	62.41	71.22		71.23	0.000062	0.83	194.47	34.28	0.06
P118-23-00	P118-23-00 R2	3187.46	Max WS	190.46	62.36	71.18		71.19	0.000056	0.82	232.7	40.27	0.06
P118-23-00	P118-23-00 R2	3150.64	Max WS	195.64	61.93	71.18	64.29	71.19	0.00006	0.77	255.32	52.14	0.06
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	195.57	61.56	71.17		71.18	0.000052	0.72	270.95	55.63	0.06
P118-23-00	P118-23-00 R2	3104.46	Max WS	197.78	61.63	71.17		71.18	0.00008	0.83	237.48	52.53	0.07
P118-23-00	P118-23-00 R2	2750.53	Max WS	224.38	60.59	71.14		71.15	0.000072	0.97	230.96	34.6	0.07
P118-23-00	P118-23-00 R2	2741.93	Max WS	224.96	60.44	71.14	63.02	71.15	0.000069	0.96	235.49	34.96	0.06
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	224.84	60.52	71.12		71.13	0.00006	0.86	261.24	42.97	0.06
P118-23-00	P118-23-00 R2	2716.57	Max WS	226.38	60.68	71.12		71.13	0.00007	0.85	266.98	52.19	0.07
P118-23-00	P118-23-00 R2	2615.37	Max WS	242.99	60.75	71.11		71.12	0.00008	1.01	240.05	37.87	0.07
P118-23-00	P118-23-00 R2	2244.98	Max WS	252.23	60.53	71.08		71.09	0.000064	0.97	260.97	35.71	0.06
P118-23-00	P118-23-00 R2	2221.06	Max WS	251.11	60.56	71.08	62.82	71.09	0.000067	0.97	257.8	36.69	0.06
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	251.06	60.59	71.06		71.07	0.00006	0.94	267.94	37.2	0.06
P118-23-00	P118-23-00 R2	2042.36	Max WS	260.75	59.78	71.06		71.06	0.000053	0.75	349.54	67.27	0.06
P118-23-00	P118-23-00 R2	1922.11	Max WS	260.09	59.56	71.05		71.06	0.000047	0.7	368.98	72.85	0.06
P118-23-00	P118-23-00 R2	1892.63	Max WS	268.03	59.68	71.05	62.62	71.06	0.000056	0.78	343.49	66.31	0.06
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	267.95	59.86	70.98		71	0.00009	1.07	250.58	38.81	0.07
P118-23-00	P118-23-00 R2	1829.45	Max WS	282.98	59.87	70.98		70.99	0.000058	0.76	371.25	75.5	0.06
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	357	59.04	70.96		70.97	0.000071	0.95	375.3	62.07	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	665.41	59.85	70.94		70.95	0.000067	1.01	2179.9	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	672.72	59.99	70.94	63.94	70.94	0.000042	0.68	2451.37	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	672.51	58.36	70.93		70.93	0.000026	0.59	2852.86	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	704.47	57.88	70.93		70.93	0.000028	0.68	2859.8	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	904.72	57.45	70.9		70.91	0.000087	1.11	2126.28	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	1104.19	57.03	70.84		70.87	0.000147	1.58	1667.9	449.67	0.1
P118-23-00	P118-23-00 R1	242.54	Max WS	1258.54	55.82	70.8	61.79	70.81	0.000052	0.76	6047.51	4847.78	0.06
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1257.72	55.57	70.78		70.78	0.000037	0.81	7184.82	5127.8	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1266.66	55.13	70.76		70.8	0.000089	1.6	1147.2	175.37	0.09
P118-23-00	P118-23-00 R3	58.33	Max WS	1265.83	53.78	70.75		70.8	0.000102	1.9	939.14	83.5	0.09
P118-23-02	P118-23-02	4138.85	Max WS	58.7	67.78	71.48		71.49	0.000224	0.86	242.68	1024.46	0.11
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	57.45	66.69	71.43		71.43	0.000102	0.59	102.59	895.1	0.08
P118-23-02	P118-23-02	3782.06	Max WS	212.77	66.66	71.41		71.43	0.000563	1.4	542.19	1021.3	0.17
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	213.04	66.22	71.41		71.41	0.000054	0.29	1878.62	1255.44	0.03
P118-23-02	P118-23-02	3692.61	Max WS	215.05	66.27	71.38		71.46	0.001241	2.2	97.62	1238.85	0.27
P118-23-02	P118-23-02	3049.5	Max WS	32.6	65.47	71.01		71.01	0.000012	0.22	362.74	1039.42	0.03
P118-23-02	P118-23-02	2386.67	Max WS	32.44	65.13	71.01		71.01	0.000006	0.18	820.11	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	32.36	65.16	71.01		71.01	0.000004	0.13	921.86	1094.25	0.01
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	31.87	65.26	71		71	0.000019	0.33	95.24	1047.63	0.03
P118-23-02	P118-23-02	2278.1	Max WS	29.83	65.19	71		71	0.000006	0.18	721.3	1051.93	0.02
P118-23-02	P118-23-02	1453.34	Max WS	110.29	63.69	70.98		70.99	0.000033	0.52	853.87	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	111.13	63.66	70.98	65.39	70.99	0.000024	0.49	944.06	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	110.91	63.56	70.98		70.98	0.000015	0.38	1272.21	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	113.16	63.36	70.98		70.98	0.000014	0.3	1151.65	958.63	0.03
P118-23-02	P118-23-02	1317.96	Max WS	115.49	62.91	70.98		70.98	0.000012	0.33	1318.78	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	124	61.86	70.98		70.98	0.00004	0.64	476.5	1203.72	0.05
P118-23-02	P118-23-02	1083.7	Max WS	133.41	62.56	70.97		70.98	0.000013	0.35	1501.07	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	308.36	60.16	70.95		70.96	0.000026	0.53	1965.27	1102.12	0.04
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	71.78		71.78	0.000001	0.08	131.28	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.97	66.34	71.78		71.78	0.000001	0.08	131.25	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	41.98	66.13	71.77		71.77	0.000019	0.36	115.3	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	83.47	65.84	71.75		71.75	0.000065	0.67	124.28	33.01	0.06
P118-25-00	P118-25-00 R2	2494.17	Max WS	98.72	65.5	71.73		71.74	0.000074	0.72	136.35	35.73	0.07
P118-25-00	P118-25-00 R2	2473.31	Max WS	98.82	65.47	71.73	67.3	71.74	0.000074	0.73	135.62	35.01	0.07
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	98.82	65.47	71.73		71.73	0.000076	0.72	137.6	37.73	0.07
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_50yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	95.87	65.38	71.73		71.73	0.000062	0.68	141.23	35.28	0.06
P118-25-00	P118-25-00 R2	2046.09	Max WS	104.05	64.63	71.71		71.71	0.000044	0.6	173.43	40.52	0.05
P118-25-00	P118-25-00 R1	1929.3	Max WS	245.48	64.22	71.64		71.68	0.00041	1.71	143.51	38.45	0.16
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	185.01	64.03	71.51		71.53	0.000162	1.21	152.91	33.08	0.1
P118-25-00	P118-25-00 R1	1208.56	Max WS	134.92	63.03	71.49		71.5	0.000063	0.81	166.95	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	127.82	63.01	71.49	65.12	71.5	0.000062	0.79	161.23	29.97	0.06
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	122.9	62.94	71.47		71.48	0.00006	0.78	158.37	29.45	0.06
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	117.77	62.83	71.47		71.48	0.000047	0.69	171.34	32.88	0.05
P118-25-00	P118-25-00 R1	980.2	Max WS	169.55	62.34	71.45		71.46	0.000065	0.85	199.69	35.75	0.06
P118-25-00	P118-25-00 R1	963.63	Max WS	176.78	62.25	71.45		71.46	0.000032	0.73	242.78	43.71	0.05
P118-25-00	P118-25-00 R1	950.55	Max WS	176.87	62.25	71.45	64.32	71.46	0.00004	0.65	295.85	93.7	0.06
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	176.19	61.68	71.43		71.44	0.000031	0.59	311.36	86	0.05
P118-25-00	P118-25-00 R1	886.91	Max WS	176.27	61.68	71.43		71.44	0.000027	0.69	254.46	51.01	0.05
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	189.81	61.16	71.42		71.43	0.000047	0.78	242.36	37.72	0.05
P118-25-00	P118-25-00 R1	490.93	Max WS	259.65	60.25	71.39		71.4	0.000069	0.95	272.94	44.02	0.07
P118-25-00	P118-25-00 R1	251.81	Max WS	271.61	58.25	71.38		71.39	0.00004	0.8	338.16	44.09	0.05
P118-25-00	P118-25-00 R1	229.81*	Max WS	265.37	58.04	71.38		71.39	0.000036	0.77	344.53	44.08	0.05
P118-25-00	P118-25-00 R1	207.81*	Max WS	259.22	57.84	71.38		71.39	0.000032	0.74	350.88	44.07	0.05
P118-25-00	P118-25-00 R1	185.81*	Max WS	253.26	57.63	71.38		71.39	0.000029	0.71	357.21	44.05	0.04
P118-25-00	P118-25-00 R1	163.80*	Max WS	247.27	57.43	71.38		71.39	0.000026	0.68	363.53	44.04	0.04
P118-25-00	P118-25-00 R1	141.80*	Max WS	241.75	57.22	71.38		71.39	0.000024	0.65	369.87	44.03	0.04
P118-25-00	P118-25-00 R1	119.80*	Max WS	234.97	57.02	71.38		71.39	0.000021	0.62	376.15	44.01	0.04
P118-25-00	P118-25-00 R1	97.8	Max WS	230.08	56.81	71.38	60.12	71.39	0.00002	0.6	382.49	44	0.04
P118-25-01	P118-25-01	5341.48	Max WS	11.16	70.47	74.69		74.69	0.000004	0.14	82.31	34.44	0.02
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	163.19	68.9	74.36		74.4	0.000557	1.66	98.21	36	0.18
P118-25-01	P118-25-01	4162.47	Max WS	176.13	69.44	74.18		74.22	0.000513	1.63	108.01	38.65	0.17
P118-25-01	P118-25-01	4134.04	Max WS	179.68	69.38	74.17	71.41	74.21	0.000505	1.63	110.37	39.14	0.17
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	179.64	69.25	74.11		74.15	0.000493	1.61	111.31	39.29	0.17
P118-25-01	P118-25-01	4047.7	Max WS	179.27	69.28	74.1		74.14	0.000476	1.6	112.38	39.31	0.17
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	197.53	67.84	73.92		73.96	0.000333	1.44	136.91	42.22	0.14
P118-25-01	P118-25-01	3312.44	Max WS	199.32	67.48	73.84		73.86	0.00027	1.29	154.34	48.47	0.13
P118-25-01	P118-25-01	3014.68	Max WS	202.09	67.53	73.77		73.79	0.000207	1.23	164.05	44.88	0.11
P118-25-01	P118-25-01	2924.04	Max WS	202.73	67.71	73.75		73.77	0.000198	1.2	168.35	46.15	0.11
P118-25-01	P118-25-01	2763.33	Max WS	189.24	66.67	73.73		73.74	0.000157	1.1	171.86	44.92	0.1
P118-25-01	P118-25-01	2728.92	Max WS	191.74	66.5	73.58		73.77	0.000807	3.49	55.02	29.03	0.25
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	156.43	66.31	72.87		73.01	0.000634	2.96	52.9	32.96	0.22
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	193.25	66.04	72.94		72.99	0.000475	1.82	106.11	27.91	0.16
P118-25-01	P118-25-01	1881.88	Max WS	211.74	66.57	72.52		72.6	0.000798	2.22	95.31	28.4	0.21
P118-25-01	P118-25-01	1384.48	Max WS	214.07	65.19	72.16		72.23	0.000681	2.08	102.95	30.27	0.2
P118-25-01	P118-25-01	1245.83	Max WS	213.88	66.34	72.06		72.14	0.000702	2.15	99.56	28.19	0.2
P118-25-01	P118-25-01	584.11	Max WS	176.83	65.88	71.79		71.83	0.000293	1.49	118.71	29.02	0.13
P118-25-01	P118-25-01	60.05	Max WS	152.86	63.5	71.7		71.72	0.000157	1.16	131.29	27.03	0.09

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	5442.05	58.25	74.31		74.78	0.002666	5.77	1655.91	978.26	0.34
P118-00-00	P118-R3-2	71854.2	Max WS	5010.87	57.83	73.68		73.9	0.000474	3.81	1755.44	1024.86	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5054.84	55.05	73.22		73.41	0.000379	3.55	1720.18	447.2	0.2
P118-00-00	P118-R3-2	69527.2	Max WS	5032.96	55.28	72.84		73.02	0.000292	3.4	2091.22	520	0.18
P118-00-00	P118-R3-2	68670	Max WS	4564.05	54.88	72.4		72.69	0.000547	4.49	1430.94	309.65	0.25
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3494.84	54.47	72.35		72.53	0.000279	3.47	1443.91	356.12	0.18
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2253.96	54.14	72.36		72.44	0.000164	2.49	1508.19	344.78	0.13
P118-00-00	P118-R3-2	66869	Max WS	3123.48	53.96	71.91		72.14	0.000574	3.86	945.15	177.47	0.24
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3399.89	53.79	71.86		72.05	0.000446	3.6	1035.56	155.17	0.22
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2596.2	53.6	71.84		71.95	0.000183	2.79	1447.51	227.52	0.14
P118-00-00	P118-R3-2	65955.8	Max WS	1795.85	53.52	71.88		71.92	0.000104	1.65	1432.61	278.2	0.1
P118-00-00	P118-R3-2	65434.6	Max WS	-176.48	53.1	71.91		71.91	0.000001	-0.18	1491.84	214.6	0.01
P118-00-00	P118-R3-2	64399.74	Max WS	3773.74	52.59	71.37		71.62	0.000406	4.1	1235.27	202.94	0.21
P118-00-00	P118-R3-2	64273.7	Max WS	4226.32	53.55	71.32	62.2	71.51	0.000389	3.54	1266.54	175.5	0.21
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4225.65	53.3	71.29		71.48	0.000362	3.46	1272.76	156.4	0.2
P118-00-00	P118-R3-2	64200	Max WS	4225.65	53.3	71.29		71.48	0.000363	3.47	1272.47	156.39	0.2
P118-00-00	P118-R2-2	64100	Max WS	5907.91	52.61	71.27		71.43	0.000213	3.21	1905.92	8660.58	0.16
P118-00-00	P118-R2-2	64094	Max WS	5907.89	52.61	71.26	60.93	71.42	0.000213	3.21	1905.73	8659.55	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5907.88	52.56	71.24		71.39	0.000212	3.21	1909.5	8678.72	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5907.84	52.78	71.05	63.17	71.41	0.000526	4.89	1355.52	8291.22	0.25
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5907.65	53.04	70.11		70.56	0.000766	5.49	1188.26	4153.2	0.3
P118-00-00	P118-R2-2	63959.7	Max WS	5907.7	53.06	70.35	60.88	70.53	0.000276	3.43	1752.18	7331.58	0.18
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5907.78	53.16	70.28		70.47	0.00029	3.49	1717.83	6556.09	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	5913.27	52.4	69.82		70.48	0.001343	6.65	1126.7	205	0.38
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4849.97	50.35	69.25		69.69	0.000871	5.37	999.49	169.52	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	5232.37	50.77	68.51		68.86	0.000809	4.74	1103.31	132.2	0.29
P118-00-00	P118-R2-2	60625.3	Max WS	5588.02	49.52	67.87		68.28	0.00088	5.11	1092.58	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5547.34	49.48	66.73		67.42	0.001214	6.76	885.22	131.55	0.36
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5699.82	49.68	66.64		67.27	0.0011	6.43	937.7	132.32	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5794.51	49.89	66.58		67.34	0.00099	6.07	997.15	132.86	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5850.9	50.09	66.54		67.04	0.000896	5.73	1058.49	137.41	0.32
P118-00-00	P118-R2-1	60547.5*	Max WS	5897.11	50.3	66.5		66.95	0.000825	5.44	1117.27	143.43	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5933.83	50.5	66.45		66.87	0.000771	5.19	1173.43	150.41	0.29
P118-00-00	P118-R2-1	60396.4*	Max WS	5946.33	50.45	66.38		66.8	0.00082	5.22	1167.89	154.42	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5947.37	50.4	66.3		66.72	0.000862	5.23	1165.08	158.41	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	5947.35	50.35	66.22		66.65	0.000897	5.23	1165.67	162.42	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5947.33	50.3	66.15		66.57	0.000924	5.21	1169.19	166.38	0.32
P118-00-00	P118-R2-1	59840.2*	Max WS	5947.55	50.25	66.07		66.48	0.000944	5.18	1175.69	170.38	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5951.55	50.2	65.99		66.4	0.000955	5.14	1185.78	174.39	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5961.33	50.15	65.91		66.31	0.000961	5.09	1198.38	178.36	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5972.08	50.1	65.83		66.23	0.000978	5.07	1212.54	181.05	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5972.06	50.1	65.75		66.14	0.000986	5.04	1217.01	196.49	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5972.02	50.11	65.67		66.06	0.000992	5	1211.72	211.94	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	5972.03	50.11	65.59		65.97	0.000988	4.95	1207.09	171.5	0.32
P118-00-00	P118-R2-1	58960.5*	Max WS	5971.97	50.11	65.52		65.89	0.000948	4.89	1221.9	164.38	0.32
P118-00-00	P118-R2-1	58844.9*	Max WS	5972.01	50.11	65.45		65.81	0.00085	4.81	1242.17	157.4	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	5972.01	50.12	65.4		65.74	0.000769	4.71	1267.13	153.08	0.29
P118-00-00	P118-R2-1	58613.7	Max WS	5972	50.12	65.35		65.68	0.000653	4.59	1300	143.71	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	6116.39	47.59	65.12	58.44	65.51	0.00076	5.01	1246.85	769.25	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-7.31	67.88	69.56		69.57	0.005974	-0.79	10.27	20.33	0.14
P118-21-00	P118-21-00	2493.18	Max WS	-5.12	67.95	69.6		69.6	0.001622	-0.4	15.29	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	-1.2	67.59	69.64		69.64	0	-0.05	28.09	23.66	0.01
P118-21-00	P118-21-00	2416.26	Max WS	0.57	67.5	69.64		69.64	0	0.02	29.32	25.48	0
P118-21-00	P118-21-00	2398.13	Max WS	2.41	67.44	69.64		69.64	0.000003	0.08	29.66	22.79	0.01
P118-21-00	P118-21-00	2389.56	Max WS	4.25	67.41	69.64		69.64	0.000004	0.14	30.23	23.09	0.02

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Ait2_100Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-21-00	P118-21-00	2343.79	Max WS	7.49	67.54	69.63		69.64	0.000051	0.47	16.04	13.61	0.08
P118-21-00	P118-21-00	2303.58	Max WS	10.99	67.47	69.62		69.63	0.000268	0.67	16.31	12.84	0.11
P118-21-00	P118-21-00	2208.42	Max WS	15.63	67.31	69.58		69.59	0.000315	0.77	20.22	15.12	0.12
P118-21-00	P118-21-00	2195.48	Max WS	15.63	67.34	69.58		69.59	0.000135	0.74	21.24	18.47	0.12
P118-21-00	P118-21-00	2169.49	Max WS	15.63	66.56	69.58		69.59	0.000064	0.68	23	12.53	0.09
P118-21-00	P118-21-00	2167.76	Max WS	15.63	66.37	69.58		69.59	0.000039	0.55	28.16	13.85	0.07
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	15.63	65.03	68.83		68.83	0.000024	0.4	38.7	22.18	0.05
P118-21-00	P118-21-00	2100.84	Max WS	15.63	64.78	68.83		68.83	0.000041	0.37	41.88	19.49	0.04
P118-21-00	P118-21-00	1662.37	Max WS	114.29	63.93	68.51		68.57	0.000809	1.95	59.51	29.16	0.21
P118-21-00	P118-21-00	1144.5	Max WS	179.98	62.63	67.84		67.95	0.001299	2.62	68.62	21.66	0.26
P118-21-00	P118-21-00	595.53	Max WS	-42.62	61.49	67.42		67.42	0.000019	-0.32	134.99	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-57.04	61.18	67.41		67.42	0.000026	-0.4	144.18	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-70.87	60.87	67.41		67.42	0.000032	-0.47	151.11	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-84.16	60.57	67.41		67.42	0.000038	-0.54	155.64	38.81	0.05
P118-21-00	P118-21-00	410.63*	Max WS	-97.47	60.26	67.41		67.42	0.000044	-0.62	157.92	36.01	0.05
P118-21-00	P118-21-00	364.41*	Max WS	-112.46	59.95	67.41		67.42	0.000054	-0.72	157.68	33.21	0.06
P118-21-00	P118-21-00	318.18*	Max WS	-127.53	59.64	67.41		67.42	0.000067	-0.83	155.2	30.41	0.06
P118-21-00	P118-21-00	271.96*	Max WS	-143.11	59.34	67.41		67.42	0.000085	-0.96	150.34	27.6	0.07
P118-21-00	P118-21-00	225.73*	Max WS	-158.58	59.03	67.4		67.42	0.000112	-1.11	143.17	24.8	0.08
P118-21-00	P118-21-00	179.51	Max WS	-170.24	58.72	67.4		67.42	0.000166	-1.27	133.72	22	0.09
P118-21-00	P118-21-00	159.41*	Max WS	-180.42	57.98	67.4		67.43	0.000151	-1.25	144.67	22.53	0.09
P118-21-00	P118-21-00	139.31*	Max WS	-179.03	57.24	67.42		67.44	0.000121	-1.15	156.24	23.06	0.08
P118-21-00	P118-21-00	119.21*	Max WS	-147.92	56.51	67.44		67.45	0.000068	-0.88	168.44	23.6	0.06
P118-21-00	P118-21-00	99.11*	Max WS	-92.43	55.77	67.48		67.49	0.000022	-0.51	181.41	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-80.17	55.03	67.54		67.54	0.000014	-0.41	195.06	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.55		74.55	0.000001	0.1	106.56	42.28	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.55		74.55	0.000002	0.11	94.17	41.15	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.62	70.08	74.55	70.23	74.55	0.000003	0.12	91.71	54.84	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.55		74.55	0.000003	0.13	86.22	39.28	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.7	70.16	74.55		74.55	0.000004	0.15	83.33	38.26	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.5	69.97	74.55		74.55	0.000009	0.22	83.57	29.23	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.16	69.88	74.55		74.55	0.000012	0.25	83	43.27	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.98	68.92	74.55		74.55	0.000011	0.26	101.18	140.62	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.93	69.39	74.52		74.52	0.000008	0.22	232.56	408.19	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.6	69.56	74.52		74.52	0.000014	0.29	86.03	772.43	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.2	68.48	74.52		74.52	0.000025	0.39	88.54	1393.51	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.83	68.06	74.52		74.52	0.00003	0.43	92.02	1320.53	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.76	69.59	74.26		74.26	0.000014	0.28	542.53	1037.83	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.22	69.5	74.26		74.26	0.000029	0.42	97.29	1006.09	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	41.97	69.12	74.26		74.26	0.000029	0.43	98.63	978.05	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	42.99	69.43	74.26		74.26	0.00003	0.57	75.55	934.69	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.84	69.34	73.97		73.97	0.000023	0.37	319.3	844.73	0.04
P118-23-00	P118-23-00 R2	7257.19	Max WS	45.63	69.28	73.97		73.97	0.000031	0.39	244.56	765.83	0.04
P118-23-00	P118-23-00 R2	6786.22	Max WS	96.99	68.02	73.95		73.96	0.000028	0.38	781.23	1796.75	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	104.66	67.37	73.95		73.96	0.00005	0.58	180.32	52.63	0.06
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	94.53	67.54	72.1		72.15	0.000088	1.64	57.76	29.95	0.21
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	112.39	67.16	72.05		72.08	0.000294	1.27	88.73	29.7	0.13
P118-23-00	P118-23-00 R2	6402.43	Max WS	132.34	67.03	71.98		72.01	0.000393	1.49	88.68	28.6	0.15
P118-23-00	P118-23-00 R2	6356.93	Max WS	141.62	66.97	71.95	68.7	71.99	0.000434	1.58	89.85	28.76	0.16
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	141.62	66.93	71.93		71.96	0.00042	1.56	91.04	29.03	0.15
P118-23-00	P118-23-00 R2	6293.27	Max WS	146.76	66.88	71.91		71.95	0.000434	1.59	92.46	29.3	0.16
P118-23-00	P118-23-00 R2	5958.59	Max WS	36.28	66.24	71.86		71.86	0.000012	0.26	137	44.06	0.03
P118-23-00	P118-23-00 R2	5652.94	Max WS	40.32	65.7	71.85		71.85	0.000019	0.34	119.14	36.7	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	36.34	63.97	71.84		71.84	0.000006	0.24	153.03	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	38.26	63.84	71.84	64.38	71.84	0.000004	0.2	195.35	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	38.22	63.87	71.84		71.84	0.000003	0.19	202.57	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	49.24	63.65	71.83		71.83	0.000011	0.3	164.73	37.16	0.03
P118-23-00	P118-23-00 R2	4580.38	Max WS	64.37	63.02	71.83	64.14	71.83	0.000014	0.33	193.94	46.95	0.03
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	64.35	63.16	71.82		71.83	0.000013	0.3	215.91	58.28	0.03
P118-23-00	P118-23-00 R2	4459.75	Max WS	72.8	63.55	71.82		71.82	0.000016	0.35	210.92	52.65	0.03
P118-23-00	P118-23-00 R2	4370.6	Max WS	79.37	63.42	71.82		71.82	0.000013	0.31	253.48	65.06	0.03
P118-23-00	P118-23-00 R2	4330.88	Max WS	81.34	62.88	71.82		71.82	0.000003	0.16	498.7	125.25	0.01

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_10Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-23-00	P118-23-00 R2	4299.23	Culvert	81.27	63.33	71.81		71.81	0.000002	0.17	472.09	76.06	0.01
P118-23-00	P118-23-00 R2	4269.23	Max WS	86.02	63.34	71.81		71.81	0.000006	0.29	297.71	51.14	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	125.4	62.41	71.79		71.8	0.000029	0.59	214.18	34.28	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	168.1	62.36	71.77		71.78	0.000033	0.66	256.43	40.27	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	171.95	61.93	71.77	64.13	71.77	0.000032	0.6	286.08	52.14	0.05
P118-23-00	P118-23-00 R2	3150.64	Max WS										
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	174.39	61.63	71.76		71.77	0.000028	0.57	303.86	55.63	0.04
P118-23-00	P118-23-00 R2	3104.46	Max WS	210.96	60.59	71.74		71.75	0.000049	0.84	251.84	34.6	0.05
P118-23-00	P118-23-00 R2	2750.51	Max WS	211.62	60.44	71.74	62.93	71.75	0.000047	0.82	256.59	34.96	0.05
P118-23-00	P118-23-00 R2	2741.93	Max WS										
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	212.69	60.68	71.73		71.74	0.000044	0.71	298.99	52.19	0.05
P118-23-00	P118-23-00 R2	2716.57	Max WS	224.17	60.75	71.72		71.74	0.000051	0.85	263.47	37.87	0.06
P118-23-00	P118-23-00 R2	2615.37	Max WS	233.22	60.53	71.71		71.72	0.000043	0.82	283.36	35.71	0.05
P118-23-00	P118-23-00 R2	2244.98	Max WS	232.4	60.56	71.71	62.71	71.72	0.000045	0.83	280.82	36.69	0.05
P118-23-00	P118-23-00 R2	2221.06	Max WS										
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	246.4	59.78	71.69		71.7	0.00004	0.8	291.33	37.2	0.05
P118-23-00	P118-23-00 R2	2042.36	Max WS	249.33	59.56	71.68		71.69	0.000033	0.63	391.92	67.27	0.05
P118-23-00	P118-23-00 R2	1922.11	Max WS	257.96	59.68	71.68	62.58	71.69	0.000036	0.67	385.45	66.31	0.05
P118-23-00	P118-23-00 R2	1892.63	Max WS										
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	281.15	59.87	71.61		71.62	0.000039	0.67	418.83	75.5	0.05
P118-23-00	P118-23-00 R2	1829.45	Max WS										
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	374.81	59.04	71.59		71.61	0.000058	0.9	414.59	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	898.8	59.85	71.58		71.59	0.000062	1.03	2859.55	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	907.42	59.99	71.58	64.45	71.58	0.000041	0.73	3081.01	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	906.85	58.36	71.56		71.57	0.000028	0.66	3445.04	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	943.21	57.88	71.56		71.57	0.00003	0.75	3441.53	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	1182.4	57.45	71.53		71.54	0.000087	1.18	2596.79	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	1434.01	57.03	71.47		71.5	0.000164	1.75	1950.29	449.67	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	1667.25	55.82	71.43	62.62	71.43	0.00004	0.72	9331.94	5500.08	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1666.82	55.57	71.41		71.42	0.000029	0.76	10617.8	5546.14	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1676.46	55.13	71.39		71.44	0.000123	1.96	1257.4	175.37	0.1
P118-23-02	P118-23-02 R1	58.31	Max WS	1671.96	53.78	71.37		71.44	0.000152	2.38	990.8	83.5	0.11
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	71.66		71.66	0.000004	0.12	333.84	1138.45	0.01
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	10.29	66.69	71.66		71.66	0.000002	0.09	141.51	1052.06	0.01
P118-23-02	P118-23-02	3782.06	Max WS	31.26	66.66	71.66		71.66	0.000006	0.15	818.92	1152.87	0.02
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	31.28	66.22	71.66		71.66	0.000001	0.04	2191.68	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	31.28	66.22	71.66		71.66	0.000001	0.06	1940.52	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	31.08	65.47	71.66		71.66	0.000002	0.08	1292.16	1166.54	0.01
P118-23-02	P118-23-02	2386.67	Max WS	56.37	65.13	71.65		71.65	0.000004	0.16	1514.39	1074.84	0.01
P118-23-02	P118-23-02	2372.17	Max WS	59.14	65.16	71.65		71.65	0.000003	0.13	1628.68	1094.25	0.01
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	57.32	65.26	71.64		71.64	0.000036	0.5	115.61	1060.82	0.05
P118-23-02	P118-23-02	2278.1	Max WS	62.22	65.19	71.64		71.64	0.000006	0.21	1393.99	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	201.82	63.69	71.62		71.62	0.000037	0.6	1466.18	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	203.19	63.66	71.62	66.04	71.62	0.00003	0.58	1554.15	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	203.06	63.56	71.62		71.62	0.00002	0.47	1881.96	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	206.8	63.36	71.62		71.62	0.000017	0.33	1759.38	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	218.61	62.91	71.61		71.61	0.000015	0.4	1972.69	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	247.19	61.86	71.61		71.61	0.000015	0.42	2245.66	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	267.73	62.56	71.61		71.61	0.000017	0.43	2296.15	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	524.54	60.16	71.59		71.59	0.000033	0.62	2664.56	1102.12	0.05
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.4		72.4	0.000001	0.06	154.36	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.4		72.4	0.000001	0.06	154.32	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	53.77	66.13	72.39		72.39	0.00002	0.4	134.48	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	109.24	65.84	72.36		72.37	0.000007	0.76	144.6	33.01	0.06
P118-25-00	P118-25-00 R2	2494.17	Max WS	136.13	65.5	72.34		72.36	0.000089	0.86	158.19	35.73	0.07
P118-25-00	P118-25-00 R2	2473.31	Max WS	137.79	65.47	72.34	67.6	72.35	0.000092	0.88	156.99	35.01	0.07
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	137.77	65.47	72.33		72.35	0.000092	0.86	160.54	37.73	0.07
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	140.65	65.38	72.33		72.34	0.000087	0.87	162.5	35.28	0.07
P118-25-00	P118-25-00 R2	2046.09	Max WS	158.67	64.63	72.3		72.31	0.000068	0.8	197.45	40.52	0.06
P118-25-00	P118-25-00 R1	1929.3	Max WS	292.65	64.22	72.23		72.28	0.000377	1.75	166.87	39.73	0.15
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	270.96	64.03	72.13		72.17	0.000238	1.56	173.59	33.08	0.12
P118-25-00	P118-25-00 R1	1208.56	Max WS	212.05	63.03	72.09		72.11	0.000114	1.14	185.24	30.27	0.08
P118-25-00	P118-25-00 R1	1188.81	Max WS	207.73	63.01	72.09	65.73	72.11	0.00012	1.16	179.34	29.97	0.08
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	207.73	62.94	72.08		72.1	0.000126	1.18	176.23	29.45	0.08
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	204.2	62.83	72.08		72.09	0.000102	1.07	191.34	33.01	0.08
P118-25-00	P118-25-00 R1	980.2	Max WS	245.56	62.34	72.05		72.07	0.000301	1.11	221.19	35.75	0.08
P118-25-00	P118-25-00 R1	963.63	Max WS	252.45	62.25	72.05		72.07	0.000005	0.96	263.87	44.76	0.06
P118-25-00	P118-25-00 R1	950.55	Max WS	252.72	62.25	72.05	64.72	72.06	0.000057	0.8	352.74	94.75	0.06
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	251.45	61.68	72.02		72.02	0.000044	0.76	361.56	86	0.06
P118-25-00	P118-25-00 R1	886.91	Max WS	251.01	61.68	72.01		72.02	0.000042	0.91	274.79	51.01	0.06
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	258.03	61.16	72		72.02	0.000067	0.98	264.27	37.72	0.07
P118-25-00	P118-25-00 R1	490.93	Max WS	299.99	60.25	71.97		71.99	0.00007	1	298.72	44.02	0.07
P118-25-00	P118-25-00 R1	251.81	Max WS	299.92	58.25	71.97		71.98	0.000039	0.82	364.03	44.09	0.05
P118-25-00	P118-25-00 R1	229.81*	Max WS	295.49	58.04	71.97		71.98	0.000036	0.8	370.38	44.08	0.05
P118-25-00	P118-25-00 R1	207.81*	Max WS	290.91	57.84	71.97		71.98	0.000032	0.77	376.72	44.07	0.05
P118-25-00	P118-25-00 R1	185.81*	Max WS	286.3	57.63	71.97		71.98	0.000029	0.75	383.03	44.05	0.04
P118-25-00	P118-25-00 R1	163.80*	Max WS	281.4	57.43	71.97		71.97	0.000028	0.72	389.34	44.04	0.04
P118-25-00	P118-25-00 R1	141.80*	Max WS	276.53	57.22	71.97		71.97	0.000026	0.7	395.67	44.03	0.04
P118-25-00	P118-25-00 R1	119.80*	Max WS	270.47	57.02	71.97		71.97	0.000023	0.67	401.93	44.01	0.04
P118-25-00	P118-25-00 R1	97.8	Max WS	265.97	56.81	71.97	60.37	71.97	0.000022	0.65	408.28	44	0.04
P118-25-01	P118-25-01	5341.48	Max WS	12.73	70.47	75.27		75.27	0.000003	0.12	102.72	36	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	217.63	68.9	74.9		74.95	0.000596	1.83	118.81	39.6	0.19
P118-25-01	P118-25-01	4162.47	Max WS	237.82	69.44	74.71		74.76	0.000567	1.84	129.14	41.28	0.18
P118-25-01	P118-25-01	4134.04	Max WS	242.93	69.38	74.69	71.74	74.74	0.000569	1.84	131.71	42.24	0.18
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	242.92	69.25	74.63		74.68	0.000556	1.83	132.59	42.15	0.18
P118-25-01	P118-25-01	4047.7	Max WS	243.24	69.28	74.61		74.66	0.000538	1.83	133.25	41.33	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	260.78	67.84	74.42		74.46	0.00038	1.65	158.25	43.65	0.15
P118-25-01	P118-25-01	3312.44	Max WS	264.18	67.48	74.32		74.36	0.00031	1.48	178.27	50.05	0.14
P118-25-01	P118-25-01	3014.68	Max WS	250.01	67.53	74.25		74.28	0.000218	1.34	186.15	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	248.81	67.71	74.23		74.26	0.000205	1.3	191.02	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	209.3	66.67	74.22		74.24	0.000132	1.08	194.08	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	212.42	66.5	74.03		74.21	0.003864	3.41	62.26	29.03	0.41
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	210.36	66.31	73.18		73.4	0.000966	3.78	55.68	33.95	0.27
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	212.95	66.04	73.28		73.33	0.000452	1.84	115.66	28.55	0.16
P118-25-01	P118-25-01	1881.88	Max WS	227.63	66.57	72.91		72.98	0.000683	2.14	106.6	29.95	0.2
P118-25-01	P118-25-01	1384.48	Max WS	227.35	66.19	72.62		72.67	0.000549	1.94	117.04	32.44	0.18
P118-25-01	P118-25-01	1245.83	Max WS	226.7	66.34	72.53		72.6	0.000558	2	113.19	29.88	0.18
P118-25-01	P118-25-01	584.11	Max WS	168.99	65.88	72.35		72.37	0.000183	1.25	134.78	29.02	0.1
P118-25-01	P118-25-01	60.05	Max WS	134.21	63.5	72.3		72.31	0.000086	0.91	147.51	27.03	0.07

Alternative 2
HEC-RAS Results

HFC-RAS Plan: Ait2_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.77		75.98	0.002948	4.44	3226.21	1306.68	0.27
P118-00-00	P118-R3-2	71854.2	Max WS	6540.95	57.83	74.9		75.11	0.000434	3.97	3851.23	2035.18	0.22
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5521.06	55.05	74.49		74.66	0.000278	3.31	2292.03	447.2	0.18
P118-00-00	P118-R3-2	69527.2	Max WS	4756.47	55.28	74.29		74.4	0.000155	2.7	2844.54	520	0.14
P118-00-00	P118-R3-2	68670	Max WS	4021.57	54.88	74.12		74.27	0.000228	3.22	1966.35	309.65	0.16
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3163.16	54.47	74.1		74.19	0.000128	2.58	2080.99	369.7	0.12
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2147.84	54.14	74.1		74.15	0.00008	1.92	2127.78	365.8	0.09
P118-00-00	P118-R3-2	66869	Max WS	2907.97	53.96	73.92		74.03	0.000246	2.76	1328.99	203.17	0.16
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3069.01	53.79	73.9		73.99	0.000204	2.53	1399.58	196.12	0.15
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2403.18	53.6	73.89		73.95	0.000084	2.1	1912.85	227.52	0.1
P118-00-00	P118-R3-2	65955.8	Max WS	1955.99	53.52	73.9		73.92	0.000054	1.37	1994.54	278.2	0.08
P118-00-00	P118-R3-2	65434.6	Max WS	542.2	53.1	73.92		73.92	0.000005	0.46	1922.58	214.6	0.02
P118-00-00	P118-R3-2	64399.74	Max WS	3877.94	52.59	73.6		73.76	0.000218	3.36	1696.2	206.63	0.16
P118-00-00	P118-R3-2	64273.7	Max WS	4764.05	53.55	73.52	62.75	73.68	0.000237	3.17	1657.5	218.1	0.17
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4763.82	53.3	73.49		73.64	0.000226	3.13	1618.75	173.2	0.16
P118-00-00	P118-R3-2	64200	Max WS	4764.05	53.3	73.49		73.64	0.000226	3.13	1618.56	173.2	0.16
P118-00-00	P118-R2-2	64100	Max WS	8094.06	52.61	73.38		73.59	0.000232	3.73	2293.11	9432.87	0.17
P118-00-00	P118-R2-2	64094	Max WS	8094.01	52.61	73.38	62.23	73.59	0.000232	3.73	2292.89	9432.73	0.17
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	8094.04	52.56	73.32		73.53	0.000232	3.73	2291.37	9431.76	0.17
P118-00-00	P118-R2-2	64010.4	Max WS	8093.98	52.78	73.09	64.85	73.56	0.000568	5.65	1635.99	9409.99	0.27
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	8093.93	53.04	71.13		71.83	0.001043	6.81	1329.07	8135.32	0.35
P118-00-00	P118-R2-2	63959.7	Max WS	8093.9	53.06	71.49	62.14	71.77	0.000382	4.25	1954.32	8658.37	0.22
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	8093.93	53.16	71.39		71.68	0.000405	4.34	1911.72	8526.61	0.22
P118-00-00	P118-R2-2	63756.7	Max WS	8100.34	52.4	70.75		71.72	0.001781	8.14	1317.97	205	0.44
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	6096.32	50.35	70.29		70.84	0.00096	6.02	1189.44	185	0.32
P118-00-00	P118-R2-2	61905.2	Max WS	5987.67	50.77	69.73		70.08	0.000688	4.74	1264.23	132.2	0.27
P118-00-00	P118-R2-2	60625.3	Max WS	6511.41	49.52	69.12		69.54	0.000795	5.23	1244	121.4	0.29
P118-00-00	P118-R2-1	60595.74	Max WS	6401.37	49.48	68.18		68.82	0.000977	6.6	1076.73	131.55	0.33
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	6667.6	49.68	68.07		68.68	0.000923	6.41	1135.89	139.91	0.33
P118-00-00	P118-R2-1	60571.6*	Max WS	6919.09	49.89	67.96		68.55	0.000886	6.24	1191.77	148.28	0.32
P118-00-00	P118-R2-1	60559.5*	Max WS	7118.98	50.09	67.88		68.43	0.000844	6.04	1249.55	149.32	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	7257.35	50.3	67.82		68.33	0.000797	5.81	1312.02	151.47	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	7346.31	50.5	67.77		68.24	0.00075	5.57	1375.68	157.16	0.3
P118-00-00	P118-R2-1	60536.4*	Max WS	7356.06	50.45	67.7		68.17	0.000781	5.57	1376.81	161.22	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	7356.06	50.4	67.63		68.1	0.000805	5.55	1380.82	165.24	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	7358.42	50.35	67.57		68.03	0.000822	5.51	1388.48	169.36	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	7369.09	50.3	67.5		67.96	0.000836	5.48	1399.21	175.3	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	7379.28	50.25	67.43		67.88	0.000842	5.42	1413.52	178.16	0.31
P118-00-00	P118-R2-1	59701.1*	Max WS	7403.43	50.2	67.36		67.8	0.000845	5.37	1429.66	179.13	0.31
P118-00-00	P118-R2-1	59562.1*	Max WS	7437.01	50.15	67.29		67.72	0.000846	5.32	1446.5	180.09	0.31
P118-00-00	P118-R2-1	59423.1	Max WS	7459.83	50.1	67.2		67.64	0.000887	5.35	1461.33	181.05	0.31
P118-00-00	P118-R2-1	59307.4*	Max WS	7472.85	50.1	67.13		67.57	0.000883	5.3	1489.16	196.49	0.31
P118-00-00	P118-R2-1	59191.8*	Max WS	7472.42	50.11	67.07		67.49	0.000875	5.24	1508.25	211.94	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	7475.34	50.11	67		67.42	0.000864	5.17	1519.7	227.38	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	7482.27	50.11	66.94		67.34	0.000848	5.1	1522.54	242.82	0.31
P118-00-00	P118-R2-1	58844.9*	Max WS	7481.44	50.11	66.88		67.27	0.000832	5.03	1519.2	239.96	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	7480.85	50.12	66.82		67.2	0.00081	4.94	1529.88	221.92	0.3
P118-00-00	P118-R2-1	58613.7	Max WS	7486.48	50.12	66.76		67.13	0.000786	4.85	1549.32	217.07	0.29
P118-00-00	P118-R2-1	58463.86	Max WS	8301.15	47.59	66.53	59.77	66.92	0.000718	5.28	3439.27	2289.47	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-11.68	67.88	69.65		69.66	0.010558	-1.11	12.15	21.34	0.19
P118-21-00	P118-21-00	2493.18	Max WS	-8.76	67.95	69.73		69.74	0.002602	-0.56	19.38	31.49	0.09
P118-21-00	P118-21-00	2450.3	Max WS	-4.83	67.59	69.79		69.79	0.000004	-0.17	31.81	24.34	0.02
P118-21-00	P118-21-00	2416.26	Max WS	-3.73	67.5	69.79		69.79	0.000006	-0.12	33.26	25.7	0.02
P118-21-00	P118-21-00	2398.13	Max WS	-1.85	67.44	69.79		69.79	0.000001	-0.06	33.21	23.22	0.01
P118-21-00	P118-21-00	2389.56	Max WS	0.42	67.41	69.79		69.79	0	0.01	34.05	25.61	0
P118-21-00	P118-21-00	2343.79	Max WS	3.31	67.54	69.79		69.79	0.000007	0.18	18.49	17	0.03

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	7.15	67.47	69.79		69.79	0.000083	0.38	18.59	14.2	0.06
P118-21-00	P118-21-00	2208.42	Max WS	12.72	67.31	69.77		69.77	0.000158	0.55	23.19	17.33	0.08
P118-21-00	P118-21-00	2195.48	Max WS	12.71	67.34	69.77		69.77	0.000062	0.51	24.92	23	0.08
P118-21-00	P118-21-00	2169.49	Max WS	12.71	66.56	69.77		69.77	0.000033	0.51	25.48	13.98	0.06
P118-21-00	P118-21-00	2167.76	Max WS	12.71	66.37	69.77		69.77	0.00002	0.41	30.82	14.78	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	12.71	65.03	69.27		69.27	0.000011	0.25	50.06	32.19	0.04
P118-21-00	P118-21-00	2100.84	Max WS	12.71	64.78	69.27		69.27	0.000019	0.24	51.93	26.24	0.03
P118-21-00	P118-21-00	1662.37	Max WS	148.74	63.91	68.92		69	0.000861	2.2	74.88	45.54	0.22
P118-21-00	P118-21-00	1144.5	Max WS	-4.98	62.63	68.72		68.72	0	-0.06	88.1	23	0.01
P118-21-00	P118-21-00	595.53	Max WS	-179.36	61.49	68.71		68.72	0.000104	-0.92	196.04	47.22	0.08
P118-21-00	P118-21-00	549.31*	Max WS	-190.15	61.18	68.71		68.72	0.000099	-0.95	201.76	44.42	0.08
P118-21-00	P118-21-00	503.08*	Max WS	-201.6	60.87	68.71		68.73	0.000098	-0.99	205.17	41.62	0.08
P118-21-00	P118-21-00	456.86*	Max WS	-214.99	60.57	68.71		68.73	0.000101	-1.05	206.11	38.81	0.08
P118-21-00	P118-21-00	410.63*	Max WS	-229.69	60.26	68.71		68.73	0.000109	-1.13	204.78	36.01	0.08
P118-21-00	P118-21-00	364.41*	Max WS	-246.43	59.95	68.71		68.74	0.000122	-1.24	200.9	33.21	0.09
P118-21-00	P118-21-00	318.18*	Max WS	-262.7	59.64	68.71		68.74	0.000141	-1.36	194.78	30.43	0.09
P118-21-00	P118-21-00	271.96*	Max WS	-279.04	59.34	68.71		68.74	0.000168	-1.5	186.25	27.6	0.1
P118-21-00	P118-21-00	225.73*	Max WS	-293.91	59.03	68.7		68.75	0.000206	-1.68	175.43	24.8	0.11
P118-21-00	P118-21-00	179.51	Max WS	-304.59	58.72	68.7		68.75	0.000311	-1.88	162.35	22	0.12
P118-21-00	P118-21-00	159.41*	Max WS	-315.65	57.98	68.71		68.76	0.000276	-1.81	174.16	22.53	0.11
P118-21-00	P118-21-00	139.31*	Max WS	-304.58	57.24	68.74		68.78	0.000214	-1.63	186.68	23.06	0.1
P118-21-00	P118-21-00	119.21*	Max WS	-236.53	55.51	68.78		68.8	0.000108	-1.18	199.99	23.6	0.07
P118-21-00	P118-21-00	99.11*	Max WS	-171.62	55.77	68.8		68.81	0.000048	-0.8	213.27	24.13	0.05
P118-21-00	P118-21-00	79.01	Max WS	-106.53	55.03	68.82		68.82	0.000016	-0.47	226.65	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.23		75.23	0.000001	0.08	141.63	142.62	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.23		75.23	0.000001	0.09	126.36	151.74	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.23	70.25	75.23	0.000001	0.1	145.87	139.74	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.81	70.2	75.23		75.23	0.000002	0.1	137.09	168.27	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.23	70.16	75.23		75.23	0.000002	0.12	114.63	123.68	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.19	69.97	75.23		75.23	0.000007	0.21	103.36	155.37	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.66	69.88	75.23		75.23	0.000008	0.24	127.55	284.86	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	27.09	68.92	75.23		75.23	0.000006	0.19	384.67	692.63	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	27.09	69.39	75.23		75.23	0.000002	0.12	1003.16	1718.67	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.31	69.56	75.23		75.23	0.000013	0.26	168.47	2064.4	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.94	68.48	75.23		75.23	0.00002	0.38	153.95	2251.47	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	49.38	68.06	75.23		75.23	0.000027	0.44	112.02	2113.24	0.04
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	48.39	69.59	74.86		74.86	0.000004	0.16	1277.58	1534.45	0.02
P118-23-00	P118-23-00 R2	7313.37	Max WS	50.2	69.5	74.85		74.86	0.000029	0.43	142.84	1634.02	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	51.11	69.12	74.85		74.86	0.000028	0.42	158.04	1651.36	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	52.42	69.43	74.85		74.86	0.000004	0.17	1269.21	1695.69	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	52.4	69.34	74.85		74.85	0.000004	0.17	1438.62	1852.7	0.01
P118-23-00	P118-23-00 R2	7237.19	Max WS	55.93	69.28	74.85		74.85	0.000008	0.22	791.9	1970.18	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	121.31	68.02	74.85		74.85	0.000007	0.22	1777.92	2339.03	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	131.06	67.37	74.84		74.85	0.000041	0.56	232.11	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	35.43	67.54	73.89		73.89	0.000016	0.27	130.74	51.18	0.03
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	37.92	67.16	73.89		73.89	0.000008	0.23	161.39	45.93	0.02
P118-23-00	P118-23-00 R2	6402.43	Max WS	40.69	67.03	73.89		73.89	0.000009	0.25	159.64	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	41.96	66.97	73.88	67.68	73.89	0.00001	0.26	162.67	47.47	0.02
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	41.81	66.93	73.88		73.88	0.00001	0.25	169.7	53.43	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	42.52	66.88	73.88		73.88	0.00001	0.26	165.21	47.27	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	56.1	66.24	73.88		73.88	0.000006	0.21	268.5	68.26	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	78.25	65.7	73.87		73.87	0.000016	0.32	243.59	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	50.95	63.97	73.87		73.87	0.000004	0.23	217.5	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	50.49	63.84	73.87	64.53	73.87	0.000002	0.18	280.28	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	50.5	63.87	73.86		73.86	0.000002	0.19	273	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	56.05	63.65	73.86		73.86	0.000005	0.23	240.06	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	60.85	63.02	73.86	64.09	73.86	0.000004	0.21	289.24	46.95	0.01
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	60.79	63.16	73.86		73.86	0.000003	0.18	334.46	58.28	0.01
P118-23-00	P118-23-00 R2	4459.75	Max WS	64.95	63.55	73.86		73.86	0.000003	0.2	318.1	52.65	0.01
P118-23-00	P118-23-00 R2	4370.6	Max WS	68.22	63.42	73.86		73.86	0.000003	0.18	386	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	69	62.88	73.86		73.86	0.000001	0.09	753.76	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Alternative 2
HEC-RAS Results

HFC-RAS Plan: Alt2_50Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch B (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-23-00	P118-23-00 R2	4269.23	Max WS	69.02	63.31	73.85		73.85	0.000001	0.11	627.57	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	74.73	63.34	73.85		73.85	0.000002	0.19	402.27	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	124.63	62.41	73.84		73.85	0.000012	0.44	284.52	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	161.82	62.36	73.83		73.84	0.000013	0.48	339.56	40.27	0.03
P118-23-00	P118-23-00 R2	3150.64	Max WS	164.49	61.93	73.83	64.08	73.84	0.000011	0.42	393.76	52.14	0.03
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	164.5	61.56	73.83		73.83	0.000001	0.39	418.83	55.63	0.03
P118-23-00	P118-23-00 R2	3104.46	Max WS	166.79	61.63	73.83		73.83	0.000014	0.44	377.3	52.53	0.03
P118-23-00	P118-23-00 R2	2750.53	Max WS	201.42	60.59	73.82		73.83	0.000022	0.62	323.84	34.6	0.04
P118-23-00	P118-23-00 R2	2741.93	Max WS	202.03	60.44	73.82	62.87	73.83	0.000021	0.61	329.35	34.96	0.04
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	202.05	60.52	73.82		73.82	0.000016	0.54	377.04	42.97	0.03
P118-23-00	P118-23-00 R2	2716.57	Max WS	203.22	60.68	73.82		73.82	0.000016	0.5	407.68	52.19	0.03
P118-23-00	P118-23-00 R2	2615.37	Max WS	215.99	60.75	73.81		73.82	0.000022	0.63	342.5	37.87	0.04
P118-23-00	P118-23-00 R2	2244.98	Max WS	255.92	60.53	73.8		73.81	0.000027	0.71	358.04	35.71	0.04
P118-23-00	P118-23-00 R2	2221.06	Max WS	258.6	60.56	73.8	62.86	73.81	0.000028	0.72	357.56	36.69	0.04
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	258.58	60.59	73.78		73.79	0.000025	0.7	369.18	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	307.18	59.78	73.78		73.78	0.000002	0.58	532.67	67.27	0.04
P118-23-00	P118-23-00 R2	1922.11	Max WS	338.92	59.56	73.77		73.78	0.000021	0.6	567.38	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	357.01	59.68	73.77	63.1	73.78	0.000027	0.68	524.14	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	357	59.86	73.71		73.73	0.000057	1	356.58	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	397.63	59.87	73.71		73.72	0.000028	0.69	577.42	75.5	0.04
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	570	59.04	73.69		73.7	0.000058	1.05	544.62	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	1767.79	59.85	73.68		73.69	0.000047	1.06	5107.98	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	1782.27	59.99	73.68	65.96	73.68	0.000035	0.83	5164.77	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	1782.42	58.36	73.67		73.67	0.000028	0.8	5408.79	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	1840.22	57.88	73.67		73.67	0.000032	0.9	5370.84	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	2249.14	57.45	73.64		73.65	0.000082	1.36	4159.37	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	2723.46	57.03	73.56		73.6	0.000193	2.21	2891.22	449.67	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	3312.06	55.82	73.52	65.1	73.52	0.000015	0.53	21822.61	6598.77	0.03
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	3312.38	55.57	73.52		73.52	0.000013	0.59	22496.38	5675.65	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	3320.78	55.13	73.48		73.6	0.000246	3.11	1623.51	175.37	0.15
P118-23-00	P118-23-00 R3	58.33	Max WS	3320.38	53.78	73.4		73.62	0.000369	4.09	1160.35	83.5	0.18
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	73.75		73.75	0	0.01	3488.55	1274.25	0
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	71.29	66.69	73.75		73.75	0.000001	0.08	3345.68	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	99.42	66.66	73.75		73.75	0.000001	0.1	3395.25	1251.96	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	99.42	66.22	73.75		73.75	0.000001	0.05	4814.68	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	102.98	66.22	73.75		73.75	0.000001	0.07	4558.07	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	218.88	65.47	73.74		73.74	0.000005	0.17	3734.81	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	362.08	65.13	73.74		73.74	0.000012	0.34	3755.33	1074.84	0.03
P118-23-02	P118-23-02	2372.17	Max WS	365.5	65.16	73.74		73.74	0.000001	0.29	3909.95	1094.25	0.02
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	365.51	65.26	73.74		73.74	0.000001	0.31	4034.9	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	371.54	65.19	73.74		73.74	0.000014	0.4	3616.41	1058.12	0.03
P118-23-02	P118-23-02	1453.34	Max WS	616.41	63.69	73.72		73.72	0.000033	0.69	3491.49	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	618.88	63.66	73.72	67.9	73.72	0.000003	0.7	3572.45	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	618.88	63.56	73.71		73.71	0.000024	0.61	3898.77	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	627.81	63.36	73.71		73.71	0.000016	0.36	3769.68	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	656.55	62.91	73.71		73.71	0.000015	0.47	4136.78	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	717.49	61.86	73.71		73.71	0.000013	0.46	4821.25	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	756.01	62.56	73.71		73.71	0.000014	0.47	4916.48	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	1198.03	60.16	73.69		73.69	0.000027	0.64	4979.58	1102.12	0.04
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	74.08		74.08	0	0.05	217.13	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.08		74.08	0	0.05	217.02	37.24	0
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	49.85	66.13	74.08		74.08	0.000006	0.27	186.83	31.01	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	92.42	65.84	74.07		74.07	0.000019	0.46	200.94	33.01	0.03
P118-25-00	P118-25-00 R2	2494.17	Max WS	108.93	65.5	74.07		74.07	0.000021	0.5	219.67	35.73	0.04
P118-25-00	P118-25-00 R2	2473.31	Max WS	110.92	65.47	74.06	67.41	74.07	0.000023	0.51	217.29	35.01	0.04
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	110.9	65.47	74.06		74.07	0.000021	0.49	225.74	37.73	0.04
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Alternative 2
HEC-RAS Results

HEC-RAS Plan: Alt2_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	115.57	65.38	74.06		74.07	0.000023	0.52	223.58	35.28	0.04
P118-25-00	P118-25-00 R2	2046.09	Max WS	115.13	64.63	74.06		74.06	0.000014	0.43	268.6	40.52	0.03
P118-25-00	P118-25-00 R1	1929.3	Max WS	284.43	64.22	74.03		74.05	0.000121	1.19	238.13	39.73	0.09
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	241.81	64.03	74		74.02	0.000078	1.03	235.46	33.08	0.07
P118-25-00	P118-25-00 R1	1208.56	Max WS	192.61	63.03	73.99		74	0.000043	0.79	242.76	30.27	0.05
P118-25-00	P118-25-00 R1	1188.81	Max WS	189.08	63.01	73.99	65.6	74	0.000045	0.8	236.35	29.97	0.05
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	189.08	62.94	73.99		74	0.000047	0.81	232.47	29.45	0.05
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	186.42	62.83	73.99		73.99	0.000037	0.73	254.41	33.01	0.05
P118-25-00	P118-25-00 R1	980.2	Max WS	179.4	62.34	73.98		73.99	0.000024	0.62	290.29	35.75	0.04
P118-25-00	P118-25-00 R1	963.63	Max WS	181.4	62.25	73.98		73.99	0.000012	0.55	331.46	45.01	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	181.73	62.25	73.99	64.35	73.99	0.000011	0.4	536.3	95	0.03
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	181.73	61.68	73.96		73.96	0.000009	0.4	529	86	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	181.93	61.68	73.96		73.96	0.00001	0.53	343.08	51.01	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	181.21	61.16	73.96		73.96	0.000016	0.54	338.03	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	183.41	60.25	73.96		73.96	0.000012	0.48	385.92	44.02	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	179.13	58.25	73.95		73.96	0.000007	0.4	451.68	44.09	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	175.99	58.04	73.95		73.96	0.000007	0.38	458	44.08	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	172.67	57.84	73.95		73.96	0.000006	0.37	464.31	44.07	0.02
P118-25-00	P118-25-00 R1	185.81*	Max WS	168.98	57.63	73.95		73.96	0.000005	0.36	470.6	44.05	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	165.02	57.43	73.95		73.96	0.000005	0.35	476.87	44.04	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	160.97	57.22	73.95		73.96	0.000005	0.33	483.17	44.03	0.02
P118-25-00	P118-25-00 R1	119.80*	Max WS	156.53	57.02	73.95		73.96	0.000004	0.32	489.4	44.01	0.02
P118-25-00	P118-25-00 R1	97.8	Max WS	153.06	56.81	73.95	59.52	73.96	0.000004	0.31	495.72	44	0.02
P118-25-01	P118-25-01	5341.48	Max WS	19.28	70.47	76		76	0.000003	0.15	129	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	325.93	68.9	75.49		75.57	0.000792	2.28	142.93	42.03	0.22
P118-25-01	P118-25-01	4162.47	Max WS	335.53	69.44	75.25		75.33	0.000689	2.21	152.04	42.02	0.2
P118-25-01	P118-25-01	4134.04	Max WS	341.83	69.38	75.23	72.17	75.31	0.000688	2.21	154.98	43.02	0.2
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	341.58	69.25	75.16		75.24	0.000682	2.2	155.37	43.02	0.2
P118-25-01	P118-25-01	4047.7	Max WS	341.88	69.28	75.14		75.21	0.000669	2.2	155.31	42.03	0.2
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	339.04	67.84	74.92		74.98	0.000431	1.88	180.29	44.03	0.16
P118-25-01	P118-25-01	3312.44	Max WS	334.54	67.48	74.82		74.86	0.000335	1.64	203.46	51.15	0.15
P118-25-01	P118-25-01	3014.68	Max WS	298.83	67.53	74.75		74.78	0.000217	1.43	209.35	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	289.61	67.71	74.74		74.77	0.000193	1.35	215.05	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	216.28	66.67	74.74		74.76	0.000099	0.99	217.52	44.92	0.08
P118-25-01	P118-25-01	2728.92	Max WS	197.81	66.5	74.66		74.75	0.001495	2.46	80.45	29.03	0.26
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	194.3	66.31	74.26		74.37	0.002092	2.56	75.77	37.03	0.32
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	192.84	66.04	74.25		74.28	0.0002	1.34	144.3	30.37	0.11
P118-25-01	P118-25-01	1881.88	Max WS	164.66	66.57	74.16		74.18	0.000148	1.12	147.18	34	0.09
P118-25-01	P118-25-01	1384.48	Max WS	143.9	66.19	74.12		74.13	0.000077	0.85	168.63	35.03	0.07
P118-25-01	P118-25-01	1245.83	Max WS	142.85	66.34	74.11		74.12	0.000084	0.85	167.39	37.72	0.07
P118-25-01	P118-25-01	584.11	Max WS	88.25	65.88	74.09		74.09	0.00002	0.48	185.25	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	169.26	63.5	74.05		74.06	0.000062	0.87	194.85	27.03	0.06

Alternative 2 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	70.47	70.11	-0.36
71854.2	70.32	69.92	-0.4
70744.2	70.03	69.57	-0.46
69527.2	69.81	69.31	-0.5
68670	69.5	68.91	-0.59
68131	69.32	68.68	-0.64
67511.6	68.97	68.22	-0.75
66869	68.4	67.62	-0.78
66774	68.41	67.62	-0.79
66190	68.13	67.3	-0.83
65955.8	67.86	66.99	-0.87
65434.6	67.45	66.57	-0.88
64399.74	66.58	65.9	-0.68
64273.7	66.57	65.89	-0.68
64220.7	66.53	65.86	-0.67
64200	66.53	65.85	-0.68
64100	66.54	65.86	-0.68
64094	66.53	65.85	-0.68
64024	66.5	65.83	-0.67
64010.4	66.39	65.72	-0.67
63960.4	66.1	65.45	-0.65
63959.7	66.23	65.58	-0.65
63856.7	66.19	65.54	-0.65
63756.7	65.89	65.26	-0.63
62823.2	65.13	64.58	-0.55
61905.2	63.96	63.27	-0.69
60625.3	63.32	62.57	-0.75
60595.74	62.32	61.59	-0.73
60583.6*	62.29	61.55	-0.74
60571.6*	62.25	61.51	-0.74
60559.5*	62.22	61.48	-0.74
60547.5*	62.19	61.44	-0.75
60535.46	62.16	61.41	-0.75
60396.4*	62.09	61.34	-0.75
60257.3*	62.02	61.27	-0.75
60118.3*	61.95	61.19	-0.76
59979.2*	61.88	61.11	-0.77
59840.2*	61.81	61.03	-0.78
59701.1*	61.73	60.95	-0.78
59562.1*	61.66	60.86	-0.8
59423.1	61.59	60.79	-0.8
59307.4*	61.53	60.71	-0.82
59191.8*	61.46	60.63	-0.83
59076.2*	61.4	60.56	-0.84

Alternative 2 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	61.35	60.49	-0.86
58844.9*	61.3	60.43	-0.87
58729.3*	61.25	60.37	-0.88
58613.7	61.21	60.32	-0.89
58463.86	61.04	60.14	-0.9
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	68.85	68.85	0
2416.26	68.84	68.84	0
2398.11	68.83	68.83	0
2389.56	68.83	68.83	0
2343.79	68.78	68.78	0
2303.58	68.72	68.72	0
2208.42	68.34	68.34	0
2195.48	68.27	68.27	0
2169.49	68.24	68.24	0
2167.76	68.25	68.25	0
2135.78	66.83	66.83	0
2100.84	66.83	66.83	0
1662.37	66.34	66.34	0
1144.5	65.55	65.55	0
595.53	63.94	63.94	0
549.31*	63.75	63.75	0
503.08*	63.54	63.54	0
456.86*	63.33	63.33	0
410.63*	63.11	63.1	-0.01
364.41*	63.07	62.85	-0.22
318.18*	63.04	62.6	-0.44
271.96*	63.02	62.34	-0.68
225.73*	63.01	62.29	-0.72
179.51	62.99	62.24	-0.75
159.41*	62.99	62.23	-0.76
139.31*	62.98	62.23	-0.75
119.21*	62.98	62.22	-0.76
99.11*	62.98	62.22	-0.76
79.01	62.98	62.22	-0.76
7756.32	71.59	71.59	0
7743.32	71.59	71.59	0
7738.5	71.59	71.59	0
7733.4	71.57	71.57	0
7726.83	71.57	71.57	0
7654.51	71.54	71.54	0
7632.63	71.53	71.53	0

Alternative 2 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	71.53	71.53	0
7584.04	71.34	71.34	0
7567.5	71.33	71.33	0
7426.94	71.28	71.28	0
7369.89	71.27	71.27	0
7325.91	71.12	71.12	0
7313.37	71.15	71.15	0
7305.97	71.15	71.15	0
7294.91	71.14	71.14	0
7260.57	71.02	71.02	0
7237.19	71.01	71.01	0
6786.22	70.76	70.76	0
6723.56	70.75	70.75	0
6655.9	70.03	70.03	0
6563.37	69.82	69.82	0
6402.43	69.65	69.65	0
6356.93	69.59	69.59	0
6324.93	69.55	69.55	0
6293.27	69.51	69.51	0
5958.59	69.14	69.14	0
5652.94	68.67	68.67	0
5045.34	67.97	67.97	0
4947.92	67.93	67.93	0
4915.91	67.92	67.91	-0.01
4783.1	67.8	67.8	0
4580.38	67.67	67.64	-0.03
4553.28	67.65	67.62	-0.03
4459.75	67.58	67.53	-0.05
4370.6	67.5	67.43	-0.07
4330.88	67.51	67.45	-0.06
4269.23	67.5	67.43	-0.07
4229.24	67.49	67.41	-0.08
3733.5	67.27	67.13	-0.14
3187.46	66.98	66.69	-0.29
3150.64	66.98	66.67	-0.31
3126.39	66.95	66.61	-0.34
3104.46	66.94	66.56	-0.38
2750.51	66.87	66.33	-0.54
2741.93	66.87	66.33	-0.54
2725.96	66.87	66.33	-0.54
2716.57	66.86	66.32	-0.54
2615.37	66.85	66.3	-0.55
2244.98	66.81	66.23	-0.58
2221.06	66.81	66.23	-0.58

Alternative 2 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	66.8	66.21	-0.59
2042.36	66.79	66.19	-0.6
1922.11	66.78	66.17	-0.61
1892.63	66.77	66.16	-0.61
1863.46	66.74	66.11	-0.63
1829.45	66.74	66.11	-0.63
1611.06	66.73	66.09	-0.64
1513.84	66.69	66.03	-0.66
1454.72	66.69	66.02	-0.67
1380.55	66.68	66.02	-0.66
1354.02	66.68	66.01	-0.67
1010.56	66.66	65.99	-0.67
649.49	66.64	65.96	-0.68
242.54	66.63	65.94	-0.69
169.28	66.62	65.93	-0.69
106.82	66.62	65.93	-0.69
58.31	66.62	65.93	-0.69
4138.85	69.87	69.87	0
3790.71	69.7	69.7	0
3782.06	69.55	69.55	0
3714.78	69.57	69.57	0
3692.61	69.53	69.53	0
3049.5	68.99	68.99	0
2386.67	68.15	68.15	0
2372.17	68.13	68.13	0
2303.61	68.1	68.1	0
2278.1	68.06	68.06	0
1453.34	67.12	67.12	0
1445.67	67.12	67.12	0
1415.48	66.85	66.45	-0.4
1392.09	66.84	66.41	-0.43
1317.96	66.82	66.32	-0.5
1171.38	66.8	66.25	-0.55
1083.7	66.78	66.22	-0.56
215.24	66.71	66.06	-0.65
3232.36	68.9	68.28	-0.62
3203.12	68.9	68.26	-0.64
2930.66	68.89	68.24	-0.65
2636.62	68.88	68.2	-0.68
2494.17	68.87	68.18	-0.69
2473.31	68.87	68.18	-0.69
2465.6	68.87	68.17	-0.7
2414.49	68.87	68.17	-0.7
2046.09	68.86	68.15	-0.71

Alternative 2 - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	68.83	68.09	-0.74
1565.52	68.78	67.96	-0.82
1208.56	68.75	67.89	-0.86
1188.81	68.75	67.89	-0.86
1175.29	68.74	67.88	-0.86
1132.07	68.74	67.87	-0.87
980.2	68.73	67.86	-0.87
963.63	68.73	67.86	-0.87
950.55	68.73	67.86	-0.87
901.58	68.45	67.68	-0.77
886.91	68.45	67.68	-0.77
839.05	68.45	67.68	-0.77
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	72.33	72.33	0
4477.47	71.6	71.6	0
4162.47	71.36	71.36	0
4134.04	71.34	71.34	0
4086.12	71.31	71.31	0
4047.7	71.28	71.28	0
3617.56	71.05	71.05	0
3312.44	70.95	70.95	0
3014.68	70.87	70.87	0
2924.04	70.84	70.84	0
2763.33	70.81	70.81	0
2728.92	70.76	70.76	0
2546.4	70.75	70.75	0
2475.84	70.75	70.75	0
1881.88	70.28	70.28	0
1384.48	69.7	69.7	0
1245.83	69.52	69.52	0
584.11	68.95	68.63	-0.32
60.05	68.86	68.15	-0.71

Alternative 2 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	72.99	72.46	-0.53
71854.2	72.86	72.3	-0.56
70744.2	72.52	71.87	-0.65
69527.2	72.24	71.5	-0.74
68670	71.92	71.02	-0.9
68131	71.69	70.93	-0.76
67511.6	71.35	70.49	-0.86
66869	70.73	69.46	-1.27
66774	70.76	69.46	-1.3
66190	70.55	69.45	-1.1
65955.8	70.37	69.51	-0.86
65434.6	70.04	69.54	-0.5
64399.74	69.29	68.67	-0.62
64273.7	69.34	68.7	-0.64
64220.7	69.3	68.67	-0.63
64200	69.3	68.66	-0.64
64100	69.3	68.67	-0.63
64094	69.3	68.67	-0.63
64024	69.28	68.64	-0.64
64010.4	69.14	68.51	-0.63
63960.4	68.76	68.22	-0.54
63959.7	68.92	68.37	-0.55
63856.7	68.88	68.33	-0.55
63756.7	68.52	67.99	-0.53
62823.2	67.68	67.11	-0.57
61905.2	66.68	66.16	-0.52
60625.3	65.95	65.44	-0.51
60595.74	64.41	64.08	-0.33
60583.6*	64.38	64.06	-0.32
60571.6*	64.35	64.03	-0.32
60559.5*	64.31	63.99	-0.32
60547.5*	64.27	63.96	-0.31
60535.46	64.24	63.93	-0.31
60396.4*	64.15	63.86	-0.29
60257.3*	64.07	63.79	-0.28
60118.3*	63.99	63.72	-0.27
59979.2*	63.9	63.65	-0.25
59840.2*	63.81	63.57	-0.24
59701.1*	63.73	63.5	-0.23
59562.1*	63.64	63.43	-0.21
59423.1	63.55	63.37	-0.18
59307.4*	63.48	63.3	-0.18
59191.8*	63.41	63.25	-0.16
59076.2*	63.34	63.19	-0.15

Alternative 2 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	63.28	63.14	-0.14
58844.9*	63.22	63.1	-0.12
58729.3*	63.17	63.05	-0.12
58613.7	63.13	63.02	-0.11
58463.86	62.92	62.85	-0.07
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	69.05	69.05	0
2416.26	69.04	69.04	0
2398.11	69.04	69.04	0
2389.56	69.04	69.04	0
2343.79	69	69	0
2303.58	68.94	68.94	0
2208.42	68.71	68.71	0
2195.48	68.68	68.68	0
2169.49	68.68	68.68	0
2167.76	68.69	68.69	0
2135.78	67.76	67.76	0
2100.84	67.76	67.76	0
1662.37	67.34	67.34	0
1144.5	66.53	66.55	0.02
595.53	65.42	65.11	-0.31
549.31*	65.41	64.96	-0.45
503.08*	65.41	64.95	-0.46
456.86*	65.41	64.94	-0.47
410.63*	65.4	64.94	-0.46
364.41*	65.4	64.94	-0.46
318.18*	65.4	64.94	-0.46
271.96*	65.4	64.93	-0.47
225.73*	65.4	64.93	-0.47
179.51	65.39	64.93	-0.46
159.41*	65.39	64.93	-0.46
139.31*	65.39	64.93	-0.46
119.21*	65.39	64.93	-0.46
99.11*	65.39	64.93	-0.46
79.01	65.39	64.93	-0.46
7756.32	72.87	72.85	-0.02
7743.32	72.87	72.85	-0.02
7738.5	72.87	72.85	-0.02
7733.4	72.87	72.85	-0.02
7726.83	72.87	72.85	-0.02
7654.51	72.86	72.84	-0.02
7632.63	72.86	72.84	-0.02

Alternative 2 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	72.86	72.84	-0.02
7584.04	72.77	72.75	-0.02
7567.5	72.77	72.75	-0.02
7426.94	72.76	72.74	-0.02
7369.89	72.75	72.73	-0.02
7325.91	72.57	72.54	-0.03
7313.37	72.59	72.56	-0.03
7305.97	72.59	72.56	-0.03
7294.91	72.58	72.56	-0.02
7260.57	72.4	72.37	-0.03
7237.19	72.4	72.37	-0.03
6786.22	72.31	72.28	-0.03
6723.56	72.31	72.28	-0.03
6655.9	71.13	71.07	-0.06
6563.37	71.04	70.97	-0.07
6402.43	70.93	70.85	-0.08
6356.93	70.89	70.8	-0.09
6324.93	70.87	70.78	-0.09
6293.27	70.85	70.75	-0.1
5958.59	70.66	70.52	-0.14
5652.94	70.48	70.23	-0.25
5045.34	70.45	69.99	-0.46
4947.92	70.45	69.98	-0.47
4915.91	70.44	69.97	-0.47
4783.1	70.43	69.96	-0.47
4580.38	70.43	69.95	-0.48
4553.28	70.42	69.95	-0.47
4459.75	70.41	69.94	-0.47
4370.6	70.41	69.94	-0.47
4330.88	70.41	69.94	-0.47
4269.23	70.4	69.93	-0.47
4229.24	70.4	69.92	-0.48
3733.5	70.38	69.9	-0.48
3187.46	70.23	69.72	-0.51
3150.64	70.22	69.71	-0.51
3126.39	70.21	69.68	-0.53
3104.46	70.19	69.66	-0.53
2750.51	70.07	69.5	-0.57
2741.93	70.07	69.5	-0.57
2725.96	70.07	69.5	-0.57
2716.57	70.07	69.49	-0.58
2615.37	70.04	69.46	-0.58
2244.98	69.96	69.37	-0.59
2221.06	69.96	69.36	-0.6

Alternative 2 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	69.93	69.34	-0.59
2042.36	69.91	69.31	-0.6
1922.11	69.89	69.29	-0.6
1892.63	69.88	69.28	-0.6
1863.46	69.77	69.18	-0.59
1829.45	69.78	69.19	-0.59
1611.06	69.73	69.14	-0.59
1513.84	69.66	69.06	-0.6
1454.72	69.67	69.07	-0.6
1380.55	69.64	69.01	-0.63
1354.02	69.64	69.01	-0.63
1010.56	69.6	68.94	-0.66
649.49	69.51	68.85	-0.66
242.54	69.45	68.8	-0.65
169.28	69.42	68.77	-0.65
106.82	69.41	68.77	-0.64
58.31	69.41	68.76	-0.65
4138.85	70.9	70.87	-0.03
3790.71	70.82	70.79	-0.03
3782.06	70.75	70.7	-0.05
3714.78	70.74	70.69	-0.05
3692.61	70.72	70.67	-0.05
3049.5	70.27	70.12	-0.15
2386.67	69.78	69.3	-0.48
2372.17	69.78	69.3	-0.48
2303.61	69.77	69.24	-0.53
2278.1	69.77	69.21	-0.56
1453.34	69.73	69.14	-0.59
1445.67	69.73	69.14	-0.59
1415.48	69.72	69.13	-0.59
1392.09	69.72	69.13	-0.59
1317.96	69.72	69.13	-0.59
1171.38	69.72	69.13	-0.59
1083.7	69.72	69.13	-0.59
215.24	69.71	69.11	-0.6
3232.36	70.8	69.8	-1
3203.12	70.8	69.8	-1
2930.66	70.8	69.8	-1
2636.62	70.8	69.78	-1.02
2494.17	70.8	69.77	-1.03
2473.31	70.8	69.77	-1.03
2465.6	70.8	69.77	-1.03
2414.49	70.79	69.77	-1.02
2046.09	70.8	69.76	-1.04

Alternative 2 - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	70.8	69.67	-1.13
1565.52	70.78	69.61	-1.17
1208.56	70.77	69.57	-1.2
1188.81	70.77	69.57	-1.2
1175.29	70.76	69.56	-1.2
1132.07	70.76	69.56	-1.2
980.2	70.76	69.55	-1.21
963.63	70.76	69.55	-1.21
950.55	70.76	69.55	-1.21
901.58	70.75	69.54	-1.21
886.91	70.75	69.54	-1.21
839.05	70.75	69.54	-1.21
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	73.19	73.19	0
4477.47	72.74	72.74	0
4162.47	72.62	72.61	-0.01
4134.04	72.61	72.6	-0.01
4086.12	72.59	72.58	-0.01
4047.7	72.58	72.56	-0.02
3617.56	72.46	72.44	-0.02
3312.44	72.39	72.37	-0.02
3014.68	72.33	72.31	-0.02
2924.04	72.32	72.3	-0.02
2763.33	72.29	72.27	-0.02
2728.92	72.21	72.18	-0.03
2546.4	72.03	72.01	-0.02
2475.84	72.06	72.04	-0.02
1881.88	71.57	71.51	-0.06
1384.48	71.07	70.97	-0.1
1245.83	70.95	70.81	-0.14
584.11	70.84	70.13	-0.71
60.05	70.8	69.74	-1.06

Alternative 2 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.29	73.78	-0.51
71854.2	73.71	73.4	-0.31
70744.2	73.31	72.94	-0.37
69527.2	73.02	72.56	-0.46
68670	72.7	72.08	-0.62
68131	72.46	72.03	-0.43
67511.6	72.2	72.02	-0.18
66869	71.72	71.33	-0.39
66774	71.75	71.27	-0.48
66190	71.61	71.26	-0.35
65955.8	71.53	71.3	-0.23
65434.6	71.38	71.35	-0.03
64399.74	70.75	70.7	-0.05
64273.7	70.79	70.68	-0.11
64220.7	70.76	70.66	-0.1
64200	70.76	70.65	-0.11
64100	70.74	70.64	-0.1
64094	70.74	70.64	-0.1
64024	70.71	70.61	-0.1
64010.4	70.55	70.45	-0.1
63960.4	69.79	69.72	-0.07
63959.7	70	69.93	-0.07
63856.7	69.94	69.87	-0.07
63756.7	69.53	69.46	-0.07
62823.2	68.92	68.84	-0.08
61905.2	68.13	68.04	-0.09
60625.3	67.49	67.4	-0.09
60595.74	66.32	66.19	-0.13
60583.6*	66.25	66.14	-0.11
60571.6*	66.21	66.1	-0.11
60559.5*	66.17	66.07	-0.1
60547.5*	66.13	66.03	-0.1
60535.46	66.09	66	-0.09
60396.4*	66.02	65.92	-0.1
60257.3*	65.94	65.85	-0.09
60118.3*	65.87	65.77	-0.1
59979.2*	65.79	65.69	-0.1
59840.2*	65.71	65.61	-0.1
59701.1*	65.63	65.53	-0.1
59562.1*	65.56	65.45	-0.11
59423.1	65.47	65.37	-0.1
59307.4*	65.39	65.29	-0.1
59191.8*	65.32	65.22	-0.1
59076.2*	65.25	65.15	-0.1

Alternative 2 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.18	65.09	-0.09
58844.9*	65.13	65.04	-0.09
58729.3*	65.08	64.99	-0.09
58613.7	65.05	64.96	-0.09
58463.86	64.84	64.76	-0.08
3067.74	71.6	71.6	0
2499.4	69.46	69.47	0.01
2493.18	69.48	69.49	0.01
2450.1	69.5	69.51	0.01
2416.26	69.5	69.51	0.01
2398.11	69.5	69.5	0
2389.56	69.49	69.5	0.01
2343.79	69.48	69.49	0.01
2303.58	69.46	69.47	0.01
2208.42	69.4	69.42	0.02
2195.48	69.4	69.41	0.01
2169.49	69.4	69.41	0.01
2167.76	69.4	69.41	0.01
2135.78	68.55	68.57	0.02
2100.84	68.55	68.57	0.02
1662.37	68.21	68.25	0.04
1144.5	67.57	67.63	0.06
595.53	67.06	66.9	-0.16
549.31*	67.06	66.9	-0.16
503.08*	67.06	66.9	-0.16
456.86*	67.06	66.9	-0.16
410.63*	67.06	66.89	-0.17
364.41*	67.06	66.89	-0.17
318.18*	67.05	66.89	-0.16
271.96*	67.05	66.89	-0.16
225.73*	67.05	66.89	-0.16
179.51	67.05	66.89	-0.16
159.41*	67.05	66.89	-0.16
139.31*	67.06	66.9	-0.16
119.21*	67.08	66.93	-0.15
99.11*	67.11	66.97	-0.14
79.01	67.16	67.02	-0.14
7756.32	74.17	74.15	-0.02
7743.32	74.17	74.15	-0.02
7738.5	74.17	74.15	-0.02
7733.4	74.17	74.15	-0.02
7726.83	74.17	74.15	-0.02
7654.51	74.16	74.15	-0.01
7632.63	74.16	74.15	-0.01

Alternative 2 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.16	74.15	-0.01
7584.04	74.08	74.06	-0.02
7567.5	74.08	74.06	-0.02
7426.94	74.07	74.05	-0.02
7369.89	74.07	74.05	-0.02
7325.91	73.83	73.81	-0.02
7313.37	73.85	73.82	-0.03
7305.97	73.84	73.82	-0.02
7294.91	73.84	73.82	-0.02
7260.57	73.59	73.56	-0.03
7237.19	73.59	73.56	-0.03
6786.22	73.56	73.53	-0.03
6723.56	73.55	73.53	-0.02
6655.9	71.9	71.84	-0.06
6563.37	71.84	71.79	-0.05
6402.43	71.76	71.7	-0.06
6356.93	71.73	71.67	-0.06
6324.93	71.71	71.65	-0.06
6293.27	71.7	71.63	-0.07
5958.59	71.61	71.47	-0.14
5652.94	71.59	71.36	-0.23
5045.34	71.58	71.34	-0.24
4947.92	71.58	71.34	-0.24
4915.91	71.57	71.33	-0.24
4783.1	71.56	71.32	-0.24
4580.38	71.55	71.31	-0.24
4553.28	71.53	71.29	-0.24
4459.75	71.53	71.29	-0.24
4370.6	71.52	71.28	-0.24
4330.88	71.52	71.28	-0.24
4269.23	71.49	71.25	-0.24
4229.24	71.49	71.25	-0.24
3733.5	71.45	71.22	-0.23
3187.46	71.41	71.18	-0.23
3150.64	71.41	71.18	-0.23
3126.39	71.4	71.17	-0.23
3104.46	71.4	71.17	-0.23
2750.51	71.35	71.14	-0.21
2741.93	71.35	71.14	-0.21
2725.96	71.33	71.12	-0.21
2716.57	71.33	71.12	-0.21
2615.37	71.31	71.11	-0.2
2244.98	71.28	71.08	-0.2
2221.06	71.27	71.08	-0.19

Alternative 2 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.25	71.06	-0.19
2042.36	71.25	71.06	-0.19
1922.11	71.24	71.05	-0.19
1892.63	71.24	71.05	-0.19
1863.46	71.14	70.98	-0.16
1829.45	71.14	70.98	-0.16
1611.06	71.11	70.96	-0.15
1513.84	71.09	70.94	-0.15
1454.72	71.08	70.94	-0.14
1380.55	71.07	70.93	-0.14
1354.02	71.07	70.93	-0.14
1010.56	71.03	70.9	-0.13
649.49	70.95	70.84	-0.11
242.54	70.91	70.8	-0.11
169.28	70.88	70.78	-0.1
106.82	70.86	70.76	-0.1
58.31	70.85	70.75	-0.1
4138.85	71.49	71.48	-0.01
3790.71	71.43	71.43	0
3782.06	71.41	71.41	0
3714.78	71.41	71.41	0
3692.61	71.39	71.38	-0.01
3049.5	71.2	71.01	-0.19
2386.67	71.19	71.01	-0.18
2372.17	71.19	71.01	-0.18
2303.61	71.18	71	-0.18
2278.1	71.18	71	-0.18
1453.34	71.16	70.98	-0.18
1445.67	71.16	70.98	-0.18
1415.48	71.15	70.98	-0.17
1392.09	71.15	70.98	-0.17
1317.96	71.15	70.98	-0.17
1171.38	71.14	70.98	-0.16
1083.7	71.14	70.97	-0.17
215.24	71.11	70.95	-0.16
3232.36	71.92	71.78	-0.14
3203.12	71.92	71.78	-0.14
2930.66	71.91	71.77	-0.14
2636.62	71.9	71.75	-0.15
2494.17	71.89	71.73	-0.16
2473.31	71.89	71.73	-0.16
2465.6	71.88	71.73	-0.15
2414.49	71.88	71.73	-0.15
2046.09	71.87	71.71	-0.16

Alternative 2 - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	71.82	71.64	-0.18
1565.52	71.73	71.51	-0.22
1208.56	71.73	71.49	-0.24
1188.81	71.73	71.49	-0.24
1175.29	71.72	71.47	-0.25
1132.07	71.72	71.47	-0.25
980.2	71.71	71.45	-0.26
963.63	71.71	71.45	-0.26
950.55	71.71	71.45	-0.26
901.58	71.71	71.43	-0.28
886.91	71.71	71.43	-0.28
839.05	71.71	71.42	-0.29
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	74.69	74.69	0
4477.47	74.36	74.36	0
4162.47	74.19	74.18	-0.01
4134.04	74.17	74.17	0
4086.12	74.12	74.11	-0.01
4047.7	74.1	74.1	0
3617.56	73.93	73.92	-0.01
3312.44	73.85	73.84	-0.01
3014.68	73.78	73.77	-0.01
2924.04	73.76	73.75	-0.01
2763.33	73.74	73.73	-0.01
2728.92	73.6	73.58	-0.02
2546.4	72.89	72.87	-0.02
2475.84	72.97	72.94	-0.03
1881.88	72.58	72.52	-0.06
1384.48	72.25	72.16	-0.09
1245.83	72.16	72.06	-0.1
584.11	71.93	71.79	-0.14
60.05	71.86	71.7	-0.16

Alternative 2 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.68	74.31	-0.37
71854.2	73.97	73.68	-0.29
70744.2	73.57	73.22	-0.35
69527.2	73.28	72.84	-0.44
68670	72.98	72.4	-0.58
68131	72.77	72.35	-0.42
67511.6	72.57	72.36	-0.21
66869	72.25	71.91	-0.34
66774	72.25	71.86	-0.39
66190	72.15	71.84	-0.31
65955.8	72.1	71.88	-0.22
65434.6	72	71.91	-0.09
64399.74	71.42	71.37	-0.05
64273.7	71.45	71.32	-0.13
64220.7	71.43	71.29	-0.14
64200	71.43	71.29	-0.14
64100	71.39	71.27	-0.12
64094	71.39	71.26	-0.13
64024	71.36	71.24	-0.12
64010.4	71.18	71.05	-0.13
63960.4	70.18	70.11	-0.07
63959.7	70.42	70.35	-0.07
63856.7	70.35	70.28	-0.07
63756.7	69.89	69.82	-0.07
62823.2	69.32	69.25	-0.07
61905.2	68.6	68.51	-0.09
60625.3	67.96	67.87	-0.09
60595.74	66.83	66.73	-0.1
60583.6*	66.73	66.64	-0.09
60571.6*	66.67	66.58	-0.09
60559.5*	66.63	66.54	-0.09
60547.5*	66.58	66.5	-0.08
60535.46	66.54	66.45	-0.09
60396.4*	66.46	66.38	-0.08
60257.3*	66.39	66.3	-0.09
60118.3*	66.31	66.22	-0.09
59979.2*	66.23	66.15	-0.08
59840.2*	66.16	66.07	-0.09
59701.1*	66.08	65.99	-0.09
59562.1*	66	65.91	-0.09
59423.1	65.91	65.83	-0.08
59307.4*	65.83	65.75	-0.08
59191.8*	65.75	65.67	-0.08
59076.2*	65.68	65.59	-0.09

Alternative 2 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.6	65.52	-0.08
58844.9*	65.53	65.45	-0.08
58729.3*	65.47	65.4	-0.07
58613.7	65.43	65.35	-0.08
58463.86	65.18	65.12	-0.06
3067.74	71.6	71.6	0
2499.4	69.55	69.56	0.01
2493.18	69.6	69.6	0
2450.1	69.64	69.64	0
2416.26	69.64	69.64	0
2398.11	69.64	69.64	0
2389.56	69.64	69.64	0
2343.79	69.63	69.63	0
2303.58	69.62	69.62	0
2208.42	69.58	69.58	0
2195.48	69.58	69.58	0
2169.49	69.58	69.58	0
2167.76	69.58	69.58	0
2135.78	68.82	68.83	0.01
2100.84	68.82	68.83	0.01
1662.37	68.49	68.51	0.02
1144.5	67.8	67.84	0.04
595.53	67.49	67.42	-0.07
549.31*	67.49	67.41	-0.08
503.08*	67.48	67.41	-0.07
456.86*	67.48	67.41	-0.07
410.63*	67.48	67.41	-0.07
364.41*	67.48	67.41	-0.07
318.18*	67.48	67.41	-0.07
271.96*	67.48	67.41	-0.07
225.73*	67.47	67.4	-0.07
179.51	67.47	67.4	-0.07
159.41*	67.47	67.4	-0.07
139.31*	67.49	67.42	-0.07
119.21*	67.51	67.44	-0.07
99.11*	67.55	67.48	-0.07
79.01	67.61	67.54	-0.07
7756.32	74.56	74.55	-0.01
7743.32	74.56	74.55	-0.01
7738.5	74.56	74.55	-0.01
7733.4	74.56	74.55	-0.01
7726.83	74.56	74.55	-0.01
7654.51	74.55	74.55	0
7632.63	74.55	74.55	0

Alternative 2 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.55	74.55	0
7584.04	74.53	74.52	-0.01
7567.5	74.53	74.52	-0.01
7426.94	74.53	74.52	-0.01
7369.89	74.52	74.52	0
7325.91	74.27	74.26	-0.01
7313.37	74.27	74.26	-0.01
7305.97	74.27	74.26	-0.01
7294.91	74.27	74.26	-0.01
7260.57	73.98	73.97	-0.01
7237.19	73.98	73.97	-0.01
6786.22	73.97	73.95	-0.02
6723.56	73.96	73.95	-0.01
6655.9	72.2	72.1	-0.1
6563.37	72.17	72.05	-0.12
6402.43	72.15	71.98	-0.17
6356.93	72.14	71.95	-0.19
6324.93	72.12	71.93	-0.19
6293.27	72.12	71.91	-0.21
5958.59	72.11	71.86	-0.25
5652.94	72.1	71.85	-0.25
5045.34	72.09	71.84	-0.25
4947.92	72.09	71.84	-0.25
4915.91	72.09	71.84	-0.25
4783.1	72.08	71.83	-0.25
4580.38	72.08	71.83	-0.25
4553.28	72.07	71.82	-0.25
4459.75	72.07	71.82	-0.25
4370.6	72.07	71.82	-0.25
4330.88	72.07	71.82	-0.25
4269.23	72.06	71.81	-0.25
4229.24	72.06	71.81	-0.25
3733.5	72.04	71.79	-0.25
3187.46	72.01	71.77	-0.24
3150.64	72.01	71.77	-0.24
3126.39	72	71.77	-0.23
3104.46	72	71.76	-0.24
2750.51	71.96	71.74	-0.22
2741.93	71.96	71.74	-0.22
2725.96	71.96	71.73	-0.23
2716.57	71.96	71.73	-0.23
2615.37	71.94	71.72	-0.22
2244.98	71.92	71.71	-0.21
2221.06	71.92	71.71	-0.21

Alternative 2 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.89	71.69	-0.2
2042.36	71.89	71.69	-0.2
1922.11	71.89	71.68	-0.21
1892.63	71.89	71.68	-0.21
1863.46	71.79	71.61	-0.18
1829.45	71.79	71.61	-0.18
1611.06	71.77	71.59	-0.18
1513.84	71.75	71.58	-0.17
1454.72	71.74	71.58	-0.16
1380.55	71.73	71.56	-0.17
1354.02	71.73	71.56	-0.17
1010.56	71.69	71.53	-0.16
649.49	71.61	71.47	-0.14
242.54	71.56	71.43	-0.13
169.28	71.54	71.41	-0.13
106.82	71.51	71.39	-0.12
58.31	71.48	71.37	-0.11
4138.85	71.87	71.66	-0.21
3790.71	71.87	71.66	-0.21
3782.06	71.86	71.66	-0.2
3714.78	71.86	71.66	-0.2
3692.61	71.86	71.66	-0.2
3049.5	71.86	71.66	-0.2
2386.67	71.86	71.65	-0.21
2372.17	71.86	71.65	-0.21
2303.61	71.84	71.64	-0.2
2278.1	71.84	71.64	-0.2
1453.34	71.81	71.62	-0.19
1445.67	71.81	71.62	-0.19
1415.48	71.81	71.62	-0.19
1392.09	71.81	71.62	-0.19
1317.96	71.8	71.61	-0.19
1171.38	71.8	71.61	-0.19
1083.7	71.8	71.61	-0.19
215.24	71.76	71.59	-0.17
3232.36	72.52	72.4	-0.12
3203.12	72.52	72.4	-0.12
2930.66	72.51	72.39	-0.12
2636.62	72.49	72.36	-0.13
2494.17	72.48	72.34	-0.14
2473.31	72.48	72.34	-0.14
2465.6	72.47	72.33	-0.14
2414.49	72.47	72.33	-0.14
2046.09	72.44	72.3	-0.14

Alternative 2 - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	72.39	72.23	-0.16
1565.52	72.33	72.13	-0.2
1208.56	72.31	72.09	-0.22
1188.81	72.31	72.09	-0.22
1175.29	72.3	72.08	-0.22
1132.07	72.3	72.08	-0.22
980.2	72.29	72.05	-0.24
963.63	72.29	72.05	-0.24
950.55	72.29	72.05	-0.24
901.58	72.27	72.02	-0.25
886.91	72.27	72.01	-0.26
839.05	72.27	72	-0.27
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	75.27	75.27	0
4477.47	74.9	74.9	0
4162.47	74.71	74.71	0
4134.04	74.69	74.69	0
4086.12	74.64	74.63	-0.01
4047.7	74.62	74.61	-0.01
3617.56	74.43	74.42	-0.01
3312.44	74.33	74.32	-0.01
3014.68	74.26	74.25	-0.01
2924.04	74.24	74.23	-0.01
2763.33	74.23	74.22	-0.01
2728.92	74.05	74.03	-0.02
2546.4	73.23	73.18	-0.05
2475.84	73.32	73.28	-0.04
1881.88	72.98	72.91	-0.07
1384.48	72.71	72.62	-0.09
1245.83	72.64	72.53	-0.11
584.11	72.48	72.35	-0.13
60.05	72.44	72.3	-0.14

Alternative 2 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	75.9	75.77	-0.13
71854.2	75.11	74.9	-0.21
70744.2	74.75	74.49	-0.26
69527.2	74.57	74.29	-0.28
68670	74.43	74.12	-0.31
68131	74.37	74.1	-0.27
67511.6	74.3	74.1	-0.2
66869	74.18	73.92	-0.26
66774	74.18	73.9	-0.28
66190	74.12	73.89	-0.23
65955.8	74.11	73.9	-0.21
65434.6	74.06	73.92	-0.14
64399.74	73.71	73.6	-0.11
64273.7	73.7	73.52	-0.18
64220.7	73.67	73.49	-0.18
64200	73.66	73.49	-0.17
64100	73.54	73.38	-0.16
64094	73.54	73.38	-0.16
64024	73.47	73.32	-0.15
64010.4	73.24	73.09	-0.15
63960.4	71.18	71.13	-0.05
63959.7	71.54	71.49	-0.05
63856.7	71.44	71.39	-0.05
63756.7	70.79	70.75	-0.04
62823.2	70.33	70.29	-0.04
61905.2	69.78	69.73	-0.05
60625.3	69.17	69.12	-0.05
60595.74	68.23	68.18	-0.05
60583.6*	68.12	68.07	-0.05
60571.6*	68.01	67.96	-0.05
60559.5*	67.93	67.88	-0.05
60547.5*	67.87	67.82	-0.05
60535.46	67.82	67.77	-0.05
60396.4*	67.75	67.7	-0.05
60257.3*	67.68	67.63	-0.05
60118.3*	67.62	67.57	-0.05
59979.2*	67.55	67.5	-0.05
59840.2*	67.48	67.43	-0.05
59701.1*	67.41	67.36	-0.05
59562.1*	67.34	67.29	-0.05
59423.1	67.25	67.2	-0.05
59307.4*	67.18	67.13	-0.05
59191.8*	67.11	67.07	-0.04
59076.2*	67.05	67	-0.05

Alternative 2 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	66.98	66.94	-0.04
58844.9*	66.92	66.88	-0.04
58729.3*	66.86	66.82	-0.04
58613.7	66.81	66.76	-0.05
58463.86	66.6	66.53	-0.07
3067.74	71.6	71.6	0
2499.4	69.65	69.65	0
2493.18	69.73	69.73	0
2450.1	69.79	69.79	0
2416.26	69.79	69.79	0
2398.11	69.79	69.79	0
2389.56	69.79	69.79	0
2343.79	69.79	69.79	0
2303.58	69.79	69.79	0
2208.42	69.77	69.77	0
2195.48	69.77	69.77	0
2169.49	69.77	69.77	0
2167.76	69.77	69.77	0
2135.78	69.27	69.27	0
2100.84	69.27	69.27	0
1662.37	68.92	68.92	0
1144.5	68.77	68.72	-0.05
595.53	68.76	68.71	-0.05
549.31*	68.76	68.71	-0.05
503.08*	68.76	68.71	-0.05
456.86*	68.77	68.71	-0.06
410.63*	68.76	68.71	-0.05
364.41*	68.76	68.71	-0.05
318.18*	68.76	68.71	-0.05
271.96*	68.76	68.71	-0.05
225.73*	68.75	68.7	-0.05
179.51	68.75	68.7	-0.05
159.41*	68.76	68.71	-0.05
139.31*	68.79	68.74	-0.05
119.21*	68.83	68.78	-0.05
99.11*	68.86	68.8	-0.06
79.01	68.87	68.82	-0.05
7756.32	75.24	75.23	-0.01
7743.32	75.24	75.23	-0.01
7738.5	75.24	75.23	-0.01
7733.4	75.24	75.23	-0.01
7726.83	75.24	75.23	-0.01
7654.51	75.24	75.23	-0.01
7632.63	75.24	75.23	-0.01

Alternative 2 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	75.24	75.23	-0.01
7584.04	75.24	75.23	-0.01
7567.5	75.24	75.23	-0.01
7426.94	75.23	75.23	0
7369.89	75.23	75.23	0
7325.91	74.86	74.86	0
7313.37	74.86	74.85	-0.01
7305.97	74.86	74.85	-0.01
7294.91	74.86	74.85	-0.01
7260.57	74.86	74.85	-0.01
7237.19	74.86	74.85	-0.01
6786.22	74.86	74.85	-0.01
6723.56	74.85	74.84	-0.01
6655.9	74.1	73.89	-0.21
6563.37	74.1	73.89	-0.21
6402.43	74.1	73.89	-0.21
6356.93	74.1	73.88	-0.22
6324.93	74.09	73.88	-0.21
6293.27	74.09	73.88	-0.21
5958.59	74.09	73.88	-0.21
5652.94	74.08	73.87	-0.21
5045.34	74.08	73.87	-0.21
4947.92	74.08	73.87	-0.21
4915.91	74.07	73.86	-0.21
4783.1	74.07	73.86	-0.21
4580.38	74.07	73.86	-0.21
4553.28	74.07	73.86	-0.21
4459.75	74.07	73.86	-0.21
4370.6	74.07	73.86	-0.21
4330.88	74.07	73.86	-0.21
4269.23	74.06	73.85	-0.21
4229.24	74.06	73.85	-0.21
3733.5	74.05	73.84	-0.21
3187.46	74.04	73.83	-0.21
3150.64	74.04	73.83	-0.21
3126.39	74.04	73.83	-0.21
3104.46	74.04	73.83	-0.21
2750.51	74.02	73.82	-0.2
2741.93	74.02	73.82	-0.2
2725.96	74.02	73.82	-0.2
2716.57	74.02	73.82	-0.2
2615.37	74.01	73.81	-0.2
2244.98	73.99	73.8	-0.19
2221.06	73.99	73.8	-0.19

Alternative 2 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	73.98	73.78	-0.2
2042.36	73.97	73.78	-0.19
1922.11	73.97	73.77	-0.2
1892.63	73.96	73.77	-0.19
1863.46	73.89	73.71	-0.18
1829.45	73.9	73.71	-0.19
1611.06	73.87	73.69	-0.18
1513.84	73.86	73.68	-0.18
1454.72	73.86	73.68	-0.18
1380.55	73.85	73.67	-0.18
1354.02	73.84	73.67	-0.17
1010.56	73.81	73.64	-0.17
649.49	73.72	73.56	-0.16
242.54	73.68	73.52	-0.16
169.28	73.67	73.52	-0.15
106.82	73.63	73.48	-0.15
58.31	73.53	73.4	-0.13
4138.85	73.94	73.75	-0.19
3790.71	73.94	73.75	-0.19
3782.06	73.94	73.75	-0.19
3714.78	73.94	73.75	-0.19
3692.61	73.94	73.75	-0.19
3049.5	73.94	73.74	-0.2
2386.67	73.93	73.74	-0.19
2372.17	73.93	73.74	-0.19
2303.61	73.93	73.74	-0.19
2278.1	73.93	73.74	-0.19
1453.34	73.91	73.72	-0.19
1445.67	73.91	73.72	-0.19
1415.48	73.9	73.71	-0.19
1392.09	73.9	73.71	-0.19
1317.96	73.9	73.71	-0.19
1171.38	73.89	73.71	-0.18
1083.7	73.89	73.71	-0.18
215.24	73.87	73.69	-0.18
3232.36	74.3	74.08	-0.22
3203.12	74.3	74.08	-0.22
2930.66	74.3	74.08	-0.22
2636.62	74.29	74.07	-0.22
2494.17	74.29	74.07	-0.22
2473.31	74.29	74.06	-0.23
2465.6	74.29	74.06	-0.23
2414.49	74.29	74.06	-0.23
2046.09	74.28	74.06	-0.22

Alternative 2 - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 2	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	74.26	74.03	-0.23
1565.52	74.24	74	-0.24
1208.56	74.23	73.99	-0.24
1188.81	74.23	73.99	-0.24
1175.29	74.23	73.99	-0.24
1132.07	74.23	73.99	-0.24
980.2	74.23	73.98	-0.25
963.63	74.23	73.98	-0.25
950.55	74.23	73.99	-0.24
901.58	74.21	73.96	-0.25
886.91	74.21	73.96	-0.25
839.05	74.21	73.96	-0.25
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	76	76	0
4477.47	75.5	75.49	-0.01
4162.47	75.27	75.25	-0.02
4134.04	75.25	75.23	-0.02
4086.12	75.18	75.16	-0.02
4047.7	75.16	75.14	-0.02
3617.56	74.96	74.92	-0.04
3312.44	74.87	74.82	-0.05
3014.68	74.81	74.75	-0.06
2924.04	74.8	74.74	-0.06
2763.33	74.8	74.74	-0.06
2728.92	74.73	74.66	-0.07
2546.4	74.44	74.26	-0.18
2475.84	74.44	74.25	-0.19
1881.88	74.37	74.16	-0.21
1384.48	74.34	74.12	-0.22
1245.83	74.33	74.11	-0.22
584.11	74.31	74.09	-0.22
60.05	74.28	74.05	-0.23

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	2191.64	58.25	70.3		70.55	0.000678	4.01	545.98	72.62	0.26
P118-00-00	P118-R3-2	71854.2	Max WS	2186.78	57.83	70.14		70.25	0.000391	2.73	801.71	129.37	0.19
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	2212.24	55.05	69.82		69.91	0.000232	2.4	921.15	121.04	0.15
P118-00-00	P118-R3-2	69527.2	Max WS	2208.9	55.28	69.58		69.66	0.00018	2.23	992.47	123.1	0.14
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	2206.5	54.88	69.24		69.4	0.000438	3.27	696.81	109.87	0.21
P118-00-00	P118-R3-2	68133	Max WS	2205.43	54.47	69.04		69.2	0.000359	3.17	695.32	83.81	0.19
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2238.91	54.14	68.63		68.89	0.000626	4.03	563.33	127.51	0.25
P118-00-00	P118-R3-2	66869	Max WS	2199	53.96	68.01		68.35	0.001077	4.69	468.91	69.27	0.32
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2262.62	53.79	68.02		68.25	0.000654	3.9	580.64	78.06	0.25
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2262.02	53.6	67.7		67.95	0.000624	4.02	613.18	91.88	0.25
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2261.87	53.52	67.4		67.68	0.000899	4.3	525.93	75.7	0.29
P118-00-00	P118-R3-2	65434.6	Max WS	2261.7	53.1	66.94		67.23	0.000841	4.37	517.97	67.59	0.28
P118-00-00	P118-R3-2	64399.74	Max WS	2133.07	52.59	66.18		66.46	0.000725	4.25	501.99	60.19	0.26
P118-00-00	P118-R3-2	64273.7	Max WS	2133.06	53.55	66.17	59.55	66.38	0.000712	3.66	582.04	94.52	0.26
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	2133.06	53.3	66.13		66.32	0.000663	3.54	602.49	97.88	0.25
P118-00-00	P118-R3-2	64200	Max WS	2133.07	53.3	66.13		66.32	0.000664	3.54	602.14	97.82	0.25
P118-00-00	P118-R2-2	64100	Max WS	2312.9	52.61	66.13		66.2	0.000179	2.17	1065.97	138.66	0.14
P118-00-00	P118-R2-2	64094	Max WS	2312.9	52.61	66.13	58.26	66.2	0.000179	2.17	1065.85	138.66	0.14
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	2312.9	52.56	66.1		66.17	0.000177	2.16	1068.78	138.84	0.14
P118-00-00	P118-R2-2	64010.4	Max WS	2312.9	52.78	65.99	59.39	66.17	0.000555	3.46	672.24	116.89	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	2301.29	53.04	65.72		65.93	0.000683	3.73	616.81	101.36	0.26
P118-00-00	P118-R2-2	63959.7	Max WS	2301.42	53.06	65.84	58.23	65.92	0.000183	2.18	1054.33	137.62	0.14
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	2301.42	53.16	65.8		65.88	0.000193	2.23	1032.14	136.02	0.14
P118-00-00	P118-R2-2	63756.7	Max WS	2311.47	52.4	65.52		65.85	0.000949	4.66	496.47	65.59	0.3
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	2373.43	50.35	64.81		65.11	0.000706	4.4	540	62.11	0.26
P118-00-00	P118-R2-2	61905.2	Max WS	2495.63	50.77	63.57		63.94	0.001769	4.93	505.84	103.68	0.39
P118-00-00	P118-R2-2	60625.3	Max WS	2494.98	49.52	62.9		63.17	0.000659	4.21	592.09	71.77	0.26
P118-00-00	P118-R2-1	60595.74	Max WS	2542.33	49.48	61.91		62.39	0.001266	5.51	461.67	59.39	0.35
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2542.2	49.68	61.88		62.28	0.001057	5.06	502.41	65.65	0.32
P118-00-00	P118-R2-1	60571.6*	Max WS	2542.32	49.89	61.84		62.18	0.000901	4.7	541.28	71.33	0.3
P118-00-00	P118-R2-1	60559.5*	Max WS	2542.32	50.09	61.81		62.1	0.000774	4.38	579.97	76.51	0.28
P118-00-00	P118-R2-1	60547.5*	Max WS	2542.2	50.3	61.77		62.04	0.000678	4.11	618.37	81.96	0.26
P118-00-00	P118-R2-1	60535.46	Max WS	2542.32	50.5	61.74		61.98	0.000598	3.87	656.9	87.26	0.25
P118-00-00	P118-R2-1	60396.4*	Max WS	2542.2	50.45	61.68		61.92	0.000654	3.96	641.39	88.31	0.26
P118-00-00	P118-R2-1	60257.3*	Max WS	2542.2	50.4	61.61		61.86	0.000711	4.05	628	89.47	0.27
P118-00-00	P118-R2-1	60118.3*	Max WS	2542.09	50.35	61.53		61.8	0.000764	4.12	617.45	90.74	0.28
P118-00-00	P118-R2-1	59979.2*	Max WS	2541.99	50.3	61.46		61.73	0.000811	4.17	609.72	92.15	0.29
P118-00-00	P118-R2-1	59840.2*	Max WS	2541.99	50.25	61.38		61.65	0.000849	4.2	604.86	93.53	0.29
P118-00-00	P118-R2-1	59701.1*	Max WS	2541.9	50.2	61.3		61.58	0.000874	4.22	602.96	94.88	0.29
P118-00-00	P118-R2-1	59562.1*	Max WS	2541.98	50.15	61.22		61.5	0.000887	4.21	604.14	96.33	0.3
P118-00-00	P118-R2-1	59423.1	Max WS	2541.9	50.1	61.15		61.42	0.000886	4.18	608.63	97.94	0.3
P118-00-00	P118-R2-1	59307.4*	Max WS	2541.96	50.1	61.08		61.35	0.000885	4.14	614.44	100.46	0.29
P118-00-00	P118-R2-1	59191.8*	Max WS	2541.95	50.11	61.01		61.27	0.000874	4.08	622.47	102.95	0.29
P118-00-00	P118-R2-1	59076.2*	Max WS	2541.89	50.11	60.95		61.2	0.000849	4.01	633.63	105.41	0.29
P118-00-00	P118-R2-1	58960.5*	Max WS	2541.94	50.11	60.89		61.13	0.000816	3.93	646.99	107.73	0.28
P118-00-00	P118-R2-1	58844.9*	Max WS	2541.93	50.11	60.83		61.06	0.000775	3.83	663.51	110.26	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	2541.93	50.12	60.78		60.99	0.000731	3.73	682.1	112.98	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	2541.93	50.12	60.73		60.93	0.000677	3.61	704.01	115.2	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	2545.33	47.59	60.56	54.79	60.78	0.000684	3.76	676.38	104.17	0.26
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.1	Max WS	6.58	67.59	68.85		68.85	0.000167	0.58	11.37	17.3	0.13
P118-21-00	P118-21-00	2416.26	Max WS	6.71	67.5	68.84		68.84	0.000325	0.55	12.22	16.18	0.11
P118-21-00	P118-21-00	2398.11	Max WS	7.14	67.44	68.83		68.84	0.000263	0.52	13.67	16.63	0.1
P118-21-00	P118-21-00	2389.56	Max WS	7.59	67.41	68.83		68.83	0.000105	0.54	14.1	16.64	0.1

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_Zyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2343.79	Max WS	8.54	67.54	68.78		68.81	0.000772	1.31	6.53	8.88	0.27
P118-21-00	P118-21-00	2303.58	Max WS	9.21	67.47	68.72		68.75	0.002132	1.39	6.63	8.65	0.28
P118-21-00	P118-21-00	2208.42	Max WS	10.4	67.31	68.34		68.4	0.005055	1.92	5.42	8.42	0.42
P118-21-00	P118-21-00	2195.48	Max WS	10.4	67.34	68.27		68.34	0.003263	2.17	4.8	9.19	0.53
P118-21-00	P118-21-00	2169.49	Max WS	10.53	66.56	68.24		68.26	0.00034	1.1	9.54	8.58	0.18
P118-21-00	P118-21-00	2167.76	Max WS	10.51	66.37	68.25		68.26	0.000182	0.86	12.21	10.07	0.14
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	8.45	65.03	66.83		66.85	0.000273	0.91	9.26	9.61	0.16
P118-21-00	P118-21-00	2100.84	Max WS	8.45	64.78	66.83		66.83	0.000346	0.71	11.92	10.69	0.12
P118-21-00	P118-21-00	1662.37	Max WS	37.76	63.91	66.34		66.39	0.001375	1.77	21.29	13.42	0.25
P118-21-00	P118-21-00	1144.5	Max WS	57.64	62.63	65.55		65.62	0.001407	2.04	28.32	14.27	0.25
P118-21-00	P118-21-00	595.53	Max WS	78.69	61.49	63.94		64.1	0.003903	3.16	24.91	14.41	0.42
P118-21-00	P118-21-00	549.31*	Max WS	80.65	61.18	63.75		63.91	0.003983	3.22	25.08	14.33	0.43
P118-21-00	P118-21-00	503.08*	Max WS	82.61	60.87	63.54		63.71	0.004091	3.28	25.21	14.25	0.43
P118-21-00	P118-21-00	456.86*	Max WS	84.56	60.57	63.33		63.51	0.004373	3.35	25.21	14.48	0.45
P118-21-00	P118-21-00	410.63*	Max WS	86.52	60.26	63.1		63.28	0.00519	3.36	25.76	17.07	0.48
P118-21-00	P118-21-00	364.41*	Max WS	88.48	59.95	62.85		63.03	0.005202	3.38	26.2	17.32	0.48
P118-21-00	P118-21-00	318.18*	Max WS	47.5	59.64	62.68		62.73	0.001208	1.7	27.94	17.28	0.24
P118-21-00	P118-21-00	271.96*	Max WS	48.43	59.34	62.64		62.68	0.000882	1.56	31.08	17.17	0.2
P118-21-00	P118-21-00	225.73*	Max WS	49.39	59.03	62.61		62.64	0.000701	1.48	33.36	16.49	0.18
P118-21-00	P118-21-00	179.51	Max WS	50.35	58.72	62.57		62.61	0.000628	1.47	34.33	15.4	0.17
P118-21-00	P118-21-00	159.41*	Max WS	50.35	57.98	62.57		62.59	0.000338	1.18	42.62	16.1	0.13
P118-21-00	P118-21-00	139.31*	Max WS	50.35	57.24	62.56		62.58	0.000199	0.98	51.45	16.76	0.1
P118-21-00	P118-21-00	119.21*	Max WS	50.35	56.51	62.56		62.57	0.000126	0.83	60.64	17.39	0.08
P118-21-00	P118-21-00	99.11*	Max WS	50.35	55.77	62.56		62.56	0.000084	0.72	70.28	17.98	0.06
P118-21-00	P118-21-00	79.01	Max WS	50.34	55.03	62.55		62.56	0.000058	0.63	80.29	18.56	0.05
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	71.59		71.59	0.000037	0.31	31.89	18.19	0.04
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	71.59		71.59	0.000089	0.42	23.85	17.37	0.06
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.24	70.08	71.59	70.24	71.59	0.000132	0.48	21.25	16.98	0.08
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.24	70.2	71.57		71.58	0.000203	0.56	18.39	16.41	0.09
P118-23-00	P118-23-00 R2	7726.83	Max WS	10.65	70.16	71.57		71.57	0.000303	0.65	16.45	15.8	0.11
P118-23-00	P118-23-00 R2	7654.51	Max WS	13.25	69.97	71.54		71.55	0.000283	0.7	19.06	15.53	0.11
P118-23-00	P118-23-00 R2	7632.63	Max WS	14.27	69.88	71.53		71.54	0.000301	0.73	19.41	15.19	0.11
P118-23-00	P118-23-00 R2	7614.73	Max WS	14.97	68.92	71.53		71.54	0.00016	0.62	24.3	15.09	0.09
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	14.97	69.39	71.34		71.35	0.00023	0.68	21.88	15.48	0.1
P118-23-00	P118-23-00 R2	7567.5	Max WS	15.61	69.56	71.33		71.34	0.000311	0.78	20.14	14.79	0.12
P118-23-00	P118-23-00 R2	7426.94	Max WS	19.31	68.48	71.28		71.29	0.000306	0.85	22.72	13.98	0.12
P118-23-00	P118-23-00 R2	7369.89	Max WS	21.47	68.06	71.27		71.28	0.000266	0.84	25.66	14.31	0.11
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	21.47	69.59	71.12		71.18	0.001727	2.03	10.57	14.83	0.29
P118-23-00	P118-23-00 R2	7313.37	Max WS	22.04	69.5	71.15		71.16	0.000489	0.95	23.3	18.1	0.15
P118-23-00	P118-23-00 R2	7305.97	Max WS	22.33	69.12	71.15		71.16	0.000288	0.82	27.29	17.47	0.12
P118-23-00	P118-23-00 R2	7294.91	Max WS	22.73	69.43	71.14		71.15	0.000302	0.88	25.8	19.11	0.12
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	22.73	69.34	71.02		71.04	0.000652	1.25	18.17	16.84	0.18
P118-23-00	P118-23-00 R2	7257.19	Max WS	23.84	69.28	71.01		71.03	0.000586	1.01	23.57	19.09	0.16
P118-23-00	P118-23-00 R2	6786.22	Max WS	44.32	68.02	70.76		70.78	0.000442	1.11	39.96	22.73	0.15
P118-23-00	P118-23-00 R2	6723.56	Max WS	47.38	67.37	70.75		70.76	0.000165	0.78	60.45	27.62	0.09
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	47.37	67.54	70.03		70.15	0.004999	2.87	16.5	13.25	0.45
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	52.76	67.16	69.82		69.86	0.000869	1.55	34.12	19.28	0.2
P118-23-00	P118-23-00 R2	6402.43	Max WS	58.8	67.03	69.65		69.69	0.00108	1.75	33.66	18.55	0.23
P118-23-00	P118-23-00 R2	6356.93	Max WS	61.57	66.97	69.59	67.93	69.64	0.001169	1.82	33.83	18.62	0.24
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	61.56	66.93	69.55		69.6	0.001141	1.8	34.16	18.74	0.24
P118-23-00	P118-23-00 R2	6293.27	Max WS	63.11	66.88	69.51		69.56	0.001167	1.83	34.56	18.89	0.24
P118-23-00	P118-23-00 R2	5958.59	Max WS	76.59	66.24	69.14		69.18	0.000951	1.68	45.54	24.71	0.22
P118-23-00	P118-23-00 R2	5652.94	Max WS	88.29	65.7	68.67		68.76	0.00172	2.33	37.87	19.04	0.29
P118-23-00	P118-23-00 R2	5045.34	Max WS	87.98	63.97	67.97		68.01	0.000732	1.75	50.23	19.84	0.19
P118-23-00	P118-23-00 R2	4947.92	Max WS	94	63.84	67.93	64.95	67.96	0.000346	1.33	70.49	24.1	0.14
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	93.98	63.87	67.91		67.94	0.000229	1.15	81.74	24.65	0.11
P118-23-00	P118-23-00 R2	4783.1	Max WS	97.84	63.65	67.8		67.86	0.000973	1.96	49.9	18.88	0.21
P118-23-00	P118-23-00 R2	4580.38	Max WS	97.83	63.02	67.65	64.48	67.69	0.000528	1.59	61.22	20.6	0.16
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	97.49	63.16	67.63		67.66	0.000445	1.51	64.72	21.37	0.15
P118-23-00	P118-23-00 R2	4459.75	Max WS	101.68	63.55	67.55		67.6	0.000761	1.8	56.39	21.53	0.2
P118-23-00	P118-23-00 R2	4370.6	Max WS	104.98	63.42	67.47		67.52	0.000938	1.9	55.16	23.5	0.22
P118-23-00	P118-23-00 R2	4330.88	Max WS	106.4	62.88	67.49		67.49	0.000057	0.62	171.64	49.71	0.06

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	106.35	63.33	67.47		67.48	0.000057	0.6	177.39	55.35	0.06
P118-23-00	P118-23-00 R2	4229.24	Max WS	107.54	63.34	67.46		67.47	0.000231	1.09	98.99	35.48	0.11
P118-23-00	P118-23-00 R2	3733.5	Max WS	120.99	62.41	67.24		67.28	0.000525	1.67	72.34	23.88	0.17
P118-23-00	P118-23-00 R2	3187.46	Max WS	138.73	62.36	66.9		66.95	0.000613	1.76	78.62	27.71	0.18
P118-23-00	P118-23-00 R2	3150.64	Max WS	139.81	61.93	66.89	63.92	66.93	0.00052	1.67	83.54	27.78	0.17
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	139.34	61.56	66.84		66.89	0.000613	1.71	81.45	29.78	0.18
P118-23-00	P118-23-00 R2	3104.46	Max WS	139.66	61.63	66.8		66.87	0.000925	2.11	66.3	22.5	0.22
P118-23-00	P118-23-00 R2	2750.51	Max WS	148.26	60.59	66.59		66.63	0.000412	1.64	90.19	24.5	0.15
P118-23-00	P118-23-00 R2	2741.93	Max WS	148.43	60.44	66.59	62.44	66.62	0.000355	1.57	94.62	24.46	0.14
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	148.47	60.52	66.58		66.62	0.000324	1.49	99.94	26.76	0.14
P118-23-00	P118-23-00 R2	2716.57	Max WS	148.71	60.68	66.58		66.61	0.000353	1.53	96.92	26.38	0.14
P118-23-00	P118-23-00 R2	2615.37	Max WS	105.68	60.75	66.54		66.56	0.000186	1.13	93.72	24.81	0.1
P118-23-00	P118-23-00 R2	2244.98	Max WS	112.39	60.53	66.48		66.5	0.000132	1.01	111.51	26.79	0.09
P118-23-00	P118-23-00 R2	2221.06	Max WS	113.26	60.56	66.47	61.87	66.49	0.000149	1.06	107.11	26.23	0.09
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	113.26	60.59	66.46		66.48	0.00014	1.02	111	28.07	0.09
P118-23-00	P118-23-00 R2	2042.36	Max WS	115.43	59.78	66.44		66.45	0.000156	1	115.68	32.78	0.09
P118-23-00	P118-23-00 R2	1922.13	Max WS	115.43	59.56	66.43		66.44	0.000087	0.84	135.69	32.59	0.07
P118-23-00	P118-23-00 R2	1892.63	Max WS	125.43	59.68	66.42	61.63	66.43	0.000138	1.01	124.13	32.14	0.09
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	125.43	59.86	66.38		66.41	0.000267	1.33	94.63	25.76	0.12
P118-23-00	P118-23-00 R2	1829.45	Max WS	125.43	59.87	66.38		66.4	0.000183	1.13	110.93	29.52	0.1
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	125.42	59.04	66.36		66.37	0.000067	0.8	157.52	32.77	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	174.85	59.85	66.3		66.33	0.000191	1.29	135.18	29.79	0.11
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	174.85	59.99	66.3	61.39	66.32	0.000143	1.04	168.76	43.2	0.09
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	174.85	58.36	66.29		66.3	0.000063	0.83	211.68	41.75	0.06
P118-23-00	P118-23-00 R1	1354.02	Max WS	175.16	57.88	66.29		66.3	0.000069	0.83	210.31	40.52	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	179.59	57.45	66.26		66.28	0.000081	0.97	184.53	30.35	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	183.9	57.03	66.23		66.25	0.000081	0.98	188.35	30.69	0.07
P118-23-00	P118-23-00 R1	242.54	Max WS	169.85	55.82	66.22	57.91	66.22	0.000024	0.57	296.52	46.64	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	169.85	55.57	66.21		66.21	0.000021	0.55	307.87	46.95	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	179.84	55.13	66.21		66.21	0.000016	0.46	395.6	85.19	0.03
P118-23-02	P118-23-02 R1	58.31	Max WS	179.83	53.78	66.21		66.21	0.00001	0.43	559.98	83.5	0.03
P118-23-02	P118-23-02	4138.85	Max WS	21.75	67.78	69.87		69.9	0.001008	1.29	16.84	17.29	0.21
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	21.65	66.69	69.7		69.7	0.000107	0.56	38.61	20.93	0.07
P118-23-02	P118-23-02	3782.06	Max WS	79.97	66.66	69.55		69.63	0.001823	2.25	35.55	19.99	0.3
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	80.05	66.22	69.57		69.58	0.00037	0.79	236.15	266.69	0.11
P118-23-02	P118-23-02	3692.61	Max WS	79.95	66.22	69.53		69.58	0.001057	1.87	42.77	210.77	0.23
P118-23-02	P118-23-02	3049.5	Max WS	79.83	65.47	68.99		69.03	0.000666	1.63	49.33	23.04	0.19
P118-23-02	P118-23-02	2386.67	Max WS	79.82	65.13	68.15		68.24	0.001745	2.41	33.15	15.34	0.29
P118-23-02	P118-23-02	2372.17	Max WS	79.82	65.16	68.13		68.21	0.001542	2.27	35.16	16.52	0.27
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	79.82	65.26	68.1		68.18	0.001656	2.33	34.27	21.03	0.28
P118-23-02	P118-23-02	2278.1	Max WS	79.82	65.19	68.06		68.14	0.001543	2.28	35.07	16.19	0.27
P118-23-02	P118-23-02	1453.34	Max WS	79.77	63.69	67.12		67.17	0.000817	1.79	44.47	18.33	0.2
P118-23-02	P118-23-02	1445.67	Max WS	79.78	63.66	67.12	65.1	67.16	0.000714	1.66	48.02	20.58	0.19
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	73.73	63.56	66.66		66.72	0.001355	2.02	36.57	19.13	0.26
P118-23-02	P118-23-02	1392.09	Max WS	73.56	63.36	66.63		66.69	0.001229	2.02	36.35	17.23	0.25
P118-23-02	P118-23-02	1317.96	Max WS	72.85	62.91	66.55		66.61	0.001054	1.94	37.65	16.66	0.23
P118-23-02	P118-23-02	1171.38	Max WS	49.48	61.86	66.48		66.5	0.000291	1.09	45.35	17.68	0.12
P118-23-02	P118-23-02	1083.7	Max WS	49.48	62.56	66.46		66.48	0.000253	1.03	48.01	18.75	0.11
P118-23-02	P118-23-02	215.24	Max WS	49.45	60.16	66.34		66.34	0.000055	0.59	83.25	22.8	0.05
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	68.56		68.56	0.000035	0.29	34.82	22.49	0.04
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.99	66.34	68.55		68.55	0.000036	0.29	34.6	22.45	0.04
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.95	66.13	68.54		68.54	0.000045	0.33	30.5	19.47	0.05
P118-25-00	P118-25-00 R2	2636.62	Max WS	14.82	65.84	68.52		68.52	0.000085	0.46	32.28	19.91	0.06
P118-25-00	P118-25-00 R2	2494.17	Max WS	14.78	65.5	68.51		68.51	0.000054	0.39	37.89	21.26	0.05
P118-25-00	P118-25-00 R2	2473.31	Max WS	14.78	65.47	68.51	66.31	68.51	0.000049	0.38	38.76	20.91	0.05
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	14.78	65.47	68.5		68.5	0.000052	0.39	37.74	20.21	0.05
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_2yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	14.76	65.38	68.5		68.5	0.000043	0.36	41.02	22.06	0.05
P118-25-00	P118-25-00 R2	2046.09	Max WS	14.64	64.63	68.49		68.49	0.000017	0.25	58.01	25.71	0.03
P118-25-00	P118-25-00 R1	1929.3	Max WS	58.48	64.22	68.45		68.47	0.000295	1.11	52.85	21.31	0.12
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	58.31	64.03	68.37		68.39	0.000173	0.91	63.76	22.79	0.1
P118-25-00	P118-25-00 R1	1208.56	Max WS	59.71	63.03	68.33		68.34	0.000103	0.77	77.41	23.78	0.08
P118-25-00	P118-25-00 R1	1188.81	Max WS	59.8	63.01	68.32	64.42	68.33	0.000114	0.8	74.34	22.7	0.08
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	59.84	62.94	68.31		68.32	0.000117	0.82	73.2	22.12	0.08
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	59.99	62.83	68.31		68.32	0.000094	0.75	80.24	23.9	0.07
P118-25-00	P118-25-00 R1	980.2	Max WS	60.61	62.34	68.3		68.31	0.000067	0.64	94.52	27.99	0.06
P118-25-00	P118-25-00 R1	963.63	Max WS	60.68	62.25	68.3		68.31	0.000028	0.46	132.74	34.4	0.04
P118-25-00	P118-25-00 R1	950.55	Max WS	60.97	62.25	68.3	63.51	68.3	0.000028	0.46	132.67	34.39	0.04
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	60.78	61.68	68.07		68.07	0.000027	0.44	138.18	37.98	0.04
P118-25-00	P118-25-00 R1	886.91	Max WS	60.99	61.68	68.07		68.07	0.000025	0.45	136.82	37.97	0.04
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	61.2	61.16	68.06		68.07	0.000029	0.49	125.82	29.57	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	62.62	60.25	68.06		68.06	0.000024	0.44	141.01	33.28	0.04
P118-25-00	P118-25-00 R1	251.81	Max WS	63.52	58.25	68.05		68.05	0.000009	0.32	198.98	37.29	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	63.52	58.04	68.05		68.05	0.000009	0.31	204.82	37.61	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	63.52	57.84	68.05		68.05	0.000008	0.3	210.65	37.93	0.02
P118-25-00	P118-25-00 R1	185.81*	Max WS	63.51	57.63	68.05		68.05	0.000007	0.29	216.53	38.24	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	63.51	57.43	68.05		68.05	0.000007	0.29	222.41	38.55	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	63.42	57.22	68.05		68.05	0.000006	0.28	228.34	38.85	0.02
P118-25-00	P118-25-00 R1	119.80*	Max WS	63.42	57.02	68.05		68.05	0.000006	0.27	234.24	39.12	0.02
P118-25-00	P118-25-00 R1	97.8	Max WS	63.41	56.81	68.04	58.55	68.05	0.000006	0.26	239.99	39.4	0.02
P118-25-01	P118-25-01	5341.48	Max WS	25.87	70.47	72.33		72.36	0.001152	1.31	19.74	18.19	0.22
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	25.42	68.9	71.6		71.62	0.000574	1.06	24.07	17.82	0.16
P118-25-01	P118-25-01	4162.47	Max WS	30.79	69.44	71.36		71.39	0.000847	1.23	25.08	20.2	0.19
P118-25-01	P118-25-01	4134.04	Max WS	31.29	69.38	71.34	70.24	71.36	0.000792	1.2	26.02	20.56	0.19
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	31.28	69.25	71.31		71.33	0.000716	1.16	26.96	20.83	0.18
P118-25-01	P118-25-01	4047.7	Max WS	31.94	69.28	71.28		71.3	0.000707	1.16	27.46	20.95	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	39.76	67.84	71.05		71.07	0.000336	0.96	41.41	23.82	0.13
P118-25-01	P118-25-01	3312.44	Max WS	44.37	67.48	70.95		70.96	0.00034	0.97	45.92	26.49	0.13
P118-25-01	P118-25-01	3014.68	Max WS	49.43	67.53	70.87		70.88	0.000203	0.85	58.48	27.94	0.1
P118-25-01	P118-25-01	2924.04	Max WS	51.8	67.71	70.84		70.86	0.000226	0.88	58.9	28.83	0.11
P118-25-01	P118-25-01	2763.33	Max WS	54.33	66.67	70.81		70.82	0.000182	0.84	64.38	28.24	0.1
P118-25-01	P118-25-01	2728.92	Max WS	54.98	66.5	70.76		70.82	0.000522	1.85	29.64	21.01	0.18
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	54.98	66.31	70.75		70.79	0.000349	1.63	33.79	26.13	0.15
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	54.98	66.04	70.75		70.77	0.000256	1.04	52.65	20.42	0.11
P118-25-01	P118-25-01	1881.88	Max WS	81.81	66.57	70.28		70.34	0.001116	1.97	41.59	19.36	0.24
P118-25-01	P118-25-01	1384.48	Max WS	81.73	66.19	69.7		69.76	0.001192	1.99	41.09	19.92	0.24
P118-25-01	P118-25-01	1245.83	Max WS	81.69	66.34	69.52		69.59	0.001279	2.07	39.56	19.05	0.25
P118-25-01	P118-25-01	584.11	Max WS	76.24	65.88	68.68		68.73	0.001159	1.91	39.93	20.21	0.24
P118-25-01	P118-25-01	60.05	Max WS	43.91	63.5	68.49		68.5	0.000168	0.85	51.9	19.88	0.09

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4112.31	58.25	72.8		73.29	0.001038	5.59	736.78	101.91	0.32
P118-00-00	P118-R3-2	71854.2	Max WS	3985.05	57.83	72.67		72.86	0.000452	3.47	1147.15	143.57	0.27
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3874.08	55.05	72.27		72.42	0.000325	3.06	1342.46	334.29	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	3878.99	55.28	71.95		72.08	0.000246	2.94	1624.14	520	0.17
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3613.7	54.88	71.58		71.82	0.000471	3.94	1187.45	291.02	0.23
P118-00-00	P118-R3-2	68133	Max WS	3637.74	54.47	71.33		71.58	0.000429	4.06	1097.9	292.23	0.22
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3660.75	54.14	70.89		71.25	0.000776	4.92	1015.31	313.33	0.28
P118-00-00	P118-R3-2	66869	Max WS	3532.42	53.96	70.11		70.6	0.001312	5.62	654.11	132.14	0.36
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3598.1	53.79	70.14		70.48	0.000834	4.71	791.02	131.46	0.29
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3472.04	53.6	69.79		70.12	0.000688	4.76	979.34	227.52	0.27
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2452.54	53.52	69.85		70	0.000549	3.17	868.05	278.2	0.23
P118-00-00	P118-R3-2	65434.6	Max WS	935.78	53.1	69.92		69.94	0.000046	1.22	1064.45	214.6	0.07
P118-00-00	P118-R3-2	64399.74	Max WS	3350.33	52.59	69.05		69.39	0.000707	4.69	813.87	160.94	0.27
P118-00-00	P118-R3-2	64273.7	Max WS	3336.55	53.55	69.09	61.19	69.3	0.000557	3.7	904.82	131.61	0.24
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3335.41	53.3	69.05		69.25	0.00051	3.59	933.93	137.44	0.23
P118-00-00	P118-R3-2	64200	Max WS	3335.37	53.3	69.05		69.25	0.00051	3.59	933.56	137.37	0.23
P118-00-00	P118-R2-2	64100	Max WS	3900.86	52.61	69.05		69.16	0.000183	2.61	1511.36	1537.42	0.15
P118-00-00	P118-R2-2	64094	Max WS	3900.54	52.61	69.05	59.57	69.16	0.000183	2.61	1511.2	1536.64	0.15
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	3900.48	52.56	69.03		69.13	0.000181	2.6	1515.33	1554.41	0.15
P118-00-00	P118-R2-2	64010.4	Max WS	3900.12	52.78	68.89	61.3	69.14	0.000463	4.01	1057.58	1063.35	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	3900.07	53.04	68.57		68.85	0.000575	4.29	976.62	730.72	0.25
P118-00-00	P118-R2-2	63959.7	Max WS	3900	53.06	68.72	59.53	68.83	0.000193	2.65	1482.78	994.85	0.15
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	3900.05	53.16	68.68		68.79	0.000204	2.7	1455.31	902.96	0.15
P118-00-00	P118-R2-2	63756.7	Max WS	3909.76	52.4	68.33		68.77	0.00109	5.36	822.26	205	0.33
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3807.21	50.35	67.48		67.89	0.000988	5.18	738.43	99.14	0.31
P118-00-00	P118-R2-2	61905.2	Max WS	4124.76	50.77	66.49		66.86	0.001137	4.91	839.42	124.71	0.33
P118-00-00	P118-R2-2	60625.3	Max WS	4135.15	49.52	65.76		66.14	0.001124	4.94	836.71	121.4	0.33
P118-00-00	P118-R2-1	60595.74	Max WS	4184.63	49.48	64.28		65	0.001664	6.81	614.86	71	0.41
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	4184.64	49.68	64.26		64.86	0.001363	6.22	673.1	78.45	0.37
P118-00-00	P118-R2-1	60571.6*	Max WS	4184.64	49.89	64.22		64.74	0.001158	5.76	727	85.43	0.35
P118-00-00	P118-R2-1	60559.5*	Max WS	4184.64	50.09	64.19		64.64	0.001002	5.38	777.62	91.55	0.33
P118-00-00	P118-R2-1	60547.5*	Max WS	4184.64	50.3	64.15		64.55	0.000861	5.07	825.83	95.5	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	4184.64	50.5	64.12		64.47	0.000721	4.78	875.61	96.94	0.28
P118-00-00	P118-R2-1	60396.4*	Max WS	4184.63	50.45	64.04		64.41	0.000771	4.85	862.48	98.63	0.29
P118-00-00	P118-R2-1	60257.3*	Max WS	4184.63	50.4	63.96		64.34	0.000819	4.91	851.67	100.33	0.3
P118-00-00	P118-R2-1	60118.3*	Max WS	4184.63	50.35	63.88		64.26	0.000861	4.96	843.99	102.17	0.3
P118-00-00	P118-R2-1	59979.2*	Max WS	4184.63	50.3	63.8		64.19	0.000897	4.99	839.35	104.1	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	4184.63	50.25	63.72		64.11	0.000923	4.99	837.81	105.97	0.31
P118-00-00	P118-R2-1	59701.1*	Max WS	4184.62	50.2	63.64		64.02	0.000937	4.99	839.43	107.8	0.31
P118-00-00	P118-R2-1	59562.1*	Max WS	4184.63	50.15	63.56		63.94	0.000947	4.96	844.19	110.24	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	4184.63	50.1	63.48		63.85	0.000964	4.91	852.32	114.39	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	4184.63	50.1	63.41		63.77	0.000914	4.85	863.49	113.67	0.31
P118-00-00	P118-R2-1	59191.8*	Max WS	4184.61	50.11	63.34		63.69	0.000889	4.77	877.43	116.01	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	4184.63	50.11	63.28		63.62	0.000855	4.68	894.76	118.44	0.3
P118-00-00	P118-R2-1	58960.5*	Max WS	4184.63	50.11	63.22		63.55	0.000818	4.58	914.33	120.91	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	4184.63	50.11	63.17		63.48	0.000775	4.47	937.21	123.41	0.29
P118-00-00	P118-R2-1	58729.3*	Max WS	4184.63	50.12	63.12		63.42	0.000731	4.35	962.3	125.96	0.28
P118-00-00	P118-R2-1	58613.7	Max WS	4184.63	50.12	63.08		63.35	0.000683	4.22	990.74	128.54	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	4188.22	47.59	62.88	56.98	63.19	0.000754	4.47	936.64	119.69	0.28
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.1	Max WS	4.54	67.59	69.05		69.05	0.000035	0.31	15.05	19.78	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.84	67.5	69.04		69.04	0.000124	0.37	15.78	18.39	0.07
P118-21-00	P118-21-00	2398.11	Max WS	6.99	67.44	69.04		69.04	0.000132	0.4	17.31	18.44	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.08	67.41	69.04		69.04	0.000064	0.46	17.74	18.45	0.08

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2343.79	Max WS	10.02	67.54	69		69.03	0.000503	1.16	8.62	10.12	0.22
P118-21-00	P118-21-00	2303.58	Max WS	12.03	67.47	68.94		68.97	0.001744	1.38	8.69	9.75	0.26
P118-21-00	P118-21-00	2208.42	Max WS	14.69	67.31	68.71		68.75	0.00267	1.66	8.86	10.58	0.32
P118-21-00	P118-21-00	2195.48	Max WS	14.69	67.34	68.68		68.72	0.001051	1.64	8.98	11.04	0.32
P118-21-00	P118-21-00	2169.49	Max WS	14.69	66.56	68.68		68.7	0.000244	1.09	13.53	9.51	0.16
P118-21-00	P118-21-00	2167.76	Max WS	14.69	66.37	68.69		68.7	0.000142	0.87	16.92	11.29	0.13
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	14.67	65.03	67.76		67.77	0.000102	0.72	20.27	14.22	0.11
P118-21-00	P118-21-00	2100.84	Max WS	14.67	64.78	67.76		67.76	0.000163	0.62	23.66	14.63	0.09
P118-21-00	P118-21-00	1662.37	Max WS	71.39	63.93	67.34		67.4	0.001128	1.96	36.38	16.72	0.23
P118-21-00	P118-21-00	1144.5	Max WS	109.49	62.63	66.54		66.63	0.001553	2.5	43.72	17.1	0.28
P118-21-00	P118-21-00	595.53	Max WS	52.1	61.49	65.27		65.29	0.000312	1.11	46.85	19.23	0.13
P118-21-00	P118-21-00	549.31*	Max WS	53.17	61.18	65.26		65.27	0.000341	0.97	54.77	30.6	0.13
P118-21-00	P118-21-00	503.08*	Max WS	54.34	60.87	65.25		65.26	0.000234	0.85	64.01	33.16	0.11
P118-21-00	P118-21-00	456.86*	Max WS	55.52	60.57	65.24		65.25	0.000366	0.76	72.61	33.93	0.09
P118-21-00	P118-21-00	410.63*	Max WS	56.66	60.26	65.23		65.24	0.000124	0.71	79.93	33.63	0.08
P118-21-00	P118-21-00	364.41*	Max WS	46.07	59.95	65.23		65.24	0.000063	0.54	85.37	32.58	0.06
P118-21-00	P118-21-00	318.18*	Max WS	46.9	59.64	65.23		65.23	0.000053	0.53	88.91	30.34	0.05
P118-21-00	P118-21-00	271.96*	Max WS	47.75	59.34	65.23		65.23	0.000047	0.53	90.18	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	48.65	59.03	65.22		65.23	0.000046	0.55	89.14	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	49.54	58.72	65.22		65.23	0.00005	0.58	85.78	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	49.52	57.98	65.22		65.22	0.000037	0.52	95.44	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	49.47	57.24	65.22		65.22	0.000028	0.47	105.55	23.06	0.04
P118-21-00	P118-21-00	119.21*	Max WS	49.49	56.51	65.22		65.22	0.000022	0.43	115.95	23.6	0.03
P118-21-00	P118-21-00	99.11*	Max WS	49.49	55.77	65.22		65.22	0.000017	0.39	126.74	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	49.53	55.03	65.22		65.22	0.000014	0.36	137.87	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.86		72.86	0.000007	0.17	57.44	21.93	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.86		72.86	0.000011	0.21	48.57	21.5	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.86	70.24	72.86	0.000015	0.23	45.72	21.46	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.86		72.86	0.000019	0.25	42.4	20.96	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.24	70.16	72.86		72.86	0.000026	0.28	39.91	20.65	0.04
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.22	69.97	72.85		72.85	0.000043	0.38	42.72	20.68	0.05
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.15	69.88	72.85		72.85	0.000053	0.42	42.77	20.34	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.5	68.92	72.85		72.85	0.000043	0.41	47.55	20.24	0.05
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.49	69.39	72.76		72.76	0.000044	0.41	47.5	20.55	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.73	69.56	72.76		72.76	0.000058	0.46	44.95	19.98	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.79	68.48	72.75		72.75	0.000088	0.59	47.39	118.89	0.07
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.92	68.06	72.74		72.74	0.000094	0.63	50.81	44.22	0.07
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.92	69.59	72.55		72.59	0.000413	1.55	20.6	19.8	0.16
P118-23-00	P118-23-00 R2	7313.37	Max WS	33.01	69.5	72.57		72.58	0.000103	0.62	52.87	23.3	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.57	69.17	72.57		72.58	0.000087	0.6	55.66	22.34	0.07
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.33	69.43	72.57		72.58	0.000084	0.71	48.6	22.09	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.33	69.34	72.38		72.39	0.000177	1	34.42	41.36	0.1
P118-23-00	P118-23-00 R2	7257.19	Max WS	36.45	69.28	72.38		72.39	0.000128	0.68	53.59	24.76	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	75.65	68.02	72.29		72.31	0.000183	0.92	86.75	103.55	0.1
P118-23-00	P118-23-00 R2	6723.56	Max WS	81.51	67.37	72.29		72.3	0.000097	0.74	109.58	36.23	0.08
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	81.51	67.54	71.08		71.18	0.002368	2.47	32.96	18.96	0.33
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	91.86	67.16	70.99		71.02	0.000573	1.54	59.7	24.69	0.17
P118-23-00	P118-23-00 R2	6402.43	Max WS	103.46	67.03	70.86		70.91	0.000709	1.74	59.44	23.82	0.19
P118-23-00	P118-23-00 R2	6356.93	Max WS	108.78	66.97	70.82	68.41	70.87	0.000076	1.81	60.11	23.93	0.2
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	108.78	66.93	70.8		70.85	0.000732	1.78	61.01	24.15	0.2
P118-23-00	P118-23-00 R2	6293.27	Max WS	111.75	66.88	70.77		70.82	0.000744	1.81	61.91	24.37	0.2
P118-23-00	P118-23-00 R2	5958.59	Max WS	137.69	66.24	70.55		70.59	0.000554	1.6	86.17	33.52	0.18
P118-23-00	P118-23-00 R2	5652.94	Max WS	55.96	65.7	70.3		70.31	0.000111	0.76	73.97	25.37	0.08
P118-23-00	P118-23-00 R2	5045.34	Max WS	55.3	63.97	70.26		70.26	0.00004	0.53	104.91	27.83	0.05
P118-23-00	P118-23-00 R2	4947.92	Max WS	58.76	63.84	70.26	64.62	70.26	0.000023	0.43	135.68	31.93	0.04
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	58.66	63.87	70.24		70.25	0.000018	0.4	147.99	32.49	0.03
P118-23-00	P118-23-00 R2	4783.1	Max WS	60.88	63.65	70.24		70.24	0.000049	0.56	108.14	28.86	0.05
P118-23-00	P118-23-00 R2	4580.38	Max WS	68.34	63.02	70.23	64.17	70.23	0.000038	0.54	126.45	30.43	0.05
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	68.25	63.16	70.22		70.22	0.000039	0.51	133.28	36.41	0.05
P118-23-00	P118-23-00 R2	4459.75	Max WS	71.08	63.55	70.22		70.22	0.000045	0.55	130.12	36.12	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	73.38	63.42	70.21		70.22	0.000059	0.49	149.17	63.2	0.06
P118-23-00	P118-23-00 R2	4330.88	Max WS	74.25	62.88	70.21		70.21	0.000006	0.23	325.09	74.99	0.02

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	74.13	63.31	70.2		70.2	0.000004	0.21	349.87	75.83	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	74.95	63.34	70.2		70.2	0.000014	0.35	215.59	50.58	0.03
P118-23-00	P118-23-00 R2	3733.5	Max WS	98.64	62.41	70.18		70.18	0.000043	0.62	158.9	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	297.81	62.36	70.02		70.06	0.000269	1.6	185.97	39.77	0.13
P118-23-00	P118-23-00 R2	3150.64	Max WS	305.48	61.93	70.01	64.89	70.04	0.000344	1.57	194.18	52.14	0.14
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	305.48	61.56	69.99		70.02	0.000297	1.49	205.61	54.35	0.13
P118-23-00	P118-23-00 R2	3104.46	Max WS	306.17	61.63	69.97		70.02	0.00049	1.75	174.87	50.79	0.17
P118-23-00	P118-23-00 R2	2750.51	Max WS	313.36	60.59	69.84		69.88	0.000261	1.68	186.25	33.96	0.13
P118-23-00	P118-23-00 R2	2741.93	Max WS	313.5	60.44	69.84	63.56	69.88	0.000245	1.65	190.52	33.99	0.12
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	313.5	60.52	69.84		69.87	0.000238	1.52	206.38	42.09	0.12
P118-23-00	P118-23-00 R2	2716.57	Max WS	313.69	60.68	69.83		69.87	0.000255	1.53	205.56	44.33	0.12
P118-23-00	P118-23-00 R2	2615.37	Max WS	315.76	60.75	69.8		69.84	0.000249	1.65	191.48	35.25	0.12
P118-23-00	P118-23-00 R2	2244.98	Max WS	322.47	60.53	69.73		69.76	0.000188	1.52	212.65	35.29	0.11
P118-23-00	P118-23-00 R2	2221.06	Max WS	323.35	60.56	69.72	63.21	69.76	0.000206	1.55	207.97	35.96	0.11
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	323.34	60.59	69.69		69.73	0.000184	1.49	217.03	37.11	0.11
P118-23-00	P118-23-00 R2	2042.36	Max WS	325.51	59.78	69.67		69.7	0.000219	1.27	256.37	67.27	0.11
P118-23-00	P118-23-00 R2	1922.13	Max WS	325.51	59.56	69.65		69.67	0.000201	1.22	266.79	70.94	0.11
P118-23-00	P118-23-00 R2	1892.63	Max WS	335.51	59.68	69.64	63.01	69.66	0.000188	1.32	254.09	56.4	0.11
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	335.51	59.86	69.53		69.57	0.000304	1.73	194.2	38.81	0.14
P118-23-00	P118-23-00 R2	1829.45	Max WS	335.51	59.87	69.54		69.56	0.000248	1.28	262.04	75.5	0.12
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	341.97	59.04	69.5		69.52	0.000156	1.2	284.44	61.98	0.1
P118-23-00	P118-23-00 R1	1513.84	Max WS	387.86	59.85	69.43		69.46	0.000206	1.51	286.6	842.12	0.11
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	389.6	59.99	69.43	62.52	69.44	0.000106	0.85	956.69	976.14	0.08
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	389	58.36	69.4		69.4	0.000045	0.64	1422.88	914.81	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	403.52	57.88	69.39		69.4	0.000054	0.8	1029.43	838.57	0.06
P118-23-00	P118-23-00 R1	1010.56	Max WS	466.61	57.45	69.34		69.36	0.000169	1.29	597.43	704.1	0.1
P118-23-00	P118-23-00 R1	649.49	Max WS	522.04	57.03	69.25		69.29	0.00021	1.66	392.23	436.8	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	555.87	55.82	69.2	59.79	69.21	0.000071	0.87	1423.21	1051.37	0.07
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	553.41	55.57	69.17		69.17	0.000045	0.9	1701.53	1625.86	0.06
P118-23-00	P118-23-00 R1	106.82	Max WS	562.49	55.13	69.16		69.17	0.000034	0.88	865.95	175.37	0.05
P118-23-00	P118-23-00 R1	58.31	Max WS	562.37	53.78	69.16		69.17	0.000032	0.97	806.15	83.5	0.05
P118-23-02	P118-23-02	4138.85	Max WS	39.31	67.78	70.88		70.89	0.000403	1.04	68.98	508.94	0.14
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	39.04	66.69	70.8		70.8	0.000104	0.56	69.83	343.02	0.07
P118-23-02	P118-23-02	3782.06	Max WS	142.58	66.66	70.71		70.77	0.001187	1.95	121.02	260.86	0.26
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	142.43	66.22	70.7		70.7	0.000114	0.42	994.73	1220.6	0.06
P118-23-02	P118-23-02	3692.61	Max WS	142.05	66.22	70.67		70.73	0.000986	1.95	72.78	1057.92	0.23
P118-23-02	P118-23-02	3049.5	Max WS	141.36	65.47	70.14		70.19	0.000723	1.82	101.33	121.72	0.2
P118-23-02	P118-23-02	2386.67	Max WS	64.19	65.13	69.58		69.6	0.000261	1.09	58.96	42.51	0.12
P118-23-02	P118-23-02	2372.17	Max WS	64.21	65.16	69.58		69.6	0.000307	0.97	65.92	53.97	0.13
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	63.79	65.26	69.56		69.58	0.000216	1.05	60.75	209.4	0.11
P118-23-02	P118-23-02	2278.1	Max WS	63.66	65.19	69.56		69.57	0.000201	1.02	62.27	44.69	0.1
P118-23-02	P118-23-02	1453.34	Max WS	46.32	63.69	69.5		69.5	0.000033	0.48	96.81	85.19	0.04
P118-23-02	P118-23-02	1445.67	Max WS	46.32	63.66	69.5	64.75	69.5	0.000027	0.43	107.7	113.12	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	46.29	63.56	69.49		69.49	0.00003	0.43	106.86	150.88	0.04
P118-23-02	P118-23-02	1392.09	Max WS	46.3	63.36	69.49		69.49	0.000032	0.46	99.68	94.51	0.05
P118-23-02	P118-23-02	1317.96	Max WS	46.3	62.91	69.49		69.49	0.00003	0.46	100.5	163.92	0.04
P118-23-02	P118-23-02	1171.38	Max WS	46.3	61.86	69.48		69.49	0.000022	0.41	112.66	282.72	0.04
P118-23-02	P118-23-02	1083.7	Max WS	46.29	62.56	69.48		69.48	0.000021	0.39	118.54	260.37	0.03
P118-23-02	P118-23-02	215.24	Max WS	46.18	60.16	69.47		69.47	0.000008	0.27	171.11	661.83	0.02
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	70.29		70.29	0.000003	0.13	79.9	29.92	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.87	66.34	70.29		70.29	0.000003	0.12	79.86	29.92	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.3	66.13	70.29		70.29	0.000004	0.13	71.22	26.82	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	14.05	65.84	70.28		70.28	0.000008	0.18	76.12	31.51	0.02
P118-25-00	P118-25-00 R2	2494.17	Max WS	13.52	65.5	70.28		70.28	0.000006	0.16	84.74	33.66	0.02
P118-25-00	P118-25-00 R2	2473.31	Max WS	13.48	65.47	70.28	66.27	70.28	0.000006	0.16	84.89	34.68	0.02
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	13.48	65.47	70.28		70.28	0.000006	0.16	83.48	34.53	0.02
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	13.17	65.38	70.28		70.28	0.000005	0.15	90.28	35.28	0.02
P118-25-00	P118-25-00 R2	2046.09	Max WS	8.82	64.63	70.29		70.29	0.000001	0.08	115.96	40.28	0.01
P118-25-00	P118-25-00 R1	1929.3	Max WS	91.08	64.22	70.27		70.28	0.000136	0.93	97.98	28.38	0.09
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	89.18	64.03	70.23		70.24	0.000088	0.79	112.24	29.47	0.07
P118-25-00	P118-25-00 R1	1208.56	Max WS	90.07	63.03	70.2		70.21	0.000061	0.7	128	30.15	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	89.69	63.01	70.2	64.76	70.21	0.000067	0.73	122.87	28.97	0.06
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	89.69	62.94	70.19		70.2	0.000007	0.74	120.82	28.65	0.06
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	90.33	62.83	70.19		70.2	0.000057	0.69	131.04	30.14	0.06
P118-25-00	P118-25-00 R1	980.2	Max WS	92.29	62.34	70.18		70.19	0.000042	0.6	154.4	35.54	0.05
P118-25-00	P118-25-00 R1	963.63	Max WS	92.17	62.25	70.18		70.19	0.000017	0.46	198.42	41.21	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	91.95	62.25	70.18	63.76	70.18	0.000002	0.45	204.09	41.21	0.04
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	91.95	61.68	70.17		70.17	0.000016	0.4	228.43	47.75	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	92.17	61.68	70.17		70.17	0.000014	0.44	210.3	47.74	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	92.29	61.16	70.17		70.17	0.000021	0.47	195.02	36.51	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	93.93	60.25	70.16		70.16	0.000017	0.43	219.55	41.41	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	88.26	58.25	70.16		70.16	0.000007	0.31	284.46	43.08	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	85.68	58.04	70.16		70.16	0.000006	0.29	290.78	43.25	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	82.83	57.84	70.16		70.16	0.000005	0.28	297.09	43.41	0.02
P118-25-00	P118-25-00 R1	185.81*	Max WS	79.52	57.63	70.16		70.16	0.000005	0.26	303.4	43.54	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	76.04	57.43	70.16		70.16	0.000004	0.25	309.72	43.65	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	71.97	57.22	70.16		70.16	0.000003	0.23	316.06	43.74	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	66.48	57.02	70.16		70.16	0.000003	0.21	322.35	43.82	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	61.23	56.81	70.16	58.52	70.16	0.000002	0.19	328.75	43.89	0.01
P118-25-01	P118-25-01	5341.48	Max WS	50.45	70.47	73.19		73.22	0.000733	1.33	37.94	24.26	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50.13	68.9	72.74		72.75	0.000342	1.03	48.62	25.33	0.13
P118-25-01	P118-25-01	4162.47	Max WS	60.87	69.44	72.62		72.64	0.000371	1.1	55.56	28.41	0.14
P118-25-01	P118-25-01	4134.04	Max WS	61.85	69.38	72.61	70.57	72.63	0.000352	1.08	57.33	28.89	0.13
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	61.83	69.25	72.58		72.6	0.000328	1.05	58.85	29.22	0.13
P118-25-01	P118-25-01	4047.7	Max WS	63.15	69.28	72.57		72.58	0.000325	1.05	59.9	29.35	0.13
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.73	67.84	72.45		72.46	0.000218	0.97	81.01	33.01	0.11
P118-25-01	P118-25-01	3312.44	Max WS	87.88	67.48	72.38		72.39	0.000211	0.96	91.68	37.44	0.11
P118-25-01	P118-25-01	3014.68	Max WS	97.92	67.53	72.32		72.33	0.000161	0.93	105.3	36.44	0.1
P118-25-01	P118-25-01	2924.04	Max WS	102.6	67.71	72.3		72.32	0.000172	0.95	107.47	37.77	0.1
P118-25-01	P118-25-01	2763.33	Max WS	107.37	66.67	72.28		72.29	0.000161	0.96	112.08	36.95	0.1
P118-25-01	P118-25-01	2728.92	Max WS	108.62	66.5	72.19		72.29	0.000612	2.56	42.5	25.81	0.21
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	108.58	66.31	72.02		72.11	0.000516	2.4	45.19	30.21	0.19
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	108.61	66.04	72.04		72.07	0.000302	1.32	82.15	25.2	0.13
P118-25-01	P118-25-01	1881.88	Max WS	161.78	66.57	71.53		71.61	0.001111	2.35	68.98	24.39	0.25
P118-25-01	P118-25-01	1384.48	Max WS	158.76	66.19	71		71.08	0.001037	2.25	70.53	25.38	0.24
P118-25-01	P118-25-01	1245.83	Max WS	158.53	66.34	70.85		70.93	0.001091	2.33	67.9	23.81	0.24
P118-25-01	P118-25-01	584.11	Max WS	68.19	65.88	70.36		70.37	0.000138	0.87	78.62	25.68	0.09
P118-25-01	P118-25-01	60.05	Max WS	82.25	63.5	70.28		70.3	0.00012	0.88	93.58	25.7	0.08

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel.Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4911.39	58.25	73.72		74.25	0.001699	5.94	1126.06	733.22	0.34
P118-00-00	P118-R3-2	71854.2	Max WS	4856.46	57.83	73.35		73.59	0.000515	3.87	1456.55	859.84	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4863.84	55.05	72.87		73.07	0.000401	3.56	1570.89	416.67	0.21
P118-00-00	P118-R3-2	69527.2	Max WS	4867.86	55.28	72.47		72.65	0.000315	3.45	1898.51	520	0.19
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3466.08	54.88	72.28		72.46	0.000329	3.46	1396.12	309.65	0.19
P118-00-00	P118-R3-2	68133	Max WS	2864.98	54.47	72.23		72.35	0.000195	2.89	1400.95	355.12	0.15
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2671.85	54.14	72.1		72.24	0.000254	3.05	1422.05	341.59	0.16
P118-00-00	P118-R3-2	66869	Max WS	3471.27	53.96	71.54		71.85	0.000792	4.53	879.83	171.31	0.28
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3769.51	53.79	71.47		71.74	0.000611	4.18	976.88	148.93	0.25
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3560.87	53.6	71.26		71.5	0.00042	4.08	1314.42	227.52	0.21
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2723.56	53.52	71.28		71.39	0.000315	2.74	1267.82	278.2	0.18
P118-00-00	P118-R3-2	65434.6	Max WS	698.96	53.1	71.36		71.37	0.000016	0.77	1373.83	214.6	0.04
P118-00-00	P118-R3-2	64399.74	Max WS	3738.98	52.59	70.71		71	0.000492	4.35	1106.46	191.08	0.23
P118-00-00	P118-R3-2	64273.7	Max WS	3980.72	53.55	70.7	61.94	70.9	0.000428	3.59	1158.92	173.28	0.21
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3980.44	53.3	70.68		70.86	0.000396	3.5	1176.78	154.18	0.21
P118-00-00	P118-R3-2	64200	Max WS	3980.25	53.3	70.67		70.86	0.000396	3.5	1176.46	154.17	0.21
P118-00-00	P118-R2-2	64100	Max WS	5272.59	52.61	70.66		70.8	0.000202	3.02	1796.54	7754.69	0.16
P118-00-00	P118-R2-2	64094	Max WS	5272.56	52.61	70.66	60.52	70.8	0.000202	3.02	1796.35	7750.65	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5272.58	52.56	70.63		70.77	0.0002	3.02	1800.31	7824.04	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5272.58	52.78	70.46	62.64	70.79	0.0005	4.61	1274.42	7416.35	0.24
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5272.55	53.04	69.73		70.13	0.00069	5.09	1137.12	2885.32	0.28
P118-00-00	P118-R2-2	63959.7	Max WS	5272.54	53.06	69.94	60.47	70.1	0.000246	3.18	1683.43	4960.26	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5272.57	53.16	69.88		70.04	0.000259	3.23	1651.3	4341.08	0.17
P118-00-00	P118-R2-2	63756.7	Max WS	5278.93	52.4	69.47		70.05	0.001228	6.2	1055.34	205	0.36
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4515.77	50.35	68.85		69.27	0.000865	5.23	932.94	164.4	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	4965.03	50.77	68.05		68.41	0.000872	4.76	1042.56	132.2	0.3
P118-00-00	P118-R2-2	60625.3	Max WS	5211.79	49.57	67.41		67.81	0.000902	5.02	1037.19	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5203.57	49.48	66.21		66.9	0.00129	6.75	817.91	127.2	0.37
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5288.41	49.68	66.16		66.76	0.001124	6.3	875.67	125.39	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5330.05	49.89	66.12		66.65	0.000988	5.88	936.89	128.6	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5359.2	50.09	66.09		66.56	0.000885	5.52	996.98	134.06	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	5382.88	50.3	66.05		66.47	0.00081	5.22	1053.65	140.71	0.3
P118-00-00	P118-R2-1	60535.46	Max WS	5399.97	50.5	66.01		66.39	0.000753	4.97	1107.21	148.13	0.29
P118-00-00	P118-R2-1	60396.4*	Max WS	5404.7	50.45	65.94		66.32	0.000804	5	1100.28	152.15	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5404.63	50.4	65.86		66.25	0.00085	5.02	1095.74	156.15	0.3
P118-00-00	P118-R2-1	60138.3*	Max WS	5404.67	50.35	65.78		66.17	0.00089	5.03	1094.45	160.16	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5404.6	50.3	65.7		66.09	0.000922	5.02	1096.04	164.11	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	5404.57	50.25	65.63		66.01	0.000947	5	1100.51	168.09	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5404.57	50.2	65.55		65.93	0.000961	4.96	1108.7	172.13	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5405.23	50.15	65.47		65.84	0.000966	4.91	1119.65	176.38	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5407.41	50.1	65.39		65.76	0.000971	4.87	1133.19	180.62	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5407.4	50.1	65.31		65.67	0.000981	4.84	1130.89	195.51	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5407.33	50.11	65.23		65.59	0.000938	4.81	1127.03	173.48	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	5407.37	50.11	65.16		65.51	0.000861	4.75	1139.24	148.73	0.3
P118-00-00	P118-R2-1	58960.5*	Max WS	5407.37	50.13	65.1		65.44	0.00081	4.67	1157.9	147.85	0.29
P118-00-00	P118-R2-1	58844.9*	Max WS	5407.36	50.11	65.05		65.38	0.000741	4.58	1181.48	145.09	0.28
P118-00-00	P118-R2-1	58729.3*	Max WS	5407.28	50.12	65.01		65.32	0.000643	4.46	1211.21	138.42	0.27
P118-00-00	P118-R2-1	58613.7	Max WS	5407.27	50.12	64.97		65.26	0.000602	4.34	1245.63	141.09	0.26
P118-00-00	P118-R2-1	58463.86	Max WS	5496.83	47.59	64.77	58.02	65.11	0.00069	4.68	1184.62	540.37	0.28
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-4.54	67.88	69.46		69.47	0.003391	-0.56	8.43	19.09	0.1
P118-21-00	P118-21-00	2493.18	Max WS	-2.61	67.95	69.49		69.49	0.000746	-0.25	11.83	26.42	0.05
P118-21-00	P118-21-00	2450.1	Max WS	1.43	67.59	69.5		69.5	0.000001	0.06	24.99	22.83	0.01
P118-21-00	P118-21-00	2416.26	Max WS	3.36	67.5	69.5		69.5	0.000001	0.13	25.97	24.48	0.02
P118-21-00	P118-21-00	2398.11	Max WS	5.09	67.44	69.5		69.5	0.000002	0.19	26.66	21.64	0.03
P118-21-00	P118-21-00	2389.56	Max WS	6.72	67.41	69.5		69.5	0.000013	0.25	27.18	21.87	0.04

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2343.79	Max WS	9.61	67.54	69.49		69.5	0.000115	0.68	14.21	12.65	0.11
P118-21-00	P118-21-00	2303.58	Max WS	12.61	67.47	69.47		69.48	0.000475	0.87	14.46	12.09	0.14
P118-21-00	P118-21-00	2208.42	Max WS	16.58	67.31	69.41		69.43	0.000508	0.93	17.74	14.3	0.15
P118-21-00	P118-21-00	2195.48	Max WS	16.58	67.34	69.41		69.42	0.000205	0.91	18.31	15.87	0.15
P118-21-00	P118-21-00	2169.49	Max WS	16.58	66.56	69.41		69.42	0.000092	0.79	20.98	11.22	0.1
P118-21-00	P118-21-00	2167.76	Max WS	16.58	66.37	69.41		69.42	0.000056	0.64	25.86	13.35	0.08
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	16.56	65.03	68.57		68.57	0.000035	0.5	33.4	18.48	0.07
P118-21-00	P118-21-00	2100.84	Max WS	16.56	64.78	68.57		68.57	0.000063	0.45	36.94	18.2	0.06
P118-21-00	P118-21-00	1662.37	Max WS	101.13	63.91	68.24		68.3	0.000857	1.91	52.85	20.41	0.21
P118-21-00	P118-21-00	1144.5	Max WS	158.37	62.63	67.62		67.71	0.001166	2.48	63.86	20.19	0.25
P118-21-00	P118-21-00	595.53	Max WS	0.78	61.49	66.91		66.91	0	0.01	111.21	47.22	0
P118-21-00	P118-21-00	549.31*	Max WS	-9.38	61.18	66.91		66.91	0.000001	-0.08	121.84	44.42	0.01
P118-21-00	P118-21-00	503.08*	Max WS	-20.72	60.87	66.91		66.91	0.000004	-0.16	130.19	41.62	0.02
P118-21-00	P118-21-00	456.86*	Max WS	-32.3	60.57	66.91		66.91	0.000008	-0.24	136.13	38.81	0.02
P118-21-00	P118-21-00	410.63*	Max WS	-43.22	60.26	66.91		66.91	0.000013	-0.31	139.81	36.01	0.03
P118-21-00	P118-21-00	364.41*	Max WS	-54.17	59.95	66.91		66.91	0.000018	-0.39	140.99	33.21	0.03
P118-21-00	P118-21-00	318.18*	Max WS	-64.93	59.64	66.91		66.91	0.000024	-0.47	139.95	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-75.95	59.34	66.9		66.91	0.000032	-0.56	136.52	27.6	0.04
P118-21-00	P118-21-00	225.73*	Max WS	-86.82	59.03	66.9		66.91	0.000044	-0.66	130.8	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-95.17	58.72	66.9		66.91	0.000066	-0.78	122.77	22	0.06
P118-21-00	P118-21-00	159.41*	Max WS	-107.55	57.98	66.9		66.91	0.000067	-0.81	133.42	22.53	0.06
P118-21-00	P118-21-00	139.31*	Max WS	-114.58	57.24	66.92		66.93	0.000061	-0.79	144.74	23.06	0.06
P118-21-00	P118-21-00	119.21*	Max WS	-87.84	56.51	66.95		66.95	0.000029	-0.56	156.73	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-73.2	55.77	66.99		66.99	0.000017	-0.43	169.41	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-61.65	55.03	67.03		67.03	0.00001	-0.34	182.61	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.16		74.16	0.000002	0.11	90.91	36.86	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.16		74.16	0.000003	0.13	79.74	31.18	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.58	70.08	74.16	70.24	74.16	0.000004	0.14	76.46	25.98	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.58	70.2	74.15		74.15	0.000004	0.15	72.69	27.67	0.02
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.58	70.16	74.15		74.15	0.000006	0.17	70.05	27.71	0.02
P118-23-00	P118-23-00 R2	7654.51	Max WS	17.91	69.97	74.15		74.15	0.000012	0.25	73	25.86	0.03
P118-23-00	P118-23-00 R2	7632.63	Max WS	20.38	69.88	74.15		74.15	0.000016	0.28	72.6	25.44	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.09	68.92	74.15		74.15	0.000015	0.29	77.99	31.88	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	21.96	69.39	74.07		74.07	0.000014	0.28	91.92	177.05	0.03
P118-23-00	P118-23-00 R2	7567.5	Max WS	23.51	69.56	74.07		74.07	0.000019	0.32	74.2	486.86	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	32.38	68.48	74.06		74.06	0.000033	0.42	76.71	1138.32	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	37.58	68.06	74.06		74.06	0.000039	0.47	80.23	1065.28	0.05
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	37.58	69.59	73.82		73.84	0.000174	1.28	29.45	514.66	0.11
P118-23-00	P118-23-00 R2	7313.37	Max WS	38.95	69.5	73.83		73.83	0.000038	0.46	85	563.02	0.05
P118-23-00	P118-23-00 R2	7305.97	Max WS	39.65	69.17	73.83		73.83	0.000036	0.46	86.54	477.6	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	40.61	69.43	73.83		73.83	0.000037	0.59	68.68	492.36	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	40.61	69.34	73.57		73.57	0.000041	0.46	129.68	145.04	0.05
P118-23-00	P118-23-00 R2	7257.19	Max WS	43.28	69.28	73.57		73.57	0.000045	0.48	117.11	137.57	0.05
P118-23-00	P118-23-00 R2	6786.22	Max WS	92.67	68.02	73.54		73.55	0.000066	0.57	420.36	1366.9	0.06
P118-23-00	P118-23-00 R2	6723.56	Max WS	100.05	67.37	73.54		73.54	0.000057	0.63	159.85	46.2	0.06
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	94.96	67.54	71.86		71.91	0.001205	1.87	50.72	27.1	0.24
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	109.92	67.16	71.8		71.83	0.000357	1.35	81.28	28.51	0.14
P118-23-00	P118-23-00 R2	6402.43	Max WS	126.74	67.03	71.71		71.75	0.000457	1.56	81.24	27.47	0.16
P118-23-00	P118-23-00 R2	6356.93	Max WS	134.51	66.97	71.68	68.63	71.73	0.000496	1.63	82.31	27.61	0.17
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	134.52	66.93	71.66		71.7	0.000478	1.61	83.56	27.91	0.16
P118-23-00	P118-23-00 R2	6293.27	Max WS	138.87	66.88	71.64		71.69	0.00049	1.64	84.87	28.16	0.17
P118-23-00	P118-23-00 R2	5958.59	Max WS	132.3	66.24	71.5		71.52	0.000212	1.09	121.73	41.19	0.11
P118-23-00	P118-23-00 R2	5652.94	Max WS	142.68	65.7	71.4		71.43	0.000293	1.37	104.28	30.46	0.13
P118-23-00	P118-23-00 R2	5045.34	Max WS	46.83	63.97	71.38		71.39	0.000014	0.34	138.42	31.6	0.03
P118-23-00	P118-23-00 R2	4947.92	Max WS	50.31	63.84	71.38	64.53	71.38	0.00001	0.29	176.05	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	50.13	63.87	71.37		71.37	0.000007	0.27	186.44	34.77	0.02
P118-23-00	P118-23-00 R2	4783.1	Max WS	68.65	63.65	71.37		71.37	0.000031	0.47	147.35	37.16	0.04
P118-23-00	P118-23-00 R2	4580.38	Max WS	109.57	63.02	71.35	64.59	71.36	0.000061	0.64	171.37	46.95	0.06
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	109.45	63.16	71.34		71.34	0.000059	0.58	187.51	58.28	0.06
P118-23-00	P118-23-00 R2	4459.75	Max WS	124.58	63.55	71.33		71.33	0.00007	0.67	184.89	52.65	0.06
P118-23-00	P118-23-00 R2	4370.6	Max WS	134.63	63.42	71.32		71.33	0.000058	0.61	221.04	65.06	0.06
P118-23-00	P118-23-00 R2	4330.88	Max WS	137.77	62.88	71.32		71.33	0.000014	0.32	436.44	125.25	0.03

Alternative 3 (Recommended)
HEC-RAS Results

HFC RAS Plan: Alt3_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	137.34	63.33	71.29		71.29	0.000008	0.32	432.77	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	140.12	63.34	71.29		71.29	0.000023	0.52	271.16	51.14	0.04
P118-23-00	P118-23-00 R2	3733.5	Max WS	166.58	62.41	71.26		71.27	0.000066	0.85	195.81	34.28	0.06
P118-23-00	P118-23-00 R2	3187.46	Max WS	198.71	62.36	71.22		71.23	0.00006	0.85	234.19	40.27	0.06
P118-23-00	P118-23-00 R2	3150.64	Max WS	204.28	61.93	71.22	64.34	71.23	0.000064	0.79	257.23	52.14	0.06
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	204.1	61.56	71.21		71.22	0.000055	0.75	272.99	55.63	0.06
P118-23-00	P118-23-00 R2	3104.46	Max WS	206.51	61.63	71.21		71.22	0.000085	0.86	239.39	52.53	0.07
P118-23-00	P118-23-00 R2	2750.51	Max WS	236.06	60.59	71.17		71.19	0.000078	1.02	232.11	34.6	0.07
P118-23-00	P118-23-00 R2	2741.93	Max WS	236.56	60.44	71.17	63.09	71.18	0.000075	1	236.65	34.96	0.07
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	236.59	60.52	71.15		71.17	0.000066	0.9	262.66	42.97	0.06
P118-23-00	P118-23-00 R2	2716.57	Max WS	238.2	60.68	71.15		71.17	0.000076	0.89	268.71	52.19	0.07
P118-23-00	P118-23-00 R2	2615.37	Max WS	255.47	60.75	71.14		71.16	0.000087	1.06	241.26	37.87	0.07
P118-23-00	P118-23-00 R2	2244.98	Max WS	263.73	60.53	71.11		71.13	0.000069	1.01	262.04	35.71	0.07
P118-23-00	P118-23-00 R2	2221.06	Max WS	262.47	60.56	71.11	62.88	71.12	0.000072	1.01	258.9	36.69	0.07
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	262.33	60.59	71.09		71.1	0.000064	0.98	269.03	37.2	0.06
P118-23-00	P118-23-00 R2	2042.36	Max WS	271.28	59.78	71.08		71.09	0.000056	0.77	351.5	67.27	0.06
P118-23-00	P118-23-00 R2	1922.13	Max WS	268.73	59.56	71.08		71.09	0.000049	0.72	371.09	72.85	0.06
P118-23-00	P118-23-00 R2	1892.63	Max WS	276.16	59.68	71.08	62.67	71.09	0.000058	0.8	345.41	66.31	0.06
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	275.99	59.86	71		71.02	0.000094	1.1	251.55	38.81	0.08
P118-23-00	P118-23-00 R2	1829.45	Max WS	291.61	59.87	71.01		71.02	0.00006	0.78	373.15	75.5	0.06
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	365.57	59.04	70.98		71	0.000074	0.97	376.82	62.07	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	695.81	59.85	70.97		70.98	0.000071	1.05	2205.02	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	703.41	59.99	70.96	64.01	70.97	0.000045	0.7	2474.48	990.93	0.06
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	703.15	58.36	70.95		70.96	0.000028	0.61	2874.26	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	734.69	57.88	70.95		70.96	0.00003	0.7	2880.76	916.83	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	931.68	57.45	70.92		70.93	0.00009	1.14	2142.33	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	1128.85	57.03	70.86		70.89	0.000152	1.6	1676.81	449.67	0.1
P118-23-00	P118-23-00 R1	242.54	Max WS	1281.68	55.82	70.82	61.85	70.83	0.000052	0.77	6139.44	4876.85	0.06
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1280.93	55.57	70.8		70.8	0.000037	0.82	7279.23	5145.76	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1290.13	55.13	70.78		70.82	0.000091	1.62	1150.34	175.37	0.09
P118-23-00	P118-23-00 R1	58.31	Max WS	1289.71	53.78	70.77		70.82	0.000106	1.93	940.59	83.5	0.1
P118-23-02	P118-23-02	4138.85	Max WS	59.04	67.78	71.48		71.49	0.000226	0.87	243.09	1024.86	0.11
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	57.38	66.69	71.43		71.43	0.000102	0.59	102.62	895.29	0.08
P118-23-02	P118-23-02	3782.06	Max WS	213.21	66.66	71.41		71.43	0.000565	1.4	542.38	1021.44	0.17
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	213.21	66.22	71.41		71.41	0.000054	0.29	1878.78	1255.44	0.04
P118-23-02	P118-23-02	3692.61	Max WS	215.61	66.22	71.38		71.46	0.001248	2.21	97.64	1238.9	0.27
P118-23-02	P118-23-02	3049.5	Max WS	33.11	65.47	71.04		71.04	0.000011	0.22	375.27	1063.45	0.03
P118-23-02	P118-23-02	2386.67	Max WS	32.82	65.13	71.03		71.03	0.000006	0.17	847.9	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	32.58	65.16	71.03		71.03	0.000004	0.12	950.13	1094.25	0.01
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	32.08	65.26	71.03		71.03	0.000019	0.33	96.07	1048.99	0.03
P118-23-02	P118-23-02	2278.1	Max WS	29.86	65.19	71.03		71.03	0.000005	0.18	748.44	1052.88	0.02
P118-23-02	P118-23-02	1453.34	Max WS	117.5	63.69	71.01		71.01	0.000035	0.55	877.67	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	118.33	63.66	71.01	65.44	71.01	0.000026	0.51	967.76	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	118.24	63.56	71.01		71.01	0.000016	0.4	1295.81	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	120.54	63.36	71.01		71.01	0.000016	0.31	1175.15	958.67	0.03
P118-23-02	P118-23-02	1317.96	Max WS	123.83	62.91	71		71.01	0.000013	0.35	1343.95	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	133.54	61.86	71		71.01	0.000045	0.68	487.74	1204.27	0.05
P118-23-02	P118-23-02	1083.7	Max WS	143.9	62.56	71		71	0.000014	0.37	1531.15	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	330.47	60.16	70.98		70.98	0.000029	0.56	1991.93	1102.12	0.05
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	71.86		71.86	0.000001	0.07	134.18	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.97	66.34	71.86		71.86	0.000001	0.07	134.15	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	39.05	66.13	71.85		71.85	0.000016	0.33	117.75	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	76.48	65.84	71.83		71.84	0.000051	0.6	127.06	33.01	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	90	65.5	71.82		71.83	0.000057	0.65	139.46	35.73	0.06
P118-25-00	P118-25-00 R2	2473.31	Max WS	89.83	65.47	71.82	67.23	71.83	0.000057	0.65	138.69	35.01	0.06
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	89.57	65.47	71.81		71.82	0.000058	0.64	140.9	37.73	0.06
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_50Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	86.22	65.38	71.81		71.82	0.000047	0.6	144.33	35.28	0.05
P118-25-00	P118-25-00 R2	2046.09	Max WS	86.99	64.63	71.8		71.8	0.000029	0.49	177.25	40.52	0.04
P118-25-00	P118-25-00 R1	1929.3	Max WS	223.36	64.22	71.75		71.78	0.000312	1.51	147.67	38.63	0.14
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	153	64.03	71.67		71.68	0.0001	0.97	158.2	33.08	0.08
P118-25-00	P118-25-00 R1	1208.56	Max WS	84.34	63.03	71.66		71.67	0.000022	0.49	172.22	30.27	0.04
P118-25-00	P118-25-00 R1	1188.81	Max WS	77.56	63.01	71.66	64.63	71.67	0.000021	0.47	166.51	29.97	0.03
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	39.09	62.94	71.65		71.65	0.000006	0.24	163.81	29.45	0.02
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	31.49	62.83	71.65		71.65	0.000003	0.18	177.44	33.01	0.01
P118-25-00	P118-25-00 R1	980.2	Max WS	65.38	62.34	71.65		71.65	0.000009	0.32	206.86	35.75	0.02
P118-25-00	P118-25-00 R1	963.63	Max WS	70.68	62.25	71.65		71.65	0.000005	0.28	249.75	44.05	0.02
P118-25-00	P118-25-00 R1	950.55	Max WS	70.74	62.25	71.65	63.59	71.65	0.000006	0.25	314.62	94.04	0.02
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	70.61	61.68	71.64		71.64	0.000004	0.23	329.6	86	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	70.7	61.68	71.64		71.64	0.000004	0.27	261.98	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	81.29	61.16	71.64		71.64	0.000008	0.32	250.62	37.72	0.02
P118-25-00	P118-25-00 R1	490.93	Max WS	207.52	60.25	71.62		71.63	0.000039	0.73	283.06	44.02	0.05
P118-25-00	P118-25-00 R1	251.81	Max WS	266.51	58.25	71.6		71.61	0.000035	0.77	348.08	44.09	0.05
P118-25-00	P118-25-00 R1	229.81*	Max WS	268.31	58.04	71.6		71.61	0.000034	0.76	354.4	44.08	0.05
P118-25-00	P118-25-00 R1	207.81*	Max WS	270.09	57.84	71.6		71.61	0.000031	0.75	360.7	44.07	0.05
P118-25-00	P118-25-00 R1	185.81*	Max WS	272.68	57.63	71.6		71.61	0.00003	0.74	366.98	44.05	0.05
P118-25-00	P118-25-00 R1	163.80*	Max WS	275.25	57.43	71.6		71.61	0.00003	0.74	373.25	44.04	0.04
P118-25-00	P118-25-00 R1	141.80*	Max WS	278.29	57.22	71.6		71.61	0.00003	0.73	379.54	44.03	0.04
P118-25-00	P118-25-00 R1	119.80*	Max WS	280.93	57.02	71.6		71.61	0.000028	0.73	385.76	44.01	0.04
P118-25-00	P118-25-00 R1	97.8	Max WS	284.8	56.81	71.6	60.48	71.61	0.000028	0.73	392.08	44	0.04
P118-25-01	P118-25-01	5341.48	Max WS	11.18	70.47	74.7		74.7	0.000004	0.14	82.58	34.46	0.02
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	163.2	68.9	74.37		74.41	0.000551	1.65	98.61	36.08	0.18
P118-25-01	P118-25-01	4162.47	Max WS	176.14	69.44	74.19		74.24	0.000506	1.62	108.52	38.73	0.17
P118-25-01	P118-25-01	4134.04	Max WS	179.67	69.38	74.18	71.41	74.22	0.000498	1.62	110.89	39.23	0.17
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	179.62	69.25	74.13		74.17	0.000486	1.61	111.87	39.38	0.17
P118-25-01	P118-25-01	4047.7	Max WS	179.22	69.28	74.11		74.15	0.000469	1.59	112.96	39.41	0.17
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	197.6	67.84	73.94		73.97	0.000328	1.44	137.64	42.27	0.14
P118-25-01	P118-25-01	3312.44	Max WS	199.33	67.48	73.85		73.88	0.000265	1.28	155.24	48.48	0.13
P118-25-01	P118-25-01	3014.68	Max WS	201.69	67.53	73.79		73.81	0.000203	1.22	164.94	45	0.11
P118-25-01	P118-25-01	2924.04	Max WS	202.34	67.71	73.77		73.79	0.000194	1.2	169.29	46.21	0.11
P118-25-01	P118-25-01	2763.33	Max WS	188.21	66.67	73.75		73.76	0.000153	1.09	172.8	44.92	0.1
P118-25-01	P118-25-01	2728.92	Max WS	190.84	66.5	73.61		73.79	0.000789	3.46	55.23	29.03	0.25
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	190.86	66.31	72.89		73.09	0.000936	3.6	53.03	33	0.26
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	192.18	66.04	72.97		73.02	0.000459	1.8	106.99	27.97	0.16
P118-25-01	P118-25-01	1881.88	Max WS	210.57	65.57	72.57		72.65	0.000759	2.18	96.73	28.6	0.21
P118-25-01	P118-25-01	1384.48	Max WS	213.06	66.19	72.24		72.3	0.000638	2.03	105.11	30.57	0.19
P118-25-01	P118-25-01	1245.83	Max WS	212.72	66.34	72.14		72.21	0.000654	2.09	101.76	28.47	0.19
P118-25-01	P118-25-01	584.11	Max WS	176.23	65.88	71.88		71.91	0.000274	1.45	121.15	29.02	0.13
P118-25-01	P118-25-01	60.05	Max WS	148.89	63.5	71.79		71.81	0.000141	1.11	133.83	27.03	0.09

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_10Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	5442.05	58.25	74.27		74.75	0.002646	5.84	1616.15	973.82	0.34
P118-00-00	P118-R3-2	71854.2	Max WS	5011.76	57.83	73.58		73.81	0.000496	3.87	1659.57	962.64	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5073.49	55.05	73.09		73.3	0.0004	3.61	1666.24	447.2	0.21
P118-00-00	P118-R3-2	69527.2	Max WS	5074.27	55.28	72.69		72.88	0.000315	3.5	2013.01	520	0.19
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3267.86	54.88	72.56		72.71	0.000263	3.15	1482.28	309.65	0.17
P118-00-00	P118-R3-2	68133	Max WS	2679.05	54.47	72.52		72.62	0.000154	2.61	1504.79	357.52	0.13
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2352.02	54.14	72.45		72.54	0.000173	2.57	1539.24	345.92	0.13
P118-00-00	P118-R3-2	66869	Max WS	3094.34	53.96	72.06		72.27	0.00054	3.75	970.96	179.84	0.23
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3428.41	53.79	71.99		72.19	0.000437	3.57	1056.86	157.41	0.21
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3228.01	53.6	71.85		72.02	0.000282	3.46	1450.17	227.52	0.18
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2504.13	53.52	71.87		71.95	0.000202	2.3	1432.08	278.2	0.14
P118-00-00	P118-R3-2	65434.6	Max WS	519.15	53.1	71.93		71.94	0.000007	0.54	1496.62	214.6	0.03
P118-00-00	P118-R3-2	64399.74	Max WS	3763.48	52.59	71.4		71.64	0.000399	4.08	1241.44	203.48	0.21
P118-00-00	P118-R3-2	64273.7	Max WS	4219.24	53.55	71.35	62.2	71.54	0.000383	3.53	1272.02	175.61	0.21
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4216.31	53.3	71.32		71.51	0.000357	3.44	1277.7	156.51	0.2
P118-00-00	P118-R3-2	64200	Max WS	4214.76	53.3	71.32		71.51	0.000357	3.44	1277.41	156.51	0.2
P118-00-00	P118-R2-2	64100	Max WS	5934.52	52.61	71.3		71.46	0.000213	3.22	1911.41	8688.74	0.16
P118-00-00	P118-R2-2	64094	Max WS	5934.42	52.61	71.29	60.95	71.46	0.000213	3.22	1911.22	8687.75	0.16
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5934.5	52.56	71.27		71.43	0.000212	3.22	1914.98	8706.2	0.16
P118-00-00	P118-R2-2	64010.4	Max WS	5934.42	52.78	71.08	63.2	71.44	0.000526	4.9	1359.63	8323.56	0.25
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5934.36	53.04	70.12		70.59	0.000768	5.51	1190.8	4228.47	0.3
P118-00-00	P118-R2-2	63959.7	Max WS	5934.35	53.06	70.36	60.89	70.55	0.000277	3.44	1755.56	7390.76	0.18
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5934.39	53.16	70.3		70.49	0.000292	3.5	1721.11	6647.08	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	5939.85	52.4	69.84		70.5	0.001346	6.66	1130.38	205	0.38
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4869.53	50.35	69.27		69.71	0.000874	5.38	1002.32	169.74	0.3
P118-00-00	P118-R2-2	61905.2	Max WS	5243.27	50.77	68.53		68.88	0.000806	4.74	1106.04	132.2	0.29
P118-00-00	P118-R2-2	60625.3	Max WS	5604.25	49.52	67.89		68.3	0.000879	5.12	1095.08	121.4	0.3
P118-00-00	P118-R2-1	60595.74	Max WS	5562.96	49.48	66.75		67.44	0.001211	6.76	888.32	131.55	0.36
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	5718.42	49.68	66.66		67.29	0.001098	6.43	940.62	132.66	0.35
P118-00-00	P118-R2-1	60571.6*	Max WS	5815.86	49.89	66.6		67.17	0.00099	6.08	999.95	133.05	0.33
P118-00-00	P118-R2-1	60559.5*	Max WS	5873.96	50.09	66.56		67.06	0.000896	5.74	1061.3	137.56	0.32
P118-00-00	P118-R2-1	60547.5*	Max WS	5921.29	50.3	66.52		66.97	0.000826	5.45	1120.16	143.55	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	5958.97	50.5	66.47		66.89	0.000772	5.2	1176.43	150.51	0.29
P118-00-00	P118-R2-1	60396.4*	Max WS	5971.25	50.45	66.4		66.82	0.000821	5.23	1170.98	154.52	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	5972.52	50.4	66.32		66.74	0.000863	5.24	1168.24	158.51	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	5972.48	50.35	66.24		66.67	0.000897	5.24	1168.92	162.52	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	5972.45	50.3	66.17		66.59	0.000924	5.22	1172.53	166.48	0.32
P118-00-00	P118-R2-1	59840.2*	Max WS	5972.89	50.25	66.09		66.5	0.000944	5.19	1179.11	170.48	0.32
P118-00-00	P118-R2-1	59701.1*	Max WS	5977.35	50.2	66.01		66.42	0.000955	5.14	1189.27	174.49	0.32
P118-00-00	P118-R2-1	59562.1*	Max WS	5987.69	50.15	65.93		66.33	0.000961	5.1	1201.94	178.47	0.32
P118-00-00	P118-R2-1	59423.1	Max WS	5998.84	50.1	65.85		66.25	0.000978	5.08	1216.09	181.05	0.32
P118-00-00	P118-R2-1	59307.4*	Max WS	5998.79	50.1	65.77		66.16	0.000986	5.04	1220.87	196.49	0.32
P118-00-00	P118-R2-1	59191.8*	Max WS	5998.77	50.11	65.69		66.08	0.000992	5.01	1215.9	211.94	0.32
P118-00-00	P118-R2-1	59076.2*	Max WS	5998.79	50.11	65.61		65.99	0.000988	4.96	1210.46	174	0.32
P118-00-00	P118-R2-1	58960.5*	Max WS	5998.73	50.11	65.54		65.91	0.000956	4.9	1225.02	165.42	0.32
P118-00-00	P118-R2-1	58844.9*	Max WS	5998.69	50.11	65.47		65.83	0.000859	4.82	1245.04	158.52	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	5998.7	50.12	65.41		65.76	0.000776	4.72	1269.82	153.83	0.29
P118-00-00	P118-R2-1	58613.7	Max WS	5998.71	50.12	65.37		65.7	0.000656	4.61	1302.44	143.83	0.27
P118-00-00	P118-R2-1	58463.86	Max WS	6147.23	47.59	65.13	58.46	65.53	0.000764	5.02	1249.78	771.36	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-7.3	67.88	69.56		69.57	0.005968	-0.79	10.27	20.33	0.14
P118-21-00	P118-21-00	2493.18	Max WS	-5.11	67.95	69.6		69.6	0.001619	-0.4	15.28	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	-1.19	67.59	69.64		69.64	0	-0.05	28.09	23.65	0.01
P118-21-00	P118-21-00	2416.26	Max WS	0.58	67.5	69.64		69.64	0	0.02	29.32	25.47	0
P118-21-00	P118-21-00	2398.11	Max WS	2.42	67.44	69.64		69.64	0.000003	0.08	29.65	22.77	0.01

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Ait3_10Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2389.56	Max WS	4.27	67.41	69.64		69.64	0.000004	0.14	30.22	23.08	0.02
P118-21-00	P118-21-00	2343.79	Max WS	7.51	67.54	69.63		69.64	0.000051	0.47	16.03	13.61	0.08
P118-21-00	P118-21-00	2303.58	Max WS	11.01	67.47	69.62		69.63	0.000269	0.68	16.31	12.84	0.11
P118-21-00	P118-21-00	2208.42	Max WS	15.65	67.31	69.58		69.59	0.000317	0.77	20.21	15.12	0.12
P118-21-00	P118-21-00	2195.48	Max WS	15.65	67.34	69.58		69.59	0.000135	0.74	21.23	18.46	0.12
P118-21-00	P118-21-00	2169.49	Max WS	15.65	66.56	69.58		69.59	0.000065	0.68	22.99	12.51	0.09
P118-21-00	P118-21-00	2167.76	Max WS	15.65	66.37	69.58		69.59	0.000004	0.56	28.15	13.85	0.07
P118-21-00	P118-21-00	2161.6											
P118-21-00	P118-21-00	2135.78	Max WS	15.64	65.03	68.83		68.83	0.000024	0.4	38.65	22.15	0.05
P118-21-00	P118-21-00	2100.84	Max WS	15.64	64.78	68.83		68.83	0.000041	0.37	41.84	19.48	0.04
P118-21-00	P118-21-00	1662.37	Max WS	114.31	63.91	68.51		68.57	0.000812	1.96	59.41	29.05	0.21
P118-21-00	P118-21-00	1144.5	Max WS	180.27	62.63	67.83		67.94	0.001315	2.64	68.4	21.65	0.26
P118-21-00	P118-21-00	595.53	Max WS	-41.11	61.49	67.43		67.43	0.000018	-0.31	135.6	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-55.54	61.18	67.43		67.43	0.000024	-0.39	144.75	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-69.44	60.87	67.43		67.43	0.000003	-0.46	151.65	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-82.79	60.57	67.43		67.43	0.000036	-0.53	156.14	38.81	0.05
P118-21-00	P118-21-00	410.63*	Max WS	-96.33	60.26	67.42		67.43	0.000043	-0.61	158.38	36.01	0.05
P118-21-00	P118-21-00	364.41*	Max WS	-111.6	59.95	67.42		67.43	0.000053	-0.71	158.1	33.21	0.06
P118-21-00	P118-21-00	318.18*	Max WS	-126.94	59.64	67.42		67.43	0.000066	-0.82	155.59	30.41	0.06
P118-21-00	P118-21-00	271.96*	Max WS	-142.77	59.34	67.42		67.43	0.000084	-0.95	150.68	27.6	0.07
P118-21-00	P118-21-00	225.73*	Max WS	-158.46	59.03	67.41		67.43	0.000111	-1.11	143.48	24.8	0.08
P118-21-00	P118-21-00	179.51	Max WS	-170.31	58.72	67.41		67.44	0.000166	-1.27	133.99	22	0.09
P118-21-00	P118-21-00	159.41*	Max WS	-180.7	57.98	67.42		67.44	0.00015	-1.25	144.95	22.53	0.09
P118-21-00	P118-21-00	139.31*	Max WS	-179.31	57.24	67.43		67.45	0.000121	-1.15	156.52	23.06	0.08
P118-21-00	P118-21-00	119.21*	Max WS	-148.15	56.51	67.45		67.47	0.000068	-0.88	168.72	23.6	0.06
P118-21-00	P118-21-00	99.11*	Max WS	-91.93	55.77	67.49		67.5	0.000021	-0.51	181.69	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-81.66	55.03	67.55		67.55	0.000014	-0.42	195.36	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.55		74.55	0.000001	0.1	106.67	42.32	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.55		74.55	0.000002	0.11	94.27	41.25	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.62	70.08	74.55	70.23	74.55	0.000003	0.12	91.84	55.01	0.01
P118-23-00	P118-23-00 R2	7736.4											
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.55		74.55	0.000003	0.13	86.32	39.33	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.69	70.16	74.55		74.55	0.000004	0.14	83.43	38.31	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.49	69.97	74.55		74.55	0.000009	0.22	83.64	29.78	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.13	69.88	74.55		74.55	0.000012	0.25	83.06	43.56	0.03
P118-23-00	P118-23-00 R2	7614.75	Max WS	22.96	68.92	74.55		74.55	0.000011	0.26	101.47	141.56	0.03
P118-23-00	P118-23-00 R2	7597.04											
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.9	69.39	74.53		74.53	0.000008	0.22	233.83	411.79	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.58	69.56	74.53		74.53	0.000014	0.29	86.14	775.82	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.15	68.48	74.52		74.52	0.000025	0.39	88.63	1395.68	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.77	68.06	74.52		74.52	0.000003	0.43	92.1	1322.83	0.04
P118-23-00	P118-23-00 R2	7358.91											
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.69	69.59	74.27		74.27	0.000014	0.28	546.56	1042.09	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.15	69.5	74.26		74.27	0.000029	0.42	97.41	1009.03	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	41.89	69.12	74.26		74.27	0.000029	0.43	98.77	984.25	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	42.91	69.43	74.26		74.27	0.000003	0.57	75.61	940.04	0.05
P118-23-00	P118-23-00 R2	7280.57											
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.76	69.34	73.98		73.98	0.000023	0.37	324.21	849.16	0.04
P118-23-00	P118-23-00 R2	7237.19	Max WS	45.53	69.28	73.97		73.98	0.000031	0.39	247.25	769.92	0.04
P118-23-00	P118-23-00 R2	6785.22	Max WS	96.72	68.02	73.96		73.96	0.000028	0.37	787.09	1805.07	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	104.36	67.37	73.96		73.96	0.000049	0.58	180.64	52.72	0.06
P118-23-00	P118-23-00 R2	6675.9											
P118-23-00	P118-23-00 R2	6655.9	Max WS	94.23	67.54	72.11		72.15	0.000871	1.63	57.84	29.98	0.21
P118-23-00	P118-23-00 R2	6655											
P118-23-00	P118-23-00 R2	6654											
P118-23-00	P118-23-00 R2	6563.37	Max WS	112.04	67.16	72.06		72.08	0.000292	1.26	88.82	29.71	0.13
P118-23-00	P118-23-00 R2	6402.43	Max WS	132.14	67.03	71.98		72.02	0.000391	1.49	88.78	28.62	0.15
P118-23-00	P118-23-00 R2	6356.93	Max WS	141.44	66.97	71.95	68.69	71.99	0.000432	1.57	89.96	28.77	0.16
P118-23-00	P118-23-00 R2	6337.93											
P118-23-00	P118-23-00 R2	6324.93	Max WS	141.43	66.93	71.93		71.97	0.000418	1.55	91.14	29.04	0.15
P118-23-00	P118-23-00 R2	6293.27	Max WS	146.65	66.88	71.91		71.95	0.000432	1.58	92.57	29.32	0.16
P118-23-00	P118-23-00 R2	5958.59	Max WS	36.89	66.24	71.9		71.9	0.000014	0.27	139.16	51.79	0.03
P118-23-00	P118-23-00 R2	5652.94	Max WS	41.31	65.7	71.89		71.9	0.00002	0.34	120.81	37.81	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	36.46	63.97	71.89		71.89	0.000006	0.24	154.45	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	38.49	63.84	71.89	64.39	71.89	0.000004	0.2	197.23	41.98	0.02
P118-23-00	P118-23-00 R2	4925.91											
P118-23-00	P118-23-00 R2	4915.91	Max WS	38.02	63.87	71.88		71.88	0.000003	0.19	204.13	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	49.02	63.65	71.88		71.88	0.000011	0.29	166.4	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	64.42	63.02	71.87	64.14	71.88	0.000014	0.33	196.05	46.95	0.03
P118-23-00	P118-23-00 R2	4564.28											
P118-23-00	P118-23-00 R2	4553.28	Max WS	64.34	63.16	71.87		71.87	0.000012	0.29	218.54	58.28	0.03
P118-23-00	P118-23-00 R2	4459.75	Max WS	73.03	63.55	71.87		71.87	0.000015	0.34	213.29	52.65	0.03
P118-23-00	P118-23-00 R2	4370.6	Max WS	80.04	63.42	71.87		71.87	0.000013	0.31	256.42	65.06	0.03

Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_10Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4330.88	Max WS	82.25	62.88	71.87		71.87	0.000003	0.16	504.34	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	82.12	63.31	71.85		71.85	0.000002	0.17	475.55	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	87.21	63.34	71.85		71.85	0.000006	0.29	300.03	51.14	0.02
P118-23-00	P118-23-00 R2	3733.5	Max WS	128.53	62.41	71.84		71.84	0.000029	0.6	215.72	34.28	0.04
P118-23-00	P118-23-00 R2	3187.46	Max WS	174.35	62.36	71.81		71.82	0.000035	0.68	258.19	40.77	0.05
P118-23-00	P118-23-00 R2	3150.64	Max WS	178.44	61.93	71.81	64.18	71.82	0.000034	0.62	288.36	52.14	0.05
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	178.43	61.56	71.81		71.81	0.00003	0.58	306.28	55.63	0.04
P118-23-00	P118-23-00 R2	3104.46	Max WS	181.05	61.63	71.81		71.81	0.000045	0.67	270.94	52.53	0.05
P118-23-00	P118-23-00 R2	2750.51	Max WS	220.29	60.59	71.78		71.79	0.000053	0.87	253.28	34.6	0.06
P118-23-00	P118-23-00 R2	2741.93	Max WS	220.98	60.44	71.78	62.99	71.79	0.000051	0.86	258.05	34.96	0.06
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	220.98	60.52	71.78		71.78	0.000043	0.76	289.35	42.97	0.05
P118-23-00	P118-23-00 R2	2716.57	Max WS	222.1	60.68	71.78		71.78	0.000047	0.74	301.15	52.19	0.05
P118-23-00	P118-23-00 R2	2615.37	Max WS	233.94	60.75	71.77		71.78	0.000055	0.88	265.01	37.87	0.06
P118-23-00	P118-23-00 R2	2244.98	Max WS	241.81	60.53	71.75		71.76	0.000046	0.85	284.78	35.71	0.05
P118-23-00	P118-23-00 R2	2221.06	Max WS	240.77	60.56	71.75	62.76	71.76	0.000047	0.85	282.29	36.69	0.05
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	240.77	60.59	71.73		71.74	0.000042	0.82	292.78	37.2	0.05
P118-23-00	P118-23-00 R2	2042.36	Max WS	254.3	59.78	71.72		71.73	0.000034	0.64	394.55	67.27	0.05
P118-23-00	P118-23-00 R2	1922.11	Max WS	255.9	59.56	71.72		71.73	0.000031	0.61	417.84	72.85	0.05
P118-23-00	P118-23-00 R2	1892.63	Max WS	263.89	59.68	71.72	62.62	71.73	0.000037	0.68	388.04	66.31	0.05
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	263.87	59.86	71.65		71.66	0.000065	0.95	276.49	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	287.82	59.87	71.65		71.66	0.00004	0.68	421.55	75.5	0.05
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	381.69	59.04	71.63		71.64	0.000059	0.92	416.8	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	938.29	59.85	71.61		71.62	0.000065	1.07	2896.85	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	946.64	59.99	71.61	64.52	71.62	0.000043	0.75	3115.42	990.93	0.06
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	946.64	58.36	71.6		71.6	0.000029	0.68	3477.2	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	982.89	57.88	71.6		71.6	0.000032	0.77	3473.08	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	1219.36	57.45	71.57		71.58	0.00009	1.21	2621.51	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	1469.15	57.03	71.5		71.53	0.000168	1.78	1964.4	449.67	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	1704.1	55.82	71.46	62.69	71.46	0.00004	0.72	9499.62	5511.59	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1702.38	55.57	71.44		71.45	0.000029	0.76	10783.01	5550.55	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	1710.42	55.13	71.42		71.47	0.000127	1.99	1262.52	175.37	0.11
P118-23-00	P118-23-00 R1	58.33	Max WS	1709.94	53.78	71.4		71.47	0.000158	2.43	993.16	83.5	0.12
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	71.7		71.7	0.000003	0.11	355.26	1152.69	0.01
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	10.65	66.69	71.7		71.7	0.000002	0.09	151.88	1100.37	0.01
P118-23-02	P118-23-02	3782.06	Max WS	32.1	66.66	71.7		71.7	0.000006	0.15	864.87	1160.26	0.02
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	32.11	66.22	71.7		71.7	0.000001	0.04	2241.57	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	32.11	66.22	71.7		71.7	0.000001	0.06	1990.33	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	31.96	65.47	71.7		71.7	0.000002	0.08	1338.58	1167.05	0.01
P118-23-02	P118-23-02	2386.67	Max WS	60.61	65.13	71.69		71.69	0.000004	0.17	1557.07	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	63.41	65.16	71.69		71.69	0.000004	0.13	1672.11	1094.25	0.01
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	60.95	65.26	71.68		71.68	0.000003	0.14	1847.96	1060.82	0.01
P118-23-02	P118-23-02	2278.1	Max WS	66.07	65.19	71.68		71.68	0.000006	0.21	1435.27	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	215.48	63.69	71.66		71.66	0.000039	0.63	1502.57	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	216.86	63.66	71.66	66.12	71.66	0.000032	0.61	1590.4	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	216.52	63.56	71.65		71.65	0.000022	0.49	1918.13	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	220.99	63.36	71.65		71.65	0.000018	0.34	1795.41	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	233.9	62.91	71.65		71.65	0.000016	0.42	2011.33	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	264.28	61.86	71.65		71.65	0.000017	0.44	2291.48	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	286.42	62.56	71.65		71.65	0.000018	0.45	2342.6	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	556.53	60.16	71.62		71.63	0.000036	0.65	2703.57	1102.12	0.05
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.46		72.46	0.000001	0.06	156.61	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.46		72.46	0.000001	0.06	156.56	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	51.08	66.13	72.45		72.45	0.000017	0.37	136.38	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	102.59	65.84	72.43		72.44	0.000059	0.7	146.75	33.01	0.06
P118-25-00	P118-25-00 R2	2494.17	Max WS	126.2	65.5	72.41		72.42	0.000073	0.79	160.64	35.73	0.07
P118-25-00	P118-25-00 R2	2473.31	Max WS	127.96	65.47	72.41	67.53	72.42	0.000076	0.8	159.41	35.01	0.07
P118-25-00	P118-25-00 R2	2469.143	Simoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	127.99	65.47	72.4		72.41	0.000076	0.78	163.18	37.73	0.07

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	130.32	65.38	72.4		72.41	0.000071	0.79	164.99	35.28	0.06
P118-25-00	P118-25-00 R2	2046.09	Max WS	136.35	64.63	72.38		72.38	0.000048	0.68	200.61	40.52	0.05
P118-25-00	P118-25-00 R1	1929.3	Max WS	271.44	64.22	72.32		72.36	0.000304	1.59	170.4	39.73	0.14
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	234.07	64.03	72.25		72.28	0.000166	1.32	177.43	33.08	0.1
P118-25-00	P118-25-00 R1	1208.56	Max WS	173.28	63.03	72.23		72.24	0.000071	0.92	189.35	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	168.39	63.03	72.23	65.45	72.24	0.000074	0.92	183.46	29.97	0.07
P118-25-00	P118-25-00 R1	1181.605-Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	167.87	62.94	72.22		72.23	0.000077	0.93	180.4	29.45	0.07
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	161.91	62.83	72.22		72.23	0.000059	0.83	196.06	33.01	0.06
P118-25-00	P118-25-00 R1	980.2	Max WS	177.46	62.34	72.21		72.22	0.000049	0.78	226.81	35.75	0.05
P118-25-00	P118-25-00 R1	963.63	Max WS	181.4	62.25	72.21		72.22	0.000024	0.67	269.34	45.01	0.04
P118-25-00	P118-25-00 R1	950.55	Max WS	181.51	62.25	72.21	64.34	72.21	0.000027	0.56	367.57	95	0.04
P118-25-00	P118-25-00 R1	930.1377-Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	180.91	61.68	72.18		72.19	0.000021	0.53	375.89	86	0.04
P118-25-00	P118-25-00 R1	886.91	Max WS	180.66	61.68	72.18		72.19	0.00002	0.64	280.73	51.01	0.04
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	183.34	61.16	72.18		72.18	0.000032	0.68	270.78	37.72	0.04
P118-25-00	P118-25-00 R1	490.93	Max WS	287.11	60.25	72.14		72.16	0.000006	0.94	305.21	44.02	0.06
P118-25-00	P118-25-00 R1	251.81	Max WS	342.61	58.25	72.13		72.14	0.000048	0.92	371.13	44.09	0.06
P118-25-00	P118-25-00 R1	229.81*	Max WS	342.77	58.04	72.13		72.14	0.000046	0.91	377.44	44.08	0.05
P118-25-00	P118-25-00 R1	207.81*	Max WS	342.37	57.84	72.13		72.14	0.000042	0.89	383.75	44.07	0.05
P118-25-00	P118-25-00 R1	185.81*	Max WS	341.56	57.63	72.13		72.14	0.000039	0.88	390.03	44.05	0.05
P118-25-00	P118-25-00 R1	163.80*	Max WS	339.96	57.43	72.13		72.14	0.000039	0.86	396.32	44.04	0.05
P118-25-00	P118-25-00 R1	141.80*	Max WS	337.63	57.22	72.13		72.14	0.000037	0.84	402.62	44.03	0.05
P118-25-00	P118-25-00 R1	119.80*	Max WS	333.76	57.02	72.13		72.14	0.000033	0.82	408.87	44.01	0.05
P118-25-00	P118-25-00 R1	97.8	Max WS	330.56	56.81	72.12	60.76	72.13	0.000032	0.8	415.2	44	0.05
P118-25-01	P118-25-01	5341.48	Max WS	12.7	70.47	75.27		75.27	0.000003	0.12	102.83	36.01	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	217.53	68.9	74.91		74.96	0.000593	1.83	119.01	39.63	0.19
P118-25-01	P118-25-01	4162.47	Max WS	237.69	69.44	74.71		74.77	0.000564	1.84	129.38	41.3	0.18
P118-25-01	P118-25-01	4134.04	Max WS	242.78	69.38	74.7	71.74	74.75	0.000565	1.84	131.97	42.26	0.18
P118-25-01	P118-25-01	4110.08-Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	242.77	69.25	74.64		74.69	0.000552	1.83	132.86	42.17	0.18
P118-25-01	P118-25-01	4047.7	Max WS	243.06	69.28	74.62		74.67	0.000534	1.82	133.53	41.35	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	261	67.84	74.43		74.47	0.000378	1.65	158.6	43.68	0.15
P118-25-01	P118-25-01	3312.44	Max WS	264.33	67.48	74.33		74.36	0.000308	1.48	178.88	50.08	0.14
P118-25-01	P118-25-01	3014.68	Max WS	249.57	67.53	74.26		74.29	0.000216	1.34	186.56	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	248.17	67.71	74.24		74.27	0.000203	1.3	191.45	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	208.57	66.67	74.23		74.25	0.00013	1.07	194.51	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	210.94	66.5	74.05		74.22	0.003725	3.36	62.71	29.03	0.4
P118-25-01	P118-25-01	2639.28-Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	208.89	66.31	73.21		73.43	0.000936	3.73	55.97	34.06	0.26
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	211.61	66.04	73.31		73.36	0.000437	1.82	116.54	28.6	0.16
P118-25-01	P118-25-01	1881.88	Max WS	226	66.57	72.96		73.02	0.000651	2.09	107.95	30.13	0.2
P118-25-01	P118-25-01	1384.48	Max WS	227.24	66.19	72.67		72.73	0.000526	1.91	118.96	32.76	0.18
P118-25-01	P118-25-01	1245.83	Max WS	226.16	66.34	72.6		72.66	0.000531	1.97	115.06	30.11	0.18
P118-25-01	P118-25-01	584.11	Max WS	166.58	65.88	72.42		72.45	0.00017	1.22	136.98	29.02	0.1
P118-25-01	P118-25-01	60.05	Max WS	135.02	63.5	72.37		72.39	0.000084	0.9	149.58	27.03	0.07

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_50Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.72		75.94	0.003056	4.51	3163.94	1277.76	0.27
P118-00-00	P118-R3-2	71854.2	Max WS	6302.26	57.83	74.84		75.05	0.000416	3.87	3733.08	1994.02	0.27
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5196.01	55.05	74.44		74.59	0.000251	3.13	2269.2	447.2	0.17
P118-00-00	P118-R3-2	69527.2	Max WS	4862.85	55.28	74.24		74.35	0.000165	2.77	2817.77	520	0.14
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3132.11	54.88	74.18		74.27	0.000136	2.49	1984.53	309.65	0.13
P118-00-00	P118-R3-2	68133	Max WS	2569.09	54.47	74.16		74.22	0.000083	2.08	2103.97	369.7	0.1
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2090.6	54.14	74.14		74.18	0.000075	1.86	2142.81	365.8	0.09
P118-00-00	P118-R3-2	66869	Max WS	2785.59	53.96	73.98		74.08	0.000222	2.63	1340.96	204.01	0.15
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2934.01	53.79	73.96		74.05	0.000183	2.41	1411.55	196.78	0.14
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2748.79	53.6	73.91		73.99	0.000109	2.4	1917.48	227.52	0.11
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2326.13	53.52	73.91		73.95	0.000076	1.63	1999.6	278.2	0.09
P118-00-00	P118-R3-2	65434.6	Max WS	865.13	53.1	73.94		73.94	0.000012	0.74	1927.1	214.6	0.03
P118-00-00	P118-R3-2	64399.74	Max WS	3889.89	52.59	73.63		73.79	0.000217	3.37	1701.07	206.63	0.16
P118-00-00	P118-R3-2	64273.7	Max WS	4762.55	53.55	73.55	62.75	73.7	0.000235	3.16	1662.06	218.1	0.17
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4761.36	53.3	73.51		73.66	0.000224	3.12	1623.11	173.2	0.16
P118-00-00	P118-R3-2	64200	Max WS	4761.78	53.3	73.51		73.66	0.000224	3.12	1622.93	173.2	0.16
P118-00-00	P118-R2-2	64100	Max WS	8118.65	52.61	73.4		73.62	0.000232	3.74	2297.94	9435.95	0.17
P118-00-00	P118-R2-2	64094	Max WS	8118.62	52.61	73.4	62.25	73.62	0.000232	3.74	2297.72	9435.81	0.17
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	8118.63	52.56	73.34		73.56	0.000232	3.74	2296.02	9434.73	0.17
P118-00-00	P118-R2-2	64010.4	Max WS	8118.6	52.78	73.11	64.87	73.59	0.000568	5.66	1639.41	9420.62	0.27
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	8118.5	53.04	71.14		71.85	0.001045	6.83	1330.75	8146.49	0.35
P118-00-00	P118-R2-2	63959.7	Max WS	8118.54	53.06	71.5	62.15	71.78	0.000383	4.26	1956.77	8665.21	0.22
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	8118.54	53.16	71.4		71.69	0.000406	4.34	1914.08	8534	0.22
P118-00-00	P118-R2-2	63756.7	Max WS	8124.78	52.4	70.76		71.73	0.001784	8.15	1320.34	205	0.44
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	6118.92	50.35	70.3		70.85	0.000964	6.03	1191.07	185	0.32
P118-00-00	P118-R2-2	61905.2	Max WS	5998.48	50.77	69.74		70.09	0.000688	4.74	1265.65	132.2	0.27
P118-00-00	P118-R2-2	60625.3	Max WS	6522.71	49.52	69.13		69.55	0.000795	5.24	1245.28	121.4	0.29
P118-00-00	P118-R2-1	60595.74	Max WS	6412.61	49.48	68.19		68.83	0.000977	6.6	1078.09	131.55	0.33
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	6679.18	49.68	68.08		68.69	0.000923	6.41	1137.35	139.91	0.33
P118-00-00	P118-R2-1	60571.6*	Max WS	6930.68	49.89	67.97		68.56	0.000886	6.25	1193.31	148.28	0.32
P118-00-00	P118-R2-1	60559.5*	Max WS	7131.5	50.09	67.89		68.44	0.000844	6.04	1251.07	149.45	0.31
P118-00-00	P118-R2-1	60547.5*	Max WS	7270.81	50.3	67.83		68.34	0.000797	5.81	1313.52	151.53	0.31
P118-00-00	P118-R2-1	60535.46	Max WS	7360.99	50.5	67.78		68.25	0.000751	5.58	1377.21	157.21	0.3
P118-00-00	P118-R2-1	60396.4*	Max WS	7370.84	50.45	67.71		68.18	0.000782	5.58	1378.36	161.26	0.3
P118-00-00	P118-R2-1	60257.3*	Max WS	7371.35	50.4	67.64		68.11	0.000806	5.55	1382.4	165.29	0.31
P118-00-00	P118-R2-1	60118.3*	Max WS	7373.61	50.35	67.58		68.04	0.000823	5.52	1390.09	169.46	0.31
P118-00-00	P118-R2-1	59979.2*	Max WS	7384.25	50.3	67.51		67.97	0.000837	5.48	1400.87	175.41	0.31
P118-00-00	P118-R2-1	59840.2*	Max WS	7394.54	50.25	67.44		67.89	0.000843	5.43	1415.2	178.16	0.31
P118-00-00	P118-R2-1	59701.1*	Max WS	7419.29	50.2	67.37		67.81	0.000846	5.38	1431.32	179.13	0.31
P118-00-00	P118-R2-1	59562.1*	Max WS	7452.78	50.15	67.3		67.73	0.000847	5.32	1448.15	180.09	0.31
P118-00-00	P118-R2-1	59423.1	Max WS	7476.07	50.1	67.21		67.65	0.000888	5.36	1462.95	181.05	0.31
P118-00-00	P118-R2-1	59307.4*	Max WS	7489.43	50.1	67.14		67.58	0.000884	5.31	1490.89	196.49	0.31
P118-00-00	P118-R2-1	59191.8*	Max WS	7489.47	50.11	67.08		67.5	0.000877	5.25	1510.11	211.94	0.31
P118-00-00	P118-R2-1	59076.2*	Max WS	7492.08	50.11	67.01		67.43	0.000865	5.18	1521.66	227.38	0.31
P118-00-00	P118-R2-1	58960.5*	Max WS	7499.94	50.11	66.95		67.35	0.000849	5.1	1524.62	242.82	0.31
P118-00-00	P118-R2-1	58844.9*	Max WS	7499.24	50.11	66.88		67.28	0.000833	5.03	1521.23	240.24	0.3
P118-00-00	P118-R2-1	58729.3*	Max WS	7498.84	50.12	66.83		67.21	0.000812	4.95	1531.73	222.32	0.3
P118-00-00	P118-R2-1	58613.7	Max WS	7504.6	50.12	66.77		67.14	0.000787	4.86	1551.1	217.37	0.29
P118-00-00	P118-R2-1	58463.86	Max WS	8330.47	47.59	66.54	59.79	66.93	0.000717	5.29	3469.15	2308.09	0.29
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	-11.68	67.88	69.65		69.66	0.010557	-1.11	12.15	21.34	0.19
P118-21-00	P118-21-00	2493.18	Max WS	-8.76	67.95	69.73		69.74	0.002602	-0.56	19.38	31.49	0.09
P118-21-00	P118-21-00	2450.1	Max WS	-4.83	67.59	69.79		69.79	0.000004	-0.17	31.81	24.34	0.02
P118-21-00	P118-21-00	2416.26	Max WS	-3.72	67.5	69.79		69.79	0.000006	-0.12	33.26	25.7	0.02
P118-21-00	P118-21-00	2398.11	Max WS	-1.84	67.44	69.79		69.79	0.000001	-0.06	33.21	23.22	0.01
P118-21-00	P118-21-00	2389.56	Max WS	0.42	67.41	69.79		69.79	0	0.01	34.05	25.61	0

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-21-00	P118-21-00	2343.79	Max WS	3.32	67.54	69.79		69.79	0.000007	0.18	18.49	17	0.03
P118-21-00	P118-21-00	2303.58	Max WS	7.15	67.47	69.79		69.79	0.000083	0.39	18.59	14.2	0.06
P118-21-00	P118-21-00	2208.42	Max WS	12.72	67.31	69.77		69.77	0.000158	0.55	23.19	17.33	0.08
P118-21-00	P118-21-00	2195.48	Max WS	12.71	67.34	69.77		69.77	0.000062	0.51	24.92	21	0.08
P118-21-00	P118-21-00	2169.49	Max WS	12.71	66.56	69.77		69.77	0.000033	0.51	25.48	13.98	0.06
P118-21-00	P118-21-00	2167.76	Max WS	12.71	66.37	69.77		69.77	0.00002	0.41	30.82	14.78	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	12.71	65.03	69.27		69.27	0.000011	0.25	50.04	32.16	0.04
P118-21-00	P118-21-00	2100.84	Max WS	12.71	64.78	69.27		69.27	0.000019	0.24	51.91	26.24	0.03
P118-21-00	P118-21-00	1662.37	Max WS	148.86	63.93	68.92		69	0.000864	2.2	74.81	45.53	0.22
P118-21-00	P118-21-00	1144.5	Max WS	-5.5	62.63	68.73		68.73	0.000001	-0.06	88.35	23	0.01
P118-21-00	P118-21-00	595.53	Max WS	-179.91	61.49	68.72		68.73	0.000104	-0.92	196.56	47.22	0.08
P118-21-00	P118-21-00	549.31*	Max WS	-190.74	61.18	68.72		68.74	0.000099	-0.95	202.24	44.42	0.08
P118-21-00	P118-21-00	503.08*	Max WS	-202.25	60.87	68.72		68.74	0.000098	-0.99	205.62	41.62	0.08
P118-21-00	P118-21-00	456.86*	Max WS	-215.67	60.57	68.72		68.74	0.000101	-1.05	206.53	38.81	0.08
P118-21-00	P118-21-00	410.63*	Max WS	-230.41	60.26	68.72		68.74	0.000109	-1.13	205.17	36.01	0.08
P118-21-00	P118-21-00	364.41*	Max WS	-247.17	59.95	68.72		68.75	0.000323	-1.24	201.26	33.21	0.09
P118-21-00	P118-21-00	318.18*	Max WS	-263.45	59.64	68.72		68.75	0.000141	-1.36	195.11	30.41	0.09
P118-21-00	P118-21-00	271.96*	Max WS	-279.78	59.34	68.72		68.75	0.000368	-1.51	186.55	27.6	0.1
P118-21-00	P118-21-00	225.73*	Max WS	-294.64	59.03	68.71		68.76	0.000206	-1.68	175.7	24.8	0.11
P118-21-00	P118-21-00	179.51	Max WS	-305.31	58.72	68.71		68.77	0.000311	-1.88	162.59	22	0.12
P118-21-00	P118-21-00	159.41*	Max WS	-316.36	57.98	68.72		68.77	0.000276	-1.81	174.4	22.53	0.11
P118-21-00	P118-21-00	139.31*	Max WS	-305.23	57.24	68.75		68.79	0.000214	-1.63	186.93	23.06	0.1
P118-21-00	P118-21-00	119.21*	Max WS	-236.9	56.51	68.79		68.81	0.000108	-1.18	200.25	23.6	0.07
P118-21-00	P118-21-00	99.11*	Max WS	-171.76	55.77	68.81		68.82	0.000048	-0.8	213.53	24.13	0.05
P118-21-00	P118-21-00	79.01	Max WS	-106.44	55.03	68.83		68.83	0.000016	-0.47	226.92	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.24		75.24	0.000001	0.08	141.68	142.88	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.24		75.24	0.000001	0.09	126.41	152.1	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.24	70.25	75.24	0.000001	0.1	145.97	139.98	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.81	70.2	75.23		75.23	0.000002	0.1	137.21	168.51	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.23	70.16	75.23		75.23	0.000002	0.12	114.67	123.93	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.15	69.97	75.23		75.23	0.000007	0.2	103.39	155.67	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.63	69.88	75.23		75.23	0.000008	0.24	127.63	285.28	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	27.03	68.92	75.23		75.23	0.000006	0.19	385.17	693.29	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	27.04	69.39	75.23		75.23	0.000002	0.12	1004.41	1719.55	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.27	69.56	75.23		75.23	0.000013	0.26	168.66	2065.62	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.92	68.48	75.23		75.23	0.000002	0.38	154.13	2252.41	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	49.32	68.06	75.23		75.23	0.000027	0.44	112.04	2112.81	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	48.35	69.59	74.86		74.86	0.000004	0.16	1279.69	1536.73	0.02
P118-23-00	P118-23-00 R2	7313.37	Max WS	50.16	69.5	74.86		74.86	0.000029	0.43	143.2	1637.03	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	51.08	69.12	74.86		74.86	0.000028	0.42	158.41	1655.3	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	52.36	69.43	74.86		74.86	0.000004	0.17	1271.57	1699.42	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	52.36	69.34	74.85		74.85	0.000004	0.17	1441.22	1855.14	0.01
P118-23-00	P118-23-00 R2	7257.19	Max WS	55.89	69.28	74.85		74.85	0.000008	0.22	793.33	1972.86	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	121.12	68.02	74.85		74.85	0.000007	0.22	1779.65	2339.18	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	130.85	67.37	74.85		74.85	0.000004	0.56	232.2	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	35.29	67.54	73.92		73.92	0.000016	0.27	132.27	51.42	0.03
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	37.79	67.16	73.92		73.92	0.000008	0.23	162.75	46.02	0.02
P118-23-00	P118-23-00 R2	6402.43	Max WS	40.56	67.03	73.91		73.92	0.000009	0.25	160.88	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	41.81	66.97	73.91	67.68	73.92	0.000001	0.25	164.08	47.47	0.02
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	41.74	66.93	73.91		73.91	0.000001	0.24	171.3	53.69	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	42.46	66.88	73.91		73.91	0.000001	0.25	166.63	48.1	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	58.01	66.24	73.9		73.91	0.000006	0.21	270.52	68.26	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	80.27	65.7	73.9		73.9	0.000016	0.33	245.69	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	51.72	63.97	73.9		73.9	0.000004	0.24	218.44	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	51.08	63.84	73.9	64.54	73.9	0.000002	0.18	281.52	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	51.09	63.87	73.89		73.89	0.000002	0.19	274.03	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	56.43	63.65	73.89		73.89	0.000005	0.23	241.15	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	60.87	63.02	73.89	64.1	73.89	0.000004	0.21	290.63	46.95	0.01
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	60.89	63.16	73.89		73.89	0.000003	0.18	336.18	58.28	0.01
P118-23-00	P118-23-00 R2	4459.75	Max WS	64.9	63.55	73.89		73.89	0.000003	0.2	319.65	52.65	0.01
P118-23-00	P118-23-00 R2	4370.6	Max WS	68.09	63.42	73.89		73.89	0.000002	0.18	387.92	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	68.81	62.88	73.89		73.89	0.000001	0.09	757.46	125.25	0.01

Alternative 3 (Recommended)
HEC-RAS Results

HFC RAS Plan: Alt3_50Dyr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	68.78	63.33	73.88		73.88	0.000001	0.11	629.81	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	74.54	63.34	73.88		73.88	0.000002	0.18	403.78	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	124.8	62.41	73.87		73.88	0.000012	0.44	285.54	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	163.21	62.36	73.86		73.87	0.000013	0.48	340.75	40.27	0.03
P118-23-00	P118-23-00 R2	3150.64	Max WS	165.97	61.93	73.86	64.09	73.87	0.000011	0.42	395.29	52.14	0.03
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	165.98	61.56	73.86		73.86	0.00001	0.39	420.46	55.63	0.03
P118-23-00	P118-23-00 R2	3104.46	Max WS	168.37	61.63	73.86		73.86	0.000014	0.44	378.84	52.53	0.03
P118-23-00	P118-23-00 R2	2750.51	Max WS	204.68	60.59	73.85		73.86	0.000022	0.63	324.85	34.6	0.04
P118-23-00	P118-23-00 R2	2741.93	Max WS	205.34	60.44	73.85	62.89	73.86	0.000022	0.62	330.36	34.96	0.04
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	205.33	60.52	73.85		73.85	0.000017	0.54	378.29	42.97	0.03
P118-23-00	P118-23-00 R2	2716.57	Max WS	206.57	60.68	73.85		73.85	0.000016	0.5	409.2	52.19	0.03
P118-23-00	P118-23-00 R2	2615.37	Max WS	219.72	60.75	73.84		73.85	0.000023	0.64	343.6	37.87	0.04
P118-23-00	P118-23-00 R2	2244.98	Max WS	260.51	60.53	73.83		73.84	0.000027	0.73	359.06	35.71	0.04
P118-23-00	P118-23-00 R2	2221.06	Max WS	263.2	60.56	73.83	62.89	73.83	0.000029	0.73	358.61	36.69	0.04
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	263.2	60.59	73.81		73.82	0.000026	0.71	370.23	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	312.4	59.78	73.81		73.81	0.00002	0.58	534.57	67.27	0.04
P118-23-00	P118-23-00 R2	1922.13	Max WS	343.92	59.56	73.8		73.81	0.000021	0.6	569.44	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	361.96	59.68	73.8	63.12	73.81	0.000027	0.69	526.01	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	361.96	59.86	73.74		73.75	0.000058	1.01	357.64	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	403.01	59.87	73.74		73.75	0.000029	0.7	579.49	75.5	0.04
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	576.37	59.04	73.71		73.73	0.000059	1.06	546.3	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	1797.78	59.85	73.71		73.71	0.000047	1.07	5136.94	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	1812.5	59.99	73.71	66.01	73.71	0.000035	0.84	5191.56	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	1812.36	58.36	73.7		73.7	0.000029	0.81	5433.92	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	1870.02	57.88	73.69		73.7	0.000033	0.91	5395.51	916.83	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	2277.69	57.45	73.66		73.68	0.000083	1.37	4179.11	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	2751.4	57.03	73.59		73.63	0.000195	2.22	2902.87	449.67	0.12
P118-23-00	P118-23-00 R1	242.54	Max WS	3341.18	55.82	73.55	65.14	73.55	0.000015	0.53	21991.85	6614.29	0.03
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	3341.1	55.57	73.54		73.54	0.000013	0.59	22641.98	5675.65	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	3350.65	55.13	73.5		73.63	0.000249	3.13	1627.95	175.37	0.15
P118-23-00	P118-23-00 R1	58.31	Max WS	3348.05	53.78	73.42		73.64	0.000374	4.11	1162.36	83.5	0.18
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	73.78		73.78	0	0.01	3524.77	1274.25	0
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.73	Max WS	73.03	66.69	73.77		73.77	0.000001	0.08	3381.3	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	101.47	66.66	73.77		73.77	0.000001	0.1	3430.84	1251.96	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	101.47	66.22	73.77		73.77	0.000001	0.05	4850.37	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	105.09	66.22	73.77		73.77	0.000001	0.07	4593.67	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	223.99	65.47	73.77		73.77	0.000005	0.17	3768	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	370.24	65.13	73.77		73.77	0.000012	0.35	3785.72	1074.84	0.03
P118-23-02	P118-23-02	2372.17	Max WS	373.74	65.16	73.77		73.77	0.00001	0.3	3940.9	1094.25	0.02
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	373.79	65.26	73.77		73.77	0.000001	0.31	4064.85	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	379.88	65.19	73.77		73.77	0.000014	0.41	3646.26	1058.12	0.03
P118-23-02	P118-23-02	1453.34	Max WS	629.66	63.69	73.75		73.75	0.000034	0.7	3518.36	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	632.07	63.66	73.75	67.95	73.75	0.000031	0.71	3599.22	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	632.07	63.56	73.74		73.74	0.000024	0.62	3925.41	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	641.14	63.36	73.74		73.74	0.000016	0.37	3796.23	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	670.52	62.91	73.74		73.74	0.000015	0.48	4165.31	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	733.47	61.86	73.74		73.74	0.000014	0.47	4855.19	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	772.95	62.56	73.74		73.74	0.000014	0.48	4950.97	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	1221.16	60.16	73.72		73.72	0.000028	0.65	5009.57	1102.12	0.04
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	74.13		74.13	0	0.05	218.9	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.13		74.13	0	0.05	218.79	37.24	0
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	47.35	66.13	74.13		74.13	0.000006	0.25	188.31	31.03	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	86.92	65.84	74.12		74.12	0.000016	0.43	202.55	33.01	0.03
P118-25-00	P118-25-00 R2	2494.17	Max WS	101.91	65.5	74.12		74.12	0.000018	0.46	221.44	35.73	0.03
P118-25-00	P118-25-00 R2	2473.31	Max WS	103.6	65.47	74.11	67.34	74.12	0.000019	0.47	219.03	35.01	0.03
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	103.61	65.47	74.11		74.12	0.000018	0.46	227.62	37.73	0.03
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_500yr

River	Reach	River Sta	Profile	Q.Total (cfs)	Min.Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel.Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	107.55	65.38	74.11		74.11	0.000019	0.48	225.35	35.28	0.03
P118-25-00	P118-25-00 R2	2046.09	Max WS	94.45	64.63	74.11		74.11	0.000009	0.35	270.74	40.52	0.02
P118-25-00	P118-25-00 R1	1929.3	Max WS	278.71	64.22	74.08		74.1	0.000113	1.16	240.27	39.73	0.08
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	234.74	64.03	74.06		74.08	0.000072	0.99	237.32	33.08	0.07
P118-25-00	P118-25-00 R1	1208.56	Max WS	181.32	63.03	74.05		74.06	0.000038	0.74	244.53	30.27	0.05
P118-25-00	P118-25-00 R1	1188.81	Max WS	177.42	63.01	74.05	65.52	74.06	0.000039	0.75	238.11	29.97	0.05
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	177.47	62.94	74.04		74.05	0.000041	0.76	234.22	29.45	0.05
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	173.85	62.83	74.05		74.05	0.000032	0.68	256.37	33.01	0.04
P118-25-00	P118-25-00 R1	980.2	Max WS	165.42	62.34	74.04		74.05	0.00002	0.57	292.44	35.75	0.03
P118-25-00	P118-25-00 R1	963.63	Max WS	167.35	62.25	74.04		74.05	0.00001	0.5	333.56	45.01	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	167.68	62.25	74.05	64.26	74.05	0.000009	0.37	541.97	95	0.02
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	167.64	61.68	74.02		74.03	0.000007	0.37	534.3	86	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	167.85	61.68	74.02		74.03	0.000009	0.49	345.25	51.01	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	169.76	61.16	74.02		74.03	0.000014	0.5	340.36	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	202.39	60.25	74.01		74.02	0.000015	0.52	388.53	44.02	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	205.21	58.25	74.01		74.02	0.00001	0.45	454.25	44.09	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	199.5	58.04	74.01		74.02	0.000009	0.43	460.58	44.08	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	193.26	57.84	74.01		74.02	0.000007	0.41	466.9	44.07	0.02
P118-25-00	P118-25-00 R1	185.81*	Max WS	186.48	57.63	74.01		74.02	0.000006	0.39	473.19	44.05	0.02
P118-25-00	P118-25-00 R1	163.80*	Max WS	178.99	57.43	74.01		74.02	0.000006	0.37	479.47	44.04	0.02
P118-25-00	P118-25-00 R1	141.80*	Max WS	170.99	57.22	74.01		74.02	0.000005	0.35	485.78	44.03	0.02
P118-25-00	P118-25-00 R1	119.80*	Max WS	161.4	57.02	74.01		74.02	0.000004	0.33	492.02	44.01	0.02
P118-25-00	P118-25-00 R1	97.8	Max WS	152.41	56.81	74.01	59.52	74.02	0.000004	0.31	498.35	44	0.02
P118-25-01	P118-25-01	5341.48	Max WS	19.27	70.47	76		76	0.000003	0.15	129.04	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	325.85	68.9	75.49		75.57	0.000079	2.28	143.02	42.03	0.22
P118-25-01	P118-25-01	4162.47	Max WS	334.95	69.44	75.26		75.33	0.000684	2.2	152.18	42.02	0.2
P118-25-01	P118-25-01	4134.04	Max WS	341.31	69.38	75.24	72.17	75.31	0.000684	2.2	155.14	43.02	0.2
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	340.9	69.25	75.17		75.24	0.000676	2.19	155.55	43.02	0.2
P118-25-01	P118-25-01	4047.7	Max WS	341.17	69.28	75.14		75.22	0.000664	2.19	155.5	42.03	0.2
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	336.74	67.84	74.93		74.98	0.000423	1.86	180.65	44.03	0.16
P118-25-01	P118-25-01	3312.44	Max WS	332.67	67.48	74.83		74.87	0.000329	1.63	203.99	51.15	0.14
P118-25-01	P118-25-01	3014.68	Max WS	297.05	67.53	74.76		74.8	0.000212	1.42	209.89	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	287.42	67.71	74.75		74.78	0.000188	1.33	215.62	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	214.13	66.67	74.75		74.77	0.000096	0.98	218.07	44.92	0.08
P118-25-01	P118-25-01	2728.92	Max WS	195.52	66.5	74.67		74.76	0.001435	2.42	80.9	29.03	0.26
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	192.51	66.31	74.3		74.4	0.00193	2.49	77.26	37.04	0.3
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	190.82	66.04	74.29		74.32	0.000191	1.31	145.58	30.44	0.11
P118-25-01	P118-25-01	1881.88	Max WS	159.8	66.57	74.21		74.23	0.000135	1.07	148.87	34	0.09
P118-25-01	P118-25-01	1384.48	Max WS	137.1	66.19	74.17		74.18	0.000068	0.8	170.57	35.03	0.06
P118-25-01	P118-25-01	1245.83	Max WS	136.49	66.34	74.16		74.17	0.000074	0.81	169.52	37.72	0.07
P118-25-01	P118-25-01	584.11	Max WS	90.76	65.88	74.14		74.15	0.00002	0.49	186.91	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	184.13	63.5	74.1		74.11	0.000071	0.94	196.22	27.03	0.06

Alternative 3 (Recommended) - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	70.47	70.3	-0.17
71854.2	70.32	70.14	-0.18
70744.2	70.03	69.82	-0.21
69527.2	69.81	69.58	-0.23
68670	69.5	69.24	-0.26
68131	69.32	69.04	-0.28
67511.6	68.97	68.63	-0.34
66869	68.4	68.01	-0.39
66774	68.41	68.02	-0.39
66190	68.13	67.7	-0.43
65955.8	67.86	67.4	-0.46
65434.6	67.45	66.94	-0.51
64399.74	66.58	66.18	-0.4
64273.7	66.57	66.17	-0.4
64220.7	66.53	66.13	-0.4
64200	66.53	66.13	-0.4
64100	66.54	66.13	-0.41
64094	66.53	66.13	-0.4
64024	66.5	66.1	-0.4
64010.4	66.39	65.99	-0.4
63960.4	66.1	65.72	-0.38
63959.7	66.23	65.84	-0.39
63856.7	66.19	65.8	-0.39
63756.7	65.89	65.52	-0.37
62823.2	65.13	64.81	-0.32
61905.2	63.96	63.57	-0.39
60625.3	63.32	62.9	-0.42
60595.74	62.32	61.91	-0.41
60583.6*	62.29	61.88	-0.41
60571.6*	62.25	61.84	-0.41
60559.5*	62.22	61.81	-0.41
60547.5*	62.19	61.77	-0.42
60535.46	62.16	61.74	-0.42
60396.4*	62.09	61.68	-0.41
60257.3*	62.02	61.61	-0.41
60118.3*	61.95	61.53	-0.42
59979.2*	61.88	61.46	-0.42
59840.2*	61.81	61.38	-0.43
59701.1*	61.73	61.3	-0.43
59562.1*	61.66	61.22	-0.44
59423.1	61.59	61.15	-0.44
59307.4*	61.53	61.08	-0.45
59191.8*	61.46	61.01	-0.45
59076.2*	61.4	60.95	-0.45

Alternative 3 (Recommended) - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	61.35	60.89	-0.46
58844.9*	61.3	60.83	-0.47
58729.3*	61.25	60.78	-0.47
58613.7	61.21	60.73	-0.48
58463.86	61.04	60.56	-0.48
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	68.85	68.85	0
2416.26	68.84	68.84	0
2398.11	68.83	68.83	0
2389.56	68.83	68.83	0
2343.79	68.78	68.78	0
2303.58	68.72	68.72	0
2208.42	68.34	68.34	0
2195.48	68.27	68.27	0
2169.49	68.24	68.24	0
2167.76	68.25	68.25	0
2135.78	66.83	66.83	0
2100.84	66.83	66.83	0
1662.37	66.34	66.34	0
1144.5	65.55	65.55	0
595.53	63.94	63.94	0
549.31*	63.75	63.75	0
503.08*	63.54	63.54	0
456.86*	63.33	63.33	0
410.63*	63.11	63.1	-0.01
364.41*	63.07	62.85	-0.22
318.18*	63.04	62.68	-0.36
271.96*	63.02	62.64	-0.38
225.73*	63.01	62.61	-0.4
179.51	62.99	62.57	-0.42
159.41*	62.99	62.57	-0.42
139.31*	62.98	62.56	-0.42
119.21*	62.98	62.56	-0.42
99.11*	62.98	62.56	-0.42
79.01	62.98	62.55	-0.43
7756.32	71.59	71.59	0
7743.32	71.59	71.59	0
7738.5	71.59	71.59	0
7733.4	71.57	71.57	0
7726.83	71.57	71.57	0
7654.51	71.54	71.54	0
7632.63	71.53	71.53	0

Alternative 3 (Recommended) - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	71.53	71.53	0
7584.04	71.34	71.34	0
7567.5	71.33	71.33	0
7426.94	71.28	71.28	0
7369.89	71.27	71.27	0
7325.91	71.12	71.12	0
7313.37	71.15	71.15	0
7305.97	71.15	71.15	0
7294.91	71.14	71.14	0
7260.57	71.02	71.02	0
7237.19	71.01	71.01	0
6786.22	70.76	70.76	0
6723.56	70.75	70.75	0
6655.9	70.03	70.03	0
6563.37	69.82	69.82	0
6402.43	69.65	69.65	0
6356.93	69.59	69.59	0
6324.93	69.55	69.55	0
6293.27	69.51	69.51	0
5958.59	69.14	69.14	0
5652.94	68.67	68.67	0
5045.34	67.97	67.97	0
4947.92	67.93	67.93	0
4915.91	67.92	67.91	-0.01
4783.1	67.8	67.8	0
4580.38	67.67	67.65	-0.02
4553.28	67.65	67.63	-0.02
4459.75	67.58	67.55	-0.03
4370.6	67.5	67.47	-0.03
4330.88	67.51	67.49	-0.02
4269.23	67.5	67.47	-0.03
4229.24	67.49	67.46	-0.03
3733.5	67.27	67.24	-0.03
3187.46	66.98	66.9	-0.08
3150.64	66.98	66.89	-0.09
3126.39	66.95	66.84	-0.11
3104.46	66.94	66.8	-0.14
2750.51	66.87	66.59	-0.28
2741.93	66.87	66.59	-0.28
2725.96	66.87	66.58	-0.29
2716.57	66.86	66.58	-0.28
2615.37	66.85	66.54	-0.31
2244.98	66.81	66.48	-0.33
2221.06	66.81	66.47	-0.34

Alternative 3 (Recommended) - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	66.8	66.46	-0.34
2042.36	66.79	66.44	-0.35
1922.11	66.78	66.43	-0.35
1892.63	66.77	66.42	-0.35
1863.46	66.74	66.38	-0.36
1829.45	66.74	66.38	-0.36
1611.06	66.73	66.36	-0.37
1513.84	66.69	66.3	-0.39
1454.72	66.69	66.3	-0.39
1380.55	66.68	66.29	-0.39
1354.02	66.68	66.29	-0.39
1010.56	66.66	66.26	-0.4
649.49	66.64	66.23	-0.41
242.54	66.63	66.22	-0.41
169.28	66.62	66.21	-0.41
106.82	66.62	66.21	-0.41
58.31	66.62	66.21	-0.41
4138.85	69.87	69.87	0
3790.71	69.7	69.7	0
3782.06	69.55	69.55	0
3714.78	69.57	69.57	0
3692.61	69.53	69.53	0
3049.5	68.99	68.99	0
2386.67	68.15	68.15	0
2372.17	68.13	68.13	0
2303.61	68.1	68.1	0
2278.1	68.06	68.06	0
1453.34	67.12	67.12	0
1445.67	67.12	67.12	0
1415.48	66.85	66.66	-0.19
1392.09	66.84	66.63	-0.21
1317.96	66.82	66.55	-0.27
1171.38	66.8	66.48	-0.32
1083.7	66.78	66.46	-0.32
215.24	66.71	66.34	-0.37
3232.36	68.9	68.56	-0.34
3203.12	68.9	68.55	-0.35
2930.66	68.89	68.54	-0.35
2636.62	68.88	68.52	-0.36
2494.17	68.87	68.51	-0.36
2473.31	68.87	68.51	-0.36
2465.6	68.87	68.5	-0.37
2414.49	68.87	68.5	-0.37
2046.09	68.86	68.49	-0.37

Alternative 3 (Recommended) - 2-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	68.83	68.45	-0.38
1565.52	68.78	68.37	-0.41
1208.56	68.75	68.33	-0.42
1188.81	68.75	68.32	-0.43
1175.29	68.74	68.31	-0.43
1132.07	68.74	68.31	-0.43
980.2	68.73	68.3	-0.43
963.63	68.73	68.3	-0.43
950.55	68.73	68.3	-0.43
901.58	68.45	68.07	-0.38
886.91	68.45	68.07	-0.38
839.05	68.45	68.06	-0.39
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	72.33	72.33	0
4477.47	71.6	71.6	0
4162.47	71.36	71.36	0
4134.04	71.34	71.34	0
4086.12	71.31	71.31	0
4047.7	71.28	71.28	0
3617.56	71.05	71.05	0
3312.44	70.95	70.95	0
3014.68	70.87	70.87	0
2924.04	70.84	70.84	0
2763.33	70.81	70.81	0
2728.92	70.76	70.76	0
2546.4	70.75	70.75	0
2475.84	70.75	70.75	0
1881.88	70.28	70.28	0
1384.48	69.7	69.7	0
1245.83	69.52	69.52	0
584.11	68.95	68.68	-0.27
60.05	68.86	68.49	-0.37

Alternative 3 (Recommended) - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	72.99	72.8	-0.19
71854.2	72.86	72.67	-0.19
70744.2	72.52	72.27	-0.25
69527.2	72.24	71.95	-0.29
68670	71.92	71.58	-0.34
68131	71.69	71.33	-0.36
67511.6	71.35	70.89	-0.46
66869	70.73	70.11	-0.62
66774	70.76	70.14	-0.62
66190	70.55	69.79	-0.76
65955.8	70.37	69.85	-0.52
65434.6	70.04	69.92	-0.12
64399.74	69.29	69.05	-0.24
64273.7	69.34	69.09	-0.25
64220.7	69.3	69.05	-0.25
64200	69.3	69.05	-0.25
64100	69.3	69.05	-0.25
64094	69.3	69.05	-0.25
64024	69.28	69.03	-0.25
64010.4	69.14	68.89	-0.25
63960.4	68.76	68.57	-0.19
63959.7	68.92	68.72	-0.2
63856.7	68.88	68.68	-0.2
63756.7	68.52	68.33	-0.19
62823.2	67.68	67.48	-0.2
61905.2	66.68	66.49	-0.19
60625.3	65.95	65.76	-0.19
60595.74	64.41	64.28	-0.13
60583.6*	64.38	64.26	-0.12
60571.6*	64.35	64.22	-0.13
60559.5*	64.31	64.19	-0.12
60547.5*	64.27	64.15	-0.12
60535.46	64.24	64.12	-0.12
60396.4*	64.15	64.04	-0.11
60257.3*	64.07	63.96	-0.11
60118.3*	63.99	63.88	-0.11
59979.2*	63.9	63.8	-0.1
59840.2*	63.81	63.72	-0.09
59701.1*	63.73	63.64	-0.09
59562.1*	63.64	63.56	-0.08
59423.1	63.55	63.48	-0.07
59307.4*	63.48	63.41	-0.07
59191.8*	63.41	63.34	-0.07
59076.2*	63.34	63.28	-0.06

Alternative 3 (Recommended) - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	63.28	63.22	-0.06
58844.9*	63.22	63.17	-0.05
58729.3*	63.17	63.12	-0.05
58613.7	63.13	63.08	-0.05
58463.86	62.92	62.88	-0.04
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	69.05	69.05	0
2416.26	69.04	69.04	0
2398.11	69.04	69.04	0
2389.56	69.04	69.04	0
2343.79	69	69	0
2303.58	68.94	68.94	0
2208.42	68.71	68.71	0
2195.48	68.68	68.68	0
2169.49	68.68	68.68	0
2167.76	68.69	68.69	0
2135.78	67.76	67.76	0
2100.84	67.76	67.76	0
1662.37	67.34	67.34	0
1144.5	66.53	66.54	0.01
595.53	65.42	65.27	-0.15
549.31*	65.41	65.26	-0.15
503.08*	65.41	65.25	-0.16
456.86*	65.41	65.24	-0.17
410.63*	65.4	65.23	-0.17
364.41*	65.4	65.23	-0.17
318.18*	65.4	65.23	-0.17
271.96*	65.4	65.23	-0.17
225.73*	65.4	65.22	-0.18
179.51	65.39	65.22	-0.17
159.41*	65.39	65.22	-0.17
139.31*	65.39	65.22	-0.17
119.21*	65.39	65.22	-0.17
99.11*	65.39	65.22	-0.17
79.01	65.39	65.22	-0.17
7756.32	72.87	72.86	-0.01
7743.32	72.87	72.86	-0.01
7738.5	72.87	72.86	-0.01
7733.4	72.87	72.86	-0.01
7726.83	72.87	72.86	-0.01
7654.51	72.86	72.85	-0.01
7632.63	72.86	72.85	-0.01

Alternative 3 (Recommended) - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	72.86	72.85	-0.01
7584.04	72.77	72.76	-0.01
7567.5	72.77	72.76	-0.01
7426.94	72.76	72.75	-0.01
7369.89	72.75	72.74	-0.01
7325.91	72.57	72.55	-0.02
7313.37	72.59	72.57	-0.02
7305.97	72.59	72.57	-0.02
7294.91	72.58	72.57	-0.01
7260.57	72.4	72.38	-0.02
7237.19	72.4	72.38	-0.02
6786.22	72.31	72.29	-0.02
6723.56	72.31	72.29	-0.02
6655.9	71.13	71.08	-0.05
6563.37	71.04	70.99	-0.05
6402.43	70.93	70.86	-0.07
6356.93	70.89	70.82	-0.07
6324.93	70.87	70.8	-0.07
6293.27	70.85	70.77	-0.08
5958.59	70.66	70.55	-0.11
5652.94	70.48	70.3	-0.18
5045.34	70.45	70.26	-0.19
4947.92	70.45	70.26	-0.19
4915.91	70.44	70.24	-0.2
4783.1	70.43	70.24	-0.19
4580.38	70.43	70.23	-0.2
4553.28	70.42	70.22	-0.2
4459.75	70.41	70.22	-0.19
4370.6	70.41	70.21	-0.2
4330.88	70.41	70.21	-0.2
4269.23	70.4	70.2	-0.2
4229.24	70.4	70.2	-0.2
3733.5	70.38	70.18	-0.2
3187.46	70.23	70.02	-0.21
3150.64	70.22	70.01	-0.21
3126.39	70.21	69.99	-0.22
3104.46	70.19	69.97	-0.22
2750.51	70.07	69.84	-0.23
2741.93	70.07	69.84	-0.23
2725.96	70.07	69.84	-0.23
2716.57	70.07	69.83	-0.24
2615.37	70.04	69.8	-0.24
2244.98	69.96	69.73	-0.23
2221.06	69.96	69.72	-0.24

Alternative 3 (Recommended) - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	69.93	69.69	-0.24
2042.36	69.91	69.67	-0.24
1922.11	69.89	69.65	-0.24
1892.63	69.88	69.64	-0.24
1863.46	69.77	69.53	-0.24
1829.45	69.78	69.54	-0.24
1611.06	69.73	69.5	-0.23
1513.84	69.66	69.43	-0.23
1454.72	69.67	69.43	-0.24
1380.55	69.64	69.4	-0.24
1354.02	69.64	69.39	-0.25
1010.56	69.6	69.34	-0.26
649.49	69.51	69.25	-0.26
242.54	69.45	69.2	-0.25
169.28	69.42	69.17	-0.25
106.82	69.41	69.16	-0.25
58.31	69.41	69.16	-0.25
4138.85	70.9	70.88	-0.02
3790.71	70.82	70.8	-0.02
3782.06	70.75	70.71	-0.04
3714.78	70.74	70.7	-0.04
3692.61	70.72	70.67	-0.05
3049.5	70.27	70.14	-0.13
2386.67	69.78	69.58	-0.2
2372.17	69.78	69.58	-0.2
2303.61	69.77	69.56	-0.21
2278.1	69.77	69.56	-0.21
1453.34	69.73	69.5	-0.23
1445.67	69.73	69.5	-0.23
1415.48	69.72	69.49	-0.23
1392.09	69.72	69.49	-0.23
1317.96	69.72	69.49	-0.23
1171.38	69.72	69.48	-0.24
1083.7	69.72	69.48	-0.24
215.24	69.71	69.47	-0.24
3232.36	70.8	70.29	-0.51
3203.12	70.8	70.29	-0.51
2930.66	70.8	70.29	-0.51
2636.62	70.8	70.28	-0.52
2494.17	70.8	70.28	-0.52
2473.31	70.8	70.28	-0.52
2465.6	70.8	70.28	-0.52
2414.49	70.79	70.28	-0.51
2046.09	70.8	70.29	-0.51

Alternative 3 (Recommended) - 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	70.8	70.27	-0.53
1565.52	70.78	70.23	-0.55
1208.56	70.77	70.2	-0.57
1188.81	70.77	70.2	-0.57
1175.29	70.76	70.19	-0.57
1132.07	70.76	70.19	-0.57
980.2	70.76	70.18	-0.58
963.63	70.76	70.18	-0.58
950.55	70.76	70.18	-0.58
901.58	70.75	70.17	-0.58
886.91	70.75	70.17	-0.58
839.05	70.75	70.17	-0.58
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	73.19	73.19	0
4477.47	72.74	72.74	0
4162.47	72.62	72.62	0
4134.04	72.61	72.61	0
4086.12	72.59	72.58	-0.01
4047.7	72.58	72.57	-0.01
3617.56	72.46	72.45	-0.01
3312.44	72.39	72.38	-0.01
3014.68	72.33	72.32	-0.01
2924.04	72.32	72.3	-0.02
2763.33	72.29	72.28	-0.01
2728.92	72.21	72.19	-0.02
2546.4	72.03	72.02	-0.01
2475.84	72.06	72.04	-0.02
1881.88	71.57	71.53	-0.04
1384.48	71.07	71	-0.07
1245.83	70.95	70.85	-0.1
584.11	70.84	70.36	-0.48
60.05	70.8	70.28	-0.52

Alternative 3 (Recommended) - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.29	73.72	-0.57
71854.2	73.71	73.35	-0.36
70744.2	73.31	72.87	-0.44
69527.2	73.02	72.47	-0.55
68670	72.7	72.28	-0.42
68131	72.46	72.23	-0.23
67511.6	72.2	72.1	-0.1
66869	71.72	71.54	-0.18
66774	71.75	71.47	-0.28
66190	71.61	71.26	-0.35
65955.8	71.53	71.28	-0.25
65434.6	71.38	71.36	-0.02
64399.74	70.75	70.71	-0.04
64273.7	70.79	70.7	-0.09
64220.7	70.76	70.68	-0.08
64200	70.76	70.67	-0.09
64100	70.74	70.66	-0.08
64094	70.74	70.66	-0.08
64024	70.71	70.63	-0.08
64010.4	70.55	70.46	-0.09
63960.4	69.79	69.73	-0.06
63959.7	70	69.94	-0.06
63856.7	69.94	69.88	-0.06
63756.7	69.53	69.47	-0.06
62823.2	68.92	68.85	-0.07
61905.2	68.13	68.05	-0.08
60625.3	67.49	67.41	-0.08
60595.74	66.32	66.21	-0.11
60583.6*	66.25	66.16	-0.09
60571.6*	66.21	66.12	-0.09
60559.5*	66.17	66.09	-0.08
60547.5*	66.13	66.05	-0.08
60535.46	66.09	66.01	-0.08
60396.4*	66.02	65.94	-0.08
60257.3*	65.94	65.86	-0.08
60118.3*	65.87	65.78	-0.09
59979.2*	65.79	65.7	-0.09
59840.2*	65.71	65.63	-0.08
59701.1*	65.63	65.55	-0.08
59562.1*	65.56	65.47	-0.09
59423.1	65.47	65.39	-0.08
59307.4*	65.39	65.31	-0.08
59191.8*	65.32	65.23	-0.09
59076.2*	65.25	65.16	-0.09

Alternative 3 (Recommended) - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.18	65.1	-0.08
58844.9*	65.13	65.05	-0.08
58729.3*	65.08	65.01	-0.07
58613.7	65.05	64.97	-0.08
58463.86	64.84	64.77	-0.07
3067.74	71.6	71.6	0
2499.4	69.46	69.46	0
2493.18	69.48	69.49	0.01
2450.1	69.5	69.5	0
2416.26	69.5	69.5	0
2398.11	69.5	69.5	0
2389.56	69.49	69.5	0.01
2343.79	69.48	69.49	0.01
2303.58	69.46	69.47	0.01
2208.42	69.4	69.41	0.01
2195.48	69.4	69.41	0.01
2169.49	69.4	69.41	0.01
2167.76	69.4	69.41	0.01
2135.78	68.55	68.57	0.02
2100.84	68.55	68.57	0.02
1662.37	68.21	68.24	0.03
1144.5	67.57	67.62	0.05
595.53	67.06	66.91	-0.15
549.31*	67.06	66.91	-0.15
503.08*	67.06	66.91	-0.15
456.86*	67.06	66.91	-0.15
410.63*	67.06	66.91	-0.15
364.41*	67.06	66.91	-0.15
318.18*	67.05	66.91	-0.14
271.96*	67.05	66.9	-0.15
225.73*	67.05	66.9	-0.15
179.51	67.05	66.9	-0.15
159.41*	67.05	66.9	-0.15
139.31*	67.06	66.92	-0.14
119.21*	67.08	66.95	-0.13
99.11*	67.11	66.99	-0.12
79.01	67.16	67.03	-0.13
7756.32	74.17	74.16	-0.01
7743.32	74.17	74.16	-0.01
7738.5	74.17	74.16	-0.01
7733.4	74.17	74.15	-0.02
7726.83	74.17	74.15	-0.02
7654.51	74.16	74.15	-0.01
7632.63	74.16	74.15	-0.01

Alternative 3 (Recommended) - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.16	74.15	-0.01
7584.04	74.08	74.07	-0.01
7567.5	74.08	74.07	-0.01
7426.94	74.07	74.06	-0.01
7369.89	74.07	74.06	-0.01
7325.91	73.83	73.82	-0.01
7313.37	73.85	73.83	-0.02
7305.97	73.84	73.83	-0.01
7294.91	73.84	73.83	-0.01
7260.57	73.59	73.57	-0.02
7237.19	73.59	73.57	-0.02
6786.22	73.56	73.54	-0.02
6723.56	73.55	73.54	-0.01
6655.9	71.9	71.86	-0.04
6563.37	71.84	71.8	-0.04
6402.43	71.76	71.71	-0.05
6356.93	71.73	71.68	-0.05
6324.93	71.71	71.66	-0.05
6293.27	71.7	71.64	-0.06
5958.59	71.61	71.5	-0.11
5652.94	71.59	71.4	-0.19
5045.34	71.58	71.38	-0.2
4947.92	71.58	71.38	-0.2
4915.91	71.57	71.37	-0.2
4783.1	71.56	71.37	-0.19
4580.38	71.55	71.35	-0.2
4553.28	71.53	71.34	-0.19
4459.75	71.53	71.33	-0.2
4370.6	71.52	71.32	-0.2
4330.88	71.52	71.32	-0.2
4269.23	71.49	71.29	-0.2
4229.24	71.49	71.29	-0.2
3733.5	71.45	71.26	-0.19
3187.46	71.41	71.22	-0.19
3150.64	71.41	71.22	-0.19
3126.39	71.4	71.21	-0.19
3104.46	71.4	71.21	-0.19
2750.51	71.35	71.17	-0.18
2741.93	71.35	71.17	-0.18
2725.96	71.33	71.15	-0.18
2716.57	71.33	71.15	-0.18
2615.37	71.31	71.14	-0.17
2244.98	71.28	71.11	-0.17
2221.06	71.27	71.11	-0.16

Alternative 3 (Recommended) - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.25	71.09	-0.16
2042.36	71.25	71.08	-0.17
1922.11	71.24	71.08	-0.16
1892.63	71.24	71.08	-0.16
1863.46	71.14	71	-0.14
1829.45	71.14	71.01	-0.13
1611.06	71.11	70.98	-0.13
1513.84	71.09	70.97	-0.12
1454.72	71.08	70.96	-0.12
1380.55	71.07	70.95	-0.12
1354.02	71.07	70.95	-0.12
1010.56	71.03	70.92	-0.11
649.49	70.95	70.86	-0.09
242.54	70.91	70.82	-0.09
169.28	70.88	70.8	-0.08
106.82	70.86	70.78	-0.08
58.31	70.85	70.77	-0.08
4138.85	71.49	71.48	-0.01
3790.71	71.43	71.43	0
3782.06	71.41	71.41	0
3714.78	71.41	71.41	0
3692.61	71.39	71.38	-0.01
3049.5	71.2	71.04	-0.16
2386.67	71.19	71.03	-0.16
2372.17	71.19	71.03	-0.16
2303.61	71.18	71.03	-0.15
2278.1	71.18	71.03	-0.15
1453.34	71.16	71.01	-0.15
1445.67	71.16	71.01	-0.15
1415.48	71.15	71.01	-0.14
1392.09	71.15	71.01	-0.14
1317.96	71.15	71	-0.15
1171.38	71.14	71	-0.14
1083.7	71.14	71	-0.14
215.24	71.11	70.98	-0.13
3232.36	71.92	71.86	-0.06
3203.12	71.92	71.86	-0.06
2930.66	71.91	71.85	-0.06
2636.62	71.9	71.83	-0.07
2494.17	71.89	71.82	-0.07
2473.31	71.89	71.82	-0.07
2465.6	71.88	71.81	-0.07
2414.49	71.88	71.81	-0.07
2046.09	71.87	71.8	-0.07

Alternative 3 (Recommended) - 50-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	71.82	71.75	-0.07
1565.52	71.73	71.67	-0.06
1208.56	71.73	71.66	-0.07
1188.81	71.73	71.66	-0.07
1175.29	71.72	71.65	-0.07
1132.07	71.72	71.65	-0.07
980.2	71.71	71.65	-0.06
963.63	71.71	71.65	-0.06
950.55	71.71	71.65	-0.06
901.58	71.71	71.64	-0.07
886.91	71.71	71.64	-0.07
839.05	71.71	71.64	-0.07
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	74.69	74.7	0.01
4477.47	74.36	74.37	0.01
4162.47	74.19	74.19	0
4134.04	74.17	74.18	0.01
4086.12	74.12	74.13	0.01
4047.7	74.1	74.11	0.01
3617.56	73.93	73.94	0.01
3312.44	73.85	73.85	0
3014.68	73.78	73.79	0.01
2924.04	73.76	73.77	0.01
2763.33	73.74	73.75	0.01
2728.92	73.6	73.61	0.01
2546.4	72.89	72.89	0
2475.84	72.97	72.97	0
1881.88	72.58	72.57	-0.01
1384.48	72.25	72.24	-0.01
1245.83	72.16	72.14	-0.02
584.11	71.93	71.88	-0.05
60.05	71.86	71.79	-0.07

Alternative 3 (Recommended) - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.68	74.27	-0.41
71854.2	73.97	73.58	-0.39
70744.2	73.57	73.09	-0.48
69527.2	73.28	72.69	-0.59
68670	72.98	72.56	-0.42
68131	72.77	72.52	-0.25
67511.6	72.57	72.45	-0.12
66869	72.25	72.06	-0.19
66774	72.25	71.99	-0.26
66190	72.15	71.85	-0.3
65955.8	72.1	71.87	-0.23
65434.6	72	71.93	-0.07
64399.74	71.42	71.4	-0.02
64273.7	71.45	71.35	-0.1
64220.7	71.43	71.32	-0.11
64200	71.43	71.32	-0.11
64100	71.39	71.3	-0.09
64094	71.39	71.29	-0.1
64024	71.36	71.27	-0.09
64010.4	71.18	71.08	-0.1
63960.4	70.18	70.12	-0.06
63959.7	70.42	70.36	-0.06
63856.7	70.35	70.3	-0.05
63756.7	69.89	69.84	-0.05
62823.2	69.32	69.27	-0.05
61905.2	68.6	68.53	-0.07
60625.3	67.96	67.89	-0.07
60595.74	66.83	66.75	-0.08
60583.6*	66.73	66.66	-0.07
60571.6*	66.67	66.6	-0.07
60559.5*	66.63	66.56	-0.07
60547.5*	66.58	66.52	-0.06
60535.46	66.54	66.47	-0.07
60396.4*	66.46	66.4	-0.06
60257.3*	66.39	66.32	-0.07
60118.3*	66.31	66.24	-0.07
59979.2*	66.23	66.17	-0.06
59840.2*	66.16	66.09	-0.07
59701.1*	66.08	66.01	-0.07
59562.1*	66	65.93	-0.07
59423.1	65.91	65.85	-0.06
59307.4*	65.83	65.77	-0.06
59191.8*	65.75	65.69	-0.06
59076.2*	65.68	65.61	-0.07

Alternative 3 (Recommended) - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	65.6	65.54	-0.06
58844.9*	65.53	65.47	-0.06
58729.3*	65.47	65.41	-0.06
58613.7	65.43	65.37	-0.06
58463.86	65.18	65.13	-0.05
3067.74	71.6	71.6	0
2499.4	69.55	69.56	0.01
2493.18	69.6	69.6	0
2450.1	69.64	69.64	0
2416.26	69.64	69.64	0
2398.11	69.64	69.64	0
2389.56	69.64	69.64	0
2343.79	69.63	69.63	0
2303.58	69.62	69.62	0
2208.42	69.58	69.58	0
2195.48	69.58	69.58	0
2169.49	69.58	69.58	0
2167.76	69.58	69.58	0
2135.78	68.82	68.83	0.01
2100.84	68.82	68.83	0.01
1662.37	68.49	68.51	0.02
1144.5	67.8	67.83	0.03
595.53	67.49	67.43	-0.06
549.31*	67.49	67.43	-0.06
503.08*	67.48	67.43	-0.05
456.86*	67.48	67.43	-0.05
410.63*	67.48	67.42	-0.06
364.41*	67.48	67.42	-0.06
318.18*	67.48	67.42	-0.06
271.96*	67.48	67.42	-0.06
225.73*	67.47	67.41	-0.06
179.51	67.47	67.41	-0.06
159.41*	67.47	67.42	-0.05
139.31*	67.49	67.43	-0.06
119.21*	67.51	67.45	-0.06
99.11*	67.55	67.49	-0.06
79.01	67.61	67.55	-0.06
7756.32	74.56	74.55	-0.01
7743.32	74.56	74.55	-0.01
7738.5	74.56	74.55	-0.01
7733.4	74.56	74.55	-0.01
7726.83	74.56	74.55	-0.01
7654.51	74.55	74.55	0
7632.63	74.55	74.55	0

Alternative 3 (Recommended) - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	74.55	74.55	0
7584.04	74.53	74.53	0
7567.5	74.53	74.53	0
7426.94	74.53	74.52	-0.01
7369.89	74.52	74.52	0
7325.91	74.27	74.27	0
7313.37	74.27	74.26	-0.01
7305.97	74.27	74.26	-0.01
7294.91	74.27	74.26	-0.01
7260.57	73.98	73.98	0
7237.19	73.98	73.97	-0.01
6786.22	73.97	73.96	-0.01
6723.56	73.96	73.96	0
6655.9	72.2	72.11	-0.09
6563.37	72.17	72.06	-0.11
6402.43	72.15	71.98	-0.17
6356.93	72.14	71.95	-0.19
6324.93	72.12	71.93	-0.19
6293.27	72.12	71.91	-0.21
5958.59	72.11	71.9	-0.21
5652.94	72.1	71.89	-0.21
5045.34	72.09	71.89	-0.2
4947.92	72.09	71.89	-0.2
4915.91	72.09	71.88	-0.21
4783.1	72.08	71.88	-0.2
4580.38	72.08	71.87	-0.21
4553.28	72.07	71.87	-0.2
4459.75	72.07	71.87	-0.2
4370.6	72.07	71.87	-0.2
4330.88	72.07	71.87	-0.2
4269.23	72.06	71.85	-0.21
4229.24	72.06	71.85	-0.21
3733.5	72.04	71.84	-0.2
3187.46	72.01	71.81	-0.2
3150.64	72.01	71.81	-0.2
3126.39	72	71.81	-0.19
3104.46	72	71.81	-0.19
2750.51	71.96	71.78	-0.18
2741.93	71.96	71.78	-0.18
2725.96	71.96	71.78	-0.18
2716.57	71.96	71.78	-0.18
2615.37	71.94	71.77	-0.17
2244.98	71.92	71.75	-0.17
2221.06	71.92	71.75	-0.17

Alternative 3 (Recommended) - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	71.89	71.73	-0.16
2042.36	71.89	71.72	-0.17
1922.11	71.89	71.72	-0.17
1892.63	71.89	71.72	-0.17
1863.46	71.79	71.65	-0.14
1829.45	71.79	71.65	-0.14
1611.06	71.77	71.63	-0.14
1513.84	71.75	71.61	-0.14
1454.72	71.74	71.61	-0.13
1380.55	71.73	71.6	-0.13
1354.02	71.73	71.6	-0.13
1010.56	71.69	71.57	-0.12
649.49	71.61	71.5	-0.11
242.54	71.56	71.46	-0.1
169.28	71.54	71.44	-0.1
106.82	71.51	71.42	-0.09
58.31	71.48	71.4	-0.08
4138.85	71.87	71.7	-0.17
3790.71	71.87	71.7	-0.17
3782.06	71.86	71.7	-0.16
3714.78	71.86	71.7	-0.16
3692.61	71.86	71.7	-0.16
3049.5	71.86	71.7	-0.16
2386.67	71.86	71.69	-0.17
2372.17	71.86	71.69	-0.17
2303.61	71.84	71.68	-0.16
2278.1	71.84	71.68	-0.16
1453.34	71.81	71.66	-0.15
1445.67	71.81	71.66	-0.15
1415.48	71.81	71.65	-0.16
1392.09	71.81	71.65	-0.16
1317.96	71.8	71.65	-0.15
1171.38	71.8	71.65	-0.15
1083.7	71.8	71.65	-0.15
215.24	71.76	71.62	-0.14
3232.36	72.52	72.46	-0.06
3203.12	72.52	72.46	-0.06
2930.66	72.51	72.45	-0.06
2636.62	72.49	72.43	-0.06
2494.17	72.48	72.41	-0.07
2473.31	72.48	72.41	-0.07
2465.6	72.47	72.4	-0.07
2414.49	72.47	72.4	-0.07
2046.09	72.44	72.38	-0.06

Alternative 3 (Recommended) - 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	72.39	72.32	-0.07
1565.52	72.33	72.25	-0.08
1208.56	72.31	72.23	-0.08
1188.81	72.31	72.23	-0.08
1175.29	72.3	72.22	-0.08
1132.07	72.3	72.22	-0.08
980.2	72.29	72.21	-0.08
963.63	72.29	72.21	-0.08
950.55	72.29	72.21	-0.08
901.58	72.27	72.18	-0.09
886.91	72.27	72.18	-0.09
839.05	72.27	72.18	-0.09
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	75.27	75.27	0
4477.47	74.9	74.91	0.01
4162.47	74.71	74.71	0
4134.04	74.69	74.7	0.01
4086.12	74.64	74.64	0
4047.7	74.62	74.62	0
3617.56	74.43	74.43	0
3312.44	74.33	74.33	0
3014.68	74.26	74.26	0
2924.04	74.24	74.24	0
2763.33	74.23	74.23	0
2728.92	74.05	74.05	0
2546.4	73.23	73.21	-0.02
2475.84	73.32	73.31	-0.01
1881.88	72.98	72.96	-0.02
1384.48	72.71	72.67	-0.04
1245.83	72.64	72.6	-0.04
584.11	72.48	72.42	-0.06
60.05	72.44	72.37	-0.07

Alternative 3 (Recommended) - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	75.9	75.72	-0.18
71854.2	75.11	74.84	-0.27
70744.2	74.75	74.44	-0.31
69527.2	74.57	74.24	-0.33
68670	74.43	74.18	-0.25
68131	74.37	74.16	-0.21
67511.6	74.3	74.14	-0.16
66869	74.18	73.98	-0.2
66774	74.18	73.96	-0.22
66190	74.12	73.91	-0.21
65955.8	74.11	73.91	-0.2
65434.6	74.06	73.94	-0.12
64399.74	73.71	73.63	-0.08
64273.7	73.7	73.55	-0.15
64220.7	73.67	73.51	-0.16
64200	73.66	73.51	-0.15
64100	73.54	73.4	-0.14
64094	73.54	73.4	-0.14
64024	73.47	73.34	-0.13
64010.4	73.24	73.11	-0.13
63960.4	71.18	71.14	-0.04
63959.7	71.54	71.5	-0.04
63856.7	71.44	71.4	-0.04
63756.7	70.79	70.76	-0.03
62823.2	70.33	70.3	-0.03
61905.2	69.78	69.74	-0.04
60625.3	69.17	69.13	-0.04
60595.74	68.23	68.19	-0.04
60583.6*	68.12	68.08	-0.04
60571.6*	68.01	67.97	-0.04
60559.5*	67.93	67.89	-0.04
60547.5*	67.87	67.83	-0.04
60535.46	67.82	67.78	-0.04
60396.4*	67.75	67.71	-0.04
60257.3*	67.68	67.64	-0.04
60118.3*	67.62	67.58	-0.04
59979.2*	67.55	67.51	-0.04
59840.2*	67.48	67.44	-0.04
59701.1*	67.41	67.37	-0.04
59562.1*	67.34	67.3	-0.04
59423.1	67.25	67.21	-0.04
59307.4*	67.18	67.14	-0.04
59191.8*	67.11	67.08	-0.03
59076.2*	67.05	67.01	-0.04

Alternative 3 (Recommended) - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	66.98	66.95	-0.03
58844.9*	66.92	66.88	-0.04
58729.3*	66.86	66.83	-0.03
58613.7	66.81	66.77	-0.04
58463.86	66.6	66.54	-0.06
3067.74	71.6	71.6	0
2499.4	69.65	69.65	0
2493.18	69.73	69.73	0
2450.1	69.79	69.79	0
2416.26	69.79	69.79	0
2398.11	69.79	69.79	0
2389.56	69.79	69.79	0
2343.79	69.79	69.79	0
2303.58	69.79	69.79	0
2208.42	69.77	69.77	0
2195.48	69.77	69.77	0
2169.49	69.77	69.77	0
2167.76	69.77	69.77	0
2135.78	69.27	69.27	0
2100.84	69.27	69.27	0
1662.37	68.92	68.92	0
1144.5	68.77	68.73	-0.04
595.53	68.76	68.72	-0.04
549.31*	68.76	68.72	-0.04
503.08*	68.76	68.72	-0.04
456.86*	68.77	68.72	-0.05
410.63*	68.76	68.72	-0.04
364.41*	68.76	68.72	-0.04
318.18*	68.76	68.72	-0.04
271.96*	68.76	68.72	-0.04
225.73*	68.75	68.71	-0.04
179.51	68.75	68.71	-0.04
159.41*	68.76	68.72	-0.04
139.31*	68.79	68.75	-0.04
119.21*	68.83	68.79	-0.04
99.11*	68.86	68.81	-0.05
79.01	68.87	68.83	-0.04
7756.32	75.24	75.24	0
7743.32	75.24	75.24	0
7738.5	75.24	75.24	0
7733.4	75.24	75.23	-0.01
7726.83	75.24	75.23	-0.01
7654.51	75.24	75.23	-0.01
7632.63	75.24	75.23	-0.01

Alternative 3 (Recommended) - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7614.73	75.24	75.23	-0.01
7584.04	75.24	75.23	-0.01
7567.5	75.24	75.23	-0.01
7426.94	75.23	75.23	0
7369.89	75.23	75.23	0
7325.91	74.86	74.86	0
7313.37	74.86	74.86	0
7305.97	74.86	74.86	0
7294.91	74.86	74.86	0
7260.57	74.86	74.85	-0.01
7237.19	74.86	74.85	-0.01
6786.22	74.86	74.85	-0.01
6723.56	74.85	74.85	0
6655.9	74.1	73.92	-0.18
6563.37	74.1	73.92	-0.18
6402.43	74.1	73.91	-0.19
6356.93	74.1	73.91	-0.19
6324.93	74.09	73.91	-0.18
6293.27	74.09	73.91	-0.18
5958.59	74.09	73.9	-0.19
5652.94	74.08	73.9	-0.18
5045.34	74.08	73.9	-0.18
4947.92	74.08	73.9	-0.18
4915.91	74.07	73.89	-0.18
4783.1	74.07	73.89	-0.18
4580.38	74.07	73.89	-0.18
4553.28	74.07	73.89	-0.18
4459.75	74.07	73.89	-0.18
4370.6	74.07	73.89	-0.18
4330.88	74.07	73.89	-0.18
4269.23	74.06	73.88	-0.18
4229.24	74.06	73.88	-0.18
3733.5	74.05	73.87	-0.18
3187.46	74.04	73.86	-0.18
3150.64	74.04	73.86	-0.18
3126.39	74.04	73.86	-0.18
3104.46	74.04	73.86	-0.18
2750.51	74.02	73.85	-0.17
2741.93	74.02	73.85	-0.17
2725.96	74.02	73.85	-0.17
2716.57	74.02	73.85	-0.17
2615.37	74.01	73.84	-0.17
2244.98	73.99	73.83	-0.16
2221.06	73.99	73.83	-0.16

Alternative 3 (Recommended) - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2187.07	73.98	73.81	-0.17
2042.36	73.97	73.81	-0.16
1922.11	73.97	73.8	-0.17
1892.63	73.96	73.8	-0.16
1863.46	73.89	73.74	-0.15
1829.45	73.9	73.74	-0.16
1611.06	73.87	73.71	-0.16
1513.84	73.86	73.71	-0.15
1454.72	73.86	73.71	-0.15
1380.55	73.85	73.7	-0.15
1354.02	73.84	73.69	-0.15
1010.56	73.81	73.66	-0.15
649.49	73.72	73.59	-0.13
242.54	73.68	73.55	-0.13
169.28	73.67	73.54	-0.13
106.82	73.63	73.5	-0.13
58.31	73.53	73.42	-0.11
4138.85	73.94	73.78	-0.16
3790.71	73.94	73.77	-0.17
3782.06	73.94	73.77	-0.17
3714.78	73.94	73.77	-0.17
3692.61	73.94	73.77	-0.17
3049.5	73.94	73.77	-0.17
2386.67	73.93	73.77	-0.16
2372.17	73.93	73.77	-0.16
2303.61	73.93	73.77	-0.16
2278.1	73.93	73.77	-0.16
1453.34	73.91	73.75	-0.16
1445.67	73.91	73.75	-0.16
1415.48	73.9	73.74	-0.16
1392.09	73.9	73.74	-0.16
1317.96	73.9	73.74	-0.16
1171.38	73.89	73.74	-0.15
1083.7	73.89	73.74	-0.15
215.24	73.87	73.72	-0.15
3232.36	74.3	74.13	-0.17
3203.12	74.3	74.13	-0.17
2930.66	74.3	74.13	-0.17
2636.62	74.29	74.12	-0.17
2494.17	74.29	74.12	-0.17
2473.31	74.29	74.11	-0.18
2465.6	74.29	74.11	-0.18
2414.49	74.29	74.11	-0.18
2046.09	74.28	74.11	-0.17

Alternative 3 (Recommended) - 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
1929.3	74.26	74.08	-0.18
1565.52	74.24	74.06	-0.18
1208.56	74.23	74.05	-0.18
1188.81	74.23	74.05	-0.18
1175.29	74.23	74.04	-0.19
1132.07	74.23	74.05	-0.18
980.2	74.23	74.04	-0.19
963.63	74.23	74.04	-0.19
950.55	74.23	74.05	-0.18
901.58	74.21	74.02	-0.19
886.91	74.21	74.02	-0.19
839.05	74.21	74.02	-0.19
805	#N/A	#N/A	#N/A
772	#N/A	#N/A	#N/A
5341.48	76	76	0
4477.47	75.5	75.49	-0.01
4162.47	75.27	75.26	-0.01
4134.04	75.25	75.24	-0.01
4086.12	75.18	75.17	-0.01
4047.7	75.16	75.14	-0.02
3617.56	74.96	74.93	-0.03
3312.44	74.87	74.83	-0.04
3014.68	74.81	74.76	-0.05
2924.04	74.8	74.75	-0.05
2763.33	74.8	74.75	-0.05
2728.92	74.73	74.67	-0.06
2546.4	74.44	74.3	-0.14
2475.84	74.44	74.29	-0.15
1881.88	74.37	74.21	-0.16
1384.48	74.34	74.17	-0.17
1245.83	74.33	74.16	-0.17
584.11	74.31	74.14	-0.17
60.05	74.28	74.1	-0.18

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4104.08	58.25	73.05		73.51	0.001011	5.43	782.62	260.75	0.31
P118-00-00	P118-R3-2	71854.2	Max WS	3805.4	57.83	72.93		73.09	0.000375	3.21	1186.38	170.45	0.2
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3812.79	55.05	72.6		72.72	0.000276	2.89	1459.54	385.97	0.17
P118-00-00	P118-R3-2	69527.2	Max WS	3779.91	55.28	72.33		72.45	0.000201	2.73	1825.73	520	0.15
P118-00-00	P118-R3-2	68670	Max WS	3577.3	54.88	72.03		72.23	0.000386	3.68	1319.19	300.09	0.21
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3635.26	54.47	71.81		72.03	0.000364	3.85	1254.17	351.71	0.2
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3533.54	54.14	71.51		71.79	0.000561	4.36	1221.38	334.04	0.24
P118-00-00	P118-R3-2	66869	Max WS	3262.73	53.96	71		71.32	0.000834	4.59	789.1	163.71	0.29
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3282.31	53.79	71.02		71.25	0.000527	3.85	911.39	142.12	0.23
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3067.09	53.6	70.86		71.06	0.000358	3.68	1224.89	227.52	0.2
P118-00-00	P118-R3-2	65955.8	Max WS	2881.49	53.52	70.75		70.9	0.00046	3.17	1120.12	278.2	0.21
P118-00-00	P118-R3-2	65434.6	Max WS	2736.89	53.1	70.56		70.72	0.000316	3.31	1202	214.6	0.18
P118-00-00	P118-R3-2	64399.74	Max WS	3154.09	52.59	70.07		70.3	0.000436	3.94	987.08	179.39	0.21
P118-00-00	P118-R3-2	64273.7	Max WS	3158.16	53.55	70.1	60.96	70.25	0.000336	3.07	1055.33	171.11	0.19
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3154.88	53.3	70.08		70.22	0.000308	2.98	1085.81	152.04	0.18
P118-00-00	P118-R3-2	64200	Max WS	3155.22	53.3	70.08		70.22	0.000308	2.98	1085.57	152.03	0.18
P118-00-00	P118-R2-2	64100	Max WS	3876.46	52.61	70.08		70.16	0.00013	2.34	1692.68	4659.16	0.12
P118-00-00	P118-R2-2	64094	Max WS	3877.31	52.61	70.08	59.55	70.16	0.00013	2.34	1692.56	4657.11	0.12
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	3876.97	52.56	70.05		70.14	0.000129	2.34	1696.99	4819.61	0.12
P118-00-00	P118-R2-2	64010.4	Max WS	3874.98	52.78	69.95	61.28	70.15	0.000318	3.56	1203.78	4560.38	0.19
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	3866.79	53.04	69.59		69.81	0.00039	3.79	1116.91	2366.31	0.21
P118-00-00	P118-R2-2	63959.7	Max WS	3869.95	53.06	69.7	59.5	69.79	0.000342	2.38	1643.14	4005.4	0.13
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	3868.99	53.16	69.67		69.76	0.000148	2.42	1615.86	3551.1	0.13
P118-00-00	P118-R2-2	63756.7	Max WS	3873.24	52.4	69.45		69.76	0.000668	4.57	1050.46	205	0.26
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3191.77	50.35	69.17		69.36	0.000388	3.56	985.55	168.46	0.2
P118-00-00	P118-R2-2	61905.2	Max WS	3260.12	50.77	68.92		69.05	0.00027	2.82	1157.6	132.2	0.17
P118-00-00	P118-R2-2	60625.3	Max WS	3265.28	49.52	68.76		68.88	0.000223	2.72	1201.24	121.4	0.15
P118-00-00	P118-R2-1	60595.74	Max WS	2790.77	49.48	68.58		68.69	0.000163	2.75	1129.56	131.55	0.14
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2774.9	49.68	68.58		68.67	0.000136	2.53	1207.62	139.91	0.13
P118-00-00	P118-R2-1	60571.6*	Max WS	2762.54	49.89	68.58		68.66	0.000116	2.34	1283.07	148.28	0.12
P118-00-00	P118-R2-1	60559.5*	Max WS	2768.31	50.09	68.57		68.65	0.000102	2.19	1356.44	156.63	0.11
P118-00-00	P118-R2-1	60547.5*	Max WS	2769.15	50.3	68.57		68.63	0.000092	2.06	1428.5	158.63	0.1
P118-00-00	P118-R2-1	60535.46	Max WS	2768.16	50.5	68.57		68.63	0.000083	1.94	1502.96	161.27	0.1
P118-00-00	P118-R2-1	60396.4*	Max WS	2742.96	50.45	68.56		68.62	0.000082	1.9	1517.78	166.88	0.1
P118-00-00	P118-R2-1	60257.3*	Max WS	2714.24	50.4	68.56		68.61	0.00008	1.86	1536.51	173.48	0.1
P118-00-00	P118-R2-1	60118.3*	Max WS	2708.83	50.35	68.55		68.6	0.00008	1.83	1559.74	176.25	0.1
P118-00-00	P118-R2-1	59979.2*	Max WS	2700.02	50.3	68.55		68.59	0.000078	1.79	1584.6	177.2	0.1
P118-00-00	P118-R2-1	59840.2*	Max WS	2652.93	50.25	68.54		68.59	0.000073	1.72	1611.13	178.16	0.09
P118-00-00	P118-R2-1	59701.1*	Max WS	2598.67	50.2	68.54		68.58	0.000068	1.65	1639.94	179.13	0.09
P118-00-00	P118-R2-1	59562.1*	Max WS	2586.54	50.15	68.53		68.57	0.000066	1.61	1669.91	180.09	0.09
P118-00-00	P118-R2-1	59423.1	Max WS	2556.1	50.1	68.53		68.57	0.000066	1.6	1701.38	181.05	0.09
P118-00-00	P118-R2-1	59307.4*	Max WS	2551.2	50.1	68.52		68.56	0.000064	1.56	1762.34	196.49	0.09
P118-00-00	P118-R2-1	59191.8*	Max WS	2543.05	50.11	68.52		68.55	0.000061	1.52	1816.01	211.94	0.08
P118-00-00	P118-R2-1	59076.2*	Max WS	2532.23	50.11	68.51		68.55	0.000058	1.48	1863.86	227.38	0.08
P118-00-00	P118-R2-1	58960.5*	Max WS	2534.45	50.11	68.51		68.54	0.000055	1.44	1904.4	242.82	0.08
P118-00-00	P118-R2-1	58844.9*	Max WS	2524.71	50.11	68.51		68.54	0.000052	1.4	1938.51	258.26	0.08
P118-00-00	P118-R2-1	58729.3*	Max WS	2519.42	50.12	68.5		68.53	0.00005	1.37	1965.26	273.71	0.08
P118-00-00	P118-R2-1	58613.7	Max WS	2505.86	50.12	68.5		68.53	0.000047	1.34	1985.6	289.15	0.07
P118-00-00	P118-R2-1	58463.86	Max WS	2792.99	47.59	68.5		68.51	0.000022	1.05	11612.7	5723.48	0.05
P118-00-00	P118-R2-1	58387.5	Max WS	2887.59	47.57	61.36	55.2	61.57	0.00062	3.61	801.11	126.28	0.25
P118-00-00	P118-R2-1	58359.5 ALDINE-WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	2887.17	47.51	61.25		61.46	0.000638	3.64	794.23	125.85	0.25
P118-00-00	P118-R2-1	57555.5	Max WS	2881.81	47.03	60.63		60.94	0.000682	4.51	638.9	70.53	0.26
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	2918.33	46.03	59.88		60.2	0.000723	4.57	639.23	72.17	0.27
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	2918.32	44.69	58.87		59.33	0.001103	5.44	536.34	61.02	0.32
P118-00-00	P118-R2-1	55000	Lat Struct										
P118-00-00	P118-R2-1	54459.2	Max WS	2918.2	44.27	57.82		58.22	0.000927	5.07	576	66.34	0.3

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q.Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	53881	Lat Struct										
P118-00-00	P118-R2-1	53801.7	Max WS	2918.1	43.7	57.7		57.81	0.000234	2.62	1115.6	132.97	0.16
P118-00-00	P118-R2-1	53275.7	Max WS	2934.75	43.36	57.59		57.7	0.000178	2.62	1120.11	103.22	0.14
P118-00-00	P118-R2-1	52844.3	Max WS	3038.19	43.08	57.5	48.52	57.6	0.000224	2.56	1185.83	144.23	0.16
P118-00-00	P118-R2-1	52815.3	BERTRAND RD										
P118-00-00	P118-R2-1	52786.3	Max WS	3038.21	43.01	57.47		57.57	0.000221	2.55	1191.52	144.55	0.16
P118-00-00	P118-R2-1	52465.7	Max WS	3038.1	43.2	57.29		57.47	0.000446	3.34	910.25	121.43	0.21
P118-00-00	P118-R2-1	52221.3	Max WS	3038.09	43.89	57.12	51.47	57.34	0.000625	3.76	807.32	115.93	0.25
P118-00-00	P118-R2-1	52207.8	UTILITY										
P118-00-00	P118-R2-1	52194.3	Max WS	3038.1	43.8	57.08		57.29	0.000612	3.74	813.18	116.25	0.25
P118-00-00	P118-R2-1	51283.9	Max WS	3037.92	43.43	56.37		56.63	0.00084	4.11	739.95	115.27	0.29
P118-00-00	P118-R2-1	51096.9	Max WS	3037.94	42.91	56.33	48.42	56.51	0.000413	3.46	878.78	103.03	0.21
P118-00-00	P118-R2-1	51083.9	UTILITY										
P118-00-00	P118-R2-1	51070.9	Max WS	3037.87	42.87	56.3		56.48	0.000412	3.45	879.65	103.08	0.21
P118-00-00	P118-R2-1	50549.6	Max WS	3037.78	42.3	56.17		56.3	0.000296	2.87	1057.2	132.29	0.18
P118-00-00	P118-R2-1	50021.9	Max WS	3037.77	41.83	56.03	47.95	56.35	0.000265	2.76	1100.85	134.75	0.17
P118-00-00	P118-R2-1	49980.9	HOPPER RD										
P118-00-00	P118-R2-1	49939.9	Max WS	3037.79	41.69	56		56.31	0.000256	2.72	1115.32	135.58	0.17
P118-00-00	P118-R2-1	49231.7	Max WS	3037.67	41.03	55.6		55.81	0.000605	3.72	815.73	114.31	0.25
P118-00-00	P118-R2-1	48480.5	Max WS	3037.62	41.23	55.3		55.45	0.000359	3.13	970.11	124.36	0.2
P118-00-00	P118-R2-1	48196.5	Max WS	3037.58	41.31	55.16	48.06	55.33	0.000444	3.35	906.56	120.5	0.22
P118-00-00	P118-R2-1	48183.0	UTILITY										
P118-00-00	P118-R2-1	48169.5	Max WS	3037.58	41.24	55.13		55.3	0.000438	3.33	911.45	120.81	0.21
P118-00-00	P118-R2-1	47607.9	Max WS	3037.51	40.57	54.77		55	0.000631	3.86	786.9	108.4	0.25
P118-00-00	P118-R2-1	46939	Max WS	3037.46	40.79	54.56		54.69	0.000299	2.88	1055.1	130.09	0.18
P118-00-00	P118-R2-1	46594.8	Max WS	3037.46	40.91	54.46	46.76	54.59	0.000268	2.95	1047.09	154.01	0.17
P118-00-00	P118-R2-1	46584.8											
P118-00-00	P118-R2-1	46579.8	Max WS	3037.45	40.91	54.44		54.57	0.000292	2.91	1107.28	198.55	0.18
P118-00-00	P118-R2-1	46575.8	Max WS	3037.46	40.91	54.44	46.77	54.57	0.000292	2.91	1108.37	196.06	0.18
P118-00-00	P118-R2-1	46560.8	LITTLE YORK RD										
P118-00-00	P118-R2-1	46526.8	Max WS	3037.42	40.74	54.41		54.54	0.000257	2.91	1058.78	137.46	0.17
P118-00-00	P118-R2-1	46516.8	Max WS	3037.43	40.74	54.41	46.61	54.54	0.000283	2.88	1066.8	166.12	0.17
P118-00-00	P118-R2-1	46515.8											
P118-00-00	P118-R2-1	46478.9	Max WS	3037.44	40.49	54.32		54.48	0.000438	3.22	944.73	137.75	0.21
P118-00-00	P118-R2-1	46468.9	Max WS	3037.43	40.49	54.32	47.96	54.48	0.000439	3.22	944.1	137.62	0.21
P118-00-00	P118-R2-1	46466.8											
P118-00-00	P118-R2-1	46458.9	Max WS	3037.44	40.49	54.29		54.45	0.000444	3.23	940.6	136.89	0.21
P118-00-00	P118-R2-1	45952.3	Max WS	3037.32	40.12	53.67		54.01	0.00131	4.68	648.43	115.56	0.35
P118-00-00	P118-R2-1	45161.4	Max WS	3037.12	39.57	52.74		53.02	0.001217	4.2	745.23	157.23	0.3
P118-00-00	P118-R2-1	44549.9	Max WS	2831.34	38.76	52.16		52.34	0.000788	3.43	825.96	130.81	0.24
P118-00-00	P118-R2-1	44143.3	Max WS	2820.67	38.22	51.87		52.04	0.000698	3.28	859.12	132.55	0.23
P118-00-00	P118-R2-1	43789.5	Max WS	2847.06	37.97	51.82		51.84	0.000049	1.6	5191.06	885.63	0.08
P118-00-00	P118-R2-1	43739.48	Max WS	2847.05	37.93	51.81		51.83	0.000054	1.67	3961.64	507.95	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	2847.15	37.87	51.81		51.83	0.000049	1.6	4126	522.85	0.08
P118-00-00	P118-R2-1	43564.8*	Max WS	2846.96	37.81	51.81		51.83	0.000043	1.51	4552.26	960.96	0.07
P118-00-00	P118-R2-1	43477.4*	Max WS	2847.06	37.75	51.81		51.82	0.000031	1.29	6041	1207.18	0.06
P118-00-00	P118-R2-1	43390.1*	Max WS	2846.72	37.68	51.81		51.82	0.00002	1.02	7569.36	1238.33	0.05
P118-00-00	P118-R2-1	43302.8*	Max WS	2847.06	37.62	51.81		51.82	0.000011	0.76	9047.22	1249.34	0.04
P118-00-00	P118-R2-1	43215.5	Max WS	2846.69	37.56	51.81		51.82	0.000008	0.64	10033.31	1260.18	0.03
P118-00-00	P118-R2-1	43118.0*	Max WS	2852.52	37.49	51.81		51.81	0.000012	0.81	9160.39	1216.4	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	2852.43	37.42	51.81		51.81	0.000016	0.93	8158.4	1160.85	0.05
P118-00-00	P118-R2-1	42922.9*	Max WS	2852.51	37.35	51.81		51.81	0.000018	1	7280.91	919.3	0.05
P118-00-00	P118-R2-1	42825.49	Max WS	2852.22	37.28	51.81		51.81	0.00002	1.04	7022.47	853.56	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	2852.32	37.22	51.8		51.81	0.000019	1.02	7072.2	949.82	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	2852.4	37.15	51.8		51.81	0.000016	0.96	7678.22	1046.5	0.05
P118-00-00	P118-R2-1	42559.6*	Max WS	2852.7	37.09	51.8		51.81	0.000012	0.84	8264.1	1044.59	0.04
P118-00-00	P118-R2-1	42471	Max WS	2852.19	37.03	51.8		51.8	0.000006	0.6	8460.23	1036.58	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	2852.29	36.98	51.8		51.8	0.000008	0.68	8491.7	1056.55	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	2852.41	36.92	51.8		51.8	0.000005	0.51	9466.96	1113.75	0.02
P118-00-00	P118-R2-1	42245.55	Max WS	2852.4	36.87	51.8		51.8	0.000002	0.3	9926.67	1119.32	0.01
P118-00-00	P118-R2-1	42150.1*	Max WS	2851.95	36.8	51.8		51.8	0.000006	0.58	8878.97	1102.46	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	2852.15	36.74	51.8		51.8	0.000008	0.7	7261.73	997	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	2852.05	36.67	51.8		51.8	0.00001	0.75	6432.51	800.8	0.04
P118-00-00	P118-R2-1	41863.8	Max WS	2852.05	36.6	51.8		51.8	0.000008	0.69	6941.65	705.12	0.03
P118-00-00	P118-R2-1	41771.7*	Max WS	2852.16	36.53	51.8		51.8	0.000012	0.83	6718.5	693.75	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	2852.15	36.47	51.8		51.8	0.000015	0.94	6467.18	719.71	0.04
P118-00-00	P118-R2-1	41587.5*	Max WS	2852.26	36.4	51.79		51.8	0.000018	1.04	6178.21	725.71	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	2851.8	36.34	51.79		51.8	0.00002	1.09	6028.45	697.02	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	2851.55	36.27	51.79		51.8	0.000019	1.05	6026.64	686.49	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	2848.47	36.27	51.72	40.94	51.89	0.000007	3.29	1224.95	131.01	0.15
P118-00-00	P118-R2-1	41243.9	JENSEN DR										
P118-00-00	P118-R2-1	41203.4	Max WS	2850.69	36.25	51.76		51.88	0.000006	2.94	1229.21	131.12	0.13
P118-00-00	P118-R2-1	41197.4	Max WS	2848.47	36.25	51.72	40.94	51.89	0.000007	3.27	1272.34	133.74	0.15

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	F.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge											
P118-00-00	P118-R2-1	41185.7 Max WS		2848.11	36.25	51.71		51.88	0.000004	3.29	1272.66	172.99	0.15	
P118-00-00	P118-R2-1	40951.8 Max WS		2852.04	36.2	51.8	40.04	51.85	0.000005	1.72	1717.82	167.53	0.09	
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge											
P118-00-00	P118-R2-1	40886.8 Max WS		2852.76	36.19	51.8		51.84	0.000005	1.67	1761.25	170.5	0.08	
P118-00-00	P118-R2-1	40846.9 Max WS		2851.92	36.18	51.78	40.61	51.84	0.000008	2	1456.18	163.22	0.11	
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge											
P118-00-00	P118-R2-1	40605.5 Max WS		2851.68	36.13	51.77		51.83	0.000008	1.99	1458.34	161.61	0.11	
P118-00-00	P118-R2-1	40584.6 Max WS		2851.43	36.13	51.77	40.57	51.83	0.000008	1.98	1438.07	138.86	0.11	
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge											
P118-00-00	P118-R2-1	40515.6 Max WS		2851.06	36.12	51.77		51.83	0.000008	1.98	1438.44	138.87	0.11	
P118-00-00	P118-R2-1	39969.8 Max WS		2849.55	36.01	51.73		51.82	0.000021	2.34	1307.02	177.29	0.13	
P118-00-00	P118-R2-1	39829.91 Max WS		3107.71	36	51.52		51.74	0.000966	3.74	831.27	116.49	0.24	
P118-00-00	P118-R2-1	39188.6 Max WS		2668.46	35.6	50.6		50.87	0.001096	4.11	649.06	81.47	0.26	
P118-00-00	P118-R2-1	38423.57 Max WS		2822.69	34.76	49.71		49.99	0.001067	4.25	663.73	77.7	0.26	
P118-00-00	P118-R2-1	38170.2 Max WS		2820.8	34.35	49.65		49.79	0.000472	3.01	937.69	114.46	0.18	
P118-00-00	P118-R2-1	37899.37 Max WS		2815.53	34.35	49.52		49.66	0.000489	3.05	921.97	101.64	0.18	
P118-00-00	P118-R2-1	37413.16 Max WS		2795.88	34.13	49.16		49.36	0.000752	3.53	791.66	98.56	0.22	
P118-00-00	P118-R2-1	37258.6 Max WS		2788.35	34.02	49.02		49.23	0.000775	3.74	744.98	82.91	0.22	
P118-00-00	P118-R2-1	36408.6 Max WS		2759.55	32.39	48.29		48.53	0.000876	3.98	707.88	91.54	0.23	
P118-00-00	P118-R2-1	36341.47 Max WS		2756.28	32.39	48.22	40.84	48.47	0.000899	4.01	689.19	78.48	0.24	
P118-00-00	P118-R2-1	36330 UTILITY	Bridge											
P118-00-00	P118-R2-1	36321.56 Max WS		2761.96	32	48.36		48.46	0.000313	2.58	1069.23	103.72	0.14	
P118-00-00	P118-R2-1	36303.5 Max WS		2762.23	32	48.36		48.46	0.000299	2.53	1090.19	108.49	0.14	
P118-00-00	P118-R1-3	36195.78 Max WS		3677.75	32.04	48.22		48.4	0.000535	3.43	1071.09	106.48	0.19	
P118-00-00	P118-R1-3	36107.2 Max WS		3677.75	32	48.17		48.36	0.000537	3.44	1070.26	106.45	0.19	
P118-00-00	P118-R1-3	35434.7 Max WS		3676.83	31.72	47.91		48.05	0.000361	3.06	1199.82	102.35	0.16	
P118-00-00	P118-R1-3	35045.7 Max WS		3676.09	31.55	47.76	37.76	47.91	0.000374	3.09	1188.27	102.48	0.16	
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge											
P118-00-00	P118-R1-3	35006.1 Max WS		3675.64	31.09	47.72		47.85	0.000348	2.99	1231.15	106.29	0.15	
P118-00-00	P118-R1-3	34984.3 Max WS		3675.64	30.53	47.67	38.47	47.85	0.000463	3.41	1180.78	134.18	0.18	
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge											
P118-00-00	P118-R1-3	34870.3 Max WS		3675.53	30	47.62		47.78	0.000406	3.26	1245.96	137.97	0.17	
P118-00-00	P118-R1-3	33920.1 Max WS		3715.5	29.63	46.78		47.11	0.001016	4.57	812.66	79.76	0.25	
P118-00-00	P118-R1-3	32749.8 Max WS		3761.41	28	45.35		45.73	0.001316	4.96	758.78	82.27	0.29	
P118-00-00	P118-R1-3	31824.3 Max WS		3799.72	26.81	44.48		44.74	0.000792	4.14	918.13	90.04	0.23	
P118-00-00	P118-R1-3	30679.1 Max WS		3842.33	27.05	43.52		43.8	0.000843	4.24	908.05	104.5	0.24	
P118-00-00	P118-R1-3	30678.1	Lat Struct											
P118-00-00	P118-R1-3	30099.1 Max WS		3863.33	27.23	43.25		43.42	0.000445	3.31	1184.41	139.42	0.18	
P118-00-00	P118-R1-3	29757.8 Max WS		3878.77	27.34	43.07	33.98	43.25	0.000494	3.42	1137.68	115.51	0.19	
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge											
P118-00-00	P118-R1-3	29704.8 Max WS		3877.28	27	43.01		43.19	0.000452	3.33	1170.65	118.15	0.18	
P118-00-00	P118-R1-3	28983.7 Max WS		3816.21	26.97	42.18		42.53	0.001335	4.79	807.16	106.58	0.29	
P118-00-00	P118-R1-3	28587.3 Max WS		4297.78	26.04	41.7		41.9	0.00056	3.55	1250.76	167.28	0.2	
P118-00-00	P118-R1-3	27992 Max WS		4287.77	25.42	41.35		41.63	0.00086	4.32	1183.15	242.42	0.24	
P118-00-00	P118-R1-3	27567.7 Max WS		4279.12	25.74	41.12		41.33	0.000521	3.75	1284.65	198.27	0.19	
P118-00-00	P118-R1-3	27317 Max WS		4273.34	25.92	40.98	32.87	41.21	0.000586	3.87	1198.35	155.87	0.2	
P118-00-00	P118-R1-3	27305.8 Max WS		4272.55	25.93	40.95		41.18	0.000569	3.86	1207.67	155.38	0.2	
P118-00-00	P118-R1-3	27295.8 Max WS		4272.55	25.93	40.95	32.65	41.18	0.00057	3.86	1206.75	155.3	0.2	
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge											
P118-00-00	P118-R1-3	27189.8 Max WS		4263.64	25.89	40.78		41.02	0.00059	3.9	1187.33	153.48	0.21	
P118-00-00	P118-R1-3	27180.8 Max WS		4263.64	25.89	40.78	32.61	41.01	0.000591	3.9	1186.47	153.4	0.21	
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge											
P118-00-00	P118-R1-3	27167.5 Max WS		4265.33	25.84	40.82		41.01	0.000493	3.48	1287.71	156.69	0.19	
P118-00-00	P118-R1-3	26816.8*	Max WS	4255.24	25.02	40.61		40.8	0.000553	3.45	1250.67	145.79	0.2	
P118-00-00	P118-R1-3	26815.8	Lat Struct											
P118-00-00	P118-R1-3	26466.1 Max WS		4241.26	24.2	40.41		40.61	0.000629	3.55	1198.07	138.02	0.21	
P118-00-00	P118-R1-3	26224.4*	Max WS	4230.87	23.64	40.28		40.45	0.000545	3.38	1260.12	147.74	0.19	
P118-00-00	P118-R1-3	25982.8 Max WS		4223.46	23.07	40.18		40.34	0.00047	3.22	1331.92	153.64	0.18	
P118-00-00	P118-R1-3	25318.4 Max WS		4188.13	23.07	39.84		40.01	0.000513	3.3	1285.88	176.3	0.19	
P118-00-00	P118-R1-3	25317.4	Lat Struct											
P118-00-00	P118-R1-3	24564.2 Max WS		4141.08	21.76	39.54		39.67	0.000364	2.97	1446.66	148.65	0.16	
P118-00-00	P118-R1-3	23984.6 Max WS		4925.47	20.75	39.24		39.41	0.000412	3.3	1733.44	261.92	0.17	
P118-00-00	P118-R1-2	23796.2 Max WS		5314.43	24.42	39.13		39.32	0.000486	3.52	1517.16	170.37	0.21	
P118-00-00	P118-R1-2	23795.2	Lat Struct											
P118-00-00	P118-R1-2	23286.2 Max WS		5312.56	20.82	38.84		39.05	0.000581	3.71	1431.39	136.86	0.2	
P118-00-00	P118-R1-2	22973.4 Max WS		5309.83	20.85	38.71	28.82	38.89	0.000445	3.43	1608.16	210.63	0.18	
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge											
P118-00-00	P118-R1-2	22929.4 Max WS		5309.83	20.49	38.29		38.47	0.000452	3.44	1595.5	206.61	0.18	
P118-00-00	P118-R1-2	22928.4	Lat Struct											
P118-00-00	P118-R1-2	22630.3 Max WS		5302.56	19.11	37.9	28.78	38.27	0.000997	4.88	1085.8	98.1	0.26	
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge											

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-00-00	P118-R1-2	22587.7	Max WS	5299.88	18.99	37.68		38.06	0.00102	4.92	1076.55	97.79	0.26
P118-00-00	P118-R1-2	22577.7	Max WS	5295.59	18.99	37.67		38.05	0.001021	4.92	1075.5	97.75	0.26
P118-00-00	P118-R1-1	22186.8	Max WS	5563.56	18.55	37.33		37.67	0.000824	4.66	1198.49	100.58	0.24
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	5573.95	18.16	37.28		37.43	0.000395	3.16	1813.46	181.99	0.17
P118-00-00	P118-R1-1	21589.8	Max WS	6285.12	17.9	36.92		37.26	0.00074	4.74	1454.52	159.34	0.23
P118-00-00	P118-R1-1	21362	Max WS	6279.3	17.65	36.81		37.17	0.000062	4.79	1371.85	128.08	0.24
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	6274.75	17.65	36.81	27.79	37.17	0.000062	4.79	1371.59	128.07	0.23
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	6274.75	17.62	36.77		37.13	0.000062	4.79	1370.44	128	0.24
P118-00-00	P118-R1-1	21010.4	Max WS	6256.79	18.08	36.81	26.05	37.06	0.000439	4.36	2166.91	207.28	0.18
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	6256.79	17.96	36.73		36.97	0.000436	4.35	2174.32	207.64	0.18
P118-00-00	P118-R1-1	20880.6	Max WS	6242.65	17.96	36.48	28.1	37.09	0.000087	6.41	1684.81	190.04	0.29
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	6242.65	17.96	36.43		37.04	0.000088	6.43	1675.05	189.49	0.29
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	6308.4	19.24	35.35		36	0.002137	6.46	993.78	207.31	0.37
P118-00-00	P118-R1-1	18597.4	Max WS	6567.62	15.56	33.59		34.06	0.000879	5.53	1346.17	145.42	0.27
P118-00-00	P118-R1-1	18107.1	Max WS	6552.61	15.21	33.22		33.52	0.000989	4.37	1498.21	167.69	0.26
P118-00-00	P118-R1-1	17862.9*	Max WS	6539.51	14.55	33.09		33.32	0.000678	3.91	1672.98	167.42	0.22
P118-00-00	P118-R1-1	17618.7*	Max WS	6537.44	13.89	33		33.2	0.000492	3.59	1821.35	162.44	0.19
P118-00-00	P118-R1-1	17374.5*	Max WS	6536.63	13.23	32.9		33.08	0.000387	3.4	1920.69	153.82	0.17
P118-00-00	P118-R1-1	17130.3	Max WS	6623.15	12.57	32.82		33	0.000338	3.36	1971.64	142.75	0.16
P118-00-00	P118-R1-1	16004	Max WS	6700.46	11.24	32.31		32.51	0.000543	3.57	1878.76	177.74	0.19
P118-00-00	P118-R1-1	15045.6	Max WS	7078.35	10.55	31.56		31.87	0.000744	4.49	1575.69	132.85	0.23
P118-00-00	P118-R1-1	13937.2	Max WS	7067.36	11.62	30.87		31.16	0.000621	4.57	2236.7	295.43	0.22
P118-00-00	P118-R1-1	13341.9	Max WS	7057.56	10.38	30.28		30.73	0.000986	5.73	1800.8	254.06	0.27
P118-00-00	P118-R1-1	12945.5	Max WS	7052.62	9.55	30.04	21.59	30.36	0.000691	4.97	2374.87	340.78	0.23
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	7051.56	9.53	29.95		30.27	0.000707	5.01	2349.47	338.5	0.23
P118-00-00	P118-R1-1	12931.7	Max WS	7051.54	9.53	29.95	21.57	30.27	0.000707	5.01	2349.21	338.47	0.23
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	7048.26	8.77	29.69		29.97	0.000609	4.76	2521.61	353.84	0.22
P118-00-00	P118-R1-1	12117.3	Max WS	7045.66	7.23	29.37		29.58	0.000326	3.75	2229.59	211.56	0.16
P118-00-00	P118-R1-1	10905.1	Max WS	7653.34	9.54	28.49		28.87	0.00081	5.02	1745.6	183.82	0.25
P118-00-00	P118-R1-1	9879.2	Max WS	7634.67	6.26	27.36		27.92	0.001127	6.27	1728.33	184.95	0.29
P118-00-00	P118-R1-1	8777	Max WS	7624.5	4.71	26.75		26.89	0.000414	3.34	4137.14	680.89	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	7622.01	4.73	26.41		26.59	0.000381	3.7	3232.98	365.19	0.17
P118-00-00	P118-R1-1	6779.3	Max WS	7618.16	4.44	25.66		25.95	0.000679	4.37	2219.67	378.4	0.22
P118-00-00	P118-R1-1	5748.4	Max WS	7612.88	4.27	24.27		24.91	0.001546	6.64	1606.21	270.58	0.33
P118-00-00	P118-R1-1	4492	Max WS	7609.24	1.92	23.11		23.42	0.000711	4.49	1838.31	225.82	0.23
P118-00-00	P118-R1-1	3597.9	Max WS	7607.09	2.46	22.35		22.71	0.000982	5.1	2254.25	319.58	0.27
P118-00-00	P118-R1-1	2709.4	Max WS	7605.64	1.59	21.55		21.9	0.000814	5.16	2530.34	343.81	0.25
P118-00-00	P118-R1-1	1695.9	Max WS	7605.05	1.52	20.48		20.96	0.001156	6.04	2178.03	310.03	0.29
P118-00-00	P118-R1-1	678.7	Max WS	7604.99	0.81	18.1	12.89	19.07	0.0028	7.93	1063.97	191.16	0.43
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.85		49.89	0.001737	1.63	18.45	16.57	0.27
P118-08-00	P118-08-00	7839.79	Max WS	29.99	47.55	49.11		49.14	0.001059	1.25	24.04	22.54	0.21
P118-08-00	P118-08-00	7820.27	Max WS	30.75	47.46	49.08	48.28	49.11	0.001353	1.31	23.46	24.62	0.24
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	30.75	47.58	48.76		48.85	0.007178	2.52	12.19	16.77	0.52
P118-08-00	P118-08-00	7729.04	Max WS	32.47	46.32	48.69		48.71	0.00029	1.09	29.67	33.74	0.13
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	32.47	46.88	48.64		48.68	0.000831	1.5	21.67	21.52	0.2
P118-08-00	P118-08-00	7550.89	Max WS	35.48	46.66	48.59		48.62	0.000817	1.29	27.57	26.2	0.19
P118-08-00	P118-08-00	6762.47	Max WS	71.9	44.81	47.98		48.01	0.000608	1.47	51.28	30.78	0.18
P118-08-00	P118-08-00	5858.77	Max WS	102.46	44.48	47.29		47.32	0.000765	1.61	145.89	310.08	0.2
P118-08-00	P118-08-00	5845.88	Max WS	102.89	44.35	47.2		47.39	0.000253	3.5	29.36	454.32	0.38
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	102.88	44.6	47.15		47.39	0.000356	3.87	26.59	1379.78	0.44
P118-08-00	P118-08-00	5748.41	Max WS	104.27	44.22	47.27		47.33	0.001236	2.08	56.02	691.6	0.25
P118-08-00	P118-08-00	4837.06	Max WS	123.16	41.61	45.31		45.43	0.002553	2.75	44.85	672.04	0.36
P118-08-00	P118-08-00	4823.61	Max WS	123.69	41.31	45.32		45.4	0.001466	2.2	58.84	810	0.27
P118-08-00	P118-08-00	4767.88	Max WS	124.49	41.28	45.18		45.29	0.002234	2.65	46.95	893.85	0.33
P118-08-00	P118-08-00	4732.44	Max WS	125.74	41.13	45.18		45.24	0.000866	1.96	64.07	816.84	0.22
P118-08-00	P118-08-00	4289.14	Max WS	135.56	41.25	44.27		44.41	0.002525	3	46.46	731.44	0.36
P118-08-00	P118-08-00	4255.48	Max WS	131.3	41.41	44.19	43.08	44.35	0.00034	3.22	40.73	671.75	0.4
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	131.01	41.23	44.2		44.34	0.000325	3.02	43.38	937.06	0.39
P118-08-00	P118-08-00	4159.81	Max WS	132.77	40.8	44.23		44.32	0.000847	2.37	55.99	812.8	0.23
P118-08-00	P118-08-00	4083.03	Culvert										

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq-ft)	Top Width (ft)	Froude # Chl
P118-08-00	P118-08-00	4007.74	Max WS	133.4	40.16	44.25		44.32	0.000599	2.15	62.15	31.29	0.2
P118-08-00	P118-08-00	3928.82	Max WS	138.85	38.97	44.25		44.27	0.000258	1.27	159.89	114.84	0.17
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	202.23	38.34	43.88		43.93	0.00054	1.88	122.15	110.73	0.18
P118-08-00	P118-08-00	2630.49	Max WS	171.8	37.06	43.59		43.62	0.000238	1.3	200.02	124.54	0.12
P118-08-00	P118-08-00	1901.01	Max WS	96.36	35.97	43.51		43.51	0.000034	0.55	340.73	583.11	0.04
P118-08-00	P118-08-00	1219.08	Max WS	63.72	33.28	43.49		43.5	0.000005	0.23	316.93	641.67	0.02
P118-08-00	P118-08-00	1186.93	Max WS	139.77	34.39	36.05	36.05	37.19	0.011576	8.55	16.36	14.42	1.41
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	237.68	34.03	38		38.14	0.001363	3.03	78.43	29.41	0.28
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	237.68	33.5	37.97		38.09	0.001018	2.74	86.89	31.3	0.25
P118-08-00	P118-08-00	890.93	Max WS	252.67	28.97	37.85		37.9	0.000366	1.81	139.34	26.89	0.14
P118-08-00	P118-08-00	881.12	Max WS	263.84	27.91	37.82		37.85	0.000156	1.3	202.52	37.5	0.1
P118-08-00	P118-08-00	846.44	Max WS	275.43	26.44	37.8		37.82	0.000127	1.22	225.58	38.39	0.09
P118-08-00	P118-08-00	68.07	Max WS	274.03	23.63	37.8		37.8	0.000008	0.42	661.87	84.62	0.03
P118-09-00	P118-09-00	8416.71	Max WS	70.64	52.44	56.27		56.29	0.002465	1.19	59.54	27.97	0.14
P118-09-00	P118-09-00	8415.71	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	70.06	51.25	55.79		55.81	0.000214	0.98	71.85	28.35	0.11
P118-09-00	P118-09-00	7947.1	Max WS	121.82	50.5	55.58		55.75	0.000122	3.35	36.37	30.33	0.28
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	120.81	50.64	55.41		55.49	0.000091	2.61	255.31	131.13	0.23
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	123.88	50.66	55.43		55.43	0.000096	0.62	449.67	151.64	0.07
P118-09-00	P118-09-00	7037.08	Max WS	162.42	50.59	55.11		55.16	0.000773	1.84	88.34	36.04	0.21
P118-09-00	P118-09-00	6335.17	Max WS	201.36	50.38	54.54		54.58	0.000811	1.93	195.91	179.38	0.21
P118-09-00	P118-09-00	6241.34	Max WS	207.21	49.73	54.44		54.6	0.000158	3.41	207.69	259.74	0.31
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	207.15	49.91	54.42		54.6	0.000167	3.52	152.39	141.12	0.31
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	209.73	49.94	54.44		54.53	0.001268	2.52	142.14	113.81	0.26
P118-09-00	P118-09-00	6006.93	Max WS	215.44	49.66	54.26		54.34	0.001363	2.49	143.45	118.59	0.27
P118-09-00	P118-09-00	5998.6	Max WS	216.14	49.63	54.23		54.33	0.001542	2.64	125.86	105.62	0.29
P118-09-00	P118-09-00	5978.1	Max WS	217.83	49.66	54.23		54.28	0.000985	2.08	251.34	312.28	0.23
P118-09-00	P118-09-00	5970.8	Max WS	218.42	49.74	54.23		54.26	0.000686	1.68	430.59	631.22	0.19
P118-09-00	P118-09-00	5869.16	Max WS	224.49	49.31	54.15		54.19	0.00008	1.96	350.87	549.84	0.21
P118-09-00	P118-09-00	5818.16	Max WS	225.18	49.47	54.04		54.43	0.000334	5.21	145.95	365.48	0.46
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	225.33	49.13	54.04	52.13	54.4	0.000266	4.9	100.89	174.64	0.41
P118-09-00	P118-09-00	5685.64	Max WS	227.04	49.01	54.13		54.23	0.001285	2.59	141.9	189.98	0.27
P118-09-00	P118-09-00	4961.22	Max WS	252.06	47.46	53.35		53.45	0.001048	2.52	102.88	70.42	0.25
P118-09-00	P118-09-00	4862.39	Max WS	253.11	47.3	53.03		53.43	0.000239	5.03	50.3	26.33	0.4
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	256.28	47.66	52.68		53.24	0.000415	5.98	42.89	24.15	0.51
P118-09-00	P118-09-00	4717.67	Max WS	259.87	47.29	52.96		53.1	0.001516	2.93	88.6	28.33	0.29
P118-09-00	P118-09-00	4354.22	Max WS	286.28	46.81	52.39		52.53	0.001508	3.01	95.23	29.35	0.29
P118-09-00	P118-09-00	4232.29	Max WS	103.38	45.84	52.02		52.07	0.000028	1.83	56.56	24.08	0.14
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	103.36	45.75	52		52.06	0.000036	1.95	52.97	22.6	0.15
P118-09-00	P118-09-00	4101.99	Max WS	104.54	46.19	52.02		52.06	0.000059	1.66	63.12	21.4	0.17
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	113.98	45.18	52		52.03	0.000035	1.39	142.63	74.95	0.13
P118-09-00	P118-09-00	3214.67	Max WS	352.37	43.86	50.44		50.71	0.00031	4.17	84.72	28.84	0.4
P118-09-00	P118-09-00	3131.26	Max WS	356.58	43.6	50.08		50.69	0.000351	6.27	56.89	19.75	0.46
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	304.67	43.59	48		49.27	0.001459	9.05	33.66	14.46	0.87
P118-09-00	P118-09-00	2939.54	Max WS	386.86	43.48	47.81	48.25	49.62	0.003618	10.79	35.85	15.98	1.27
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	385.37	42.41	47.23	46.5	47.92	0.000987	6.7	75.32	50.58	0.7
P118-09-00	P118-09-00	1673	Max WS	421.26	39.78	46.71		47.19	0.000707	5.64	104.03	93.09	0.58
P118-09-00	P118-09-00	1610.87	Max WS	422.07	39.04	46.75		47.13	0.000144	5.01	136.79	104.73	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	422.07	38	46.78		47.1	0.000108	4.56	139.58	87.34	0.28
P118-09-00	P118-09-00	1491.18	Max WS	425.2	37.86	46.81		46.97	0.002541	3.4	170.13	95.97	0.3
P118-09-00	P118-09-00	945.12	Max WS	451.22	36.86	44.87		45.16	0.004176	4.3	105.11	32.92	0.38
P118-09-00	P118-09-00	435.38	Max WS	477.59	35.21	43.93		43.96	0.000171	1.34	356.7	75.77	0.11
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	478.24	35.18	43.93		43.96	0.000158	1.31	366.28	76.19	0.1
P118-09-00	P118-09-00	376.38	Culvert										
P118-09-00	P118-09-00	222.06	Max WS	387.44	24.19	39.35		39.36	0.000007	0.38	1017.06	126.64	0.02

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-09-00	P118-09-00	209.24	Max WS	387.44	24.13	39.35		39.36	0.000007	0.38	1018.22	127.77	0.02
P118-09-00	P118-09-00	139.66	Max WS	386.57	23.56	39.35		39.36	0.000006	0.35	1092.58	132.36	0.02
P118-09-00	P118-09-00	74.44	Max WS	387.3	22.87	39.35		39.36	0.000004	0.34	1141.27	111.2	0.02
P118-14-00	P118-14-00-001	13760.5	Max WS	67.35	58.1	62.66		62.67	0.000137	0.83	81.33	126.74	0.09
P118-14-00	P118-14-00-001	13096.8	Max WS	66.82	57.3	62.6		62.61	0.000045	0.53	125.1	55.31	0.05
P118-14-00	P118-14-00-001	11983.3	Max WS	212.48	56.1	62.47		62.49	0.00012	1.05	203.17	504.63	0.09
P118-14-00	P118-14-00-001	11755.1											
P118-14-00	P118-14-00-001	11526.9	Max WS	211.6	55.3	61.85		61.87	0.00025	1.31	161	70.55	0.12
P118-14-00	P118-14-00-001	10870.6	Max WS	313.92	55	61.52		61.58	0.000443	1.88	166.87	195.22	0.17
P118-14-00	P118-14-00-001	10833.25											
P118-14-00	P118-14-00-001	10795.9	Max WS	313.9	55.5	61.17		61.25	0.000805	2.28	137.94	341.3	0.22
P118-14-00	P118-14-00-001	10606.9	Max WS	338.91	55.19	61.09		61.13	0.00032	1.66	204.32	49.46	0.14
P118-14-00	P118-14-00-001	9666.7	Max WS	456.89	54.05	60.88		60.9	0.000332	1.19	383.38	79.59	0.1
P118-14-00	P118-14-00-001	8993.1	Max WS	548.36	53.23	60.68		60.73	0.000333	1.82	307.76	445.43	0.15
P118-14-00	P118-14-00-001	8655.1	Max WS	587.53	51.98	60.53		60.61	0.000411	2.38	448.54	854.63	0.17
P118-14-00	P118-14-00-001	8532.1	Max WS	587.3	51.53	60.51		60.54	0.000165	1.57	1428.86	1578.77	0.11
P118-14-00	P118-14-00-001	8507											
P118-14-00	P118-14-00-001	8481.9	Max WS	564.75	51.41	59.6		59.7	0.000483	2.48	351.48	726.51	0.18
P118-14-00	P118-14-00-001	8025.2	Max WS	556.74	50.63	59.38		59.46	0.000517	2.34	436.81	652.55	0.18
P118-14-00	P118-14-00-001	7510.9	Max WS	604.61	49.74	59.18		59.23	0.000295	1.91	1088.99	1528.4	0.14
P118-14-00	P118-14-00-001	6550.7	Max WS	697.26	48.37	58.93		58.98	0.000215	1.94	990.52	1452.52	0.12
P118-14-00	P118-14-00-001	6479.1	Max WS	705.11	48.26	58.92		58.96	0.00016	1.69	1428.72	1929.52	0.11
P118-14-00	P118-14-00-001	6454.3											
P118-14-00	P118-14-00-001	6429.1	Max WS	704.86	48.13	58.41		58.47	0.000264	2.09	816.08	1799.22	0.14
P118-14-00	P118-14-00-001	6302.9	Max WS	716.86	48.15	58.35		58.43	0.000479	2.34	404.87	605.85	0.18
P118-14-00	P118-14-00-001	6179.9	Max WS	729.28	48.17	58.3	52.97	58.37	0.000405	2.36	725.72	1351.02	0.17
P118-14-00	P118-14-00-001	6165.4											
P118-14-00	P118-14-00-001	6150.9	Max WS	729.25	48.08	58.27		58.34	0.000372	2.27	815.46	1365.38	0.16
P118-14-00	P118-14-00-001	5970	Max WS	746.35	47.75	58.2		58.28	0.000389	2.47	713.59	983.36	0.17
P118-14-00	P118-14-00-001	5823.6	Max WS	760.06	47.49	58.17	52.58	58.2	0.000188	1.73	2001.86	2379.61	0.12
P118-14-00	P118-14-00-001	5800.1											
P118-14-00	P118-14-00-001	5776.6	Max WS	758.67	47.36	58.01		58.04	0.000202	1.79	1913.09	2377.3	0.12
P118-14-00	P118-14-00-001	5628.5	Max WS	771.4	47.07	57.95		58.03	0.000269	2.26	744.55	1015.6	0.14
P118-14-00	P118-14-00-001	5509.6	Max WS	781.73	46.83	57.93		57.98	0.000324	2.11	1556.6	2469.65	0.15
P118-14-00	P118-14-00-001	5484.6											
P118-14-00	P118-14-00-001	5459.6	Max WS	754.3	46.8	57.77		57.83	0.000391	2.28	1282.7	2435.58	0.16
P118-14-00	P118-14-00-001	5294.4	Max WS	763.22	46.75	57.72		57.77	0.000172	1.8	904.08	990.53	0.11
P118-14-00	P118-14-00-001	5161	Max WS	773.17	46.71	57.71		57.74	0.000114	1.46	2122.57	2860.07	0.09
P118-14-00	P118-14-00-001	5136											
P118-14-00	P118-14-00-001	5111	Max WS	761.3	46.69	57.57		57.59	0.000135	1.57	1853.78	2836.16	0.1
P118-14-00	P118-14-00-001	4683.7	Max WS	790.77	46.22	57.48		57.53	0.000232	2.04	1225.67	1521.11	0.13
P118-14-00	P118-14-00-001	4316.3	Max WS	813.28	45.87	57.39		57.46	0.000244	2.15	912.96	961.7	0.13
P118-14-00	P118-14-00-001	4164.8	Max WS	824.19	45.65	57.38		57.4	0.000111	1.47	2411.44	2002.19	0.09
P118-14-00	P118-14-00-001	4140.3											
P118-14-00	P118-14-00-001	4115.8	Max WS	787.45	45.6	56.57		56.63	0.000277	2.18	1035.47	1368.36	0.14
P118-14-00	P118-14-00-001	3617.5	Max WS	812.68	45.9	56.41		56.48	0.000343	2.16	810.34	1331.6	0.16
P118-14-00	P118-14-00-001	3259.8	Max WS	837.25	46.12	56.27		56.34	0.000398	2.27	941.1	1551.83	0.17
P118-14-00	P118-14-00-001	3169.5	Max WS	842.01	46.17	56.2	50.81	56.31	0.000557	2.66	322.06	1670.38	0.2
P118-14-00	P118-14-00-001	3141.3											
P118-14-00	P118-14-00-001	3113.1	Max WS	841.71	46.07	56.1		56.21	0.000555	2.66	322.36	1677.13	0.2
P118-14-00	P118-14-00-001	2974.8	Max WS	850.81	45.87	56.1		56.13	0.000182	1.62	1089.61	1665.53	0.12
P118-14-00	P118-14-00-001	2884.9	Max WS	856.98	45.74	56.08		56.12	0.000161	1.57	1159.06	1527.3	0.11
P118-14-00	P118-14-00-001	2836.2	Max WS	861.22	45.67	56.06		56.12	0.000308	2.11	1077.09	1507.76	0.15
P118-14-00	P118-14-00-001	2771.2											
P118-14-00	P118-14-00-001	2706.2	Max WS	729.34	45.15	53.49		53.64	0.000916	3.04	240.04	49.71	0.24
P118-14-00	P118-14-00-001	2164.7	Max WS	743.32	43.47	53.31		53.33	0.000091	1.23	690.14	133.06	0.08
P118-14-00	P118-14-00-001	1654.8	Max WS	801.72	41.9	53.27		53.29	0.000059	1.07	869.98	475.13	0.07
P118-14-00	P118-14-00-001	1523.9	Max WS	833.88	41.49	53.27		53.28	0.000057	1.08	769.26	1100.35	0.07
P118-14-00	P118-14-00-001	1492.9											
P118-14-00	P118-14-00-001	1461.9	Max WS	813	41.24	53.13		53.14	0.000053	1.04	780.26	1210.31	0.07
P118-14-00	P118-14-00-001	1132.9	Max WS	832.28	40.69	52.87		53.01	0.001056	3.23	633.04	1107.27	0.24
P118-14-00	P118-14-00-001	226.85	Max WS	925.83	39.16	48.76		49.36	0.006031	6.61	198.79	82.08	0.54
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067											
P118-21-00	P118-21-00	3066											
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.1	Max WS	4.48	67.59	69.06		69.06	0.000032	0.3	15.37	19.98	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.77	67.5	69.06		69.06	0.000116	0.36	16.08	18.56	0.07
P118-21-00	P118-21-00	2398.11	Max WS	6.93	67.44	69.05		69.06	0.000123	0.39	17.61	18.58	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.02	67.41	69.05		69.06	0.00006	0.44	18.04	18.59	0.08
P118-21-00	P118-21-00	2343.79	Max WS	9.95	67.54	69.02		69.04	0.000469	1.13	8.81	10.23	0.21
P118-21-00	P118-21-00	2303.58	Max WS	11.95	67.47	68.96		68.99	0.001607	1.34	8.91	9.85	0.25

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions 10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2208.42	Max WS	6.16	67.31	68.82		68.83	0.000329	0.61	10.12	11.26	0.11
P118-21-00	P118-21-00	2195.48	Max WS	6.17	67.34	68.82		68.82	0.000118	0.59	10.52	11.64	0.11
P118-21-00	P118-21-00	2169.49	Max WS	6.17	66.56	68.82		68.82	0.000033	0.42	14.84	9.78	0.06
P118-21-00	P118-21-00	2167.76	Max WS	6.17	66.37	68.82		68.82	0.000002	0.33	18.42	11.67	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	6.16	65.03	68.69		68.69	0.000004	0.17	35.8	20.08	0.02
P118-21-00	P118-21-00	2100.84	Max WS	6.16	64.78	68.69		68.69	0.000007	0.16	39.28	18.82	0.02
P118-21-00	P118-21-00	1662.37	Max WS	13.44	63.91	68.69		68.69	0.000009	0.22	65.25	35.71	0.02
P118-21-00	P118-21-00	1144.5	Max WS	-1.43	62.63	68.69		68.69	0	-0.02	87.44	23	0
P118-21-00	P118-21-00	595.53	Max WS	-84.99	61.49	68.69		68.69	0.000024	-0.44	194.94	47.22	0.04
P118-21-00	P118-21-00	549.31*	Max WS	-91.03	61.18	68.69		68.69	0.000023	-0.46	200.64	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-96.46	60.87	68.69		68.69	0.000023	-0.48	204.06	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-102.3	60.57	68.69		68.69	0.000023	-0.5	205.06	38.81	0.04
P118-21-00	P118-21-00	410.63*	Max WS	-108.57	60.26	68.69		68.69	0.000025	-0.54	203.81	36.01	0.04
P118-21-00	P118-21-00	364.41*	Max WS	-113.64	59.95	68.69		68.69	0.000026	-0.57	200.06	33.21	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-119.79	59.64	68.69		68.69	0.00003	-0.62	194.07	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-125.54	59.34	68.69		68.69	0.000034	-0.68	185.68	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	-129.63	59.03	68.69		68.69	0.00004	-0.74	175.01	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-132.53	58.72	68.69		68.7	0.000059	-0.82	162.02	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	-137.17	57.98	68.69		68.7	0.000053	-0.79	173.59	22.53	0.05
P118-21-00	P118-21-00	139.31*	Max WS	-136.46	57.24	68.69		68.7	0.000044	-0.74	185.64	23.06	0.05
P118-21-00	P118-21-00	119.21*	Max WS	-122.25	56.51	68.7		68.7	0.00003	-0.62	198.08	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-107.7	55.77	68.7		68.71	0.00002	-0.51	210.83	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-92.36	55.03	68.71		68.71	0.000012	-0.41	223.9	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.94		72.95	0.000006	0.17	59.28	22.18	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.94		72.95	0.00001	0.2	50.38	21.77	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.94	70.24	72.95	0.000013	0.22	47.53	21.76	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.94		72.94	0.000017	0.24	44.18	21.26	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.23	70.16	72.94		72.94	0.000023	0.27	41.66	20.97	0.03
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.16	69.97	72.94		72.94	0.000038	0.36	44.49	21.03	0.04
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.08	69.88	72.93		72.94	0.000047	0.41	44.51	20.68	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.4	68.92	72.93		72.93	0.000039	0.39	49.29	20.57	0.04
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.4	69.39	72.85		72.85	0.000039	0.39	49.36	20.87	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.62	69.56	72.85		72.85	0.000051	0.44	46.76	22.03	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.61	68.48	72.84		72.84	0.000078	0.56	49.21	150.18	0.06
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.7	68.06	72.83		72.84	0.000084	0.6	52.65	57.94	0.07
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.7	69.59	72.65		72.68	0.000366	1.49	21.27	20.13	0.15
P118-23-00	P118-23-00 R2	7313.37	Max WS	32.78	69.5	72.67		72.67	0.000091	0.6	55.06	23.64	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.33	69.12	72.67		72.67	0.000077	0.58	57.76	22.67	0.06
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.08	69.43	72.66		72.67	0.000075	0.68	50.09	22.29	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.08	69.34	72.48		72.49	0.000156	0.96	35.57	42.87	0.1
P118-23-00	P118-23-00 R2	7237.19	Max WS	36.18	69.28	72.48		72.49	0.000112	0.65	56.06	27.45	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	74.94	68.02	72.4		72.41	0.00016	0.87	93.13	164.42	0.09
P118-23-00	P118-23-00 R2	6723.56	Max WS	80.73	67.37	72.39		72.4	0.000087	0.71	113.53	36.84	0.07
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	80.73	67.54	71.23		71.31	0.001917	2.25	35.95	20.47	0.3
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	90.98	67.16	71.16		71.19	0.000467	1.42	63.94	25.5	0.16
P118-23-00	P118-23-00 R2	6402.43	Max WS	102.44	67.03	71.06		71.1	0.000566	1.6	64.1	24.65	0.17
P118-23-00	P118-23-00 R2	6356.93	Max WS	107.71	66.97	71.02	68.41	71.07	0.000602	1.66	65	24.77	0.18
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	107.69	66.93	71		71.05	0.000577	1.63	66.1	25.04	0.18
P118-23-00	P118-23-00 R2	6293.27	Max WS	110.64	66.88	70.98		71.03	0.000584	1.65	67.19	25.29	0.18
P118-23-00	P118-23-00 R2	5958.59	Max WS	44.36	66.24	70.81		70.82	0.000044	0.47	95.38	35.7	0.05
P118-23-00	P118-23-00 R2	5652.94	Max WS	49.8	65.7	70.79		70.8	0.000057	0.57	86.97	27.3	0.06
P118-23-00	P118-23-00 R2	5045.34	Max WS	49.07	63.97	70.77		70.78	0.000022	0.41	119.65	29.62	0.04
P118-23-00	P118-23-00 R2	4947.92	Max WS	52.07	63.84	70.77	64.55	70.77	0.000013	0.34	152.55	33.67	0.03
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	51.7	63.87	70.76		70.76	0.00001	0.31	165.31	34.33	0.03
P118-23-00	P118-23-00 R2	4789.1	Max WS	54.34	63.65	70.76		70.76	0.000032	0.44	124.76	37.1	0.04
P118-23-00	P118-23-00 R2	4580.38	Max WS	66.74	63.02	70.75	64.16	70.75	0.000032	0.46	144.11	39.57	0.04
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	66.52	63.16	70.74		70.74	0.00003	0.43	154.63	45.62	0.04
P118-23-00	P118-23-00 R2	4459.75	Max WS	68.99	63.55	70.74		70.74	0.000039	0.45	153.85	52.65	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	70.83	63.42	70.74		70.74	0.000029	0.39	182.89	65.06	0.04
P118-23-00	P118-23-00 R2	4330.88	Max WS	71.53	62.88	70.74		70.74	0.000004	0.19	368.41	89.97	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	71.09	63.31	70.72		70.72	0.000003	0.18	389.56	76.06	0.01

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel.Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4229.24	Max WS	71.71	63.34	70.72		70.72	0.000009	0.3	242.22	51.14	0.02
P118-23-00	P118-23-00 R2	3733.5	Max WS	109.31	62.41	70.7		70.71	0.000038	0.62	176.85	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	229.64	62.36	70.63		70.65	0.000111	1.09	210.63	40.27	0.08
P118-23-00	P118-23-00 R2	3150.64	Max WS	241.65	61.93	70.63	64.56	70.64	0.000133	1.07	226.52	52.14	0.09
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	241.68	61.56	70.62		70.63	0.000116	1.01	240.1	55.37	0.09
P118-23-00	P118-23-00 R2	3104.46	Max WS	244.2	61.63	70.61		70.63	0.000185	1.17	208.07	52.53	0.1
P118-23-00	P118-23-00 R2	2750.51	Max WS	269.32	60.59	70.54		70.57	0.000136	1.28	210.52	34.6	0.09
P118-23-00	P118-23-00 R2	2741.93	Max WS	269.87	60.44	70.54	63.31	70.57	0.000129	1.26	214.83	34.87	0.09
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	269.84	60.52	70.53		70.55	0.000118	1.14	235.99	42.89	0.09
P118-23-00	P118-23-00 R2	2716.57	Max WS	270.42	60.68	70.53		70.55	0.000131	1.14	236.9	47.35	0.09
P118-23-00	P118-23-00 R2	2615.37	Max WS	280.03	60.75	70.51		70.54	0.000141	1.29	217.52	37.87	0.09
P118-23-00	P118-23-00 R2	2244.98	Max WS	294.88	60.53	70.46		70.49	0.000113	1.23	238.96	35.71	0.08
P118-23-00	P118-23-00 R2	2221.06	Max WS	295.89	60.56	70.46	63.07	70.48	0.000122	1.26	235.11	36.69	0.09
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	295.81	60.59	70.44		70.47	0.000108	1.21	244.99	37.2	0.08
P118-23-00	P118-23-00 R2	2042.36	Max WS	300.05	59.78	70.43		70.45	0.000104	0.97	307.75	67.27	0.08
P118-23-00	P118-23-00 R2	1922.11	Max WS	296.53	59.56	70.42		70.44	0.000093	0.92	323.37	72.85	0.08
P118-23-00	P118-23-00 R2	1892.63	Max WS	304.01	59.68	70.42	62.84	70.43	0.000108	1.01	301.81	66.31	0.08
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	303.8	59.86	70.33		70.36	0.000159	1.35	225.29	38.81	0.1
P118-23-00	P118-23-00 R2	1829.45	Max WS	308.58	59.87	70.34		70.35	0.000108	0.96	322.33	75.5	0.08
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	353.94	59.04	70.31		70.32	0.0001	1.06	334.73	62.07	0.08
P118-23-00	P118-23-00 R1	1513.84	Max WS	434.38	59.85	70.29		70.3	0.000066	0.94	1478.09	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	438.21	59.99	70.28	62.75	70.29	0.000038	0.59	1801.66	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	438.1	58.36	70.27		70.28	0.000021	0.49	2241.08	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	457.92	57.88	70.27		70.28	0.000021	0.56	2258.98	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	565.58	57.45	70.25		70.26	0.000063	0.89	1645.4	742.6	0.06
P118-23-00	P118-23-00 R1	649.49	Max WS	659.67	57.03	70.22		70.23	0.000084	1.12	1387.04	449.67	0.07
P118-23-00	P118-23-00 R1	242.54	Max WS	708.08	55.82	70.19	60.32	70.2	0.000043	0.65	3567.43	3024.54	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	707.63	55.57	70.17		70.17	0.000028	0.67	4325.94	3792.4	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	716.42	55.13	70.16		70.17	0.000036	0.98	1041.42	175.37	0.06
P118-23-00	P118-23-00 R1	58.31	Max WS	716.57	53.78	70.16		70.17	0.000039	1.13	889.53	83.5	0.06
P118-23-02	P118-23-02	4138.85	Max WS	37.76	67.78	70.95		70.96	0.000322	0.94	77.38	608.92	0.12
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	37.36	66.69	70.88		70.89	0.000085	0.51	73.17	386.72	0.07
P118-23-02	P118-23-02	3782.06	Max WS	135.99	66.66	70.83		70.87	0.000858	1.69	155.41	339.07	0.22
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	135.75	66.27	70.82		70.82	0.000008	0.35	1144.27	1237.25	0.05
P118-23-02	P118-23-02	3692.61	Max WS	135.31	66.22	70.8		70.85	0.000758	1.76	76.88	1133.17	0.2
P118-23-02	P118-23-02	3049.5	Max WS	129.81	65.47	70.43		70.46	0.000475	1.44	136.53	248.91	0.18
P118-23-02	P118-23-02	2386.67	Max WS	33.6	65.13	70.37		70.37	0.000037	0.41	112.65	617.66	0.05
P118-23-02	P118-23-02	2372.17	Max WS	33.51	65.16	70.37		70.37	0.000035	0.31	108.75	791.33	0.04
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	33.31	65.26	70.36		70.36	0.000031	0.43	77.7	772.33	0.04
P118-23-02	P118-23-02	2278.1	Max WS	33.32	65.19	70.36		70.36	0.000031	0.41	86.56	500.94	0.04
P118-23-02	P118-23-02	1453.34	Max WS	53.14	63.69	70.33		70.33	0.000028	0.44	121.53	515.23	0.04
P118-23-02	P118-23-02	1445.67	Max WS	53.15	63.66	70.33	64.83	70.33	0.000018	0.4	168.15	619.98	0.03
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	52.62	63.56	70.32		70.32	0.000019	0.39	140.53	921.16	0.03
P118-23-02	P118-23-02	1392.09	Max WS	52.56	63.36	70.32		70.32	0.000021	0.38	139.74	875.15	0.04
P118-23-02	P118-23-02	1317.96	Max WS	52.15	62.91	70.32		70.32	0.000021	0.41	171.79	948.94	0.04
P118-23-02	P118-23-02	1171.38	Max WS	51.66	61.86	70.32		70.32	0.000016	0.37	193.25	1015.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	51.19	62.56	70.32		70.32	0.000015	0.35	163.46	1015.36	0.03
P118-23-02	P118-23-02	215.24	Max WS	80.13	60.16	70.3		70.3	0.000015	0.38	208.9	1097.26	0.03
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	71.12		71.12	0.000002	0.09	107.15	35.43	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.94	66.34	71.12		71.12	0.000002	0.09	107.13	35.42	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	9.57	66.13	71.12		71.12	0.000002	0.1	95.17	30.87	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	13.76	65.84	71.12		71.12	0.000003	0.13	103.6	33.01	0.01
P118-25-00	P118-25-00 R2	2494.17	Max WS	12.42	65.5	71.12		71.12	0.000002	0.11	114.46	35.73	0.01
P118-25-00	P118-25-00 R2	2473.31	Max WS	11.78	65.47	71.12	66.23	71.12	0.000002	0.1	114.23	35.01	0.01
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	11.78	65.47	71.12		71.12	0.000002	0.1	114.71	37.73	0.01
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	9.98	65.38	71.12		71.12	0.000001	0.08	119.84	35.28	0.01

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_10Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2046.09	Max WS	18.06	64.63	71.13		71.13	0.000002	0.12	149.96	40.52	0.01
P118-25-00	P118-25-00 R1	1929.3	Max WS	121.32	64.22	71.11		71.12	0.00014	0.98	123.87	34.23	0.09
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	122.23	64.03	71.07		71.08	0.000095	0.88	138.37	32.63	0.08
P118-25-00	P118-25-00 R1	1208.56	Max WS	95.15	63.03	71.05		71.05	0.00004	0.62	153.59	30.27	0.05
P118-25-00	P118-25-00 R1	1188.81	Max WS	92.27	63.01	71.05	64.78	71.05	0.000042	0.62	148.02	29.97	0.05
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	91.88	62.94	71.03		71.04	0.000043	0.63	145.57	29.45	0.05
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1152.07	Max WS	89	62.83	71.03		71.04	0.000034	0.57	157.22	31.95	0.04
P118-25-00	P118-25-00 R1	980.2	Max WS	87.21	62.34	71.03		71.03	0.000022	0.47	184.7	35.75	0.04
P118-25-00	P118-25-00 R1	963.63	Max WS	86.94	62.25	71.03		71.03	0.00001	0.38	228.09	43	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	87.09	62.25	71.03	63.73	71.03	0.000013	0.36	256.71	92.98	0.03
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	87.09	61.68	71.02		71.02	0.00001	0.32	277.17	76.72	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	87.31	61.68	71.02		71.02	0.000008	0.36	240.26	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	81.91	61.16	71.02		71.02	0.000011	0.36	227.24	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	68.5	60.25	71.02		71.02	0.000006	0.27	256.73	44.02	0.02
P118-25-00	P118-25-00 R1	251.81	Max WS	43.63	58.25	71.02		71.02	0.000001	0.14	322.33	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	39.32	58.04	71.02		71.02	0.000001	0.12	328.69	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	35.08	57.84	71.02		71.02	0.000001	0.1	335.03	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	30.68	57.63	71.02		71.02	0	0.09	341.35	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	26.18	57.43	71.02		71.02	0	0.08	347.66	44.04	0
P118-25-00	P118-25-00 R1	141.80*	Max WS	21.62	57.22	71.02		71.02	0	0.06	353.99	44.03	0
P118-25-00	P118-25-00 R1	119.80*	Max WS	16.57	57.02	71.02		71.02	0	0.05	360.25	44.01	0
P118-25-00	P118-25-00 R1	97.8	Max WS	12.05	56.81	71.02	57.55	71.02	0	0.03	366.58	44	0
P118-25-01	P118-25-01	5341.48	Max WS	50.39	70.47	73.2		73.23	0.000714	1.32	38.27	24.35	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50.11	68.9	72.76		72.78	0.00033	1.02	49.28	25.5	0.13
P118-25-01	P118-25-01	4162.47	Max WS	60.87	69.44	72.65		72.67	0.000355	1.08	56.44	28.63	0.14
P118-25-01	P118-25-01	4134.04	Max WS	61.84	69.38	72.64	70.57	72.66	0.000337	1.06	58.24	29.09	0.13
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	61.82	69.25	72.61		72.63	0.000314	1.03	59.79	29.43	0.13
P118-25-01	P118-25-01	4047.7	Max WS	63.14	69.28	72.6		72.62	0.000311	1.04	60.85	29.56	0.13
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.71	67.84	72.48		72.5	0.000209	0.96	82.24	33.26	0.11
P118-25-01	P118-25-01	3312.44	Max WS	87.84	67.48	72.42		72.43	0.000202	0.94	93.19	37.74	0.11
P118-25-01	P118-25-01	3014.68	Max WS	97.89	67.53	72.36		72.38	0.000154	0.92	106.85	36.69	0.09
P118-25-01	P118-25-01	2924.04	Max WS	102.56	67.71	72.35		72.36	0.000165	0.94	109.11	38.03	0.1
P118-25-01	P118-25-01	2763.33	Max WS	107.19	66.67	72.32		72.33	0.000154	0.94	113.72	37.21	0.1
P118-25-01	P118-25-01	2728.92	Max WS	108.23	66.5	72.24		72.34	0.000588	2.52	42.92	25.97	0.2
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	108.23	66.31	72.06		72.15	0.000498	2.37	45.6	30.35	0.19
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	108.1	66.04	72.09		72.12	0.000288	1.3	83.31	25.37	0.13
P118-25-01	P118-25-01	1881.88	Max WS	158.61	65.57	71.62		71.69	0.000983	2.23	71.14	24.74	0.23
P118-25-01	P118-25-01	1384.48	Max WS	64.85	66.19	71.26		71.27	0.000135	0.84	77.37	26.49	0.09
P118-25-01	P118-25-01	1245.83	Max WS	59.51	66.34	71.27		71.28	0.000105	0.76	78.22	25.32	0.08
P118-25-01	P118-25-01	584.11	Max WS	62.86	65.88	71.18		71.19	0.00006	0.62	101.02	28.57	0.06
P118-25-01	P118-25-01	60.05	Max WS	103.26	63.5	71.12		71.13	0.000104	0.89	115.72	27.03	0.08

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	5470.51	58.25	74.71		75.06	0.002717	5.12	2063.27	1018.55	0.3
P118-00-00	P118-R3-2	71854.2	Max WS	5010.77	57.83	74.01		74.2	0.000406	3.61	2216.86	1609.15	0.21
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4967.16	55.05	73.62		73.79	0.000312	3.31	1901.21	447.2	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	4837.18	55.28	73.34		73.48	0.000224	3.07	2350.02	520	0.16
P118-00-00	P118-R3-2	68670	Max WS	4170.31	54.88	73.06		73.27	0.000355	3.78	1638.01	309.65	0.2
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3890.96	54.47	72.89		73.09	0.000287	3.63	1639.6	360.63	0.18
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3506.09	54.14	72.74		72.93	0.000344	3.68	1641.04	349.64	0.19
P118-00-00	P118-R3-2	66869	Max WS	3145.17	53.96	72.48		72.67	0.000477	3.6	1048.7	187.28	0.22
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3152.98	53.79	72.48		72.63	0.000332	3.09	1136.16	168.51	0.19
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2910	53.6	72.4		72.52	0.000192	2.94	1573.82	227.52	0.15
P118-00-00	P118-R3-2	65955.8	Max WS	2808.09	53.52	72.36		72.44	0.000205	2.4	1566.63	278.2	0.14
P118-00-00	P118-R3-2	65434.6	Max WS	2482.42	53.1	72.28		72.37	0.00015	2.49	1571.31	214.6	0.12
P118-00-00	P118-R3-2	64399.74	Max WS	3893.17	52.59	71.81		72.05	0.000375	4.04	1325.89	206.05	0.2
P118-00-00	P118-R3-2	64273.7	Max WS	3962.79	53.55	71.83	61.92	71.98	0.000288	3.14	1357.1	177.34	0.18
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3960.3	53.3	71.81		71.96	0.000268	3.07	1354.5	173.2	0.17
P118-00-00	P118-R3-2	64200	Max WS	3960.12	53.3	71.81		71.96	0.000268	3.07	1354.28	173.2	0.17
P118-00-00	P118-R2-2	64100	Max WS	5851.79	52.61	71.78		71.92	0.000181	3.05	1999.33	9035.06	0.15
P118-00-00	P118-R2-2	64094	Max WS	5851.61	52.61	71.78	60.9	71.92	0.000181	3.05	1999.16	9034.65	0.15
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5851.26	52.56	71.75		71.9	0.00018	3.04	2003.64	9045.39	0.15
P118-00-00	P118-R2-2	64010.4	Max WS	5849.96	52.78	71.59	63.14	71.91	0.000441	4.61	1430.14	8935.42	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5771.27	53.04	70.66		71.05	0.000612	5.08	1264.52	7163.11	0.27
P118-00-00	P118-R2-2	63959.7	Max WS	5780.09	53.06	70.86	60.79	71.02	0.000229	3.2	1841.89	8165.44	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5778.15	53.16	70.8		70.97	0.000241	3.26	1808.44	8041.3	0.17
P118-00-00	P118-R2-2	63756.7	Max WS	5703.95	52.4	70.45		70.97	0.000983	5.93	1256.86	205	0.33
P118-00-00	P118-R2-2	63753	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4249.15	50.35	70.19		70.46	0.000482	4.24	1170.93	185	0.23
P118-00-00	P118-R2-2	61905.2	Max WS	3979.53	50.77	69.97		70.11	0.000781	3.07	1295.7	132.2	0.17
P118-00-00	P118-R2-2	60625.3	Max WS	3967.22	49.52	69.8		69.94	0.000241	2.99	1326.61	121.4	0.16
P118-00-00	P118-R2-1	60595.74	Max WS	3670.25	49.48	69.59		69.74	0.000208	3.27	1261.39	131.55	0.16
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3702.24	49.68	69.58		69.71	0.000178	3.05	1347.64	139.91	0.15
P118-00-00	P118-R2-1	60571.6*	Max WS	3727.39	49.89	69.58		69.7	0.000156	2.86	1431.26	148.28	0.14
P118-00-00	P118-R2-1	60559.5*	Max WS	3741.55	50.09	69.57		69.68	0.000139	2.68	1512.77	156.63	0.13
P118-00-00	P118-R2-1	60547.5*	Max WS	3761.73	50.3	69.57		69.66	0.000126	2.54	1591.26	165	0.12
P118-00-00	P118-R2-1	60535.46	Max WS	3768.24	50.5	69.56		69.65	0.000114	2.4	1667.98	171.19	0.12
P118-00-00	P118-R2-1	60396.4*	Max WS	3760.85	50.45	69.56		69.64	0.000114	2.37	1688.44	174.32	0.12
P118-00-00	P118-R2-1	60257.3*	Max WS	3745.81	50.4	69.55		69.63	0.000112	2.32	1710.16	175.28	0.12
P118-00-00	P118-R2-1	60118.3*	Max WS	3736.82	50.35	69.54		69.62	0.000111	2.28	1734.14	176.25	0.12
P118-00-00	P118-R2-1	59979.2*	Max WS	3720.88	50.3	69.53		69.61	0.000108	2.23	1759.56	177.2	0.11
P118-00-00	P118-R2-1	59840.2*	Max WS	3710.26	50.25	69.53		69.6	0.000105	2.18	1786.63	178.16	0.11
P118-00-00	P118-R2-1	59701.1*	Max WS	3708.99	50.2	69.52		69.59	0.000102	2.14	1815.97	179.13	0.11
P118-00-00	P118-R2-1	59562.1*	Max WS	3708.37	50.15	69.51		69.58	0.000098	2.09	1846.42	180.09	0.11
P118-00-00	P118-R2-1	59423.1	Max WS	3700.45	50.1	69.5		69.57	0.000104	2.11	1877.85	181.05	0.11
P118-00-00	P118-R2-1	59307.4*	Max WS	3702.9	50.1	69.5		69.56	0.0001	2.06	1953.37	196.49	0.11
P118-00-00	P118-R2-1	59191.8*	Max WS	3707.99	50.11	69.49		69.55	0.000096	2.02	2021.54	211.94	0.11
P118-00-00	P118-R2-1	59076.2*	Max WS	3719.73	50.11	69.48		69.54	0.000093	1.98	2083.75	227.38	0.1
P118-00-00	P118-R2-1	58960.5*	Max WS	3734.79	50.11	69.48		69.53	0.000087	1.92	2138.94	242.82	0.1
P118-00-00	P118-R2-1	58844.9*	Max WS	3749.63	50.11	69.47		69.53	0.000084	1.89	2187.26	258.26	0.1
P118-00-00	P118-R2-1	58729.3*	Max WS	3765.27	50.12	69.46		69.52	0.000081	1.86	2228.08	273.71	0.1
P118-00-00	P118-R2-1	58613.7	Max WS	3785.75	50.12	69.46		69.51	0.000079	1.83	2262.31	289.15	0.1
P118-00-00	P118-R2-1	58463.86	Max WS	4780.97	47.59	69.46		69.47	0.000033	1.34	17286.03	5991.93	0.06
P118-00-00	P118-R2-1	58387.5	Max WS	4770.36	47.57	64.43	57.48	64.68	0.000453	3.99	1468.21	539.05	0.23
P118-00-00	P118-R2-1	58359.5 ALDINE-WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	4770.38	47.51	64.33		64.58	0.00046	4.01	1445.86	533.91	0.23
P118-00-00	P118-R2-1	57555.5	Max WS	4769.77	47.03	63.66		64.12	0.000808	5.48	974.86	468.28	0.29
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	4523.05	46.03	62.93		63.34	0.000752	5.14	879.23	91.62	0.28
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	4522.91	44.69	61.88		62.44	0.00117	6.04	849.62	195.13	0.34
P118-00-00	P118-R2-1	55000	Lat Struct										
P118-00-00	P118-R2-1	54459.2	Max WS	4598.22	44.27	60.67		61.21	0.00102	5.89	780.08	76.67	0.33

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	53881	Lat Struct	4830.55	43.7	60.56		60.72	0.000287	3.14	1539.72	163.24	0.18
P118-00-00	P118-R2-1	53801.7	Max WS	4851.95	43.36	60.39		60.58	0.000241	3.44	1412.59	106.42	0.17
P118-00-00	P118-R2-1	52844.3	Max WS	4991.75	43.08	60.32	50.16	60.47	0.000235	3.11	1623.65	166.46	0.17
P118-00-00	P118-R2-1	52815.3	BERTRAND RD	Bridge									
P118-00-00	P118-R2-1	52786.3	Max WS	4991.69	43.01	60.29		60.43	0.000232	3.1	1630.47	166.74	0.17
P118-00-00	P118-R2-1	52465.7	Max WS	4991.57	43.2	60.09		60.32	0.000471	3.92	1273.94	139.09	0.23
P118-00-00	P118-R2-1	52221.3	Max WS	4991.38	43.89	59.9	53.28	60.19	0.000618	4.32	1154.74	133.56	0.26
P118-00-00	P118-R2-1	52207.8	UTILITY	Bridge									
P118-00-00	P118-R2-1	52194.3	Max WS	4991.28	43.8	59.85		60.14	0.00061	4.3	1160.48	133.89	0.26
P118-00-00	P118-R2-1	51283.9	Max WS	4990.67	43.41	59.21		59.53	0.000732	4.58	1126.46	211.27	0.28
P118-00-00	P118-R2-1	51096.9	Max WS	4990.69	42.91	59.14	50.3	59.41	0.000488	4.19	1248.4	292.24	0.23
P118-00-00	P118-R2-1	51083.9	UTILITY	Bridge									
P118-00-00	P118-R2-1	51070.9	Max WS	4990.64	42.87	59.1		59.38	0.000488	4.19	1249.33	293.38	0.23
P118-00-00	P118-R2-1	50549.6	Max WS	4990.42	42.3	58.98		59.16	0.000332	3.42	1476.21	251.16	0.2
P118-00-00	P118-R2-1	50021.9	Max WS	4990.38	41.83	58.82	49.61	58.99	0.000303	3.31	1559.1	301.03	0.19
P118-00-00	P118-R2-1	49980.9	HOPPER RD	Bridge									
P118-00-00	P118-R2-1	49939.9	Max WS	4990.18	41.69	58.71		58.88	0.000301	3.3	1567.76	323.88	0.19
P118-00-00	P118-R2-1	49231.7	Max WS	4989.63	41.03	58.27		58.56	0.000629	4.34	1254.09	411.11	0.26
P118-00-00	P118-R2-1	48480.5	Max WS	4989.23	41.23	57.95		58.15	0.000406	3.7	1753.83	936.26	0.21
P118-00-00	P118-R2-1	48196.5	Max WS	4989.05	41.31	57.79	50.05	58.03	0.000489	3.94	1590.8	1064.29	0.23
P118-00-00	P118-R2-1	48183.0	UTILITY	Bridge									
P118-00-00	P118-R2-1	48169.5	Max WS	4988.91	41.24	57.7		57.94	0.000493	3.95	1573.07	1038.77	0.23
P118-00-00	P118-R2-1	47607.9	Max WS	4988.54	40.57	57.31		57.63	0.000684	4.54	1438.12	1105.67	0.27
P118-00-00	P118-R2-1	46939	Max WS	4988.37	40.79	57.03		57.2	0.000386	3.4	2251.29	1516.57	0.2
P118-00-00	P118-R2-1	46594.8	Max WS	4628.53	40.91	56.9	48.15	57.08	0.000274	3.44	2974.83	2181.69	0.18
P118-00-00	P118-R2-1	46584.8	Bridge										
P118-00-00	P118-R2-1	46579.8	Max WS	4628	40.91	56.9		57.06	0.000307	3.27	2057.75	1178.52	0.19
P118-00-00	P118-R2-1	46575.8	Max WS	4628.15	40.91	56.9	48.17	57.06	0.000308	3.28	1728.77	511.26	0.19
P118-00-00	P118-R2-1	46560.8	LITTLE YORK RD	Bridge									
P118-00-00	P118-R2-1	46526.8	Max WS	4626.83	40.74	56.84		57.01	0.000279	3.36	3011.9	2222.59	0.18
P118-00-00	P118-R2-1	46516.8	Max WS	4626.82	40.74	56.84	48.01	57	0.000316	3.24	3210.79	2266.53	0.19
P118-00-00	P118-R2-1	46515.8	Bridge										
P118-00-00	P118-R2-1	46478.9	Max WS	4621.05	40.49	56.74		56.94	0.000422	3.56	1713.84	1528.27	0.21
P118-00-00	P118-R2-1	46468.9	Max WS	4620.76	40.49	56.74	49.4	56.94	0.000422	3.57	1707.07	1514.09	0.22
P118-00-00	P118-R2-1	46466.8	Bridge										
P118-00-00	P118-R2-1	46458.9	Max WS	4620.36	40.49	56.72		56.92	0.000426	3.58	1674.73	1443.06	0.22
P118-00-00	P118-R2-1	45952.3	Max WS	4592.95	40.17	56.34		56.61	0.000902	4.29	2078.58	1792.09	0.3
P118-00-00	P118-R2-1	45161.4	Max WS	4519.39	39.57	55.75		55.98	0.000732	3.96	1974.81	1309.66	0.24
P118-00-00	P118-R2-1	44549.9	Max WS	4440.62	38.76	55.43		55.61	0.000526	3.41	1703.2	1214.64	0.21
P118-00-00	P118-R2-1	44143.3	Max WS	4371.91	38.22	55.27		55.42	0.000439	3.19	1811.88	1014.81	0.19
P118-00-00	P118-R2-1	43789.5	Max WS	4476.74	37.97	55.25		55.26	0.000036	1.59	8797.61	1781.69	0.07
P118-00-00	P118-R2-1	43739.48	Max WS	4474.91	37.93	55.24		55.26	0.000045	1.79	6249.74	1327.81	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	4475.35	37.87	55.24		55.26	0.000039	1.67	7329.76	1766.39	0.07
P118-00-00	P118-R2-1	43564.8*	Max WS	4474.87	37.81	55.24		55.25	0.000029	1.45	8891.4	1829.81	0.06
P118-00-00	P118-R2-1	43477.4*	Max WS	4475.34	37.75	55.24		55.25	0.000002	1.22	10499.68	1801.89	0.05
P118-00-00	P118-R2-1	43390.1*	Max WS	4475.82	37.68	55.24		55.25	0.000014	0.99	12090.95	1878.85	0.04
P118-00-00	P118-R2-1	43302.8*	Max WS	4475.81	37.62	55.24		55.25	0.000008	0.78	13645.34	2092.23	0.03
P118-00-00	P118-R2-1	43215.5	Max WS	4475.79	37.56	55.24		55.25	0.000006	0.68	14775.36	2465.1	0.03
P118-00-00	P118-R2-1	43118.0*	Max WS	4506.27	37.49	55.24		55.25	0.000009	0.84	13665.22	2127.4	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	4505.78	37.42	55.24		55.25	0.000012	0.95	12526.86	2181.16	0.04
P118-00-00	P118-R2-1	42922.9*	Max WS	4506.7	37.35	55.24		55.24	0.000015	1.04	11458.08	2361.13	0.05
P118-00-00	P118-R2-1	42825.49	Max WS	4505.29	37.28	55.24		55.24	0.000017	1.12	10496.3	2343.12	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	4504.31	37.22	55.24		55.24	0.000016	1.08	11002.94	2038.25	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	4502.85	37.15	55.24		55.24	0.000013	1	11631.19	1667.88	0.04
P118-00-00	P118-R2-1	42559.6*	Max WS	4505.26	37.09	55.24		55.24	0.00001	0.88	12218.06	1624.52	0.04
P118-00-00	P118-R2-1	42471	Max WS	4503.33	37.03	55.24		55.24	0.000005	0.63	12491.63	1651.91	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	4504.29	36.98	55.23		55.24	0.000007	0.71	12695.14	1696.76	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	4503.81	36.92	55.23		55.24	0.000004	0.55	13611.15	1646.86	0.02
P118-00-00	P118-R2-1	42245.55	Max WS	4503.79	36.87	55.23		55.24	0.000001	0.33	14015.63	1621.44	0.01
P118-00-00	P118-R2-1	42150.1*	Max WS	4503.27	36.8	55.23		55.24	0.000005	0.62	12934.06	1528.63	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	4502.77	36.74	55.23		55.24	0.000007	0.74	11209.54	1531.36	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	4501.26	36.67	55.23		55.24	0.000008	0.81	9813.9	1578.78	0.03
P118-00-00	P118-R2-1	41863.8	Max WS	4501.76	36.6	55.23		55.24	0.000008	0.79	9891.65	1530.37	0.03
P118-00-00	P118-R2-1	41771.7*	Max WS	4500.21	36.53	55.23		55.24	0.000011	0.95	9625.18	1527.66	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	4500.71	36.47	55.23		55.23	0.000014	1.05	9394.04	1616	0.04
P118-00-00	P118-R2-1	41587.5*	Max WS	4499.68	36.4	55.23		55.23	0.000016	1.14	9162.18	1706.97	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	4499.15	36.34	55.22		55.23	0.000018	1.19	9089.81	1740.16	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	4499.66	36.27	55.22		55.23	0.000017	1.16	9223.9	1751.22	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	4448.68	36.27	55.13	42.44	55.4	0.000008	4.15	1712.05	1963.05	0.17
P118-00-00	P118-R2-1	41243.9	JENSEN DR	Bridge									
P118-00-00	P118-R2-1	41203.4	Max WS	4491.38	36.25	55.21		55.38	0.000006	3.53	1722.99	1988.4	0.14
P118-00-00	P118-R2-1	41197.4	Max WS	4448.67	36.25	55.13	42.42	55.39	0.000008	4.13	1764.75	1954.48	0.17

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge											
P118-00-00	P118-R2-1	41185.7 Max WS		4432.56	36.25	55.1		55.37	0.000004	4.15	1763.01	2083.35	0.17	
P118-00-00	P118-R2-1	40951.8 Max WS		4484.85	36.2	55.2	41.28	55.26	0.000005	2.05	4351.38	2215.68	0.09	
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge											
P118-00-00	P118-R2-1	40886.8 Max WS		4484.85	36.19	55.2		55.26	0.000005	2	4235.68	2159.8	0.09	
P118-00-00	P118-R2-1	40846.9 Max WS		4479.82	36.18	55.18	42	55.27	0.000008	2.32	4539.94	2383.59	0.11	
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge											
P118-00-00	P118-R2-1	40605.5 Max WS		4472.97	36.13	55.17		55.25	0.000008	2.31	4296.91	2298.62	0.11	
P118-00-00	P118-R2-1	40584.6 Max WS		4472.96	36.13	55.17	41.94	55.25	0.000009	2.27	3713.47	1986.34	0.11	
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge											
P118-00-00	P118-R2-1	40515.6 Max WS		4471.76	36.12	55.16		55.24	0.000009	2.25	4286.24	2235.9	0.11	
P118-00-00	P118-R2-1	39969.8 Max WS		4460.89	36.01	55.15		55.24	0.000018	2.53	4887.34	2566.42	0.13	
P118-00-00	P118-R2-1	39829.91 Max WS		5531.72	36	55.08		55.22	0.000629	3.33	3783.8	2515.31	0.2	
P118-00-00	P118-R2-1	39188.6 Max WS		5496.02	35.6	54.65		54.88	0.000799	4.33	3412.89	2226.31	0.23	
P118-00-00	P118-R2-1	38423.57 Max WS		5771.42	34.76	54.08		54.35	0.000801	4.59	2957.24	1716.19	0.23	
P118-00-00	P118-R2-1	38170.2 Max WS		5755.34	34.35	53.98		54.17	0.00049	3.65	3304.3	1793.55	0.19	
P118-00-00	P118-R2-1	37899.37 Max WS		5723.84	34.35	53.89		54.07	0.000433	3.62	3116.36	1716.4	0.18	
P118-00-00	P118-R2-1	37413.16 Max WS		5650.15	34.13	53.64		53.92	0.00066	4.34	2144.43	1487.53	0.22	
P118-00-00	P118-R2-1	37258.6 Max WS		5608.63	34.02	53.53		53.82	0.000721	4.54	2240.72	1354.59	0.22	
P118-00-00	P118-R2-1	36408.6 Max WS		5413.44	32.39	53.03		53.26	0.000905	4.19	2276.36	1036.22	0.24	
P118-00-00	P118-R2-1	36341.47 Max WS		5370.53	32.39	52.94	43.89	53.21	0.001017	4.41	2094.61	1145.45	0.26	
P118-00-00	P118-R2-1	36330 UTILITY	Bridge											
P118-00-00	P118-R2-1	36321.56 Max WS		5401.71	32	53		53.15	0.000349	3.22	2735.25	1314.75	0.15	
P118-00-00	P118-R2-1	36303.5 Max WS		5402.46	32	53		53.14	0.000317	3.09	2874.86	1457.54	0.15	
P118-00-00	P118-R1-3	36195.78 Max WS		6816.16	32.04	52.85		53.09	0.000516	4	2786.64	1142.14	0.19	
P118-00-00	P118-R1-3	36107.2 Max WS		6814.81	32	52.82		53.04	0.000497	3.93	2973.46	1014.63	0.19	
P118-00-00	P118-R1-3	35434.7 Max WS		6807.36	31.72	52.54		52.77	0.000432	3.86	2421.05	726.83	0.18	
P118-00-00	P118-R1-3	35045.7 Max WS		6803.5	31.55	52.36	40.15	52.6	0.00045	3.91	1905.24	449.68	0.18	
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge											
P118-00-00	P118-R1-3	35006.1 Max WS		6800.54	31.09	52.28		52.5	0.000411	3.8	2088.98	530.18	0.18	
P118-00-00	P118-R1-3	34984.3 Max WS		6799.37	30.53	52.24	41	52.51	0.000518	4.23	1955.05	308.74	0.2	
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge											
P118-00-00	P118-R1-3	34870.3 Max WS		6797.74	30	52.18		52.43	0.000467	4.08	2131.77	459.92	0.19	
P118-00-00	P118-R1-3	33920.1 Max WS		6858.62	29.63	51.28		51.75	0.001049	5.59	1608.82	673.69	0.27	
P118-00-00	P118-R1-3	32749.8 Max WS		6935.53	28	49.88		50.4	0.001235	5.83	1468.05	433.45	0.29	
P118-00-00	P118-R1-3	31824.3 Max WS		6993.19	26.81	49.06		49.43	0.00078	4.99	1794.86	404.93	0.24	
P118-00-00	P118-R1-3	30679.1 Max WS		7054.1	27.05	48.12		48.51	0.00082	5.13	1633.4	228.56	0.24	
P118-00-00	P118-R1-3	30678.1	Lat Struct											
P118-00-00	P118-R1-3	30099.1 Max WS		7093.22	27.23	47.87		48.13	0.000435	4.14	2142.84	291.19	0.19	
P118-00-00	P118-R1-3	29757.8 Max WS		7124.06	27.34	47.68	36.46	47.97	0.000491	4.34	1814.96	322.47	0.2	
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge											
P118-00-00	P118-R1-3	29704.8 Max WS		7116.51	27	47.55		47.83	0.000466	4.27	1893.77	441.3	0.19	
P118-00-00	P118-R1-3	28983.7 Max WS		7057.06	26.97	46.81		47.31	0.001063	5.69	1401.65	196.53	0.28	
P118-00-00	P118-R1-3	28587.3 Max WS		7976.84	26.04	46.47		46.75	0.000501	4.35	2238.14	239.09	0.2	
P118-00-00	P118-R1-3	27992 Max WS		7971.73	25.42	46.25		46.56	0.000626	4.79	2890.96	423.2	0.22	
P118-00-00	P118-R1-3	27567.7 Max WS		7964.79	25.74	46.03		46.33	0.000482	4.57	2612.56	334.43	0.2	
P118-00-00	P118-R1-3	27317 Max WS		7958.88	25.92	45.89	35.44	46.21	0.000537	4.73	2136.03	320.04	0.21	
P118-00-00	P118-R1-3	27306.0 UTILITY	Bridge											
P118-00-00	P118-R1-3	27305.8 Max WS		7952.71	25.93	45.75		46.1	0.000561	4.86	2104.64	299.98	0.21	
P118-00-00	P118-R1-3	27295.8 Max WS		7952.7	25.93	45.74	35.26	46.1	0.000562	4.86	2102.88	299.19	0.21	
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge											
P118-00-00	P118-R1-3	27189.8 Max WS		7939.17	25.89	45.47		45.83	0.000591	4.93	2035.39	267	0.22	
P118-00-00	P118-R1-3	27180.8 Max WS		7939.17	25.89	45.46	35.22	45.82	0.000592	4.93	2033.9	266.25	0.22	
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge											
P118-00-00	P118-R1-3	27167.5 Max WS		7943.76	25.84	45.53		45.81	0.000471	4.34	2192.58	302.52	0.2	
P118-00-00	P118-R1-3	26816.8*	Max WS	7932.05	25.02	45.34		45.61	0.000496	4.2	2138.6	242.83	0.2	
P118-00-00	P118-R1-3	26815.8	Lat Struct											
P118-00-00	P118-R1-3	26466.1 Max WS		7920.75	24.2	45.17		45.44	0.000583	4.23	2067.96	227.96	0.21	
P118-00-00	P118-R1-3	26224.4*	Max WS	7935.53	23.64	45.04		45.29	0.000529	4.1	2124.74	215.64	0.2	
P118-00-00	P118-R1-3	25982.8 Max WS		7936.24	23.07	44.94		45.18	0.000477	3.96	2195.26	210.18	0.19	
P118-00-00	P118-R1-3	25318.4 Max WS		7913.41	23.07	44.62		44.86	0.000489	3.96	2368.92	256.77	0.19	
P118-00-00	P118-R1-3	25317.4	Lat Struct											
P118-00-00	P118-R1-3	24564.2 Max WS		7894.16	21.76	44.3		44.52	0.000378	3.84	2278.57	216.31	0.17	
P118-00-00	P118-R1-3	23984.6 Max WS		9234.09	20.75	44.03		44.27	0.0004	4.05	3306.22	395.9	0.18	
P118-00-00	P118-R1-2	23796.2 Max WS		9832.16	24.42	43.92		44.19	0.000395	4.19	2578.7	249.98	0.2	
P118-00-00	P118-R1-2	23795.2	Lat Struct											
P118-00-00	P118-R1-2	23286.2 Max WS		9836.91	20.82	43.6		43.93	0.000625	4.57	2253.16	322.45	0.22	
P118-00-00	P118-R1-2	22973.4 Max WS		9823.63	20.85	43.46	31.35	43.74	0.000524	4.3	3584.26	693.67	0.2	
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge											
P118-00-00	P118-R1-2	22929.4 Max WS		9823.63	20.49	43.01		43.3	0.000537	4.34	3513.09	684.23	0.2	
P118-00-00	P118-R1-2	22928.4	Lat Struct											
P118-00-00	P118-R1-2	22630.3 Max WS		9735.16	19.11	42.56	32.53	43.11	0.001289	5.94	1638.95	135.74	0.3	
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge											

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R1-2	22587.7	Max WS	9732.65	18.99	42.21		42.78	0.001365	6.05	1608.36	135.13	0.31
P118-00-00	P118-R1-2	22577.7	Max WS	9726.49	18.99	42.2		42.77	0.001367	6.05	1606.86	135.1	0.31
P118-00-00	P118-R1-1	22186.8	Max WS	10083.36	18.55	41.66		42.25	0.00102	6.19	1711.99	164.31	0.27
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	10375.05	18.16	41.74		42	0.000431	4.13	2682.31	210.45	0.19
P118-00-00	P118-R1-1	21589.8	Max WS	11476.29	17.9	41.24		41.79	0.000847	6.16	2172.7	172.54	0.26
P118-00-00	P118-R1-1	21362	Max WS	11433.7	17.65	41.02		41.68	0.000079	6.55	2017.41	187.79	0.28
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	11417.47	17.65	41.02	30.94	41.68	0.000079	6.54	2017.45	187.79	0.28
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	11417.47	17.62	40.95		41.61	0.00008	6.55	2010.52	187.42	0.28
P118-00-00	P118-R1-1	21010.4	Max WS	11340.43	18.08	41.08	29.18	41.51	0.000611	5.96	3121.8	251.06	0.23
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	11342.88	17.96	40.95		41.38	0.000613	5.97	3118.49	250.75	0.23
P118-00-00	P118-R1-1	20880.6	Max WS	11288.48	17.96	40.51	31.51	41.66	0.000125	8.95	2538.81	234.56	0.36
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	11294.39	17.96	40.44		41.6	0.000126	8.99	2521.09	233.56	0.36
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	11016.65	19.24	39.91		40.74	0.00165	7.41	1679.13	303.83	0.35
P118-00-00	P118-R1-1	18597.4	Max WS	11754.42	15.56	38.3		39.03	0.000959	7.07	2102.19	175.81	0.29
P118-00-00	P118-R1-1	18107.1	Max WS	11686.45	15.21	38.08		38.45	0.000865	4.83	2418.39	210.84	0.25
P118-00-00	P118-R1-1	17862.9*	Max WS	11644.74	14.55	37.94		38.26	0.000663	4.53	2571.32	202.58	0.22
P118-00-00	P118-R1-1	17618.7*	Max WS	11638.89	13.89	37.84		38.14	0.000537	4.35	2678.15	196.23	0.2
P118-00-00	P118-R1-1	17374.5*	Max WS	11636.55	13.23	37.71		38	0.000455	4.28	2733.4	203.88	0.19
P118-00-00	P118-R1-1	17130.3	Max WS	11673	12.57	37.61		37.9	0.000413	4.32	2754.21	204.87	0.18
P118-00-00	P118-R1-1	16004	Max WS	11699.67	11.24	37.11		37.39	0.000503	4.21	2798.15	207.47	0.2
P118-00-00	P118-R1-1	15045.6	Max WS	12367.71	10.55	36.25		36.72	0.000831	5.48	2294.82	180.49	0.25
P118-00-00	P118-R1-1	13937.2	Max WS	12361.61	11.62	35.59		35.99	0.000612	5.52	3926.04	424.9	0.23
P118-00-00	P118-R1-1	13341.9	Max WS	12361.21	10.38	35.05		35.61	0.000898	6.67	3219.25	338.3	0.27
P118-00-00	P118-R1-1	12945.5	Max WS	12360.38	9.55	34.9	25.5	35.23	0.000585	5.53	4294.89	422.84	0.22
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	12358.52	9.53	34.76		35.1	0.000601	5.59	4245.11	422.08	0.22
P118-00-00	P118-R1-1	12931.7	Max WS	12358.51	9.53	34.76	25.48	35.1	0.000601	5.59	4244.84	422.07	0.22
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	12356.4	8.77	34.39		34.72	0.000547	5.41	4413.19	424.74	0.21
P118-00-00	P118-R1-1	12117.3	Max WS	12355.99	7.23	34.02		34.33	0.000386	4.82	3341.34	272.7	0.18
P118-00-00	P118-R1-1	10905.1	Max WS	13491.79	9.54	32.95		33.55	0.000886	6.4	2649.04	246.48	0.27
P118-00-00	P118-R1-1	9879.2	Max WS	13473.16	6.26	31.58		32.49	0.001381	8.2	2578.81	218.48	0.33
P118-00-00	P118-R1-1	8777	Max WS	13464.97	4.71	30.98		31.15	0.000359	3.84	7340.86	799.44	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	13461.74	4.73	30.59		30.88	0.000444	4.75	4839.86	403.35	0.2
P118-00-00	P118-R1-1	6779.3	Max WS	13457.57	4.44	29.81		30.21	0.000674	5.3	3947.52	442.22	0.23
P118-00-00	P118-R1-1	5748.4	Max WS	13451.9	4.27	28.39		29.26	0.001571	8.07	2924.02	368.48	0.35
P118-00-00	P118-R1-1	4492	Max WS	13447.83	1.92	27.13		27.62	0.000804	5.77	2982.46	338.42	0.25
P118-00-00	P118-R1-1	3597.9	Max WS	13446.06	2.46	26.41		26.89	0.000954	6.15	3791.28	418.69	0.28
P118-00-00	P118-R1-1	2709.4	Max WS	13445.05	1.59	25.57		26.07	0.000888	6.41	4016.3	389.22	0.27
P118-00-00	P118-R1-1	1695.9	Max WS	13444.61	1.52	24.38		25.07	0.001276	7.51	3446.24	343.47	0.32
P118-00-00	P118-R1-1	678.7	Max WS	13444.56	0.81	21.83	16.43	23.22	0.0028	9.74	1873.74	231.28	0.46
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.85		49.89	0.001737	1.63	18.45	16.57	0.27
P118-08-00	P118-08-00	7839.79	Max WS	29.62	47.55	49.21		49.23	0.000809	1.33	26.18	23.22	0.19
P118-08-00	P118-08-00	7820.27	Max WS	30.69	47.46	49.19	48.28	49.21	0.00102	1.18	26	25.85	0.21
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	31.18	47.58	49		49.05	0.00321	1.88	16.56	19.31	0.36
P118-08-00	P118-08-00	7729.04	Max WS	34.02	46.32	48.97		48.99	0.000217	1.02	33.26	36.03	0.11
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	34.03	46.88	48.95		48.98	0.000516	1.32	25.73	23.07	0.17
P118-08-00	P118-08-00	7550.89	Max WS	39.01	46.66	48.92		48.94	0.000529	1.13	34.42	41.43	0.16
P118-08-00	P118-08-00	6762.47	Max WS	98.63	44.81	48.32		48.36	0.000745	1.71	63.45	43.41	0.2
P118-08-00	P118-08-00	5858.77	Max WS	148.56	44.48	47.71		47.73	0.000476	1.37	375.43	823.08	0.16
P118-08-00	P118-08-00	5845.88	Max WS	145.16	44.35	47.63		47.91	0.000308	4.26	34.57	922.37	0.43
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	144.98	44.6	47.57		47.9	0.000418	4.66	31.13	1833.37	0.49
P118-08-00	P118-08-00	5748.41	Max WS	151.72	44.22	47.73		47.81	0.001364	2.37	87.62	1279.91	0.27
P118-08-00	P118-08-00	4837.06	Max WS	181.69	41.61	46		46.13	0.002237	2.88	63.1	1130.74	0.34
P118-08-00	P118-08-00	4823.61	Max WS	182.56	41.31	46.02		46.1	0.001505	2.28	90.38	1217.61	0.28
P118-08-00	P118-08-00	4767.88	Max WS	184.33	41.28	45.87		46	0.002044	2.83	65.05	1173.54	0.33
P118-08-00	P118-08-00	4732.44	Max WS	186.33	41.13	45.86		45.94	0.000968	2.26	83	1158.17	0.23
P118-08-00	P118-08-00	4289.14	Max WS	204.64	41.25	44.8		45	0.003025	3.58	61.71	879.19	0.4
P118-08-00	P118-08-00	4255.48	Max WS	200.7	41.41	44.69	43.52	44.93	0.000416	3.92	51.21	822.79	0.45
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	201.71	41.23	44.72		44.92	0.000368	3.6	56	1391.73	0.42
P118-08-00	P118-08-00	4159.81	Max WS	201	40.8	44.75		44.9	0.001199	3.11	64.71	1137.32	0.28
P118-08-00	P118-08-00	4083.03	Culvert										

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-08-00	P118-08-00	4007.74	Max WS	203.13	40.16	44.77		44.89	0.000891	2.86	71	107.23	0.25
P118-08-00	P118-08-00	3928.82	Max WS	211.61	38.97	44.78		44.81	0.000377	1.62	202.52	160.75	0.15
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	-64.42	38.34	44.24		44.25	0.000038	-0.52	192.53	277.67	0.05
P118-08-00	P118-08-00	2630.49	Max WS	176.82	37.06	43.72		43.74	0.000225	1.28	216.68	140.92	0.11
P118-08-00	P118-08-00	1901.01	Max WS	905.88	35.97	43.51		43.85	0.002953	-5.13	341.51	584.77	0.42
P118-08-00	P118-08-00	1219.08	Max WS	47.79	33.28	43.46		43.46	0.000003	0.17	309.86	630.48	0.01
P118-08-00	P118-08-00	1186.93	Max WS	362.89	34.39	42.57		42.61	0.000301	1.71	212.82	229.56	0.14
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	357.46	34.03	42.57		42.6	0.00012	1.42	556.1	284.47	0.09
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	357.01	33.5	42.48		42.53	0.000168	1.73	206.89	52.26	0.11
P118-08-00	P118-08-00	890.93	Max WS	381.82	28.97	42.46		42.48	0.000152	1.15	333.17	73.82	0.1
P118-08-00	P118-08-00	881.12	Max WS	399.41	27.91	42.45		42.46	0.000059	0.92	432.45	66.4	0.06
P118-08-00	P118-08-00	846.44	Max WS	410.33	26.44	42.45		42.46	0.000048	0.91	451.85	58.96	0.06
P118-08-00	P118-08-00	68.07	Max WS	365	23.63	42.46		42.47	0.000004	0.34	1176.19	132.25	0.02
P118-09-00	P118-09-00	8416.71	Max WS	120.67	52.44	57.38		57.4	0.002025	1.28	95.59	47.15	0.14
P118-09-00	P118-09-00	8415.71	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	120.17	51.25	56.98		57	0.000204	1.1	109.25	34.59	0.11
P118-09-00	P118-09-00	7947.1	Max WS	209.48	50.5	56.62		56.96	0.000181	4.69	44.67	35.53	0.35
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	205.71	50.64	56.25		56.37	0.000121	3.43	355.43	144.47	0.27
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	210.99	50.66	56.27		56.28	0.000126	0.79	582.85	162.67	0.08
P118-09-00	P118-09-00	7037.08	Max WS	270.01	50.59	55.87		55.94	0.000951	2.25	165.95	303.9	0.24
P118-09-00	P118-09-00	6335.17	Max WS	325.72	50.38	55.33		55.36	0.000609	1.75	514.74	784.54	0.23
P118-09-00	P118-09-00	6241.34	Max WS	327.09	49.73	55.25		55.42	0.000149	3.76	514	570.47	0.31
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	327.07	49.91	55.18		55.42	0.00019	4.23	334.88	350.78	0.35
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	318.29	49.94	55.22		55.28	0.000988	2.44	301.26	266.28	0.24
P118-09-00	P118-09-00	6006.93	Max WS	318.09	49.66	55.1		55.15	0.000889	2.23	318.34	305.61	0.23
P118-09-00	P118-09-00	5998.6	Max WS	319.91	49.63	55.08		55.15	0.000992	2.35	302.32	382.77	0.24
P118-09-00	P118-09-00	5978.1	Max WS	324.76	49.66	55.09		55.1	0.000367	1.42	813.83	960.43	0.14
P118-09-00	P118-09-00	5970.8	Max WS	326.4	49.74	55.09		55.09	0.000183	0.97	1157.11	1019.56	0.1
P118-09-00	P118-09-00	5869.16	Max WS	337.79	49.31	55.07		55.07	0.000205	1.1	1128.13	1044.76	0.11
P118-09-00	P118-09-00	5818.16	Max WS	340.34	49.47	55.05		55.1	0.000225	2.5	975.36	1043.06	0.32
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	340.34	49.13	55.03		55.16	0.000566	3.66	457.28	786.97	0.5
P118-09-00	P118-09-00	5685.64	Max WS	343.62	49.01	55.02		55.07	0.000752	2.18	422.61	518.78	0.21
P118-09-00	P118-09-00	4961.22	Max WS	373.65	47.46	54.6		54.68	0.000743	2.39	239.9	160.19	0.21
P118-09-00	P118-09-00	4862.39	Max WS	378.07	47.3	54.48		54.66	0.000559	3.54	166.1	165.39	0.5
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	377.98	47.66	54.42		54.69	0.000695	4.25	144.4	150.7	0.56
P118-09-00	P118-09-00	4717.67	Max WS	383.74	47.29	54.46		54.58	0.001027	2.79	152.56	134.74	0.25
P118-09-00	P118-09-00	4354.22	Max WS	428.26	46.81	54.06		54.18	0.000968	2.82	165.04	68.93	0.24
P118-09-00	P118-09-00	4232.29	Max WS	418.64	45.84	53.6		54.11	0.000201	5.78	77.5	71.92	0.38
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	423.1	45.75	51.79		52.87	0.000693	8.33	50.79	21.62	0.65
P118-09-00	P118-09-00	4101.99	Max WS	449.55	46.19	52.15		52.87	0.000975	6.81	65.97	21.92	0.69
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	114.14	45.18	51.51		51.55	0.000054	1.64	108.45	64.37	0.16
P118-09-00	P118-09-00	3214.67	Max WS	540.28	43.86	51.03	49.23	51.47	0.000462	5.38	128.22	173.59	0.49
P118-09-00	P118-09-00	3131.26	Max WS	547.34	43.6	50.24		51.6	0.000752	9.35	59.62	40.73	0.68
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	304.98	43.59	48.01		49.28	0.001447	9.03	33.77	14.48	0.87
P118-09-00	P118-09-00	2939.54	Max WS	553.26	43.48	48.6	49	50.54	0.003119	11.17	49.54	18.74	1.21
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	593.21	42.41	48.2		48.99	0.000957	7.32	131.94	66.35	0.7
P118-09-00	P118-09-00	1673	Max WS	607.86	39.78	47.89		48.21	0.000451	4.87	406.71	486.48	0.48
P118-09-00	P118-09-00	1610.87	Max WS	567.11	39.04	47.86		48.27	0.000139	5.41	451.31	596.63	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	565.93	38	47.48		47.94	0.000143	5.53	207.7	184.05	0.33
P118-09-00	P118-09-00	1491.18	Max WS	571.14	37.86	47.57		47.72	0.002344	3.46	275.94	184.72	0.29
P118-09-00	P118-09-00	945.12	Max WS	593.64	36.86	45.95		46.17	0.003218	3.96	223.41	200.07	0.34
P118-09-00	P118-09-00	435.38	Max WS	619.03	35.21	45.22		45.25	0.000141	1.35	459.17	82.65	0.1
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	611.59	35.18	45.22		45.25	0.000129	1.3	469.8	83.51	0.1
P118-09-00	P118-09-00	376.38	Culvert										
P118-09-00	P118-09-00	222.06	Max WS	602.98	24.19	44.22		44.22	0.000004	0.35	1724.68	161.78	0.02

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-09-00	P118-09-00	209.24	Max WS	601.83	24.13	44.22		44.22	0.000004	0.35	1724.82	158	0.02
P118-09-00	P118-09-00	139.66	Max WS	618.69	23.56	44.22		44.22	0.000004	0.34	1822.26	163.03	0.02
P118-09-00	P118-09-00	74.44	Max WS	597.27	22.87	44.21		44.22	0.000003	0.36	1681.73	111.2	0.02
P118-14-00	P118-14-00-001	13760.5	Max WS	87.45	58.1	63.82		63.82	0.000004	0.41	552.36	1185.88	0.05
P118-14-00	P118-14-00-001	13096.8	Max WS	87.31	57.3	63.79		63.8	0.000029	0.42	287.74	469.96	0.04
P118-14-00	P118-14-00-001	11983.3	Max WS	277.65	56.1	63.76		63.76	0.000037	0.55	1451.08	1410.39	0.05
P118-14-00	P118-14-00-001	11755.1											
P118-14-00	P118-14-00-001	11526.9	Max WS	257.32	55.3	62.73		62.75	0.000195	1.26	204.47	242.15	0.11
P118-14-00	P118-14-00-001	10870.6	Max WS	416.33	55	62.39		62.45	0.000494	2	209.6	669.98	0.18
P118-14-00	P118-14-00-001	10833.25											
P118-14-00	P118-14-00-001	10795.9	Max WS	398.9	55.5	61.77		61.86	0.000812	2.43	164.11	676.58	0.22
P118-14-00	P118-14-00-001	10606.9	Max WS	441.94	55.19	61.68		61.73	0.000372	1.89	234.21	52.12	0.16
P118-14-00	P118-14-00-001	9666.7	Max WS	656.2	54.05	61.39		61.42	0.000212	1.54	425.07	219.45	0.12
P118-14-00	P118-14-00-001	8993.1	Max WS	829.45	53.23	61.03		61.13	0.000588	2.54	362.76	717.02	0.2
P118-14-00	P118-14-00-001	8655.1	Max WS	908.76	51.98	60.77		60.92	0.000752	3.3	636.12	947.99	0.23
P118-14-00	P118-14-00-001	8532.1	Max WS	908.49	51.53	60.74		60.78	0.00027	2.06	1774.06	1637.83	0.14
P118-14-00	P118-14-00-001	8507											
P118-14-00	P118-14-00-001	8481.9	Max WS	883.51	51.41	60.18		60.27	0.000527	2.75	1120.05	1501.44	0.19
P118-14-00	P118-14-00-001	8025.2	Max WS	876.8	50.63	59.9		60	0.000712	2.91	831.7	1168.7	0.22
P118-14-00	P118-14-00-001	7510.9	Max WS	973.59	49.74	59.61		59.66	0.000413	2.37	1817.14	1812.28	0.17
P118-14-00	P118-14-00-001	6550.7	Max WS	1150.06	48.37	59.18		59.28	0.000437	2.82	1390.62	1749.74	0.18
P118-14-00	P118-14-00-001	6479.1	Max WS	1164.78	48.26	59.16		59.22	0.00031	2.39	1821.66	2019.18	0.15
P118-14-00	P118-14-00-001	6454.3											
P118-14-00	P118-14-00-001	6429.1	Max WS	1158.48	48.13	58.87		58.95	0.000384	2.63	1563.37	1952.79	0.17
P118-14-00	P118-14-00-001	6302.9	Max WS	1178.57	48.15	58.77		58.92	0.000841	3.25	886.77	1635.4	0.24
P118-14-00	P118-14-00-001	6179.9	Max WS	1199.49	48.17	58.69	54.2	58.8	0.000643	3.06	1283.68	1636.09	0.21
P118-14-00	P118-14-00-001	6165.4											
P118-14-00	P118-14-00-001	6150.9	Max WS	1198.6	48.08	58.63		58.74	0.000615	3	1334.65	1660.6	0.21
P118-14-00	P118-14-00-001	5970	Max WS	1226.39	47.75	58.49		58.64	0.000749	3.53	1123.63	1887.08	0.23
P118-14-00	P118-14-00-001	5823.6	Max WS	1250.25	47.49	58.44	53.93	58.48	0.000302	2.25	2647.88	2396.54	0.15
P118-14-00	P118-14-00-001	5800.1											
P118-14-00	P118-14-00-001	5776.6	Max WS	1249.51	47.36	58.34		58.38	0.000285	2.19	2723.3	2398.51	0.14
P118-14-00	P118-14-00-001	5628.5	Max WS	1272.99	47.07	58.25		58.39	0.000556	3.33	1167.86	1864.7	0.21
P118-14-00	P118-14-00-001	5509.6	Max WS	1292.34	46.83	58.23		58.27	0.000399	2.41	2608.66	2508.49	0.16
P118-14-00	P118-14-00-001	5484.6											
P118-14-00	P118-14-00-001	5459.6	Max WS	1291.68	46.8	58.2		58.24	0.000398	2.41	2609.25	2508.52	0.16
P118-14-00	P118-14-00-001	5294.4	Max WS	1318.08	46.75	58.12		58.2	0.000356	2.68	1512.21	2061.8	0.17
P118-14-00	P118-14-00-001	5161	Max WS	1340.1	46.71	58.1		58.12	0.000152	1.74	3732.17	2894.78	0.11
P118-14-00	P118-14-00-001	5136											
P118-14-00	P118-14-00-001	5111	Max WS	1339.61	46.69	58.06		58.08	0.000157	1.77	3674.33	2892.98	0.11
P118-14-00	P118-14-00-001	4683.7	Max WS	1410.19	46.22	57.92		58	0.000419	2.84	2012.81	2001.72	0.17
P118-14-00	P118-14-00-001	4316.3	Max WS	1463.74	45.87	57.73		57.87	0.000587	3.42	1311.26	1474.3	0.21
P118-14-00	P118-14-00-001	4164.8	Max WS	1487.62	45.65	57.7		57.74	0.000233	2.18	3067.95	2136.31	0.13
P118-14-00	P118-14-00-001	4140.3											
P118-14-00	P118-14-00-001	4115.8	Max WS	1471.36	45.6	57.34		57.4	0.000347	2.6	2432.64	2007.36	0.16
P118-14-00	P118-14-00-001	3617.5	Max WS	1544.49	45.9	57.13		57.21	0.000462	2.71	2146.88	2237.19	0.18
P118-14-00	P118-14-00-001	3259.8	Max WS	1605.39	46.12	56.94		57.01	0.000532	2.79	2212.14	2270.26	0.2
P118-14-00	P118-14-00-001	3169.5	Max WS	1617.37	46.17	56.91	52.52	56.95	0.000361	2.28	2917.99	2351.72	0.16
P118-14-00	P118-14-00-001	3141.3											
P118-14-00	P118-14-00-001	3113.1	Max WS	1617.34	46.07	56.83		56.87	0.000364	2.3	2809.23	2359.59	0.16
P118-14-00	P118-14-00-001	2974.8	Max WS	1638.49	45.87	56.78		56.83	0.000296	2.2	2486.53	2313.33	0.15
P118-14-00	P118-14-00-001	2884.9	Max WS	1652.84	45.74	56.75		56.81	0.000291	2.26	2529.43	2489.5	0.15
P118-14-00	P118-14-00-001	2836.2	Max WS	1662.81	45.67	56.72		56.8	0.000508	2.89	2227.82	2361.67	0.19
P118-14-00	P118-14-00-001	2771.2											
P118-14-00	P118-14-00-001	2706.2	Max WS	1662.82	45.15	54.61		55.08	0.002567	5.48	374.76	380.17	0.42
P118-14-00	P118-14-00-001	2164.7	Max WS	1745.69	43.47	54.05		54.15	0.000364	2.57	879.05	504.64	0.17
P118-14-00	P118-14-00-001	1654.8	Max WS	1823.79	41.9	53.91		53.99	0.000227	2.17	1504.75	1674.94	0.14
P118-14-00	P118-14-00-001	1523.9	Max WS	1840.25	41.49	53.9		53.95	0.000168	1.91	2541.58	1941.58	0.12
P118-14-00	P118-14-00-001	1492.9											
P118-14-00	P118-14-00-001	1461.9	Max WS	1839.14	41.24	53.85		53.89	0.000146	1.8	2939.58	2124.19	0.11
P118-14-00	P118-14-00-001	1132.9	Max WS	1586.51	40.69	53.37		53.56	0.00174	4.39	1446.08	2117.11	0.31
P118-14-00	P118-14-00-001	226.85	Max WS	1369.95	39.16	53.18		53.2	0.000237	1.85	3177.72	2255.38	0.12
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067											
P118-21-00	P118-21-00	3066											
P118-21-00	P118-21-00	2499.4	Max WS	5.43	67.88	69.58		69.59	0.002947	-0.56	10.82	20.67	0.1
P118-21-00	P118-21-00	2493.18	Max WS	-5.06	67.95	69.61		69.61	0.00354	-0.4	15.47	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	4.94	67.59	69.64		69.64	0.000007	-0.19	28.17	23.77	0.03
P118-21-00	P118-21-00	2416.26	Max WS	-5.01	67.5	69.64		69.64	0.000017	-0.18	29.41	25.51	0.03
P118-21-00	P118-21-00	2398.11	Max WS	-4.78	67.44	69.64		69.64	0.000013	-0.16	29.75	22.86	0.02
P118-21-00	P118-21-00	2389.56	Max WS	-4.47	67.41	69.64		69.64	0.000004	-0.15	30.33	23.15	0.02
P118-21-00	P118-21-00	2343.79	Max WS	-3.96	67.54	69.64		69.64	0.000014	-0.25	16.17	13.75	0.04
P118-21-00	P118-21-00	2303.58	Max WS	-3.26	67.47	69.64		69.64	0.000022	-0.2	16.64	12.97	0.03

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2208.42	Max WS	-2.32	67.31	69.65		69.65	0.000006	-0.11	21.18	15.58	0.02
P118-21-00	P118-21-00	2195.48	Max WS	-2.32	67.34	69.65		69.65	0.000003	-0.1	22.46	19.38	0.02
P118-21-00	P118-21-00	2169.49	Max WS	-2.32	66.56	69.65		69.65	0.000001	-0.1	23.86	13.04	0.01
P118-21-00	P118-21-00	2167.76	Max WS	-2.32	66.37	69.65		69.65	0.000001	-0.08	29.07	14.18	0.01
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	-2.32	65.03	69.68		69.68	0	-0.03	68.46	61	0.01
P118-21-00	P118-21-00	2100.84	Max WS	-2.41	64.78	69.68		69.68	0	-0.04	66.82	40.52	0
P118-21-00	P118-21-00	1662.37	Max WS	-31.07	63.91	69.68		69.69	0.000017	-0.36	109.88	46.01	0.03
P118-21-00	P118-21-00	1144.5	Max WS	-84.44	62.63	69.69		69.7	0.000068	-0.77	110.51	23	0.06
P118-21-00	P118-21-00	595.53	Max WS	-133.82	61.49	69.72		69.72	0.000029	-0.56	243.6	47.22	0.04
P118-21-00	P118-21-00	549.31*	Max WS	-139.25	61.18	69.72		69.72	0.000028	-0.57	246.42	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-143.97	60.87	69.72		69.72	0.000028	-0.59	246.97	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-148.56	60.57	69.72		69.72	0.000028	-0.61	245.08	38.81	0.04
P118-21-00	P118-21-00	410.63*	Max WS	-152.73	60.26	69.72		69.72	0.000029	-0.64	240.96	36.01	0.04
P118-21-00	P118-21-00	364.41*	Max WS	-156.53	59.95	69.72		69.73	0.000031	-0.67	234.32	33.21	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-160.04	59.64	69.72		69.73	0.000033	-0.71	225.46	30.41	0.05
P118-21-00	P118-21-00	271.96*	Max WS	-163.9	59.34	69.72		69.73	0.000038	-0.77	214.18	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	-166.16	59.03	69.72		69.73	0.000044	-0.83	200.63	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-167.57	58.72	69.72		69.73	0.000066	-0.91	184.75	22	0.06
P118-21-00	P118-21-00	159.41*	Max WS	-170.63	57.98	69.72		69.73	0.000058	-0.87	196.89	22.53	0.05
P118-21-00	P118-21-00	139.31*	Max WS	-165.73	57.24	69.73		69.74	0.000046	-0.79	209.52	23.06	0.05
P118-21-00	P118-21-00	119.21*	Max WS	-136.46	56.51	69.74		69.74	0.000027	-0.61	222.58	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-108.84	55.77	69.74		69.74	0.000015	-0.46	235.9	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-81.66	55.03	69.74		69.75	0.000007	-0.33	249.53	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.57		74.57	0.000001	0.1	107.2	42.49	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.57		74.57	0.000002	0.11	94.78	41.77	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.62	70.08	74.57	70.24	74.57	0.000003	0.12	92.54	55.87	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.56		74.57	0.000003	0.13	86.81	39.61	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.69	70.16	74.56		74.56	0.000004	0.14	83.91	38.58	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.46	69.97	74.56		74.56	0.000009	0.22	83.99	32.58	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.1	69.88	74.56		74.56	0.000011	0.25	83.4	45	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.93	68.92	74.56		74.56	0.000011	0.26	102.92	146.33	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.88	69.39	74.54		74.54	0.000008	0.22	240.35	431.7	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.55	69.56	74.54		74.54	0.000014	0.28	86.68	792.93	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.1	68.48	74.54		74.54	0.000024	0.38	89.04	1405.5	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.7	68.06	74.53		74.54	0.000029	0.43	92.51	1333.35	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.6	69.59	74.28		74.28	0.000013	0.27	563.68	1060.01	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.05	69.5	74.28		74.28	0.000029	0.42	97.88	1021.27	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	41.79	69.17	74.28		74.28	0.000028	0.42	99.38	1009.78	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	42.8	69.43	74.28		74.28	0.000029	0.56	75.87	962.48	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.58	69.34	74		74	0.000022	0.36	342.21	864.65	0.04
P118-23-00	P118-23-00 R2	7237.19	Max WS	45.33	69.28	74		74	0.000029	0.38	257.11	788.95	0.04
P118-23-00	P118-23-00 R2	6786.22	Max WS	95.97	68.02	73.98		73.98	0.000026	0.36	808.28	1833.82	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	103.53	67.37	73.98		73.98	0.000048	0.57	181.8	53.05	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	24.24	67.54	72.36		72.36	0.000042	0.37	65.79	32.95	0.05
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	26.28	67.16	72.36		72.36	0.000013	0.27	98.05	32.18	0.03
P118-23-00	P118-23-00 R2	6402.43	Max WS	28.47	67.03	72.35		72.36	0.000014	0.29	99.87	31.53	0.03
P118-23-00	P118-23-00 R2	6356.93	Max WS	29.56	66.97	72.35	67.49	72.36	0.000014	0.29	101.81	30.76	0.03
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	29.48	66.93	72.35		72.35	0.000014	0.28	103.79	32.31	0.03
P118-23-00	P118-23-00 R2	6293.27	Max WS	30.06	66.88	72.35		72.35	0.000013	0.28	105.75	32.03	0.03
P118-23-00	P118-23-00 R2	5958.59	Max WS	35.05	66.24	72.34		72.34	0.000009	0.21	164.93	63.05	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	39.42	65.7	72.34		72.34	0.000017	0.28	141.1	55.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	30.3	63.97	72.33		72.33	0.000003	0.18	168.61	31.87	0.01
P118-23-00	P118-23-00 R2	4947.92	Max WS	33.71	63.84	72.33	64.34	72.33	0.000002	0.16	215.88	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	33.68	63.87	72.33		72.33	0.000002	0.15	219.64	34.77	0.01
P118-23-00	P118-23-00 R2	4789.1	Max WS	44.64	63.65	72.33		72.33	0.000007	0.24	183	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	59.93	63.02	72.32	64.08	72.32	0.000009	0.28	217.08	46.95	0.02
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	59.93	63.16	72.32		72.32	0.000008	0.24	244.73	58.28	0.02
P118-23-00	P118-23-00 R2	4459.75	Max WS	69.79	63.55	72.32		72.32	0.000001	0.29	236.99	52.65	0.02
P118-23-00	P118-23-00 R2	4370.6	Max WS	77.86	63.42	72.32		72.32	0.000009	0.27	285.72	65.06	0.02
P118-23-00	P118-23-00 R2	4330.88	Max WS	80.65	62.88	72.32		72.32	0.000002	0.14	560.73	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	80.66	63.31	72.31		72.31	0.000002	0.16	510.17	76.06	0.01

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4229.24	Max WS	86.53	63.34	72.31		72.31	0.000005	0.27	323.31	51.14	0.02
P118-23-00	P118-23-00 R2	3733.5	Max WS	132.99	62.41	72.29		72.3	0.000026	0.57	231.38	34.28	0.04
P118-23-00	P118-23-00 R2	3187.46	Max WS	179.55	62.36	72.27		72.28	0.000003	0.65	276.7	40.27	0.04
P118-23-00	P118-23-00 R2	3150.64	Max WS	184.23	61.93	72.27	64.21	72.28	0.000028	0.59	312.33	52.14	0.04
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	184.23	61.56	72.27		72.27	0.000025	0.56	331.89	55.63	0.04
P118-23-00	P118-23-00 R2	3104.46	Max WS	186.86	61.63	72.27		72.27	0.000036	0.63	295.14	52.53	0.05
P118-23-00	P118-23-00 R2	2750.51	Max WS	224.28	60.59	72.25		72.26	0.000046	0.83	269.34	34.6	0.05
P118-23-00	P118-23-00 R2	2741.93	Max WS	224.84	60.44	72.24	63.02	72.26	0.000044	0.82	274.27	34.96	0.05
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	224.84	60.52	72.24		72.25	0.000036	0.73	309.21	42.97	0.05
P118-23-00	P118-23-00 R2	2716.57	Max WS	226.11	60.68	72.24		72.25	0.000038	0.7	325.28	52.19	0.05
P118-23-00	P118-23-00 R2	2615.37	Max WS	239.28	60.75	72.23		72.24	0.000048	0.85	282.56	37.87	0.05
P118-23-00	P118-23-00 R2	2244.98	Max WS	249.49	60.53	72.21		72.22	0.000041	0.83	301.38	35.71	0.05
P118-23-00	P118-23-00 R2	2221.06	Max WS	248.07	60.56	72.21	62.8	72.22	0.000043	0.83	299.35	36.69	0.05
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	248.06	60.59	72.19		72.2	0.000038	0.8	309.95	37.2	0.05
P118-23-00	P118-23-00 R2	2042.36	Max WS	272.91	59.78	72.19		72.19	0.000031	0.64	425.57	67.27	0.04
P118-23-00	P118-23-00 R2	1922.11	Max WS	281.49	59.56	72.18		72.19	0.000029	0.62	451.42	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	290.78	59.68	72.18	62.77	72.19	0.000035	0.69	418.59	66.31	0.05
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	290.67	59.86	72.1		72.12	0.000066	0.99	294.24	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	320.66	59.87	72.11		72.12	0.000039	0.7	456.08	75.5	0.05
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	425.15	59.04	72.08		72.1	0.000006	0.96	445.12	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	1186.76	59.85	72.07		72.08	0.000069	1.14	3385.07	1069.22	0.07
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	1194.87	59.99	72.07	64.99	72.07	0.000047	0.82	3567.49	990.93	0.06
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	1194.89	58.36	72.06		72.06	0.000034	0.76	3902.88	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	1230.49	57.88	72.05		72.06	0.000037	0.85	3891.2	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	1455.34	57.45	72.02		72.03	0.000092	1.27	2959.29	742.6	0.08
P118-23-00	P118-23-00 R1	649.49	Max WS	1685.92	57.03	71.96		71.98	0.000169	1.85	2168.79	449.67	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	1875.7	55.82	71.92	63.04	71.92	0.000026	0.6	12042.13	5583.94	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1875.69	55.57	71.9		71.9	0.000002	0.65	13349.11	5617.32	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	1874.7	55.13	71.88		71.94	0.000013	2.07	1343.23	175.37	0.11
P118-23-00	P118-23-00 R1	58.31	Max WS	1871.37	53.78	71.85		71.94	0.000168	2.57	1031.24	83.5	0.12
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	72.17		72.17	0.000001	0.07	613.67	1250.53	0.01
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	24.19	66.69	72.17		72.17	0.000005	0.16	315.99	1222.52	0.02
P118-23-02	P118-23-02	3782.06	Max WS	44.88	66.66	72.17		72.17	0.000003	0.13	1433.13	1236.41	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	44.88	66.22	72.17		72.17	0.000001	0.04	2836.14	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	44.89	66.22	72.17		72.17	0.000001	0.06	2583.65	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	46.23	65.47	72.17		72.17	0.000002	0.08	1892.46	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	116.23	65.13	72.17		72.17	0.000007	0.23	2065.27	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	118.4	65.16	72.17		72.17	0.000006	0.19	2189.45	1094.25	0.02
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	117.63	65.26	72.14		72.14	0.000005	0.2	2342.37	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	123.78	65.19	72.14		72.14	0.000001	0.29	1928.32	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	321.21	63.69	72.12		72.12	0.000046	0.71	1948.32	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	323.24	63.66	72.12	66.69	72.12	0.000039	0.7	2034.54	961.46	0.05
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	323.18	63.56	72.11		72.12	0.000028	0.58	2362.01	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	329.07	63.36	72.11		72.12	0.000021	0.38	2237.8	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	347.49	62.91	72.11		72.11	0.000019	0.48	2487.19	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	389.98	61.86	72.11		72.11	0.000019	0.49	2857.47	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	418.69	62.56	72.11		72.11	0.000021	0.51	2918.01	1249.68	0.04
P118-23-02	P118-23-02	215.24	Max WS	761.48	60.16	72.08		72.08	0.000041	0.72	3207.32	1102.12	0.05
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.67		72.67	0	0.06	164.62	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.67		72.67	0	0.06	164.56	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	42.87	66.13	72.67		72.67	0.000001	0.3	143.12	31.01	0.02
P118-25-00	P118-25-00 R2	2636.62	Max WS	86.17	65.84	72.65		72.66	0.000036	0.56	154.21	33.01	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	105.43	65.5	72.65		72.65	0.000044	0.62	168.93	35.73	0.05
P118-25-00	P118-25-00 R2	2473.31	Max WS	107.17	65.47	72.64	67.37	72.65	0.000046	0.64	167.55	35.01	0.05
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	107.18	65.47	72.64		72.64	0.000045	0.62	172.01	37.73	0.05
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	110.32	65.38	72.64		72.64	0.000044	0.64	173.31	35.28	0.05

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_100yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch. El (ft)	W.S. Elev (ft)	Crit. W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2046.09	Max WS	122.53	64.63	72.62		72.63	0.000033	0.58	210.49	40.52	0.05
P118-25-00	P118-25-00 R1	1929.3	Max WS	242.37	64.22	72.58		72.61	0.000202	1.34	180.72	39.73	0.11
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	205.55	64.03	72.54		72.56	0.00011	1.1	187.09	33.08	0.08
P118-25-00	P118-25-00 R1	1208.56	Max WS	159.93	63.03	72.53		72.54	0.000053	0.81	198.34	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	156.39	63.01	72.53	65.36	72.54	0.000056	0.81	192.36	29.97	0.06
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	155.66	62.94	72.52		72.53	0.000058	0.82	189.2	29.45	0.06
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1152.07	Max WS	152.2	62.83	72.52		72.52	0.000046	0.74	205.9	33.01	0.05
P118-25-00	P118-25-00 R1	980.2	Max WS	144.15	62.34	72.51		72.52	0.000028	0.61	237.74	35.75	0.04
P118-25-00	P118-25-00 R1	963.63	Max WS	145	62.25	72.51		72.52	0.000013	0.52	280.02	45.01	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	145.63	62.25	72.52	64.13	72.52	0.000014	0.42	396.58	95	0.03
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	131.94	61.68	72.49		72.5	0.000009	0.36	402.75	86	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	131.97	61.68	72.49		72.5	0.000009	0.45	291.72	51.01	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	128.46	61.16	72.49		72.5	0.000014	0.45	282.69	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	97.9	60.25	72.49		72.49	0.000006	0.3	321.47	44.02	0.02
P118-25-00	P118-25-00 R1	251.81	Max WS	56.31	58.25	72.49		72.49	0.000001	0.15	387.2	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	50.35	58.04	72.49		72.49	0.000001	0.13	393.54	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	44.5	57.84	72.49		72.49	0.000001	0.11	399.87	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	38.42	57.63	72.49		72.49	0	0.09	406.17	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	32.27	57.43	72.49		72.49	0	0.08	412.46	44.04	0
P118-25-00	P118-25-00 R1	141.80*	Max WS	25.93	57.22	72.49		72.49	0	0.06	418.78	44.03	0
P118-25-00	P118-25-00 R1	119.80*	Max WS	19.15	57.02	72.49		72.49	0	0.05	425.02	44.01	0
P118-25-00	P118-25-00 R1	97.8	Max WS	13.35	56.81	72.49	57.59	72.49	0	0.03	431.33	44	0
P118-25-01	P118-25-01	5341.48	Max WS	12.68	70.47	75.27		75.28	0.000003	0.12	102.87	36.02	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	216.7	68.9	74.91		74.96	0.000585	1.82	119.22	39.67	0.18
P118-25-01	P118-25-01	4162.47	Max WS	236.63	69.44	74.72		74.77	0.000554	1.82	129.72	41.33	0.18
P118-25-01	P118-25-01	4134.04	Max WS	241.67	69.38	74.7	71.73	74.76	0.000555	1.83	132.33	42.28	0.18
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	241.63	69.25	74.65		74.7	0.000542	1.81	133.27	42.2	0.18
P118-25-01	P118-25-01	4047.7	Max WS	241.88	69.28	74.63		74.68	0.000524	1.81	133.95	41.38	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	260.03	67.84	74.44		74.48	0.000371	1.63	159.22	43.72	0.15
P118-25-01	P118-25-01	3312.44	Max WS	263.6	67.48	74.34		74.38	0.000303	1.47	179.45	50.13	0.14
P118-25-01	P118-25-01	3014.68	Max WS	247.62	67.53	74.27		74.3	0.00021	1.32	187.35	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	245.85	67.71	74.26		74.28	0.000196	1.28	192.3	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	206.09	66.67	74.25		74.27	0.000125	1.05	195.34	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	206.56	66.5	74.08		74.24	0.003405	3.24	63.66	29.03	0.39
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	203.6	66.31	73.3		73.5	0.00085	3.59	56.73	34.33	0.25
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	206.4	66.04	73.39		73.43	0.000394	1.74	118.77	28.75	0.15
P118-25-01	P118-25-01	1881.88	Max WS	220.2	65.57	73.08		73.14	0.000564	1.97	111.71	30.63	0.18
P118-25-01	P118-25-01	1384.48	Max WS	219.82	66.19	72.84		72.89	0.000434	1.76	124.57	33.31	0.16
P118-25-01	P118-25-01	1245.83	Max WS	220.46	66.34	72.78		72.83	0.000444	1.83	120.62	30.77	0.16
P118-25-01	P118-25-01	584.11	Max WS	144.97	65.88	72.65		72.67	0.000112	1.01	143.65	29.02	0.08
P118-25-01	P118-25-01	60.05	Max WS	124.28	63.5	72.62		72.63	0.000062	0.8	156.17	27.03	0.06

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.93		76.11	0.002629	4.25	3437.08	1384.28	0.25
P118-00-00	P118-R3-2	71854.2	Max WS	6303.59	57.83	75.17		75.35	0.00035	3.63	4441.42	2178.57	0.2
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	4957.36	55.05	74.86		74.98	0.000197	2.85	2455.74	447.2	0.15
P118-00-00	P118-R3-2	69527.2	Max WS	4435.08	55.28	74.73		74.81	0.000116	2.39	3069.67	520	0.12
P118-00-00	P118-R3-2	68670	Max WS	3670.62	54.88	74.61		74.72	0.000162	2.79	2117.47	309.65	0.14
P118-00-00	P118-R3-2	68500	Lat Struct										
P118-00-00	P118-R3-2	68133	Max WS	3371.99	54.47	74.56		74.65	0.000126	2.62	2249.63	369.7	0.12
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2943.54	54.14	74.5		74.58	0.000131	2.5	2276.48	365.8	0.12
P118-00-00	P118-R3-2	66869	Max WS	2739.09	53.96	74.4		74.49	0.000187	2.46	1428.57	211.19	0.14
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2794.24	53.79	74.39		74.46	0.000145	2.18	1497.95	201.48	0.13
P118-00-00	P118-R3-2	66300	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2648.51	53.6	74.35		74.41	0.00009	2.22	2017.41	227.52	0.1
P118-00-00	P118-R3-2	65955.8	Max WS	2516.73	53.52	74.35		74.38	0.000077	1.67	2119.8	278.2	0.09
P118-00-00	P118-R3-2	65434.6	Max WS	2192.88	53.1	74.32		74.36	0.000067	1.81	2008.97	214.6	0.08
P118-00-00	P118-R3-2	64399.74	Max WS	3697.01	52.59	74.05		74.18	0.000175	3.08	1788.44	206.63	0.14
P118-00-00	P118-R3-2	64273.7	Max WS	3545.28	53.55	74.16	61.44	74.23	0.000107	2.21	1859	218.1	0.11
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3545.28	53.3	74.07		74.14	0.000105	2.21	1746.73	173.2	0.11
P118-00-00	P118-R3-2	64200	Max WS	3535.31	53.3	74.08		74.15	0.000104	2.2	1747.91	173.2	0.11
P118-00-00	P118-R2-2	64100	Max WS	6630.62	52.61	73.95		74.08	0.000136	2.93	2397.92	9512.23	0.13
P118-00-00	P118-R2-2	64094	Max WS	6053.74	52.61	74	61.03	74.11	0.000112	2.67	2407.43	9528.17	0.12
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	6053.74	52.56	73.91		74.02	0.000113	2.68	2400.52	9516.21	0.12
P118-00-00	P118-R2-2	64010.4	Max WS	8357.34	52.78	73.8	65.03	73.8	0.000025	1.22	37651.78	9537.92	0.06
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	7417.23	53.04	71.83		72.35	0.000714	5.86	1425.5	8921.9	0.29
P118-00-00	P118-R2-2	63959.7	Max WS	7480.07	53.06	72.09	61.8	72.31	0.000281	3.73	2064.43	8990.28	0.19
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	7430.94	53.16	71.95		72.37	0.000296	3.8	2013.26	8867.21	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	7220.94	52.4	71.54		72.18	0.001078	6.64	1480.27	205	0.35
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	5290.56	50.35	71.36		71.69	0.00051	4.67	1388.68	185	0.24
P118-00-00	P118-R2-2	61905.2	Max WS	4143.01	50.77	71.24		71.37	0.000208	2.83	1464.31	132.2	0.15
P118-00-00	P118-R2-2	60625.3	Max WS	3939.99	49.52	71.14		71.25	0.000166	2.64	1489.76	121.4	0.13
P118-00-00	P118-R2-1	60595.74	Max WS	3674.84	49.48	71		71.12	0.000141	2.87	1447.69	131.55	0.13
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3705.7	49.68	71		71.1	0.000121	2.68	1546.21	139.91	0.12
P118-00-00	P118-R2-1	60571.6*	Max WS	3727.76	49.89	71		71.09	0.000106	2.51	1642.12	148.28	0.12
P118-00-00	P118-R2-1	60559.5*	Max WS	3742.03	50.09	71		71.08	0.000094	2.36	1735.92	156.63	0.11
P118-00-00	P118-R2-1	60547.5*	Max WS	3754.62	50.3	70.99		71.07	0.000084	2.23	1826.76	165	0.1
P118-00-00	P118-R2-1	60535.46	Max WS	3761.47	50.5	70.99		71.06	0.000077	2.12	1915.57	173.36	0.1
P118-00-00	P118-R2-1	60396.4*	Max WS	3759.14	50.45	70.99		71.05	0.000076	2.08	1938.09	174.32	0.1
P118-00-00	P118-R2-1	60257.3*	Max WS	3759.65	50.4	70.98		71.05	0.000075	2.05	1961.6	175.28	0.1
P118-00-00	P118-R2-1	60118.3*	Max WS	3755.66	50.35	70.98		71.04	0.000074	2.01	1987.39	176.25	0.1
P118-00-00	P118-R2-1	59979.2*	Max WS	3754.34	50.3	70.97		71.03	0.000073	1.98	2014.55	177.2	0.1
P118-00-00	P118-R2-1	59840.2*	Max WS	3760.1	50.25	70.97		71.02	0.000071	1.94	2043.38	178.16	0.09
P118-00-00	P118-R2-1	59701.1*	Max WS	3764.12	50.2	70.96		71.02	0.000069	1.91	2074.47	179.13	0.09
P118-00-00	P118-R2-1	59562.1*	Max WS	3771.63	50.15	70.96		71.01	0.000067	1.87	2106.67	180.09	0.09
P118-00-00	P118-R2-1	59423.1	Max WS	3778.34	50.1	70.95		71	0.000073	1.91	2139.84	181.05	0.09
P118-00-00	P118-R2-1	59307.4*	Max WS	3804.27	50.1	70.94		71	0.000071	1.87	2238.03	196.49	0.09
P118-00-00	P118-R2-1	59191.8*	Max WS	3830.2	50.11	70.94		70.99	0.000069	1.84	2328.92	211.94	0.09
P118-00-00	P118-R2-1	59076.2*	Max WS	3860.04	50.11	70.93		70.98	0.000067	1.81	2413.88	227.38	0.09
P118-00-00	P118-R2-1	58960.5*	Max WS	3898.48	50.11	70.93		70.98	0.000062	1.75	2491.95	242.82	0.09
P118-00-00	P118-R2-1	58844.9*	Max WS	3928.99	50.11	70.93		70.97	0.00006	1.72	2563.15	258.26	0.09
P118-00-00	P118-R2-1	58729.3*	Max WS	3964	50.12	70.92		70.97	0.000059	1.7	2626.91	273.71	0.08
P118-00-00	P118-R2-1	58613.7	Max WS	4006.04	50.12	70.92		70.96	0.000057	1.68	2684.06	289.15	0.08
P118-00-00	P118-R2-1	58463.86	Max WS	5896.48	47.59	70.92		70.92	0.00002	1.11	26033.28	5991.93	0.05
P118-00-00	P118-R2-1	58387.5	Max WS	5882.14	47.57	65.01	58.28	65.33	0.000055	4.57	1826.12	767.08	0.25
P118-00-00	P118-R2-1	58359.5 ALDINE-WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	5882.14	47.51	64.9		65.22	0.0000561	4.6	1787.71	734.59	0.26
P118-00-00	P118-R2-1	57555.5	Max WS	5882.13	47.03	64.03	56.85	64.67	0.001094	6.47	1222.6	877.93	0.34
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	4099.85	46.03	63.7		63.99	0.0000505	4.31	1058.44	337.57	0.23
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	4099.56	44.69	63.12		63.46	0.000667	4.72	1247.69	499.83	0.26
P118-00-00	P118-R2-1	55000	Lat Struct										
P118-00-00	P118-R2-1	54459.2	Max WS	5177.45	44.27	61.9		62.44	0.000944	5.9	900.79	183.74	0.32

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-00-00	P118-R2-1	53881	Lat Struct										
P118-00-00	P118-R2-1	53801.7	Max WS	5947.8	43.7	61.72		61.91	0.000313	3.43	1752.27	280.74	0.19
P118-00-00	P118-R2-1	53275.7	Max WS	5971.98	43.36	61.51		61.75	0.000281	3.9	1539.58	143.2	0.18
P118-00-00	P118-R2-1	52844.3	Max WS	6137.53	43.08	61.44	50.97	61.62	0.000253	3.45	1815.22	175.71	0.18
P118-00-00	P118-R2-1	52815.3	BERTRAND RD										
P118-00-00	P118-R2-1	52786.3	Max WS	6137.42	43.01	61.36		61.54	0.000254	3.45	1813.74	175.58	0.18
P118-00-00	P118-R2-1	52465.7	Max WS	6137.07	43.2	61.13		61.42	0.000517	4.31	1440.59	255.29	0.24
P118-00-00	P118-R2-1	52221.3	Max WS	6136.86	43.89	60.93	54.01	61.28	0.000678	4.73	1319.16	201.65	0.27
P118-00-00	P118-R2-1	52207.8	UTILITY										
P118-00-00	P118-R2-1	52194.3	Max WS	6136.58	43.8	60.87		61.22	0.000672	4.72	1325.21	203.15	0.27
P118-00-00	P118-R2-1	51283.9	Max WS	6134.81	43.41	60.16		60.55	0.000795	5.02	1451.2	519.58	0.29
P118-00-00	P118-R2-1	51096.9	Max WS	6134.41	42.91	60.08	51.25	60.41	0.000571	4.68	1693.28	749.82	0.25
P118-00-00	P118-R2-1	51083.9	UTILITY										
P118-00-00	P118-R2-1	51070.9	Max WS	6134.22	42.87	60.03		60.37	0.000571	4.68	1690.88	747.9	0.25
P118-00-00	P118-R2-1	50549.6	Max WS	6133.79	42.3	59.88		60.1	0.00037	3.79	2123.81	1690.91	0.21
P118-00-00	P118-R2-1	50021.9	Max WS	6133.3	41.83	59.71	50.45	59.91	0.000325	3.62	2724.67	2681.63	0.2
P118-00-00	P118-R2-1	49980.9	HOPPER RD										
P118-00-00	P118-R2-1	49939.9	Max WS	6132.2	41.69	59.53		59.73	0.00033	3.64	2627.91	2548.52	0.2
P118-00-00	P118-R2-1	49231.7	Max WS	6130.78	41.03	59.1		59.43	0.000584	4.7	2198.98	2455.93	0.27
P118-00-00	P118-R2-1	48480.5	Max WS	5707.2	41.23	58.73		58.93	0.000375	3.73	2902.23	2395.14	0.21
P118-00-00	P118-R2-1	48196.5	Max WS	5707.19	41.31	58.6	50.61	58.82	0.000427	3.85	3083.87	2647.09	0.22
P118-00-00	P118-R2-1	48183.0	UTILITY										
P118-00-00	P118-R2-1	48169.5	Max WS	5707.19	41.24	58.56		58.77	0.00042	3.82	3152.32	2713.6	0.22
P118-00-00	P118-R2-1	47607.9	Max WS	5706.72	40.57	58.28		58.52	0.000542	4.2	3153.54	2504.27	0.24
P118-00-00	P118-R2-1	46939	Max WS	5704.77	40.79	57.99		58.13	0.000317	3.13	4137.67	2654.07	0.19
P118-00-00	P118-R2-1	46594.8	Max WS	5702.33	40.91	57.86	48.94	58.05	0.000277	3.65	5859.12	4057.58	0.18
P118-00-00	P118-R2-1	46584.8											
P118-00-00	P118-R2-1	46579.8	Max WS	5702.55	40.91	57.85		58.04	0.000336	3.55	4248.76	3704.76	0.2
P118-00-00	P118-R2-1	46575.8	Max WS	5702.33	40.91	57.84	48.95	58.04	0.000355	3.65	3116.86	2702.7	0.2
P118-00-00	P118-R2-1	46560.8	LITTLE YORK RD										
P118-00-00	P118-R2-1	46526.8	Max WS	5701.41	40.74	57.81		57.98	0.000288	3.49	6179.73	4485.58	0.18
P118-00-00	P118-R2-1	46516.8	Max WS	5701.4	40.74	57.81	48.79	57.96	0.000332	3.31	6253.99	4116.05	0.19
P118-00-00	P118-R2-1	46515.8											
P118-00-00	P118-R2-1	46478.9	Max WS	5698.94	40.49	57.66		57.87	0.000431	3.75	4152.33	3788.5	0.22
P118-00-00	P118-R2-1	46468.9	Max WS	5698.65	40.49	57.65	50.18	57.86	0.000432	3.75	4135.31	3770.73	0.22
P118-00-00	P118-R2-1	46466.8											
P118-00-00	P118-R2-1	46458.9	Max WS	5698.55	40.49	57.64		57.85	0.000435	3.76	4092.17	3726.28	0.22
P118-00-00	P118-R2-1	45952.3	Max WS	5689.67	40.12	57.39		57.57	0.000638	3.82	4993.86	3927.45	0.25
P118-00-00	P118-R2-1	45161.4	Max WS	5664.76	39.57	56.96		57.13	0.000568	3.72	5079.46	3267.76	0.22
P118-00-00	P118-R2-1	44549.9	Max WS	5644.16	38.76	56.73		56.88	0.000425	3.32	4868.36	3386.22	0.19
P118-00-00	P118-R2-1	44143.3	Max WS	5629.99	38.22	56.62		56.74	0.000351	3.08	5235.55	3667.51	0.17
P118-00-00	P118-R2-1	43789.5	Max WS	5805.66	37.97	56.59		56.6	0.000038	1.73	13313.54	4162.18	0.07
P118-00-00	P118-R2-1	43739.48	Max WS	5804.92	37.93	56.58		56.61	0.000048	1.95	10033.51	3745.63	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	5805.28	37.87	56.58		56.6	0.00004	1.79	11596.45	3899.18	0.08
P118-00-00	P118-R2-1	43564.8*	Max WS	5804.07	37.81	56.58		56.59	0.00003	1.55	13309.7	4158.13	0.07
P118-00-00	P118-R2-1	43477.4*	Max WS	5805.23	37.75	56.58		56.59	0.000021	1.31	15035.81	4200.21	0.05
P118-00-00	P118-R2-1	43390.1*	Max WS	5804.8	37.68	56.58		56.59	0.000015	1.09	16695.99	4181.59	0.05
P118-00-00	P118-R2-1	43302.8*	Max WS	5803.97	37.62	56.58		56.59	0.000009	0.87	18372.9	4083.98	0.04
P118-00-00	P118-R2-1	43215.5	Max WS	5805.21	37.56	56.58		56.59	0.000007	0.76	19570.82	4055.17	0.03
P118-00-00	P118-R2-1	43118.0*	Max WS	5855.91	37.49	56.58		56.59	0.000011	0.93	18327.99	3937.15	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	5854.63	37.42	56.58		56.59	0.000013	1.05	17014.03	4194.14	0.04
P118-00-00	P118-R2-1	42922.9*	Max WS	5854.57	37.35	56.58		56.58	0.000016	1.14	15960.76	4036.17	0.05
P118-00-00	P118-R2-1	42825.49	Max WS	5853.6	37.28	56.58		56.58	0.000018	1.22	14984.68	4001.99	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	5855	37.22	56.58		56.58	0.000017	1.18	15363.61	4000.69	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	5853.51	37.15	56.57		56.58	0.000015	1.11	15782.83	3997.13	0.05
P118-00-00	P118-R2-1	42559.6*	Max WS	5852.93	37.09	56.57		56.58	0.000012	0.99	16143.9	3995.38	0.04
P118-00-00	P118-R2-1	42471	Max WS	5853.97	37.03	56.57		56.58	0.000006	0.71	16138.78	3936.75	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	5852.35	36.98	56.57		56.58	0.000008	0.8	16244.92	3744.52	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	5852.3	36.92	56.57		56.58	0.000005	0.63	17117.07	3696.62	0.03
P118-00-00	P118-R2-1	42245.55	Max WS	5852.84	36.87	56.57		56.58	0.000002	0.37	17466.82	3678.83	0.02
P118-00-00	P118-R2-1	42150.1*	Max WS	5852.23	36.8	56.57		56.58	0.000006	0.71	16304.83	3594.43	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	5853.9	36.74	56.57		56.58	0.000008	0.84	14624.45	3526.85	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	5852.78	36.67	56.57		56.58	0.00001	0.91	13155.65	3511.45	0.04
P118-00-00	P118-R2-1	41863.8	Max WS	5853.34	36.6	56.57		56.57	0.000009	0.91	13281.23	3438.72	0.04
P118-00-00	P118-R2-1	41771.7*	Max WS	5853.3	36.53	56.57		56.57	0.000014	1.09	13151.57	3434.22	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	5851.5	36.47	56.57		56.57	0.000016	1.19	12974.64	3444.71	0.05
P118-00-00	P118-R2-1	41587.5*	Max WS	5851.48	36.4	56.56		56.57	0.000019	1.29	12720.88	3448.13	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	5849.58	36.34	56.56		56.57	0.00002	1.34	12671.62	3595.41	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	5848.92	36.27	56.56		56.57	0.000019	1.3	12809.57	3763.39	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	5812.65	36.27	56.46	43.57	56.84	0.000011	5.04	2291.15	3710.36	0.2
P118-00-00	P118-R2-1	41243.9	JENSEN DR										
P118-00-00	P118-R2-1	41203.4	Max WS	5849.43	36.25	56.56		56.78	0.000008	4.18	2376.43	3832.12	0.17
P118-00-00	P118-R2-1	41197.4	Max WS	5812.62	36.25	56.46	43.55	56.83	0.000011	5.01	2326.23	3628.64	0.2

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge										
P118-00-00	P118-R2-1	41185.7	Max WS	5775.26	36.25	56.36		56.75	0.000006	5.05	7284.25	3582.72	0.2
P118-00-00	P118-R2-1	40951.8	Max WS	5809.98	36.2	56.45	42.15	56.54	0.000006	2.38	7872.88	3293.6	0.1
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40886.8	Max WS	5811.41	36.19	56.45		56.53	0.000006	2.32	7663.57	3244.92	0.1
P118-00-00	P118-R2-1	40846.9	Max WS	5808.55	36.18	56.44	42.97	56.55	0.000009	2.67	8313.18	3579.47	0.12
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge										
P118-00-00	P118-R2-1	40605.5	Max WS	5803.61	36.13	56.43		56.53	0.000009	2.67	7927.69	3435.26	0.12
P118-00-00	P118-R2-1	40584.6	Max WS	5804.33	36.13	56.43	42.93	56.53	0.00001	2.58	7011.82	3171.78	0.13
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40515.6	Max WS	5801.47	36.12	56.41		56.51	0.00001	2.56	7929.19	3480.11	0.12
P118-00-00	P118-R2-1	39969.8	Max WS	5796.16	36.01	56.4		56.5	0.000019	2.75	9188.54	4187.06	0.13
P118-00-00	P118-R2-1	39829.91	Max WS	7471.88	36	56.38		56.46	0.000394	2.9	7640.87	3866.76	0.17
P118-00-00	P118-R2-1	39188.6	Max WS	7456.05	35.6	56.14		56.26	0.000462	3.58	7801.44	4083.38	0.18
P118-00-00	P118-R2-1	38423.57	Max WS	7930.3	34.76	55.82		55.96	0.00048	3.89	6609.72	2587.39	0.19
P118-00-00	P118-R2-1	38170.2	Max WS	7925.1	34.35	55.74		55.87	0.000376	3.48	7266.03	2903.21	0.17
P118-00-00	P118-R2-1	37899.37	Max WS	7921.89	34.35	55.68		55.8	0.000321	3.4	7232.48	3076.06	0.16
P118-00-00	P118-R2-1	37413.16	Max WS	7910.46	34.13	55.57		55.74	0.000448	3.94	6283.67	2929.84	0.18
P118-00-00	P118-R2-1	37258.6	Max WS	7901.7	34.02	55.5		55.68	0.000487	4.1	6293.91	2692.31	0.19
P118-00-00	P118-R2-1	36408.6	Max WS	7849.96	32.39	55.28		55.39	0.000448	3.41	7560.78	3231.63	0.18
P118-00-00	P118-R2-1	36341.47	Max WS	7847.07	32.39	55.25	45.94	55.36	0.000459	3.44	7252.59	2884.79	0.18
P118-00-00	P118-R2-1	36330 UTILITY	Bridge										
P118-00-00	P118-R2-1	36321.56	Max WS	7845.78	32	55.21		55.32	0.000272	3.14	7438.68	2727.73	0.14
P118-00-00	P118-R2-1	36303.5	Max WS	7845.75	32	55.21		55.31	0.000232	2.94	7622.01	2776.72	0.13
P118-00-00	P118-R1-3	36195.78	Max WS	9340.3	32.04	55.08		55.27	0.000392	3.87	6331.62	2068.29	0.17
P118-00-00	P118-R1-3	36107.2	Max WS	9340.24	32	55.05		55.23	0.000387	3.85	6191.11	1783.11	0.17
P118-00-00	P118-R1-3	35434.7	Max WS	9339.42	31.72	54.79		55.07	0.000458	4.38	4930	1473.32	0.19
P118-00-00	P118-R1-3	35045.7	Max WS	9338.9	31.55	54.58	41.62	54.9	0.000509	4.58	3678.89	1116.85	0.2
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge										
P118-00-00	P118-R1-3	35006.1	Max WS	9337.61	31.09	54.45		54.75	0.000473	4.48	4073.14	1243.41	0.19
P118-00-00	P118-R1-3	34984.3	Max WS	9337.35	30.53	54.42	42.58	54.77	0.000585	4.92	3450.38	1019.16	0.22
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge										
P118-00-00	P118-R1-3	34870.3	Max WS	9334.72	30	54.16		54.49	0.000548	4.81	3758.14	1099.59	0.21
P118-00-00	P118-R1-3	33920.1	Max WS	9412.25	29.63	53.44		53.86	0.000893	5.69	3887.04	1352.57	0.25
P118-00-00	P118-R1-3	32749.8	Max WS	9504.43	28	52.32		52.78	0.00098	5.85	3459.29	1104.04	0.27
P118-00-00	P118-R1-3	31824.3	Max WS	9573.86	26.81	51.58		51.97	0.000699	5.29	3742.37	1375.55	0.23
P118-00-00	P118-R1-3	30679.1	Max WS	9645.98	27.05	50.75		51.18	0.000741	5.49	3607.76	1494.52	0.24
P118-00-00	P118-R1-3	30678.1	Lat Struct										
P118-00-00	P118-R1-3	30099.1	Max WS	9638.42	27.23	50.5		50.81	0.000443	4.64	3822.67	1376.2	0.19
P118-00-00	P118-R1-3	29757.8	Max WS	9657.86	27.34	50.31	38	50.66	0.000496	4.85	4451.21	1956.93	0.2
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge										
P118-00-00	P118-R1-3	29704.8	Max WS	9632.98	27	50.1		50.38	0.000423	4.5	4710.2	2099.12	0.19
P118-00-00	P118-R1-3	28983.7	Max WS	9539.64	26.97	49.5		50.04	0.000953	6.1	2596.97	1167.18	0.27
P118-00-00	P118-R1-3	28587.3	Max WS	10612.85	26.04	49.19		49.52	0.000481	4.76	3630.82	1211.4	0.2
P118-00-00	P118-R1-3	27992	Max WS	10630.33	25.42	49		49.34	0.000564	5.09	4338.76	827.78	0.21
P118-00-00	P118-R1-3	27567.7	Max WS	10625.33	25.74	48.82		49.13	0.000436	4.83	4633.73	1196.53	0.19
P118-00-00	P118-R1-3	27317	Max WS	10623.4	25.92	48.73	36.92	49.02	0.00044	4.78	5535.5	2162.15	0.19
P118-00-00	P118-R1-3	27306.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27305.8	Max WS	10599.16	25.93	48.41		48.83	0.00057	5.42	4897.95	2040.7	0.22
P118-00-00	P118-R1-3	27295.8	Max WS	10598.18	25.93	48.4	36.76	48.83	0.000571	5.42	4885.64	2038.09	0.22
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge										
P118-00-00	P118-R1-3	27189.8	Max WS	10535.13	25.89	47.84		48.33	0.000654	5.7	3900.18	1631.11	0.24
P118-00-00	P118-R1-3	27180.8	Max WS	10535.76	25.89	47.84	36.69	48.32	0.000655	5.7	3889.89	1629.23	0.24
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27167.5	Max WS	10546.46	25.84	47.92		48.24	0.000463	4.74	3993.26	1712.79	0.2
P118-00-00	P118-R1-3	26816.8*	Max WS	10518.39	25.02	47.73		48.05	0.000498	4.67	3153.37	1049.79	0.2
P118-00-00	P118-R1-3	26815.8	Lat Struct										
P118-00-00	P118-R1-3	26466.1	Max WS	10446	24.2	47.56		47.88	0.000568	4.6	2852.33	629.78	0.21
P118-00-00	P118-R1-3	26224.4*	Max WS	10542.89	23.64	47.43		47.74	0.000531	4.54	2725.63	282.06	0.2
P118-00-00	P118-R1-3	25982.8	Max WS	10575.91	23.07	47.32		47.62	0.00048	4.4	2903.16	349.42	0.2
P118-00-00	P118-R1-3	25318.4	Max WS	10514.8	23.07	47.02		47.29	0.000478	4.34	3139.24	514.71	0.19
P118-00-00	P118-R1-3	25317.4	Lat Struct										
P118-00-00	P118-R1-3	24564.2	Max WS	10363.17	21.76	46.67		46.95	0.000399	4.34	3447.38	1047.74	0.18
P118-00-00	P118-R1-3	23984.6	Max WS	12278.24	20.75	46.41		46.69	0.00041	4.5	4344.31	543.17	0.19
P118-00-00	P118-R1-2	23796.2	Max WS	12861.06	24.42	46.3		46.61	0.000382	4.58	3671.14	691.59	0.2
P118-00-00	P118-R1-2	23795.2	Lat Struct										
P118-00-00	P118-R1-2	23286.2	Max WS	12936.83	20.82	45.99		46.37	0.000601	4.99	3274.47	514.39	0.22
P118-00-00	P118-R1-2	22973.4	Max WS	12936.65	20.85	45.84	32.78	46.19	0.000526	4.78	5777.69	1441.2	0.21
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22929.4	Max WS	12936.56	20.49	45.45		45.81	0.000534	4.81	5677.59	1140.98	0.21
P118-00-00	P118-R1-2	22928.4	Lat Struct										
P118-00-00	P118-R1-2	22630.3	Max WS	12888.54	19.11	44.99	34.41	45.65	0.001308	6.5	1989.3	162.9	0.31
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge										

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R1-2	22587.7	Max WS	12887.68	18.99	44.6		45.29	0.001402	6.64	1947.61	161.15	0.32
P118-00-00	P118-R1-2	22577.7	Max WS	12887.68	18.99	44.59		45.28	0.001407	6.65	1946.68	164.9	0.32
P118-00-00	P118-R1-1	22186.8	Max WS	12052.75	18.55	44.18		44.79	0.000905	6.32	2181.93	247.46	0.26
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	12090.92	18.16	44.24		44.5	0.00035	4.12	3322.32	316.35	0.17
P118-00-00	P118-R1-1	21589.8	Max WS	13728.89	17.9	43.77		44.35	0.000745	6.34	2663.62	227.76	0.25
P118-00-00	P118-R1-1	21362	Max WS	13719.61	17.65	43.55		44.26	0.000071	6.8	2564.67	322.01	0.27
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	13720.23	17.65	43.55	32.03	44.25	0.000071	6.8	2563.27	321.29	0.27
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	13715.95	17.62	43.47		44.18	0.000072	6.81	2547.72	313.15	0.27
P118-00-00	P118-R1-1	21010.4	Max WS	13720.16	18.08	43.56	30.31	44.06	0.000615	6.43	3859.05	437.43	0.23
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	13715.4	17.96	43.44		43.94	0.000615	6.43	3857.25	435.83	0.23
P118-00-00	P118-R1-1	20880.6	Max WS	13700.03	17.96	43.01	32.89	44.27	0.000119	9.48	3165.2	269.26	0.36
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	13697.66	17.96	42.97		44.24	0.00012	9.5	3155.32	268.67	0.36
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	13323.67	19.24	42.6		43.41	0.001284	7.36	2217.55	544.85	0.32
P118-00-00	P118-R1-1	18597.4	Max WS	14361	15.56	41.2		41.97	0.000837	7.3	2644.64	201.09	0.28
P118-00-00	P118-R1-1	18107.1	Max WS	14364.28	15.21	41.15		41.48	0.00063	4.63	3780.62	333.43	0.22
P118-00-00	P118-R1-1	17862.9*	Max WS	14361.14	14.55	41.05		41.35	0.000492	4.43	3376.87	345.5	0.2
P118-00-00	P118-R1-1	17618.7*	Max WS	14376.02	13.89	40.97		41.26	0.000411	4.34	3542.04	358.38	0.18
P118-00-00	P118-R1-1	17374.5*	Max WS	14451.86	13.23	40.85		41.15	0.000375	4.39	3471.46	298.89	0.18
P118-00-00	P118-R1-1	17130.3	Max WS	14723.48	12.57	40.74		41.05	0.000367	4.55	3495.94	299.95	0.18
P118-00-00	P118-R1-1	16004	Max WS	15535.45	11.24	40.24		40.56	0.000462	4.55	3772.11	694.24	0.19
P118-00-00	P118-R1-1	15045.6	Max WS	16402.04	10.55	39.41		39.94	0.000785	5.89	3055.55	367.96	0.25
P118-00-00	P118-R1-1	13937.2	Max WS	16400.53	11.62	38.85		39.27	0.000552	5.84	5538.71	599.98	0.22
P118-00-00	P118-R1-1	13341.9	Max WS	16399.98	10.38	38.38		38.94	0.000786	6.96	4412.06	387.44	0.26
P118-00-00	P118-R1-1	12945.5	Max WS	16399.79	9.55	38.26	27.31	38.59	0.000496	5.67	5922.78	607.51	0.21
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	16399.58	9.53	38.12		38.46	0.000509	5.72	5850.3	598.38	0.21
P118-00-00	P118-R1-1	12931.7	Max WS	16399.58	9.53	38.12	27.28	38.46	0.000509	5.72	5849.98	598.34	0.21
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	16398.87	8.77	37.28		37.62	0.000517	5.75	5802.67	592.24	0.21
P118-00-00	P118-R1-1	12117.3	Max WS	16398.68	7.23	36.88		37.25	0.0004	5.34	4216.33	351.78	0.19
P118-00-00	P118-R1-1	10905.1	Max WS	18002.29	9.54	35.68		36.46	0.000945	7.3	3449.39	355.75	0.29
P118-00-00	P118-R1-1	9879.2	Max WS	17986.42	6.26	34.19		35.35	0.001519	9.37	3197.46	246.93	0.36
P118-00-00	P118-R1-1	8777	Max WS	17980.85	4.71	33.6		33.78	0.000344	4.16	9526.66	874.25	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	17977.62	4.73	33.17		33.53	0.000481	5.39	5911.7	426.91	0.21
P118-00-00	P118-R1-1	6779.3	Max WS	17974.24	4.44	32.37		32.84	0.000684	5.89	5176.66	514.61	0.24
P118-00-00	P118-R1-1	5748.4	Max WS	17969.11	4.27	30.96		31.94	0.001556	8.82	3947.54	429.39	0.35
P118-00-00	P118-R1-1	4492	Max WS	17965.28	1.92	29.66		30.26	0.000835	6.48	3912.03	396.53	0.26
P118-00-00	P118-R1-1	3597.9	Max WS	17963.97	2.46	28.96		29.52	0.000941	6.76	5008.84	546.74	0.28
P118-00-00	P118-R1-1	2709.4	Max WS	17963.15	1.59	28.07		28.7	0.000961	7.29	5108.26	479.68	0.29
P118-00-00	P118-R1-1	1695.9	Max WS	17962.8	1.52	26.8		27.63	0.001348	8.42	4313.3	372.42	0.33
P118-00-00	P118-R1-1	678.7	Max WS	17962.73	0.81	24.16	18.91	25.81	0.0028	10.79	2433.82	249.9	0.47
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.88		49.92	0.001603	1.58	18.97	16.71	0.26
P118-08-00	P118-08-00	7839.79	Max WS	29.99	47.55	49.35		49.37	0.00058	1.01	29.69	24.3	0.16
P118-08-00	P118-08-00	7820.27	Max WS	31.74	47.46	49.34	48.29	49.35	0.000738	1.06	30.06	27.7	0.18
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	31.73	47.58	49.23		49.26	0.001681	1.49	21.31	21.73	0.27
P118-08-00	P118-08-00	7729.04	Max WS	35.68	46.32	49.21		49.23	0.000177	0.98	36.39	38.02	0.1
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	35.68	46.88	49.2		49.22	0.000385	1.23	28.89	24.29	0.15
P118-08-00	P118-08-00	7550.89	Max WS	42.59	46.66	49.17		49.19	0.000414	1.06	40.01	88.66	0.14
P118-08-00	P118-08-00	6762.47	Max WS	123.79	44.81	48.52		48.58	0.00091	1.95	73.36	53.15	0.22
P118-08-00	P118-08-00	5858.77	Max WS	180.95	44.48	48.04		48.04	0.00024	1.04	760.84	1617.38	0.11
P118-08-00	P118-08-00	5845.88	Max WS	180.98	44.35	47.97		48.32	0.000333	4.76	45.14	1907.26	0.45
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	174.58	44.6	47.91		48.3	0.000414	5	34.88	2226.89	0.5
P118-08-00	P118-08-00	5748.41	Max WS	184.25	44.22	48.05		48.12	0.001131	2.31	173.96	2198.57	0.25
P118-08-00	P118-08-00	4837.06	Max WS	231.21	41.61	46.44		46.58	0.002257	3.02	76.67	1713.07	0.35
P118-08-00	P118-08-00	4823.61	Max WS	232.33	41.31	46.48		46.55	0.001415	2.21	150.22	1974.38	0.27
P118-08-00	P118-08-00	4767.88	Max WS	235.12	41.28	46.33		46.47	0.001859	3	83.73	1729.83	0.32
P118-08-00	P118-08-00	4732.44	Max WS	237.78	41.13	46.31		46.41	0.001005	2.48	104.26	1941.25	0.24
P118-08-00	P118-08-00	4289.14	Max WS	260.86	41.25	45.33		45.37	0.00338	3.97	77.1	1159.41	0.43
P118-08-00	P118-08-00	4255.48	Max WS	254.11	41.41	44.99	43.81	45.29	0.000475	4.39	57.84	1046.15	0.49
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	256.11	41.23	45.03		45.28	0.000406	4.01	63.89	2003.43	0.45
P118-08-00	P118-08-00	4159.81	Max WS	254.83	40.8	45.04		45.25	0.001504	3.66	69.7	1594.71	0.32
P118-08-00	P118-08-00	4083.03	Culvert										

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch. El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-08-00	P118-08-00	4007.74	Max WS	256.79	40.16	45.07		45.25	0.001129	3.37	76.12	305.2	0.28
P118-08-00	P118-08-00	3928.82	Max WS	271.16	38.97	45.09		45.13	0.000478	1.87	235.41	292.62	0.17
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	313.23	38.34	44.51		44.57	0.000643	2.18	282.17	401.6	0.2
P118-08-00	P118-08-00	2630.49	Max WS	92.01	37.06	44.29		44.3	0.000035	0.54	356.82	432.77	0.05
P118-08-00	P118-08-00	1901.01	Max WS	-351.62	35.97	44.33		44.36	0.000188	-1.41	799.34	1244.99	0.11
P118-08-00	P118-08-00	1219.08	Max WS	-759.8	33.28	44.46		44.52	0.000318	-2.05	735.08	1241.43	0.15
P118-08-00	P118-08-00	1186.93	Max WS	757.88	34.39	44.47		44.54	0.000402	-2.13	683.49	1214.71	0.17
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	-727.45	34.03	44.51		44.52	0.000182	-1.23	1286.71	746.09	0.11
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	-727.85	33.5	44.56		44.64	0.000766	-2.29	361.95	221.3	0.21
P118-08-00	P118-08-00	890.93	Max WS	-751.4	28.97	44.72		44.75	0.000163	-1.42	576	170.75	0.1
P118-08-00	P118-08-00	881.12	Max WS	-761.42	27.91	44.75		44.77	0.000085	-1.25	644.03	131.84	0.08
P118-08-00	P118-08-00	846.44	Max WS	774.67	26.44	44.76		44.79	0.000088	-1.27	633.85	128.99	0.08
P118-08-00	P118-08-00	68.07	Max WS	-834.27	23.63	44.79		44.79	0.00001	-0.64	1526.18	191.16	0.03
P118-09-00	P118-09-00	8416.71	Max WS	167.45	52.44	57.93		57.96	0.002166	1.43	129.46	75.97	0.14
P118-09-00	P118-09-00	8415.71	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	158.25	51.25	57.5		57.52	0.000231	1.24	132.55	123.39	0.12
P118-09-00	P118-09-00	7947.1	Max WS	264.3	50.5	56.97		57.45	0.000235	5.57	47.49	37.31	0.4
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	279.42	50.64	56.63		56.81	0.000166	4.21	404.19	161.75	0.32
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	284.89	50.66	56.66		56.67	0.000166	0.95	648.44	186.46	0.1
P118-09-00	P118-09-00	7037.08	Max WS	363.37	50.59	56.19		56.28	0.001105	2.52	307.83	589.71	0.26
P118-09-00	P118-09-00	6335.17	Max WS	407.47	50.38	55.65		55.67	0.000486	1.53	825.17	1177.89	0.2
P118-09-00	P118-09-00	6241.34	Max WS	406.38	49.73	55.58		55.75	0.000158	4.04	714.58	832.68	0.32
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	405.94	49.91	55.45		55.73	0.000219	4.72	436.93	459.73	0.38
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	390.54	49.94	55.49		55.56	0.001008	2.54	386.74	366.68	0.24
P118-09-00	P118-09-00	6006.93	Max WS	382.37	49.66	55.38		55.43	0.000847	2.24	419.78	448.32	0.22
P118-09-00	P118-09-00	5998.6	Max WS	384.24	49.63	55.36		55.42	0.000904	2.31	437.83	590.05	0.23
P118-09-00	P118-09-00	5978.1	Max WS	390.51	49.66	55.36		55.37	0.000286	1.29	1096.27	1078.69	0.13
P118-09-00	P118-09-00	5970.8	Max WS	392.94	49.74	55.36		55.37	0.000155	0.92	1452.75	1133.15	0.09
P118-09-00	P118-09-00	5869.16	Max WS	408.95	49.31	55.35		55.35	0.000163	1.01	1430.59	1090.21	0.1
P118-09-00	P118-09-00	5818.16	Max WS	412.13	49.47	55.34		55.37	0.000169	2.26	1283.52	1121.24	0.28
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	412.11	49.13	55.32		55.41	0.000484	3.28	743.99	1165.43	0.46
P118-09-00	P118-09-00	5685.64	Max WS	415.71	49.01	55.3		55.35	0.000694	2.16	619.66	909.83	0.2
P118-09-00	P118-09-00	4961.22	Max WS	441.23	47.46	54.91		54.99	0.000768	2.49	308.1	267.66	0.22
P118-09-00	P118-09-00	4862.39	Max WS	448.89	47.3	54.82		54.98	0.000426	3.36	236.19	271.49	0.44
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	448.89	47.66	54.77		55.01	0.000578	4.04	222.67	336.17	0.52
P118-09-00	P118-09-00	4717.67	Max WS	457.21	47.29	54.76		54.9	0.001164	3.04	173.72	384.38	0.27
P118-09-00	P118-09-00	4354.22	Max WS	520.04	46.81	54.26		54.42	0.001235	3.24	185.68	118.92	0.28
P118-09-00	P118-09-00	4232.29	Max WS	418.67	45.84	53.6		54.11	0.000201	5.78	77.5	71.94	0.38
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	468.74	45.75	51.96		53.2	0.000763	8.93	52.48	22.38	0.69
P118-09-00	P118-09-00	4101.99	Max WS	549.69	46.19	52.61		53.41	0.000986	7.18	76.57	23.78	0.71
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	113.88	45.18	51.75		51.78	0.000044	1.51	124.39	69.5	0.15
P118-09-00	P118-09-00	3214.67	Max WS	677.13	43.86	51.47	49.73	51.97	0.000494	5.79	248.72	327.93	0.52
P118-09-00	P118-09-00	3131.26	Max WS	687.01	43.6	50.85		52.53	0.000827	10.48	111.4	175.85	0.73
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	305.14	43.59	48.03		49.28	0.001421	8.98	33.96	14.53	0.86
P118-09-00	P118-09-00	2939.54	Max WS	694.55	43.48	49.08	49.59	51.24	0.003101	11.79	58.89	20.43	1.22
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	755.8	42.41	48.65	48.06	49.6	0.001071	8.08	164.04	85.15	0.75
P118-09-00	P118-09-00	1673	Max WS	733.75	39.78	48.37		48.63	0.00038	4.65	692.45	663.44	0.44
P118-09-00	P118-09-00	1610.87	Max WS	667.62	39.04	48.34		48.73	0.000136	5.54	762.33	876.35	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	647.45	38	47.88	43.24	48.4	0.000156	5.95	299.13	350.04	0.34
P118-09-00	P118-09-00	1491.18	Max WS	654.23	37.86	47.99		48.12	0.00021	3.4	377.76	354.94	0.28
P118-09-00	P118-09-00	945.12	Max WS	663.18	36.86	47.11		47.17	0.001325	2.28	728.18	1075.81	0.24
P118-09-00	P118-09-00	435.38	Max WS	688.98	35.21	46.77		46.8	0.000081	1.17	591.08	85.41	0.08
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	656.52	35.18	46.78		46.8	0.000069	1.09	602.29	85.29	0.07
P118-09-00	P118-09-00	376.38	Culvert										
P118-09-00	P118-09-00	222.06	Max WS	650.38	24.19	46.64		46.64	0.000002	0.31	2121.48	164.21	0.02

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
P118-09-00	P118-09-00	209.24	Max WS	643.08	24.13	46.64		46.64	0.000002	0.3	2114.44	161.61	0.01	
P118-09-00	P118-09-00	139.66	Max WS	582.25	23.56	46.64		46.64	0.000002	0.26	2228.37	170.49	0.01	
P118-09-00	P118-09-00	74.44	Max WS	582.11	22.87	46.64		46.64	0.000002	0.3	1951.35	111.2	0.01	
P118-14-00	P118-14-00-001	13760.5	Max WS	101.08	58.1	64.72		64.72	0.000004	0.16	2126.55	1402.08	0.02	
P118-14-00	P118-14-00-001	13096.8	Max WS	100.9	57.3	64.72		64.72	0.000009	0.27	835.54	1207.98	0.02	
P118-14-00	P118-14-00-001	11983.3	Max WS	321.33	56.1	64.71		64.71	0.00001	0.33	3128.02	1473.21	0.03	
P118-14-00	P118-14-00-001	11755.1												
P118-14-00	P118-14-00-001	11526.9	Max WS	291.97	55.3	63.35		63.37	0.000165	1.23	237.85	491.28	0.1	
P118-14-00	P118-14-00-001	10870.6	Max WS	499.34	55	63.03		63.1	0.000441	2.05	250.55	1105.64	0.17	
P118-14-00	P118-14-00-001	10833.25												
P118-14-00	P118-14-00-001	10795.9	Max WS	475.36	55.5	62.13		62.23	0.00089	2.63	180.62	932.25	0.24	
P118-14-00	P118-14-00-001	10606.9	Max WS	530.65	55.19	62.02		62.09	0.000436	2.1	252.19	54.61	0.17	
P118-14-00	P118-14-00-001	9666.7	Max WS	817.1	54.05	61.64		61.69	0.000293	1.83	447.33	273.3	0.14	
P118-14-00	P118-14-00-001	8993.1	Max WS	1055.08	53.23	61.23		61.38	0.000818	3.08	410.34	858.39	0.24	
P118-14-00	P118-14-00-001	8655.1	Max WS	1163.95	51.98	60.88		61.09	0.001087	4.01	724.06	983.09	0.27	
P118-14-00	P118-14-00-001	8532.1	Max WS	1163.69	51.53	60.83		60.88	0.000384	2.47	1911.69	1655.17	0.16	
P118-14-00	P118-14-00-001	8507												
P118-14-00	P118-14-00-001	8481.9	Max WS	1147.94	51.41	60.51		60.58	0.000518	2.82	1604.13	1616.7	0.19	
P118-14-00	P118-14-00-001	8025.2	Max WS	1141.02	50.63	60.21		60.31	0.000738	3.07	1348.07	1569.17	0.23	
P118-14-00	P118-14-00-001	7510.9	Max WS	1282.11	49.74	59.89		59.95	0.000462	2.59	2353.57	1958.69	0.18	
P118-14-00	P118-14-00-001	6550.7	Max WS	1530.71	48.37	59.33		59.47	0.000536	3.44	1674.81	1900.42	0.22	
P118-14-00	P118-14-00-001	6479.1	Max WS	1551.11	48.26	59.31		59.38	0.000388	2.71	2486.49	2231.04	0.17	
P118-14-00	P118-14-00-001	6454.3												
P118-14-00	P118-14-00-001	6429.1	Max WS	1547.79	48.13	59.22		59.28	0.000363	2.63	2572.68	2239.44	0.16	
P118-14-00	P118-14-00-001	6302.9	Max WS	1577.85	48.15	59.12		59.26	0.000899	3.5	1520.45	1971.95	0.25	
P118-14-00	P118-14-00-001	6179.9	Max WS	1608.89	48.17	59.02	55.04	59.13	0.000718	3.32	1869.65	1855.8	0.23	
P118-14-00	P118-14-00-001	6165.4												
P118-14-00	P118-14-00-001	6150.9	Max WS	1607.36	48.08	58.97		59.07	0.00068	3.24	1934.27	1871.76	0.22	
P118-14-00	P118-14-00-001	5970	Max WS	1648.51	47.75	58.81		58.97	0.000833	3.83	1815.51	2292.47	0.25	
P118-14-00	P118-14-00-001	5823.6	Max WS	1683.51	47.49	58.76	54.87	58.8	0.000314	2.36	3412.69	2415.29	0.15	
P118-14-00	P118-14-00-001	5800.1												
P118-14-00	P118-14-00-001	5776.6	Max WS	1683.36	47.36	58.65		58.68	0.000305	2.33	3454.31	2415.89	0.15	
P118-14-00	P118-14-00-001	5628.5	Max WS	1718.31	47.07	58.54		58.71	0.000703	3.83	1750.78	2160.14	0.23	
P118-14-00	P118-14-00-001	5509.6	Max WS	1747.82	46.83	58.51		58.55	0.000426	2.56	3317.42	2543.91	0.17	
P118-14-00	P118-14-00-001	5484.6												
P118-14-00	P118-14-00-001	5459.6	Max WS	1747.68	46.8	58.5		58.54	0.00041	2.51	3370.79	2546.22	0.17	
P118-14-00	P118-14-00-001	5294.4	Max WS	1788.44	46.75	58.4		58.51	0.000468	3.15	2145.79	2376.5	0.19	
P118-14-00	P118-14-00-001	5161	Max WS	1821.3	46.71	58.38		58.4	0.000182	1.95	4546.23	2924.75	0.12	
P118-14-00	P118-14-00-001	5136												
P118-14-00	P118-14-00-001	5111	Max WS	1821.3	46.69	58.35		58.38	0.000184	1.96	4524.1	2923.87	0.12	
P118-14-00	P118-14-00-001	4683.7	Max WS	1924.55	46.22	58.18		58.28	0.000542	3.3	2547.85	2189.06	0.2	
P118-14-00	P118-14-00-001	4316.3	Max WS	1999.89	45.87	57.89		58.11	0.000926	4.36	1576.4	1776.69	0.26	
P118-14-00	P118-14-00-001	4164.8	Max WS	2034.81	45.65	57.84		57.9	0.00037	2.78	3385.26	2311.81	0.17	
P118-14-00	P118-14-00-001	4140.3												
P118-14-00	P118-14-00-001	4115.8	Max WS	2034.36	45.6	57.73		57.8	0.000388	2.84	3258.36	2254.46	0.17	
P118-14-00	P118-14-00-001	3617.5	Max WS	2097.3	45.9	57.5		57.58	0.000485	2.88	3008.22	2392.08	0.19	
P118-14-00	P118-14-00-001	3259.8	Max WS	2185.46	46.12	57.29		57.36	0.000577	3.01	3046.68	2473.4	0.21	
P118-14-00	P118-14-00-001	3169.5	Max WS	2197.54	46.17	57.26	53.51	57.3	0.000385	2.44	3759.52	2528.51	0.17	
P118-14-00	P118-14-00-001	3141.3												
P118-14-00	P118-14-00-001	3113.1	Max WS	2197.54	46.07	57.05		57.1	0.000456	2.63	3486.38	2456.84	0.18	
P118-14-00	P118-14-00-001	2974.8	Max WS	2229.22	45.87	56.98		57.05	0.000419	2.67	2950.04	2374.3	0.18	
P118-14-00	P118-14-00-001	2884.9	Max WS	2251.85	45.74	56.93		57.02	0.000432	2.8	3006.85	2749.04	0.18	
P118-14-00	P118-14-00-001	2836.2	Max WS	2267.42	45.67	56.89		57.01	0.000759	3.59	2579.35	2557.09	0.24	
P118-14-00	P118-14-00-001	2771.2												
P118-14-00	P118-14-00-001	2706.2	Max WS	1715.02	45.15	55.65		55.86	0.001082	4	1241.26	1690.11	0.28	
P118-14-00	P118-14-00-001	2164.7	Max WS	1466.42	43.47	55.4		55.43	0.000118	1.56	2653.55	2187.41	0.1	
P118-14-00	P118-14-00-001	1654.8	Max WS	1462.46	41.9	55.36		55.38	0.00005	1.14	4764.97	2579.45	0.07	
P118-14-00	P118-14-00-001	1523.9	Max WS	1470.81	41.49	55.36		55.37	0.000034	0.95	5808.22	2396.91	0.05	
P118-14-00	P118-14-00-001	1492.9												
P118-14-00	P118-14-00-001	1461.9	Max WS	1468.5	41.24	55.35		55.35	0.000028	0.88	6380.15	2439.03	0.05	
P118-14-00	P118-14-00-001	1132.9	Max WS	1494.35	40.69	55.33		55.34	0.000058	0.97	6572.25	2908.79	0.06	
P118-14-00	P118-14-00-001	226.85	Max WS	1474.25	39.16	55.33		55.33	0.000021	0.66	9561.31	3400.67	0.04	
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0	
P118-21-00	P118-21-00	3067												
P118-21-00	P118-21-00	3066												
P118-21-00	P118-21-00	2499.4	Max WS	-9.06	67.88	71.03		71.03	0.000188	-0.26	41.72	21.34	0.03	
P118-21-00	P118-21-00	2493.18	Max WS	-9.96	67.95	71.03		71.03	0.000311	-0.19	60.38	31.49	0.02	
P118-21-00	P118-21-00	2450.1	Max WS	-18.08	67.59	71.03		71.04	0.000009	-0.34	62.06	24.34	0.04	
P118-21-00	P118-21-00	2416.26	Max WS	-23.6	67.5	71.03		71.04	0.000031	-0.4	65.17	25.7	0.04	
P118-21-00	P118-21-00	2398.11	Max WS	-25.89	67.44	71.03		71.04	0.000039	-0.43	62.21	23.38	0.05	
P118-21-00	P118-21-00	2389.56	Max WS	-26.69	67.41	71.03		71.04	0.000014	-0.43	66.27	26	0.05	
P118-21-00	P118-21-00	2343.79	Max WS	-29.46	67.54	71.03		71.04	0.000061	-0.85	39.49	17	0.09	
P118-21-00	P118-21-00	2303.58	Max WS	-29.73	67.47	71.03		71.04	0.000178	-0.83	36.27	14.2	0.09	

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-21-00	P118-21-00	2208.42	Max WS	-35.31	67.31	71.05		71.05	0.000127	-0.68	53.61	25	0.08
P118-21-00	P118-21-00	2195.48	Max WS	-36.53	67.34	71.05		71.05	0.000004	-0.63	70.18	39.01	0.07
P118-21-00	P118-21-00	2169.49	Max WS	-38.02	66.56	71.05		71.06	0.000057	-0.88	60.77	32.94	0.09
P118-21-00	P118-21-00	2167.76	Max WS	-38.1	66.37	71.05		71.06	0.000037	-0.75	66.6	32.46	0.07
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	-38.44	65.03	71.07		71.07	0.000006	-0.28	152.88	61	0.03
P118-21-00	P118-21-00	2100.84	Max WS	-43.44	64.78	71.07		71.07	0.000023	-0.4	132.18	50.22	0.04
P118-21-00	P118-21-00	1662.37	Max WS	-68.98	63.91	71.07		71.08	0.000028	-0.56	173.83	46.01	0.04
P118-21-00	P118-21-00	1144.5	Max WS	-99.09	62.63	71.09		71.09	0.000044	-0.71	142.6	23	0.05
P118-21-00	P118-21-00	595.53	Max WS	-138.62	61.49	71.1		71.11	0.000015	-0.45	309.09	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-144.74	61.18	71.1		71.11	0.000015	-0.48	308	44.42	0.03
P118-21-00	P118-21-00	503.08*	Max WS	-149.98	60.87	71.1		71.11	0.000016	-0.5	304.65	41.62	0.03
P118-21-00	P118-21-00	456.86*	Max WS	-155.05	60.57	71.1		71.11	0.000017	-0.52	298.84	38.81	0.03
P118-21-00	P118-21-00	410.63*	Max WS	-159.3	60.26	71.1		71.11	0.000018	-0.55	290.83	36.01	0.03
P118-21-00	P118-21-00	364.41*	Max WS	-163.59	59.95	71.1		71.11	0.000019	-0.59	280.3	33.21	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-167.22	59.64	71.1		71.11	0.000022	-0.63	267.55	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-170.04	59.34	71.1		71.11	0.000025	-0.68	252.38	27.6	0.04
P118-21-00	P118-21-00	225.73*	Max WS	-172.77	59.03	71.1		71.11	0.00003	-0.74	234.94	24.8	0.04
P118-21-00	P118-21-00	179.51	Max WS	-174.28	58.72	71.1		71.11	0.000048	-0.81	215.19	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	-177.87	57.98	71.1		71.11	0.000042	-0.78	228.04	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	-173.92	57.24	71.11		71.12	0.000035	-0.72	241.36	23.06	0.04
P118-21-00	P118-21-00	119.21*	Max WS	-149.55	56.51	71.11		71.12	0.000022	-0.59	255.11	23.6	0.03
P118-21-00	P118-21-00	99.11*	Max WS	-126.76	55.77	71.12		71.12	0.000014	-0.47	269.13	24.13	0.02
P118-21-00	P118-21-00	79.01	Max WS	-105.16	55.03	71.12		71.12	0.000008	-0.37	283.47	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.24		75.24	0.000001	0.08	142.12	145.28	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.24		75.24	0.000001	0.09	126.81	155.12	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.24	70.25	75.24	0.000001	0.1	146.87	142.14	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.8	70.2	75.24		75.24	0.000002	0.1	138.29	170.73	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.21	70.16	75.24		75.24	0.000002	0.12	115.01	126.21	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.06	69.97	75.24		75.24	0.000006	0.2	103.6	158.32	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.5	69.88	75.24		75.24	0.000008	0.23	128.37	289.09	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	26.9	68.92	75.24		75.24	0.000006	0.19	389.61	699.15	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	26.89	69.39	75.24		75.24	0.000002	0.12	1015.42	1727.24	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.09	69.56	75.24		75.24	0.000012	0.26	170.43	2076.59	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.61	68.48	75.24		75.24	0.000002	0.37	155.74	2273.52	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	48.94	68.06	75.23		75.24	0.000027	0.44	112.28	2126.69	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	47.9	69.59	74.87		74.87	0.000004	0.16	1298.67	1562.55	0.01
P118-23-00	P118-23-00 R2	7313.37	Max WS	49.69	69.5	74.87		74.87	0.000028	0.42	146.5	1664.77	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	50.6	69.17	74.87		74.87	0.000027	0.42	161.84	1696.75	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	51.85	69.43	74.87		74.87	0.000004	0.17	1292.64	1733.25	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	51.82	69.34	74.87		74.87	0.000003	0.16	1464.4	1876.74	0.01
P118-23-00	P118-23-00 R2	7237.19	Max WS	55.32	69.28	74.87		74.87	0.000008	0.21	806.07	1996.47	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	119.58	68.02	74.86		74.86	0.000007	0.22	1794.93	2340.5	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	129.16	67.37	74.86		74.86	0.000039	0.55	232.96	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	27.52	67.54	74.32		74.33	0.000006	0.18	153.89	55.61	0.02
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	30.04	67.16	74.32		74.32	0.000004	0.17	181.51	46.02	0.01
P118-23-00	P118-23-00 R2	6402.43	Max WS	34.94	67.03	74.32		74.32	0.000005	0.2	177.86	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	38.27	66.97	74.32	67.63	74.32	0.000006	0.21	183.46	47.47	0.02
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	38.28	66.93	74.32		74.32	0.000006	0.2	193.24	53.71	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	41.35	66.88	74.32		74.32	0.000007	0.22	187.75	52.38	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	91.3	66.24	74.31		74.31	0.000011	0.31	298.23	68.26	0.03
P118-23-00	P118-23-00 R2	5652.94	Max WS	100.94	65.7	74.31		74.31	0.000018	0.37	274.5	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	64.89	63.97	74.3		74.3	0.000006	0.28	231.35	31.87	0.02
P118-23-00	P118-23-00 R2	4947.92	Max WS	61.75	63.84	74.3	64.65	74.3	0.000003	0.21	298.53	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	61.74	63.87	74.3		74.3	0.000003	0.21	288.1	34.77	0.01
P118-23-00	P118-23-00 R2	4789.1	Max WS	66.02	63.65	74.29		74.3	0.000005	0.26	256.19	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	68.97	63.02	74.29	64.19	74.29	0.000004	0.22	309.63	46.95	0.02
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	68.97	63.16	74.29		74.29	0.000003	0.19	359.77	58.28	0.01
P118-23-00	P118-23-00 R2	4459.75	Max WS	72.62	63.55	74.29		74.29	0.000004	0.21	340.97	52.65	0.01
P118-23-00	P118-23-00 R2	4370.6	Max WS	75.27	63.42	74.29		74.29	0.000002	0.18	414.26	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	75.67	62.88	74.29		74.29	0.000001	0.09	808.17	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	75.67	63.31	74.28		74.28	0.000001	0.11	660.56	76.06	0.01

Impact Analysis Baseline Conditions
HEC-RAS Results

HFC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4229.24	Max WS	82.54	63.34	74.28		74.28	0.000002	0.19	424.45	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	137.14	62.41	74.28		74.28	0.000013	0.46	299.37	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	179.52	62.36	74.27		74.27	0.000014	0.5	356.98	40.27	0.03
P118-23-00	P118-23-00 R2	3150.64	Max WS	182.6	61.93	74.27	64.2	74.27	0.000012	0.44	416.31	52.14	0.03
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	182.6	61.56	74.26		74.27	0.000001	0.41	442.88	55.63	0.03
P118-23-00	P118-23-00 R2	3104.46	Max WS	185.17	61.63	74.26		74.27	0.000014	0.46	400.01	52.53	0.03
P118-23-00	P118-23-00 R2	2750.51	Max WS	226.12	60.59	74.25		74.26	0.000024	0.67	338.75	34.6	0.04
P118-23-00	P118-23-00 R2	2741.93	Max WS	226.98	60.44	74.25	63.04	74.26	0.000024	0.66	344.41	34.96	0.04
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	226.93	60.52	74.25		74.25	0.000018	0.57	395.57	42.97	0.03
P118-23-00	P118-23-00 R2	2716.57	Max WS	228.21	60.68	74.25		74.25	0.000017	0.53	430.19	52.19	0.03
P118-23-00	P118-23-00 R2	2615.37	Max WS	242.48	60.75	74.24		74.25	0.000025	0.68	358.81	37.87	0.04
P118-23-00	P118-23-00 R2	2244.98	Max WS	290.49	60.53	74.23		74.24	0.000031	0.78	373.34	35.71	0.04
P118-23-00	P118-23-00 R2	2221.06	Max WS	293.76	60.56	74.23	63.05	74.24	0.000032	0.79	373.27	36.69	0.04
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	293.74	60.59	74.21		74.22	0.000029	0.76	385.08	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	347.36	59.78	74.21		74.21	0.000021	0.62	561.42	67.27	0.04
P118-23-00	P118-23-00 R2	1922.11	Max WS	386.53	59.56	74.2		74.21	0.000023	0.65	598.47	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	406.32	59.68	74.2	63.37	74.21	0.000029	0.74	552.41	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	405.99	59.86	74.13		74.15	0.000065	1.09	372.95	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	451.87	59.87	74.14		74.15	0.000031	0.74	609.34	75.5	0.05
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	640.76	59.04	74.11		74.13	0.000064	1.12	570.66	62.07	0.07
P118-23-00	P118-23-00 R1	1513.84	Max WS	2061.36	59.85	74.1		74.11	0.000049	1.12	5557.23	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	2075.67	59.99	74.1	66.4	74.1	0.000037	0.89	5580.86	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	2075.71	58.36	74.09		74.09	0.000031	0.86	5800.22	933.17	0.05
P118-23-00	P118-23-00 R1	1354.02	Max WS	2134.92	57.88	74.09		74.09	0.000035	0.96	5755.34	916.81	0.05
P118-23-00	P118-23-00 R1	1010.56	Max WS	2319.58	57.45	74.06		74.07	0.00007	1.3	4470.22	742.6	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	2735.21	57.03	74		74.03	0.000161	2.07	3086.03	449.67	0.11
P118-23-00	P118-23-00 R1	242.54	Max WS	3182.3	55.82	73.95	64.97	73.95	0.000001	0.45	24709.48	6858.7	0.03
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	3182.3	55.57	73.95		73.95	0.000009	0.49	24938.72	5675.66	0.03
P118-23-00	P118-23-00 R1	106.82	Max WS	2775.85	55.13	73.93		74.01	0.000151	2.49	1702.97	175.37	0.12
P118-23-00	P118-23-00 R1	58.31	Max WS	2746.31	53.78	73.94		74.07	0.000225	3.26	1205.26	83.5	0.14
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	74.17		74.17	0	0.01	4029.91	1274.25	0
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	87.96	66.69	74.17		74.17	0.000001	0.08	3878.14	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	116.57	66.66	74.17		74.17	0.000001	0.1	3927.14	1251.96	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	116.61	66.22	74.17		74.17	0.000001	0.05	5348.08	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	121.37	66.22	74.17		74.17	0.000001	0.07	5090.34	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	269.89	65.47	74.17		74.17	0.000005	0.18	4231.73	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	440.91	65.13	74.16		74.16	0.000012	0.36	4211.71	1074.84	0.03
P118-23-02	P118-23-02	2372.17	Max WS	444.98	65.16	74.16		74.16	0.000001	0.31	4374.57	1094.25	0.02
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	444.98	65.26	74.16		74.16	0.00001	0.33	4484.9	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	452.28	65.19	74.16		74.16	0.000014	0.42	4065.24	1058.12	0.03
P118-23-02	P118-23-02	1453.34	Max WS	742.84	63.69	74.14		74.14	0.000035	0.73	3899.97	964.79	0.05
P118-23-02	P118-23-02	1445.67	Max WS	745.59	63.66	74.14	68.33	74.14	0.000032	0.74	3979.5	961.46	0.05
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	745.6	63.56	74.13		74.14	0.000026	0.66	4304.85	962.09	0.04
P118-23-02	P118-23-02	1392.09	Max WS	756.12	63.36	74.13		74.13	0.000017	0.38	4174.41	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	790.41	62.91	74.13		74.13	0.000016	0.5	4572.38	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	862.86	61.86	74.13		74.13	0.000014	0.49	5339.56	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	908.08	62.56	74.13		74.13	0.000015	0.5	5443.63	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	1420.45	60.16	74.11		74.11	0.000029	0.67	5443.22	1102.12	0.04
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	74.5		74.5	0	0.04	232.79	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.5		74.5	0	0.04	232.67	37.24	0
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	41.56	66.13	74.5		74.5	0.000004	0.21	199.9	31.01	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	73.91	65.84	74.5		74.5	0.000001	0.34	214.97	33.01	0.02
P118-25-00	P118-25-00 R2	2494.17	Max WS	85.41	65.5	74.49		74.5	0.000011	0.36	234.94	35.73	0.02
P118-25-00	P118-25-00 R2	2473.31	Max WS	86.69	65.47	74.49	67.2	74.49	0.000011	0.37	232.27	35.01	0.03
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	86.69	65.47	74.49		74.49	0.000011	0.36	241.91	37.73	0.02
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	89.73	65.38	74.49		74.49	0.000011	0.38	238.73	35.28	0.03

Impact Analysis Baseline Conditions
HEC-RAS Results

HEC-RAS Plan: BaselineConditions_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-25-00	P118-25-00 R2	2046.09	Max WS	85.42	64.63	74.49		74.49	0.000006	0.3	286.13	40.52	0.02
P118-25-00	P118-25-00 R1	1929.3	Max WS	259.61	64.22	74.47		74.48	0.000081	1.02	255.62	39.73	0.07
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	215.6	64.03	74.45		74.46	0.000052	0.86	250.34	33.08	0.06
P118-25-00	P118-25-00 R1	1208.56	Max WS	167.53	63.03	74.45		74.46	0.000028	0.65	256.5	30.27	0.04
P118-25-00	P118-25-00 R1	1188.81	Max WS	164.49	63.01	74.45	65.42	74.45	0.000029	0.66	249.96	29.97	0.04
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	164.49	62.94	74.44		74.45	0.000031	0.67	245.9	29.45	0.04
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	160.43	62.83	74.44		74.45	0.000023	0.6	269.47	33.01	0.04
P118-25-00	P118-25-00 R1	980.2	Max WS	141.35	62.34	74.44		74.45	0.000013	0.46	306.68	35.75	0.03
P118-25-00	P118-25-00 R1	963.63	Max WS	140.39	62.25	74.44		74.45	0.000006	0.4	347.5	45.01	0.02
P118-25-00	P118-25-00 R1	950.55	Max WS	140.7	62.25	74.44	64.1	74.45	0.000005	0.29	579.79	95	0.02
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	140.71	61.68	74.43		74.43	0.000004	0.29	568.9	86	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	140.9	61.68	74.42		74.43	0.000005	0.39	359.35	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	141.11	61.16	74.42		74.43	0.000009	0.4	355.58	37.72	0.02
P118-25-00	P118-25-00 R1	490.93	Max WS	127.31	60.25	74.42		74.42	0.000005	0.31	406.53	44.02	0.02
P118-25-00	P118-25-00 R1	251.81	Max WS	94.94	58.25	74.42		74.42	0.000002	0.2	472.4	44.09	0.01
P118-25-00	P118-25-00 R1	229.81*	Max WS	90.88	58.04	74.42		74.42	0.000002	0.19	478.72	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	86.64	57.84	74.42		74.42	0.000001	0.18	485.02	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	82.32	57.63	74.42		74.42	0.000001	0.17	491.3	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	78.19	57.43	74.42		74.42	0.000001	0.16	497.56	44.04	0.01
P118-25-00	P118-25-00 R1	141.80*	Max WS	73.77	57.22	74.42		74.42	0.000001	0.15	503.85	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	69.15	57.02	74.42		74.42	0.000001	0.14	510.07	44.01	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	64.96	56.81	74.42	58.58	74.42	0.000001	0.13	516.39	44	0.01
P118-25-01	P118-25-01	5341.48	Max WS	19.04	70.47	76		76	0.000003	0.15	129.12	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	322.66	68.9	75.51		75.58	0.000763	2.25	143.7	42.03	0.21
P118-25-01	P118-25-01	4162.47	Max WS	326.03	69.44	75.29		75.36	0.000631	2.12	153.55	42.02	0.2
P118-25-01	P118-25-01	4134.04	Max WS	331.76	69.38	75.27	72.13	75.34	0.000627	2.12	156.62	43.02	0.2
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	329.56	69.25	75.21		75.28	0.00061	2.09	157.33	43.02	0.19
P118-25-01	P118-25-01	4047.7	Max WS	329.08	69.28	75.19		75.25	0.000595	2.09	157.35	42.03	0.19
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	311.9	67.84	75.01		75.06	0.000341	1.69	184.27	44.03	0.15
P118-25-01	P118-25-01	3312.44	Max WS	307.41	67.48	74.93		74.97	0.000259	1.47	209.31	51.15	0.13
P118-25-01	P118-25-01	3014.68	Max WS	276.14	67.53	74.88		74.91	0.00017	1.28	215.27	45.99	0.1
P118-25-01	P118-25-01	2924.04	Max WS	266.28	67.71	74.87		74.89	0.000149	1.2	221.3	47.25	0.1
P118-25-01	P118-25-01	2763.33	Max WS	195.88	66.67	74.88		74.89	0.000075	0.88	223.5	44.92	0.07
P118-25-01	P118-25-01	2728.92	Max WS	178.68	66.5	74.81		74.88	0.001026	2.1	85.03	29.03	0.22
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	177.05	66.31	74.62		74.68	0.001045	1.99	88.85	37.04	0.23
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	176.41	66.04	74.61		74.63	0.000136	1.13	155.45	31	0.09
P118-25-01	P118-25-01	1881.88	Max WS	144	66.57	74.56		74.57	0.000087	0.9	160.74	34	0.07
P118-25-01	P118-25-01	1384.48	Max WS	125.51	66.19	74.54		74.54	0.000046	0.68	183.25	35.03	0.05
P118-25-01	P118-25-01	1245.83	Max WS	124.07	66.34	74.53		74.54	0.000048	0.68	183.32	37.72	0.05
P118-25-01	P118-25-01	584.11	Max WS	86.71	65.88	74.52		74.52	0.000016	0.44	197.7	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	174.13	63.5	74.48		74.49	0.000055	0.84	206.52	27.03	0.05

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	4112.31	58.25	72.86		73.34	0.001033	5.56	744.33	140.98	0.32
P118-00-00	P118-R3-2	71854.2	Max WS	4010.07	57.83	72.73		72.92	0.000447	3.47	1155.84	145.83	0.22
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	3964.86	55.05	72.33		72.48	0.000331	3.1	1363.78	344.62	0.19
P118-00-00	P118-R3-2	69527.2	Max WS	3941.39	55.28	72.01		72.15	0.000248	2.97	1657.88	520	0.17
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3534.31	54.88	71.69		71.9	0.000433	3.81	1216.76	292.48	0.22
P118-00-00	P118-R3-2	68133	Max WS	3530.76	54.47	71.46		71.69	0.000387	3.88	1136.63	310.48	0.21
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	3527.6	54.14	71.08		71.4	0.000665	4.62	1079.33	328.59	0.26
P118-00-00	P118-R3-2	66869	Max WS	3205.45	53.96	70.52		70.88	0.000937	4.82	713.38	155.98	0.3
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3217.24	53.79	70.55		70.8	0.000584	4	845.94	136.28	0.24
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	3059.67	53.6	70.34		70.57	0.000431	3.91	1105.94	227.52	0.21
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2278.79	53.52	70.37		70.48	0.000353	2.68	1013.18	278.2	0.18
P118-00-00	P118-R3-2	65434.6	Max WS	881.35	53.1	70.41		70.43	0.000034	1.08	1170.79	214.6	0.06
P118-00-00	P118-R3-2	64399.74	Max WS	2986.81	52.59	69.87		70.09	0.000419	3.81	950.87	175.7	0.21
P118-00-00	P118-R3-2	64273.7	Max WS	3008.02	53.55	69.89	60.78	70.03	0.00033	3	1019.89	161.39	0.19
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3005.64	53.3	69.87		70	0.000302	2.91	1054.04	151.28	0.18
P118-00-00	P118-R3-2	64200	Max WS	3005.89	53.3	69.87		70	0.000302	2.91	1053.8	151.28	0.18
P118-00-00	P118-R2-2	64100	Max WS	3650.85	52.61	69.87		69.95	0.000123	2.25	1655.59	3983.34	0.12
P118-00-00	P118-R2-2	64094	Max WS	3650.24	52.61	69.87	59.38	69.95	0.000123	2.25	1655.48	3981.6	0.12
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	3649.79	52.56	69.84		69.92	0.000122	2.25	1659.97	4054.12	0.12
P118-00-00	P118-R2-2	64010.4	Max WS	3648.19	52.78	69.75	61.04	69.93	0.000301	3.42	1176.04	3882.31	0.19
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	3630.68	53.04	69.43		69.63	0.000363	3.62	1095.84	1972.74	0.2
P118-00-00	P118-R2-2	63959.7	Max WS	3638.29	53.06	69.54	59.32	69.62	0.000131	2.28	1616.04	3466.03	0.12
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	3636.12	53.16	69.51		69.59	0.000137	2.31	1589.49	3010.66	0.13
P118-00-00	P118-R2-2	63756.7	Max WS	3625.66	52.4	69.3		69.59	0.00062	4.36	1021.05	205	0.25
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	3035.62	50.35	69.03		69.21	0.000368	3.44	961.96	166.65	0.2
P118-00-00	P118-R2-2	61905.2	Max WS	3135.83	50.77	68.79		68.91	0.000262	2.75	1139.73	132.2	0.17
P118-00-00	P118-R2-2	60625.3	Max WS	3168.75	49.57	68.64		68.75	0.000219	2.67	1185.66	121.4	0.15
P118-00-00	P118-R2-1	60595.74	Max WS	2787.94	49.48	68.45		68.57	0.00017	2.79	1112.48	131.55	0.14
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	2809.47	49.68	68.45		68.55	0.000145	2.59	1189.38	139.91	0.13
P118-00-00	P118-R2-1	60571.6*	Max WS	2700.82	49.89	68.45		68.53	0.000116	2.32	1263.74	148.28	0.12
P118-00-00	P118-R2-1	60559.5*	Max WS	2708.73	50.09	68.44		68.51	0.000102	2.17	1336.01	156.63	0.11
P118-00-00	P118-R2-1	60547.5*	Max WS	2715.78	50.3	68.44		68.5	0.000092	2.04	1407.92	157.06	0.1
P118-00-00	P118-R2-1	60535.46	Max WS	2719.01	50.5	68.44		68.49	0.000083	1.93	1481.97	160.6	0.1
P118-00-00	P118-R2-1	60396.4*	Max WS	2706.33	50.45	68.43		68.49	0.000083	1.9	1496.09	165.45	0.1
P118-00-00	P118-R2-1	60257.3*	Max WS	2695.7	50.4	68.43		68.48	0.000083	1.87	1513.92	172.04	0.1
P118-00-00	P118-R2-1	60118.3*	Max WS	2682.67	50.35	68.42		68.47	0.000081	1.83	1536.68	176.25	0.1
P118-00-00	P118-R2-1	59979.2*	Max WS	2608.66	50.3	68.42		68.46	0.000076	1.75	1561.41	177.2	0.09
P118-00-00	P118-R2-1	59840.2*	Max WS	2578.98	50.25	68.41		68.45	0.000073	1.7	1587.83	178.16	0.09
P118-00-00	P118-R2-1	59701.1*	Max WS	2566.07	50.2	68.41		68.45	0.00007	1.66	1616.5	179.13	0.09
P118-00-00	P118-R2-1	59562.1*	Max WS	2526.23	50.15	68.4		68.44	0.000065	1.6	1646.34	180.09	0.09
P118-00-00	P118-R2-1	59423.1	Max WS	2509.48	50.1	68.4		68.43	0.000067	1.59	1677.7	181.05	0.09
P118-00-00	P118-R2-1	59307.4*	Max WS	2496.79	50.1	68.39		68.43	0.000064	1.55	1736.64	196.49	0.09
P118-00-00	P118-R2-1	59191.8*	Max WS	2484.94	50.11	68.39		68.42	0.000061	1.51	1788.3	211.94	0.08
P118-00-00	P118-R2-1	59076.2*	Max WS	2466.57	50.11	68.38		68.42	0.000058	1.46	1834.14	227.38	0.08
P118-00-00	P118-R2-1	58960.5*	Max WS	2469.02	50.11	68.38		68.41	0.000054	1.42	1872.64	242.82	0.08
P118-00-00	P118-R2-1	58844.9*	Max WS	2457.97	50.11	68.38		68.41	0.000052	1.39	1904.74	258.26	0.08
P118-00-00	P118-R2-1	58729.3*	Max WS	2453.69	50.12	68.37		68.4	0.000049	1.36	1929.49	273.71	0.08
P118-00-00	P118-R2-1	58613.7	Max WS	2446.69	50.12	68.37		68.4	0.000047	1.33	1947.85	289.15	0.07
P118-00-00	P118-R2-1	58463.86	Max WS	2692.95	47.59	68.37		68.38	0.000023	1.05	10872.87	5588.31	0.05
P118-00-00	P118-R2-1	58387.5	Max WS	2669.15	47.57	60.91	54.87	61.11	0.00067	3.58	745.02	122.59	0.26
P118-00-00	P118-R2-1	58359.5 ALDINE WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	2667.6	47.51	60.8		61	0.000686	3.62	737.9	121.96	0.26
P118-00-00	P118-R2-1	57555.5	Max WS	2662.17	47.03	60.18		60.47	0.000669	4.38	607.32	69.04	0.26
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	2703.34	46.03	59.44		59.75	0.000707	4.45	607.92	70.25	0.27
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	2702.88	44.69	58.47		58.91	0.001055	5.27	512.43	58.92	0.32
P118-00-00	P118-R2-1	55000	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min.Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	54459.2	Max WS	2641.07	44.27	57.48		57.83	0.000846	4.77	553.49	65.1	0.29
P118-00-00	P118-R2-1	53881	Lat Struct										
P118-00-00	P118-R2-1	53801.7	Max WS	2640.65	43.7	57.36		57.46	0.000211	2.47	1071.25	129.39	0.15
P118-00-00	P118-R2-1	53275.7	Max WS	2668.3	43.36	57.26		57.36	0.000162	2.46	1086.32	102.97	0.13
P118-00-00	P118-R2-1	52844.3	Max WS	2833.18	43.08	57.17	48.32	57.26	0.000221	2.49	1138.01	141.51	0.15
P118-00-00	P118-R2-1	52815.3	BERTRAND RD										
P118-00-00	P118-R2-1	52786.3	Max WS	2833.19	43.01	57.14		57.23	0.000218	2.48	1143.67	141.84	0.15
P118-00-00	P118-R2-1	52465.7	Max WS	2833.16	43.2	56.96		57.13	0.000439	3.25	870.55	119.33	0.21
P118-00-00	P118-R2-1	52221.3	Max WS	2833.16	43.89	56.79	51.22	57	0.000622	3.68	769.67	113.86	0.25
P118-00-00	P118-R2-1	52207.8	UTILITY										
P118-00-00	P118-R2-1	52194.3	Max WS	2833.16	43.8	56.75		56.96	0.000609	3.65	775.52	114.18	0.25
P118-00-00	P118-R2-1	51283.9	Max WS	2833.14	43.41	56.04		56.3	0.000842	4.03	702.77	112.66	0.28
P118-00-00	P118-R2-1	51096.9	Max WS	2833.14	42.91	56.01	48.19	56.18	0.000398	3.35	845.77	101.23	0.2
P118-00-00	P118-R2-1	51083.9	UTILITY										
P118-00-00	P118-R2-1	51070.9	Max WS	2833.13	42.87	55.98		56.15	0.000397	3.35	846.79	101.28	0.2
P118-00-00	P118-R2-1	50549.6	Max WS	2833.12	42.3	55.85		55.97	0.000287	2.79	1015.31	129.8	0.18
P118-00-00	P118-R2-1	50021.9	Max WS	2833.12	41.83	55.72	47.75	55.83	0.000257	2.68	1058.77	132.31	0.17
P118-00-00	P118-R2-1	49980.9	HOPPER RD										
P118-00-00	P118-R2-1	49939.9	Max WS	2833.12	41.69	55.68		55.79	0.000247	2.64	1073.16	133.15	0.16
P118-00-00	P118-R2-1	49231.7	Max WS	2833.12	41.03	55.29		55.5	0.000594	3.63	781.46	112.36	0.24
P118-00-00	P118-R2-1	48480.5	Max WS	2833.09	41.23	55		55.14	0.000345	3.03	934.39	119.8	0.19
P118-00-00	P118-R2-1	48196.5	Max WS	2833.07	41.31	54.87	47.77	55.03	0.000429	3.25	871.99	118.27	0.21
P118-00-00	P118-R2-1	48183.0	UTILITY										
P118-00-00	P118-R2-1	48169.5	Max WS	2833.08	41.24	54.84		55	0.000423	3.23	876.78	118.58	0.21
P118-00-00	P118-R2-1	47607.9	Max WS	2833.02	40.57	54.5		54.71	0.000611	3.74	757.21	106.67	0.25
P118-00-00	P118-R2-1	46939	Max WS	2832.96	40.79	54.29		54.41	0.000283	2.78	1020.41	127.67	0.17
P118-00-00	P118-R2-1	46594.8	Max WS	2832.94	40.91	54.19	46.56	54.32	0.000256	2.83	1009.18	134.19	0.17
P118-00-00	P118-R2-1	46584.8	Bridge										
P118-00-00	P118-R2-1	46579.8	Max WS	2832.93	40.91	54.18		54.31	0.000278	2.8	1056.31	193.25	0.17
P118-00-00	P118-R2-1	46575.8	Max WS	2832.95	40.91	54.18	46.57	54.3	0.000278	2.8	1058.9	184.59	0.17
P118-00-00	P118-R2-1	46560.8	LITTLE YORK RD										
P118-00-00	P118-R2-1	46526.8	Max WS	2832.9	40.74	54.15		54.27	0.000245	2.79	1024.44	128.33	0.16
P118-00-00	P118-R2-1	46516.8	Max WS	2832.9	40.74	54.15	46.41	54.27	0.000267	2.77	1026.66	143.67	0.17
P118-00-00	P118-R2-1	46515.8	Bridge										
P118-00-00	P118-R2-1	46478.9	Max WS	2832.84	40.49	54.06		54.21	0.000423	3.11	910.08	130.72	0.21
P118-00-00	P118-R2-1	46468.9	Max WS	2832.9	40.49	54.06	47.71	54.21	0.000424	3.11	909.5	130.68	0.21
P118-00-00	P118-R2-1	46466.8	Bridge										
P118-00-00	P118-R2-1	46458.9	Max WS	2832.85	40.49	54.03		54.18	0.000428	3.13	906.26	130.5	0.21
P118-00-00	P118-R2-1	45952.3	Max WS	2832.31	40.12	53.44		53.76	0.001253	4.55	622.19	111.77	0.34
P118-00-00	P118-R2-1	45161.4	Max WS	2830.86	39.57	52.56		52.81	0.001759	4.04	716.73	150.06	0.29
P118-00-00	P118-R2-1	44549.9	Max WS	2829.96	38.76	52.01		52.2	0.000845	3.51	806.03	129.75	0.25
P118-00-00	P118-R2-1	44143.3	Max WS	2829.39	38.27	51.7		51.87	0.000761	3.39	835.65	131.32	0.24
P118-00-00	P118-R2-1	43789.5	Max WS	2849.31	37.97	51.63		51.65	0.000053	1.65	5028.55	876.48	0.08
P118-00-00	P118-R2-1	43739.48	Max WS	2849.33	37.93	51.63		51.65	0.000058	1.71	3868.03	505.93	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	2849.32	37.87	51.63		51.65	0.000052	1.64	4029.61	520.42	0.08
P118-00-00	P118-R2-1	43564.8*	Max WS	2849.29	37.81	51.63		51.64	0.000046	1.55	4381.99	854.87	0.08
P118-00-00	P118-R2-1	43477.4*	Max WS	2849.26	37.75	51.63		51.64	0.000034	1.33	5818.53	1197.81	0.07
P118-00-00	P118-R2-1	43390.1*	Max WS	2849.34	37.68	51.63		51.63	0.000021	1.06	7340.66	1235.22	0.05
P118-00-00	P118-R2-1	43302.8*	Max WS	2849.27	37.62	51.63		51.63	0.000012	0.78	8816.71	1244.36	0.04
P118-00-00	P118-R2-1	43215.5	Max WS	2849.25	37.56	51.63		51.63	0.000008	0.66	9800.73	1255.98	0.03
P118-00-00	P118-R2-1	43118.0*	Max WS	2852.87	37.49	51.63		51.63	0.000013	0.83	8935.82	1211.82	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	2852.9	37.42	51.62		51.63	0.000017	0.95	7944.11	1154.66	0.05
P118-00-00	P118-R2-1	42922.9*	Max WS	2852.89	37.35	51.62		51.63	0.00002	1.03	7113.4	898.17	0.05
P118-00-00	P118-R2-1	42825.49	Max WS	2852.87	37.28	51.62		51.63	0.000021	1.06	6864.52	851.1	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	2852.77	37.22	51.62		51.63	0.00002	1.05	6899.07	893.28	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	2852.73	37.15	51.62		51.62	0.000018	0.98	7484.37	1043.12	0.05
P118-00-00	P118-R2-1	42559.6*	Max WS	2852.67	37.09	51.62		51.62	0.000013	0.86	8070.55	1041.13	0.04
P118-00-00	P118-R2-1	42471	Max WS	2852.77	37.03	51.62		51.62	0.000007	0.62	8268.07	1034.05	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	2852.93	36.98	51.62		51.62	0.000009	0.7	8296.94	1045.68	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	2852.69	36.92	51.62		51.62	0.000005	0.52	9260.55	1110.24	0.03
P118-00-00	P118-R2-1	42245.55	Max WS	2852.65	36.87	51.62		51.62	0.000002	0.31	9719.15	1116.46	0.01
P118-00-00	P118-R2-1	42150.1*	Max WS	2852.63	36.8	51.62		51.62	0.000006	0.6	8674.58	1099.02	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	2852.61	36.74	51.61		51.62	0.000009	0.72	7081.95	954.82	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	2852.74	36.67	51.61		51.62	0.00001	0.77	6287.48	748.12	0.04
P118-00-00	P118-R2-1	41863.8	Max WS	2852.68	36.6	51.61		51.62	0.000008	0.7	6811.19	697.07	0.03
P118-00-00	P118-R2-1	41771.7*	Max WS	2852.8	36.53	51.61		51.62	0.000012	0.85	6589.71	691.84	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	2852.67	36.47	51.61		51.62	0.000016	0.95	6333.84	713.74	0.05
P118-00-00	P118-R2-1	41587.5*	Max WS	2852.88	36.4	51.61		51.61	0.000019	1.06	6043.5	721.79	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	2852.79	36.34	51.61		51.61	0.000021	1.11	5898.95	693.91	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	2852.59	36.27	51.6		51.61	0.00002	1.08	5898.95	684.18	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	2852.07	36.27	51.54	40.95	51.71	0.000007	3.34	1200.38	129.53	0.15
P118-00-00	P118-R2-1	41243.9	JENSEN DR										
P118-00-00	P118-R2-1	41203.4	Max WS	2852.28	36.25	51.57		51.7	0.000006	2.99	1204.72	129.64	0.14

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	41197.4	Max WS	2851.99	36.25	51.54	40.94	51.7	0.000007	3.32	1247.27	132.43	0.15
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge										
P118-00-00	P118-R2-1	41185.7	Max WS	2851.46	36.25	51.52		51.69	0.000004	3.34	1247.55	139.86	0.15
P118-00-00	P118-R2-1	40951.8	Max WS	2852.52	36.2	51.61	40.04	51.66	0.000005	1.75	1686.88	165.99	0.09
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40886.8	Max WS	2852.59	36.19	51.61		51.66	0.000005	1.7	1729.76	168.99	0.09
P118-00-00	P118-R2-1	40846.9	Max WS	2852.59	36.18	51.59	40.61	51.66	0.000009	2.03	1426.03	160.29	0.11
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge										
P118-00-00	P118-R2-1	40605.5	Max WS	2852.66	36.13	51.59		51.65	0.000008	2.02	1428.4	158.67	0.11
P118-00-00	P118-R2-1	40584.6	Max WS	2852.66	36.13	51.59	40.57	51.65	0.000009	2.02	1412.2	137.74	0.11
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40515.6	Max WS	2852.28	36.12	51.58		51.64	0.000009	2.02	1412.55	137.75	0.11
P118-00-00	P118-R2-1	39969.8	Max WS	2851.81	36.01	51.55		51.63	0.000022	2.39	1273.87	173.85	0.14
P118-00-00	P118-R2-1	39829.31	Max WS	3033.96	36	51.34		51.56	0.000978	3.74	810.57	112.74	0.25
P118-00-00	P118-R2-1	39188.6	Max WS	2503.32	35.6	50.45		50.69	0.001013	3.93	636.89	80.6	0.25
P118-00-00	P118-R2-1	38423.57	Max WS	2726.53	34.76	49.6		49.87	0.001022	4.16	654.87	76.34	0.25
P118-00-00	P118-R2-1	38170.2	Max WS	2726.1	34.35	49.54		49.68	0.000455	2.95	925.04	109.69	0.17
P118-00-00	P118-R2-1	37899.37	Max WS	2724.44	34.35	49.41		49.55	0.000472	2.99	911.03	100.96	0.18
P118-00-00	P118-R2-1	37413.16	Max WS	2718.47	34.13	49.06		49.25	0.000738	3.48	782.02	97.53	0.22
P118-00-00	P118-R2-1	37258.6	Max WS	2715.72	34.02	48.92		49.13	0.000758	3.68	737.18	82.7	0.22
P118-00-00	P118-R2-1	36408.6	Max WS	2695.98	32.39	48.21		48.45	0.00086	3.92	700.69	90.91	0.23
P118-00-00	P118-R2-1	36341.47	Max WS	2694.18	32.39	48.14	40.75	48.39	0.000882	3.95	683.12	78.33	0.23
P118-00-00	P118-R2-1	36330 UTILITY	Bridge										
P118-00-00	P118-R2-1	36321.56	Max WS	2698.75	32	48.28		48.38	0.000305	2.54	1060.82	103.42	0.14
P118-00-00	P118-R2-1	36303.5	Max WS	2698.5	32	48.27		48.37	0.000291	2.5	1081.39	108.14	0.14
P118-00-00	P118-R1-3	36195.78	Max WS	3625.01	32.04	48.14		48.32	0.000532	3.41	1062.44	106.16	0.19
P118-00-00	P118-R1-3	36107.2	Max WS	3624.93	32	48.09		48.27	0.000533	3.41	1061.64	106.13	0.19
P118-00-00	P118-R1-3	35434.7	Max WS	3624.21	31.72	47.83		47.97	0.000357	3.04	1191.78	102.03	0.16
P118-00-00	P118-R1-3	35045.7	Max WS	3623.69	31.55	47.69	37.71	47.83	0.000369	3.07	1180.38	102.13	0.16
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge										
P118-00-00	P118-R1-3	35006.1	Max WS	3623.47	31.09	47.64		47.78	0.00034	2.96	1223.07	104.87	0.15
P118-00-00	P118-R1-3	34984.3	Max WS	3623.25	30.53	47.6	38.42	47.77	0.00046	3.39	1170.57	133.58	0.18
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge										
P118-00-00	P118-R1-3	34870.3	Max WS	3623.25	30	47.55		47.7	0.000403	3.23	1235.53	137.37	0.17
P118-00-00	P118-R1-3	33920.1	Max WS	3667.2	29.63	46.72		47.04	0.001008	4.54	807.21	79.52	0.25
P118-00-00	P118-R1-3	32749.8	Max WS	3718.39	28	45.29		45.67	0.001309	4.93	753.91	82.02	0.29
P118-00-00	P118-R1-3	31824.3	Max WS	3759.45	26.81	44.42		44.69	0.000786	4.12	913.25	89.81	0.23
P118-00-00	P118-R1-3	30679.1	Max WS	3804.12	27.05	43.47		43.74	0.000839	4.22	903.04	102.51	0.24
P118-00-00	P118-R1-3	30678.1	Lat Struct										
P118-00-00	P118-R1-3	30099.1	Max WS	3825.58	27.23	43.2		43.37	0.000443	3.29	1177.82	138.05	0.18
P118-00-00	P118-R1-3	29757.8	Max WS	3841.45	27.34	43.02	33.95	43.2	0.000492	3.4	1132.3	115.08	0.18
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge										
P118-00-00	P118-R1-3	29704.8	Max WS	3839.37	27	42.97		43.14	0.00045	3.31	1165.21	117.71	0.18
P118-00-00	P118-R1-3	28983.7	Max WS	3781.38	26.97	42.13		42.49	0.001333	4.77	802.65	106.2	0.29
P118-00-00	P118-R1-3	28387.3	Max WS	4264.83	26.04	41.66		41.86	0.000559	3.54	1243.54	165.76	0.2
P118-00-00	P118-R1-3	27992	Max WS	4254.48	25.42	41.31		41.59	0.000859	4.31	1172.74	237.35	0.24
P118-00-00	P118-R1-3	27567.7	Max WS	4245.41	25.74	41.07		41.29	0.00052	3.74	1276.16	197.87	0.19
P118-00-00	P118-R1-3	27317	Max WS	4240	25.92	40.93	32.84	41.16	0.000584	3.86	1191.75	155.26	0.2
P118-00-00	P118-R1-3	27306.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27305.8	Max WS	4237.6	25.93	40.91		41.14	0.000567	3.84	1201.14	154.78	0.2
P118-00-00	P118-R1-3	27295.8	Max WS	4238.4	25.93	40.91	32.62	41.13	0.000568	3.84	1200.22	154.69	0.2
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge										
P118-00-00	P118-R1-3	27189.8	Max WS	4229.24	25.89	40.74		40.97	0.000588	3.88	1180.98	152.89	0.21
P118-00-00	P118-R1-3	27180.8	Max WS	4228.38	25.89	40.73	32.58	40.97	0.000589	3.88	1180.13	152.81	0.21
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27167.5	Max WS	4231.81	25.84	40.78		40.96	0.000492	3.47	1281.18	156.16	0.19
P118-00-00	P118-R1-3	26816.8*	Max WS	4219.74	25.02	40.57		40.75	0.000551	3.44	1244.68	145.31	0.2
P118-00-00	P118-R1-3	26815.8	Lat Struct										
P118-00-00	P118-R1-3	26466.1	Max WS	4207.26	24.2	40.37		40.57	0.000627	3.53	1192.51	137.25	0.21
P118-00-00	P118-R1-3	26224.4*	Max WS	4199.79	23.64	40.23		40.41	0.000544	3.37	1254.2	147.18	0.19
P118-00-00	P118-R1-3	25982.8	Max WS	4191.73	23.07	40.14		40.3	0.000468	3.2	1325.78	153.19	0.18
P118-00-00	P118-R1-3	25318.4	Max WS	4153.98	23.07	39.8		39.97	0.000511	3.29	1279.09	173.34	0.19
P118-00-00	P118-R1-3	25317.4	Lat Struct										
P118-00-00	P118-R1-3	24564.2	Max WS	4111.28	21.76	39.5		39.63	0.000363	2.96	1441.05	148.45	0.16
P118-00-00	P118-R1-3	23984.6	Max WS	4894.49	20.75	39.21		39.37	0.000412	3.29	1723.66	261.01	0.17
P118-00-00	P118-R1-2	23796.2	Max WS	5282.84	24.42	39.09		39.28	0.000485	3.51	1510.8	170.01	0.21
P118-00-00	P118-R1-2	23795.2	Lat Struct										
P118-00-00	P118-R1-2	23286.2	Max WS	5280.76	20.82	38.8		39.01	0.00058	3.7	1426.4	136.64	0.2
P118-00-00	P118-R1-2	22973.4	Max WS	5279.13	20.85	38.67	28.8	38.85	0.000444	3.42	1600.58	208.89	0.18
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22929.4	Max WS	5278.38	20.49	38.25		38.44	0.00045	3.43	1588.12	204.93	0.18
P118-00-00	P118-R1-2	22928.4	Lat Struct										
P118-00-00	P118-R1-2	22630.3	Max WS	5268.86	19.11	37.86	28.75	38.23	0.000993	4.87	1082.44	97.99	0.26

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 JA 10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22587.7	Max WS	5259.43	18.99	37.65		38.02	0.001013	4.9	1073.34	97.68	0.26
P118-00-00	P118-R1-2	22577.7	Max WS	5259.22	18.99	37.64		38.01	0.001016	4.9	1072.3	97.64	0.26
P118-00-00	P118-R1-1	22186.8	Max WS	5515.1	18.55	37.3		37.63	0.000816	4.63	1195.57	100.56	0.23
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	5524.97	18.16	37.25		37.4	0.000392	3.14	1808.13	181.82	0.17
P118-00-00	P118-R1-1	21589.8	Max WS	6252.82	17.9	36.89		37.23	0.000739	4.73	1449.67	159.04	0.23
P118-00-00	P118-R1-1	21362	Max WS	6246.2	17.65	36.78		37.14	0.000062	4.78	1368.05	127.87	0.23
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	6241.8	17.65	36.78	27.77	37.14	0.000062	4.77	1367.8	127.86	0.23
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	6241.8	17.62	36.74		37.1	0.000062	4.78	1366.67	127.79	0.23
P118-00-00	P118-R1-1	21010.4	Max WS	6224.56	18.08	36.78	26.03	37.03	0.000437	4.35	2160.7	206.98	0.18
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	6224.56	17.96	36.7		36.94	0.000434	4.34	2168.22	207.35	0.18
P118-00-00	P118-R1-1	20880.6	Max WS	6210.18	17.96	36.46	28.07	37.06	0.000087	6.39	1679.49	189.74	0.29
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	6210.18	17.96	36.4		37.01	0.000088	6.41	1669.76	189.18	0.29
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	6274.87	19.24	35.32		35.97	0.002137	6.45	990.13	206.71	0.37
P118-00-00	P118-R1-1	18597.4	Max WS	6535.88	15.56	33.56		34.03	0.000877	5.51	1342.04	145.17	0.27
P118-00-00	P118-R1-1	18107.1	Max WS	6521.51	15.21	33.19		33.49	0.000988	4.37	1493.4	167.44	0.26
P118-00-00	P118-R1-1	17862.9*	Max WS	6508.88	14.55	33.06		33.29	0.000677	3.9	1668.22	167.21	0.22
P118-00-00	P118-R1-1	17618.7*	Max WS	6506.88	13.89	32.97		33.17	0.000491	3.58	1816.76	162.28	0.19
P118-00-00	P118-R1-1	17374.5*	Max WS	6506.11	13.23	32.87		33.05	0.000386	3.39	1916.4	153.68	0.17
P118-00-00	P118-R1-1	17130.3	Max WS	6593.59	12.57	32.79		32.97	0.000337	3.35	1967.68	142.63	0.16
P118-00-00	P118-R1-1	16004	Max WS	6673	11.24	32.28		32.48	0.000543	3.56	1873.9	177.6	0.19
P118-00-00	P118-R1-1	15945.6	Max WS	7051.64	10.55	31.53		31.84	0.000743	4.49	1572.2	132.71	0.23
P118-00-00	P118-R1-1	13937.2	Max WS	7040.85	11.62	30.84		31.13	0.000621	4.57	2229.06	294.92	0.22
P118-00-00	P118-R1-1	13341.9	Max WS	7031.75	10.38	30.25		30.71	0.000986	5.73	1794.24	253.62	0.27
P118-00-00	P118-R1-1	12945.5	Max WS	7026.34	9.55	30.02	21.57	30.33	0.000692	4.97	2365.97	339.98	0.23
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	7025.31	9.53	29.92		30.24	0.000707	5	2340.76	337.7	0.23
P118-00-00	P118-R1-1	12931.7	Max WS	7025.29	9.53	29.92	21.55	30.24	0.000707	5	2340.51	337.68	0.23
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	7022.59	8.77	29.66		29.95	0.000609	4.75	2512.97	353.09	0.22
P118-00-00	P118-R1-1	12117.3	Max WS	7019.98	7.23	29.35		29.55	0.000325	3.75	2224.54	211.28	0.16
P118-00-00	P118-R1-1	10905.1	Max WS	7628.87	9.54	28.47		28.85	0.00081	5.01	1741.35	183.68	0.25
P118-00-00	P118-R1-1	9879.2	Max WS	7609.9	6.26	27.34		27.9	0.001126	6.26	1724.22	184.77	0.29
P118-00-00	P118-R1-1	8777	Max WS	7599.64	4.71	26.73		26.87	0.000415	3.34	4121.87	680.04	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	7596.38	4.73	26.38		26.57	0.00038	3.7	3224.83	364.99	0.17
P118-00-00	P118-R1-1	6779.3	Max WS	7592.41	4.44	25.64		25.93	0.000679	4.36	2211.29	377.31	0.22
P118-00-00	P118-R1-1	5748.4	Max WS	7587.04	4.27	24.24		24.89	0.001546	6.63	1600.24	270.05	0.33
P118-00-00	P118-R1-1	4492	Max WS	7583	1.92	23.09		23.4	0.00071	4.48	1833.45	225.16	0.23
P118-00-00	P118-R1-1	3597.9	Max WS	7580.85	2.46	22.33		22.68	0.000983	5.09	2247.27	318.71	0.27
P118-00-00	P118-R1-1	2709.4	Max WS	7579.42	1.59	21.53		21.88	0.000814	5.15	2522.86	343.44	0.25
P118-00-00	P118-R1-1	1695.9	Max WS	7578.87	1.52	20.46		20.94	0.001156	6.03	2171.41	309.88	0.29
P118-00-00	P118-R1-1	678.7	Max WS	7578.83	0.81	18.08	12.87	19.04	0.0028	7.92	1060.09	190.38	0.43
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.85		49.89	0.001737	1.63	18.45	16.57	0.27
P118-08-00	P118-08-00	7839.79	Max WS	30	47.55	49.11		49.14	0.001059	1.25	24.04	22.54	0.21
P118-08-00	P118-08-00	7820.27	Max WS	30.76	47.46	49.08	48.28	49.11	0.001353	1.31	23.46	24.62	0.24
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	30.75	47.58	48.76		48.85	0.007182	2.52	12.19	16.77	0.52
P118-08-00	P118-08-00	7729.04	Max WS	32.47	46.32	48.69		48.71	0.00029	1.09	29.67	33.74	0.13
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	32.47	46.88	48.64		48.68	0.000832	1.5	21.67	21.52	0.2
P118-08-00	P118-08-00	7550.89	Max WS	35.48	46.66	48.59		48.62	0.000817	1.29	27.57	26.19	0.19
P118-08-00	P118-08-00	6762.47	Max WS	71.81	44.81	47.98		48.01	0.000607	1.46	51.28	30.78	0.18
P118-08-00	P118-08-00	5858.77	Max WS	102.45	44.48	47.29		47.32	0.000765	1.61	145.89	310.08	0.2
P118-08-00	P118-08-00	5845.88	Max WS	102.89	44.35	47.2		47.39	0.000253	3.5	29.36	454.32	0.38
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	102.88	44.6	47.15		47.39	0.000356	3.87	26.59	1379.78	0.44
P118-08-00	P118-08-00	5748.41	Max WS	104.27	44.22	47.27		47.33	0.001236	2.08	56.02	691.6	0.25
P118-08-00	P118-08-00	4837.06	Max WS	123.22	41.61	45.31		45.43	0.002556	2.75	44.85	672.03	0.36
P118-08-00	P118-08-00	4823.61	Max WS	123.69	41.31	45.32		45.4	0.001466	2.2	58.84	809.98	0.27
P118-08-00	P118-08-00	4767.88	Max WS	124.51	41.28	45.18		45.29	0.002235	2.65	46.95	893.8	0.33
P118-08-00	P118-08-00	4732.44	Max WS	125.76	41.13	45.18		45.24	0.000866	1.96	64.07	816.8	0.22
P118-08-00	P118-08-00	4289.14	Max WS	135.59	41.25	44.27		44.41	0.002524	3	46.47	731.53	0.36
P118-08-00	P118-08-00	4255.48	Max WS	131.14	41.41	44.19	43.08	44.35	0.000339	3.22	40.74	671.84	0.4
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	130.85	41.23	44.2		44.34	0.000324	3.02	43.39	937.31	0.39
P118-08-00	P118-08-00	4159.81	Max WS	132.89	40.8	44.23		44.32	0.000848	2.37	56	812.98	0.23

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_JA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-08-00	P118-08-00	4083.03	Culvert										
P118-08-00	P118-08-00	4007.74	Max WS	133.61	40.16	44.25		44.32	0.000601	2.15	62.16	31.29	0.2
P118-08-00	P118-08-00	3928.82	Max WS	138.87	38.97	44.25		44.27	0.000258	1.27	159.92	114.87	0.12
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	202.53	38.34	43.88		43.93	0.000541	1.88	122.21	110.86	0.18
P118-08-00	P118-08-00	2630.49	Max WS	172.12	37.06	43.59		43.62	0.000239	1.3	200.09	124.57	0.12
P118-08-00	P118-08-00	1901.01	Max WS	96.76	35.97	43.51		43.51	0.000034	0.55	340.9	583.47	0.05
P118-08-00	P118-08-00	1219.08	Max WS	65.52	33.28	43.5		43.5	0.000005	0.24	317.03	641.82	0.02
P118-08-00	P118-08-00	1186.93	Max WS	139.77	34.39	36.05	36.05	37.19	0.011576	8.55	16.36	14.42	1.41
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	235.18	34.03	37.97		38.11	0.001372	3.03	77.69	29.3	0.28
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	235.18	33.5	37.94		38.06	0.001022	2.73	86.14	31.15	0.25
P118-08-00	P118-08-00	890.93	Max WS	250.27	28.97	37.82		37.87	0.000364	1.81	138.44	26.69	0.14
P118-08-00	P118-08-00	881.12	Max WS	261.61	27.91	37.79		37.82	0.000156	1.3	201.26	37.38	0.1
P118-08-00	P118-08-00	846.44	Max WS	273.28	26.44	37.76		37.79	0.000327	1.22	224.29	38.23	0.09
P118-08-00	P118-08-00	68.07	Max WS	272.02	23.63	37.76		37.77	0.000008	0.42	659.01	84.42	0.03
P118-09-00	P118-09-00	8416.71	Max WS	70.65	52.44	56.27		56.29	0.002467	1.19	59.54	27.97	0.14
P118-09-00	P118-09-00	8415.71	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	70.06	51.25	55.79		55.81	0.000214	0.98	71.85	28.35	0.11
P118-09-00	P118-09-00	7947.1	Max WS	121.82	50.5	55.58		55.75	0.000122	3.35	36.37	30.33	0.28
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	120.77	50.64	55.41		55.49	0.000091	2.61	255.31	131.13	0.23
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	123.92	50.66	55.43		55.43	0.000096	0.62	449.67	151.64	0.07
P118-09-00	P118-09-00	7037.08	Max WS	162.42	50.59	55.11		55.16	0.000773	1.84	88.34	36.04	0.21
P118-09-00	P118-09-00	6335.17	Max WS	201.37	50.38	54.54		54.58	0.000811	1.93	195.91	179.38	0.21
P118-09-00	P118-09-00	6241.34	Max WS	207.18	49.73	54.44		54.6	0.000158	3.4	207.69	259.74	0.31
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	207.18	49.91	54.42		54.6	0.000167	3.52	152.39	141.12	0.31
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	209.73	49.94	54.44		54.53	0.001268	2.52	142.14	113.81	0.26
P118-09-00	P118-09-00	6006.93	Max WS	215.44	49.66	54.26		54.34	0.001363	2.49	143.45	118.59	0.27
P118-09-00	P118-09-00	5998.6	Max WS	216.14	49.63	54.23		54.33	0.001542	2.64	125.86	105.62	0.29
P118-09-00	P118-09-00	5978.1	Max WS	217.83	49.66	54.23		54.28	0.000985	2.08	251.34	312.28	0.23
P118-09-00	P118-09-00	5970.8	Max WS	218.42	49.74	54.23		54.26	0.000686	1.68	430.59	631.23	0.19
P118-09-00	P118-09-00	5869.16	Max WS	224.49	49.31	54.15		54.19	0.0008	1.96	350.87	549.84	0.21
P118-09-00	P118-09-00	5818.16	Max WS	225.18	49.47	54.04		54.43	0.000334	5.21	145.95	365.49	0.46
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	225.33	49.13	54.04	52.13	54.4	0.000266	4.9	100.89	174.64	0.41
P118-09-00	P118-09-00	5685.64	Max WS	227.04	49.01	54.13		54.23	0.001285	2.59	141.9	189.98	0.27
P118-09-00	P118-09-00	4961.22	Max WS	252.06	47.46	53.35		53.45	0.001048	2.52	102.88	70.42	0.25
P118-09-00	P118-09-00	4862.39	Max WS	253.11	47.3	53.03		53.43	0.000239	5.03	50.3	26.33	0.4
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	256.28	47.66	52.68		53.24	0.000415	5.98	42.89	24.15	0.51
P118-09-00	P118-09-00	4717.67	Max WS	259.86	47.29	52.96		53.1	0.001516	2.93	88.6	28.33	0.29
P118-09-00	P118-09-00	4354.22	Max WS	286.28	46.81	52.39		52.53	0.001508	3.01	95.23	29.35	0.29
P118-09-00	P118-09-00	4232.29	Max WS	103.38	45.84	52.02		52.07	0.000028	1.83	56.56	24.08	0.14
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	103.36	45.75	52.01		52.06	0.000036	1.95	52.97	22.6	0.15
P118-09-00	P118-09-00	4101.99	Max WS	104.54	46.19	52.02		52.06	0.000059	1.66	63.13	21.4	0.17
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	113.98	45.18	52		52.03	0.000035	1.39	142.65	74.96	0.13
P118-09-00	P118-09-00	3214.67	Max WS	352.37	43.86	50.44		50.71	0.00031	4.17	84.72	28.84	0.4
P118-09-00	P118-09-00	3131.26	Max WS	356.58	43.6	50.08		50.69	0.000351	6.27	56.89	19.75	0.46
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	303.24	43.59	48		49.26	0.001446	9.01	33.66	14.46	0.87
P118-09-00	P118-09-00	2939.54	Max WS	386.88	43.48	47.81	48.25	49.62	0.003618	10.79	35.85	15.98	1.27
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	385.38	42.41	47.23	46.5	47.92	0.000987	6.7	75.32	50.58	0.7
P118-09-00	P118-09-00	1673	Max WS	421.26	39.78	46.71		47.19	0.000707	5.64	104.03	93.09	0.58
P118-09-00	P118-09-00	1610.87	Max WS	422.07	39.04	46.75		47.13	0.000144	5.01	136.79	104.73	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	422.07	38	46.78		47.1	0.000108	4.56	139.58	87.34	0.28
P118-09-00	P118-09-00	1491.18	Max WS	425.2	37.86	46.81		46.97	0.002541	3.4	170.13	95.97	0.3
P118-09-00	P118-09-00	945.12	Max WS	451.22	36.86	44.87		45.16	0.004176	4.3	105.11	32.92	0.38
P118-09-00	P118-09-00	435.38	Max WS	477.59	35.21	43.93		43.96	0.000171	1.34	356.7	75.77	0.11
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	478.24	35.18	43.93		43.96	0.000158	1.31	366.28	76.19	0.1
P118-09-00	P118-09-00	376.38	Culvert										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_JA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-09-00	P118-09-00	222.06	Max WS	386.81	24.19	39.32		39.32	0.000007	0.38	1012.23	126.34	0.02
P118-09-00	P118-09-00	209.24	Max WS	386.8	24.13	39.32		39.32	0.000007	0.38	1013.35	127.46	0.02
P118-09-00	P118-09-00	139.66	Max WS	386.77	23.56	39.32		39.32	0.000006	0.36	1087.53	132.05	0.02
P118-09-00	P118-09-00	74.44	Max WS	386.68	22.87	39.32		39.32	0.000004	0.34	1137.02	111.2	0.02
P118-14-00	P118-14-00 001	13760.5	Max WS	67.31	58.1	62.66		62.67	0.000137	0.83	81.33	126.76	0.09
P118-14-00	P118-14-00 001	13096.8	Max WS	66.85	57.3	62.6		62.61	0.000045	0.53	125.1	55.33	0.05
P118-14-00	P118-14-00 001	11983.3	Max WS	212.46	56.1	62.47		62.49	0.00012	1.05	203.17	504.65	0.09
P118-14-00	P118-14-00 001	11755.1											
P118-14-00	P118-14-00 001	11526.9	Max WS	211.61	55.3	61.85		61.87	0.00025	1.31	161	70.55	0.12
P118-14-00	P118-14-00 001	10870.6	Max WS	313.92	55	61.52		61.58	0.000443	1.88	166.87	195.24	0.17
P118-14-00	P118-14-00 001	10833.25											
P118-14-00	P118-14-00 001	10795.9	Max WS	313.91	55.5	61.17		61.25	0.000805	2.28	137.94	341.32	0.22
P118-14-00	P118-14-00 001	10606.9	Max WS	338.91	55.19	61.09		61.13	0.00032	1.66	204.32	49.46	0.14
P118-14-00	P118-14-00 001	9666.7	Max WS	456.96	54.05	60.88		60.9	0.000132	1.19	383.38	79.59	0.1
P118-14-00	P118-14-00 001	8993.1	Max WS	548.28	53.23	60.68		60.73	0.000333	1.82	307.76	445.47	0.15
P118-14-00	P118-14-00 001	8655.1	Max WS	587.54	51.98	60.53		60.61	0.000411	2.38	448.56	854.64	0.17
P118-14-00	P118-14-00 001	8532.1	Max WS	587.32	51.53	60.51		60.54	0.000165	1.57	1428.91	1578.78	0.11
P118-14-00	P118-14-00 001	8507											
P118-14-00	P118-14-00 001	8481.9	Max WS	564.89	51.41	59.6		59.7	0.000483	2.48	351.51	726.61	0.18
P118-14-00	P118-14-00 001	8025.2	Max WS	556.99	50.63	59.38		59.46	0.000518	2.34	436.83	652.59	0.18
P118-14-00	P118-14-00 001	7510.9	Max WS	604.62	49.74	59.18		59.23	0.000295	1.91	1089.03	1528.43	0.14
P118-14-00	P118-14-00 001	6550.7	Max WS	697.29	48.37	58.93		58.98	0.000215	1.94	990.55	1452.55	0.12
P118-14-00	P118-14-00 001	6479.1	Max WS	705.13	48.26	58.92		58.96	0.00016	1.69	1428.75	1929.53	0.11
P118-14-00	P118-14-00 001	6454.1											
P118-14-00	P118-14-00 001	6429.1	Max WS	704.86	48.13	58.41		58.47	0.000264	2.09	816.11	1799.24	0.14
P118-14-00	P118-14-00 001	6302.9	Max WS	716.85	48.15	58.35		58.43	0.000479	2.34	404.89	605.89	0.18
P118-14-00	P118-14-00 001	6179.9	Max WS	729.32	48.17	58.3	52.97	58.38	0.000405	2.36	725.74	1351.03	0.17
P118-14-00	P118-14-00 001	6165.4											
P118-14-00	P118-14-00 001	6150.9	Max WS	729.31	48.08	58.27		58.34	0.000372	2.27	815.47	1365.39	0.16
P118-14-00	P118-14-00 001	5970	Max WS	746.35	47.75	58.2		58.28	0.000389	2.47	713.61	983.38	0.17
P118-14-00	P118-14-00 001	5823.6	Max WS	760.07	47.49	58.17	52.58	58.2	0.000188	1.73	2001.89	2379.61	0.12
P118-14-00	P118-14-00 001	5800.1											
P118-14-00	P118-14-00 001	5776.6	Max WS	758.58	47.36	58.01		58.04	0.000201	1.79	1913.14	2377.3	0.12
P118-14-00	P118-14-00 001	5628.5	Max WS	771.35	47.07	57.95		58.03	0.000269	2.26	744.56	1015.61	0.14
P118-14-00	P118-14-00 001	5509.6	Max WS	781.75	46.83	57.93		57.98	0.000324	2.11	1556.65	2469.65	0.15
P118-14-00	P118-14-00 001	5484.6											
P118-14-00	P118-14-00 001	5459.6	Max WS	754.51	46.8	57.77		57.83	0.000391	2.28	1282.83	2435.61	0.16
P118-14-00	P118-14-00 001	5294.4	Max WS	763.42	46.75	57.72		57.77	0.000172	1.8	904.15	990.65	0.11
P118-14-00	P118-14-00 001	5163	Max WS	773.35	46.71	57.71		57.74	0.000114	1.46	2122.72	2860.07	0.09
P118-14-00	P118-14-00 001	5136											
P118-14-00	P118-14-00 001	5111	Max WS	761.31	46.69	57.57		57.59	0.000135	1.57	1854.07	2836.19	0.1
P118-14-00	P118-14-00 001	4683.7	Max WS	790.49	46.27	57.48		57.53	0.000231	2.04	1225.92	1521.28	0.13
P118-14-00	P118-14-00 001	4316.3	Max WS	813.52	45.82	57.39		57.46	0.000244	2.15	913.14	961.98	0.13
P118-14-00	P118-14-00 001	4164.8	Max WS	824.29	45.65	57.38		57.4	0.000111	1.47	2411.82	2002.28	0.09
P118-14-00	P118-14-00 001	4140.3											
P118-14-00	P118-14-00 001	4115.8	Max WS	787.67	45.6	56.57		56.63	0.000277	2.18	1036.68	1371.44	0.14
P118-14-00	P118-14-00 001	3617.5	Max WS	812.8	45.9	56.41		56.48	0.000342	2.16	811.82	1334.06	0.16
P118-14-00	P118-14-00 001	3259.8	Max WS	837.01	46.12	56.27		56.34	0.000398	2.26	943.27	1553.82	0.17
P118-14-00	P118-14-00 001	3169.5	Max WS	841.89	46.17	56.2	50.81	56.31	0.000556	2.66	322.15	1672.5	0.2
P118-14-00	P118-14-00 001	3141.3											
P118-14-00	P118-14-00 001	3113.1	Max WS	841.51	46.07	56.11		56.22	0.000554	2.66	322.47	1679.45	0.2
P118-14-00	P118-14-00 001	2974.8	Max WS	850.56	45.87	56.1		56.13	0.000182	1.62	1092.3	1869.38	0.12
P118-14-00	P118-14-00 001	2884.9	Max WS	856.72	45.74	56.08		56.12	0.000161	1.57	1161.56	1530.04	0.11
P118-14-00	P118-14-00 001	2836.2	Max WS	860.95	45.67	56.06		56.12	0.000308	2.11	1079.34	1510.65	0.15
P118-14-00	P118-14-00 001	2771.2											
P118-14-00	P118-14-00 001	2706.2	Max WS	732.03	45.15	53.49		53.64	0.000921	3.05	240.15	49.72	0.24
P118-14-00	P118-14-00 001	2164.7	Max WS	757.12	43.47	53.31		53.33	0.000094	1.25	690.3	133.14	0.09
P118-14-00	P118-14-00 001	1654.8	Max WS	819.71	41.9	53.27		53.29	0.000061	1.09	870.39	475.87	0.07
P118-14-00	P118-14-00 001	1523.9	Max WS	833.21	41.49	53.27		53.28	0.000057	1.08	769.34	1100.88	0.07
P118-14-00	P118-14-00 001	1492.9											
P118-14-00	P118-14-00 001	1461.9	Max WS	812.54	41.24	53.13		53.14	0.000052	1.04	780.26	1210.33	0.07
P118-14-00	P118-14-00 001	1132.9	Max WS	832.79	40.69	52.87		53.01	0.001057	3.23	633.02	1107.23	0.24
P118-14-00	P118-14-00 001	226.85	Max WS	936.87	39.16	48.7		49.34	0.006458	6.81	193.82	80.97	0.56
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067											
P118-21-00	P118-21-00	3066											
P118-21-00	P118-21-00	2499.4	Max WS	5	67.88	69.26		69.27	0.008148	0.79	6.34	8.05	0.16
P118-21-00	P118-21-00	2493.18	Max WS	5.58	67.95	69.18		69.19	0.015816	0.94	6	17.45	0.21
P118-21-00	P118-21-00	2450.3	Max WS	4.5	67.59	69.06		69.06	0.000033	0.3	15.3	19.93	0.06
P118-21-00	P118-21-00	2416.26	Max WS	5.79	67.5	69.05		69.06	0.000118	0.36	16.01	18.52	0.07
P118-21-00	P118-21-00	2398.13	Max WS	6.95	67.44	69.05		69.05	0.000125	0.4	17.54	18.55	0.07
P118-21-00	P118-21-00	2389.56	Max WS	8.04	67.41	69.05		69.05	0.000061	0.45	17.97	18.56	0.08
P118-21-00	P118-21-00	2343.79	Max WS	9.97	67.54	69.02		69.04	0.000477	1.14	8.77	10.21	0.22

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Ait3_IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	11.98	67.47	68.96		68.99	0.001639	1.35	8.86	9.83	0.25
P118-21-00	P118-21-00	2208.42	Max WS	14.64	67.31	68.75		68.79	0.002303	1.57	9.33	10.84	0.3
P118-21-00	P118-21-00	2195.48	Max WS	14.64	67.34	68.73		68.77	0.000885	1.54	9.52	11.25	0.29
P118-21-00	P118-21-00	2169.49	Max WS	14.64	66.56	68.73		68.75	0.000221	1.05	13.99	9.6	0.15
P118-21-00	P118-21-00	2167.76	Max WS	14.64	66.37	68.74		68.75	0.000129	0.84	17.46	11.41	0.12
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	6.11	65.03	68.57		68.57	0.000005	0.18	33.39	18.48	0.02
P118-21-00	P118-21-00	2100.84	Max WS	6.11	64.78	68.57		68.57	0.000009	0.17	36.94	18.2	0.02
P118-21-00	P118-21-00	1662.37	Max WS	13.89	63.91	68.56		68.56	0.000011	0.23	61.04	30.84	0.02
P118-21-00	P118-21-00	1144.5	Max WS	5.7	62.63	68.56		68.56	0.000001	0.07	84.5	23	0.01
P118-21-00	P118-21-00	595.53	Max WS	-76.86	61.49	68.56		68.56	0.000022	-0.41	188.93	47.22	0.04
P118-21-00	P118-21-00	549.31*	Max WS	-84.03	61.18	68.56		68.56	0.000022	-0.44	194.97	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-90.79	60.87	68.56		68.56	0.000022	-0.46	198.74	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-97.39	60.57	68.56		68.56	0.000023	-0.49	200.09	38.81	0.04
P118-21-00	P118-21-00	410.63*	Max WS	-103.91	60.26	68.56		68.56	0.000024	-0.53	199.2	36.01	0.04
P118-21-00	P118-21-00	364.41*	Max WS	-110.32	59.95	68.56		68.56	0.000027	-0.57	195.8	33.23	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-117.11	59.64	68.56		68.56	0.00003	-0.62	190.17	30.43	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-123.85	59.34	68.56		68.56	0.000035	-0.68	182.13	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	-128.68	59.03	68.56		68.57	0.000042	-0.75	171.81	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-132.75	58.72	68.56		68.57	0.000062	-0.83	159.18	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	-138.08	57.98	68.56		68.57	0.000056	-0.81	170.69	22.53	0.05
P118-21-00	P118-21-00	139.31*	Max WS	-138.36	57.24	68.56		68.57	0.000047	-0.76	182.66	23.06	0.05
P118-21-00	P118-21-00	119.21*	Max WS	-125.32	56.51	68.57		68.58	0.000032	-0.64	195.04	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-112.12	55.77	68.57		68.58	0.000022	-0.54	207.71	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-99.46	55.03	68.58		68.58	0.000015	-0.45	220.71	24.66	0.03
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	72.9		72.9	0.000007	0.17	58.38	22.06	0.02
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	72.9		72.9	0.000011	0.2	49.5	21.64	0.02
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.45	70.08	72.9	70.24	72.9	0.000014	0.22	46.64	21.61	0.03
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.45	70.2	72.9		72.9	0.000018	0.24	43.3	21.12	0.03
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.24	70.16	72.9		72.9	0.000024	0.28	40.8	20.83	0.03
P118-23-00	P118-23-00 R2	7654.51	Max WS	16.2	69.97	72.89		72.9	0.000041	0.37	43.62	20.86	0.05
P118-23-00	P118-23-00 R2	7632.63	Max WS	18.13	69.88	72.89		72.89	0.00005	0.42	43.65	20.53	0.05
P118-23-00	P118-23-00 R2	7614.73	Max WS	19.46	68.92	72.89		72.89	0.000041	0.4	48.43	20.41	0.05
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	19.46	69.39	72.81		72.81	0.000042	0.4	48.44	20.72	0.05
P118-23-00	P118-23-00 R2	7567.5	Max WS	20.69	69.56	72.81		72.81	0.000054	0.45	45.87	20.15	0.05
P118-23-00	P118-23-00 R2	7426.94	Max WS	27.72	68.48	72.79		72.8	0.000083	0.57	48.31	136.26	0.06
P118-23-00	P118-23-00 R2	7369.89	Max WS	31.84	68.06	72.78		72.79	0.000089	0.62	51.74	51.21	0.07
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	31.84	69.59	72.6		72.64	0.000389	1.52	20.94	19.96	0.15
P118-23-00	P118-23-00 R2	7313.37	Max WS	32.92	69.5	72.62		72.63	0.000097	0.61	53.98	23.48	0.07
P118-23-00	P118-23-00 R2	7305.97	Max WS	33.48	69.12	72.62		72.62	0.000082	0.59	56.72	22.51	0.07
P118-23-00	P118-23-00 R2	7294.91	Max WS	34.23	69.43	72.62		72.62	0.000079	0.69	49.35	22.19	0.07
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	34.23	69.34	72.43		72.44	0.000166	0.98	35	42.12	0.1
P118-23-00	P118-23-00 R2	7237.19	Max WS	36.35	69.28	72.43		72.44	0.00012	0.66	54.8	25.66	0.08
P118-23-00	P118-23-00 R2	6786.22	Max WS	75.35	68.02	72.35		72.36	0.000171	0.9	89.87	133.78	0.1
P118-23-00	P118-23-00 R2	6723.56	Max WS	81.17	67.37	72.34		72.35	0.000092	0.73	111.57	36.54	0.07
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	81.17	67.54	71.16		71.24	0.002138	2.36	34.4	19.7	0.31
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	91.47	67.16	71.07		71.1	0.000518	1.48	61.78	25.09	0.17
P118-23-00	P118-23-00 R2	6402.43	Max WS	103.02	67.03	70.96		71	0.000634	1.67	61.74	24.23	0.18
P118-23-00	P118-23-00 R2	6356.93	Max WS	108.31	66.97	70.92	68.41	70.97	0.000676	1.73	62.53	24.35	0.19
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	108.3	66.93	70.9		70.95	0.00065	1.7	63.53	24.59	0.19
P118-23-00	P118-23-00 R2	6293.27	Max WS	111.27	66.88	70.88		70.92	0.000659	1.72	64.53	24.83	0.19
P118-23-00	P118-23-00 R2	5958.59	Max WS	137.06	66.24	70.68		70.72	0.000482	1.51	90.74	34.62	0.16
P118-23-00	P118-23-00 R2	5652.94	Max WS	54	65.7	70.64		70.65	0.000076	0.65	82.91	26.71	0.07
P118-23-00	P118-23-00 R2	5045.34	Max WS	52.92	63.97	70.62		70.62	0.000028	0.46	115.04	29.07	0.04
P118-23-00	P118-23-00 R2	4947.92	Max WS	56.03	63.84	70.61	64.59	70.62	0.000017	0.38	147.28	33.13	0.03
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	55.75	63.87	70.61		70.61	0.000013	0.35	159.99	33.78	0.03
P118-23-00	P118-23-00 R2	4783.1	Max WS	57.9	63.65	70.6		70.6	0.000038	0.49	119.15	33.7	0.05
P118-23-00	P118-23-00 R2	4580.38	Max WS	66.77	63.02	70.59	64.15	70.6	0.000032	0.48	138.25	35.33	0.04
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	66.57	63.16	70.59		70.59	0.000032	0.45	147.76	42.42	0.04
P118-23-00	P118-23-00 R2	4459.75	Max WS	69.17	63.55	70.58		70.58	0.000046	0.48	145.58	52.65	0.05
P118-23-00	P118-23-00 R2	4370.6	Max WS	71.36	63.42	70.58		70.58	0.000036	0.41	172.64	65	0.04
P118-23-00	P118-23-00 R2	4330.88	Max WS	72.12	62.88	70.58		70.58	0.000005	0.2	354.42	86.56	0.02
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC RAS Plan: Alt3_IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4269.23	Max WS	71.88	63.31	70.56		70.57	0.000003	0.19	377.62	76.06	0.02
P118-23-00	P118-23-00 R2	4229.24	Max WS	72.72	63.34	70.56		70.56	0.000001	0.31	234.18	51.14	0.03
P118-23-00	P118-23-00 R2	3733.5	Max WS	103.22	62.41	70.55		70.55	0.000037	0.6	171.49	34.28	0.05
P118-23-00	P118-23-00 R2	3187.46	Max WS	259.52	62.36	70.45		70.47	0.000158	1.28	203.21	40.27	0.1
P118-23-00	P118-23-00 R2	3150.64	Max WS	269.8	61.93	70.44	64.71	70.46	0.00019	1.24	216.83	52.14	0.11
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	269.8	61.56	70.43		70.45	0.000165	1.17	229.76	55.06	0.1
P118-23-00	P118-23-00 R2	3104.46	Max WS	271.16	61.63	70.42		70.45	0.000265	1.37	198.07	52.17	0.12
P118-23-00	P118-23-00 R2	2750.53	Max WS	283.47	60.59	70.34		70.37	0.000166	1.39	203.43	34.54	0.1
P118-23-00	P118-23-00 R2	2741.93	Max WS	283.74	60.44	70.34	63.39	70.37	0.000157	1.37	207.72	34.61	0.1
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	283.74	60.52	70.33		70.36	0.000146	1.25	227.34	42.66	0.1
P118-23-00	P118-23-00 R2	2716.57	Max WS	284.07	60.68	70.33		70.35	0.000154	1.25	227.67	44.85	0.1
P118-23-00	P118-23-00 R2	2615.37	Max WS	287.45	60.75	70.31		70.34	0.000164	1.37	209.86	37.37	0.1
P118-23-00	P118-23-00 R2	2244.98	Max WS	297.33	60.53	70.26		70.28	0.000126	1.28	231.54	35.71	0.09
P118-23-00	P118-23-00 R2	2221.06	Max WS	298.43	60.56	70.25	63.08	70.28	0.000137	1.31	227.46	36.69	0.09
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	298.43	60.59	70.23		70.26	0.000121	1.26	237.1	37.2	0.09
P118-23-00	P118-23-00 R2	2042.36	Max WS	301.92	59.78	70.22		70.24	0.000123	1.03	293.36	67.27	0.09
P118-23-00	P118-23-00 R2	1922.11	Max WS	299.19	59.56	70.21		70.22	0.000111	0.97	307.62	72.85	0.08
P118-23-00	P118-23-00 R2	1892.63	Max WS	307.58	59.68	70.2	62.86	70.22	0.000124	1.07	287.58	64.08	0.09
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	304.99	59.86	70.11		70.14	0.00018	1.41	216.71	38.81	0.1
P118-23-00	P118-23-00 R2	1829.45	Max WS	305.51	59.87	70.12		70.13	0.000125	1	305.73	75.5	0.09
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	338.27	59.04	70.09		70.1	0.000104	1.05	321.09	62.07	0.08
P118-23-00	P118-23-00 R1	1513.84	Max WS	363.67	59.85	70.07		70.08	0.000063	0.9	1242.45	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	367.88	59.99	70.06	62.45	70.07	0.000036	0.56	1583.63	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	367.8	58.36	70.06		70.06	0.000019	0.45	2036.67	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	386.67	57.88	70.05		70.06	0.000019	0.51	2058.23	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	484.2	57.45	70.04		70.04	0.000059	0.83	1484.11	742.6	0.06
P118-23-00	P118-23-00 R1	649.49	Max WS	577.44	57.03	70		70.02	0.000076	1.05	1290.7	449.67	0.07
P118-23-00	P118-23-00 R1	242.54	Max WS	632.23	55.82	69.98	60.07	69.98	0.000041	0.62	2966.77	2642.77	0.05
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	632.15	55.57	69.95		69.96	0.000003	0.68	3598.72	3049.07	0.05
P118-23-00	P118-23-00 R1	106.82	Max WS	641.72	55.13	69.95		69.96	0.000031	0.9	1003.92	175.37	0.05
P118-23-00	P118-23-00 R3	58.31	Max WS	641.71	53.78	69.94		69.96	0.000033	1.03	871.75	83.5	0.05
P118-23-02	P118-23-02	4138.85	Max WS	38.24	67.78	70.9		70.92	0.000362	0.99	71.8	572.07	0.13
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	37.51	66.69	70.83		70.84	0.000092	0.53	71.12	362.84	0.07
P118-23-02	P118-23-02	3782.06	Max WS	134.7	66.66	70.76		70.81	0.000956	1.77	135.55	293.64	0.23
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	134.49	66.22	70.76		70.76	0.000088	0.37	1062.85	1228.72	0.05
P118-23-02	P118-23-02	3692.61	Max WS	133.57	66.22	70.73		70.78	0.000805	1.79	74.71	1084.99	0.21
P118-23-02	P118-23-02	3049.5	Max WS	126.18	65.47	70.33		70.36	0.000506	1.48	120.29	187.21	0.17
P118-23-02	P118-23-02	2386.67	Max WS	43.96	65.13	70.13		70.13	0.000008	0.6	77.95	314.23	0.07
P118-23-02	P118-23-02	2372.17	Max WS	43.98	65.16	70.13		70.13	0.000094	0.47	92.89	412.99	0.07
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	39.27	65.26	70.11		70.12	0.000051	0.54	72.2	626.94	0.05
P118-23-02	P118-23-02	2278.1	Max WS	39.23	65.19	70.11		70.12	0.000054	0.53	74.63	170.67	0.05
P118-23-02	P118-23-02	1453.34	Max WS	29.38	63.69	70.09		70.09	0.000001	0.26	113.14	315.8	0.02
P118-23-02	P118-23-02	1445.67	Max WS	29.44	63.66	70.09	64.53	70.09	0.000007	0.23	143.16	390.61	0.02
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	29.07	63.56	70.08		70.09	0.000007	0.23	130.25	804.95	0.02
P118-23-02	P118-23-02	1392.09	Max WS	28.95	63.36	70.08		70.08	0.000008	0.23	124.98	695.57	0.03
P118-23-02	P118-23-02	1317.96	Max WS	28.79	62.91	70.08		70.08	0.000008	0.24	133.02	836.58	0.02
P118-23-02	P118-23-02	1171.38	Max WS	28.39	61.86	70.08		70.08	0.000006	0.22	143.2	863.18	0.02
P118-23-02	P118-23-02	1083.7	Max WS	28.26	62.56	70.08		70.08	0.000005	0.2	146.07	835.37	0.02
P118-23-02	P118-23-02	215.24	Max WS	25.71	60.16	70.08		70.08	0.000002	0.13	198.06	1087.1	0.01
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	70.68		70.68	0.000002	0.11	92.12	32.4	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	9.64	66.34	70.68		70.68	0.000002	0.1	92.1	32.39	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	10.05	66.13	70.68		70.68	0.000003	0.12	82.03	28.36	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	14.2	65.84	70.68		70.68	0.000005	0.16	88.98	33.01	0.02
P118-25-00	P118-25-00 R2	2494.17	Max WS	13.25	65.5	70.68		70.68	0.000004	0.13	98.61	35.73	0.01
P118-25-00	P118-25-00 R2	2473.31	Max WS	13.65	65.47	70.68	66.28	70.68	0.000004	0.14	98.73	35.01	0.01
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	13.65	65.47	70.68		70.68	0.000004	0.14	97.96	37.73	0.02
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_IA_10yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch. El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chf
P118-25-00	P118-25-00 R2	2414.49	Max WS	12.39	65.38	70.67		70.67	0.000003	0.12	104.11	35.28	0.01
P118-25-00	P118-25-00 R2	2046.09	Max WS	16.63	64.63	70.68		70.68	0.000003	0.13	131.88	40.52	0.01
P118-25-00	P118-25-00 R1	1929.3	Max WS	103.26	64.22	70.66		70.67	0.000133	0.94	109.54	30.68	0.09
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	100.47	64.03	70.62		70.63	0.000085	0.81	124.15	31.02	0.07
P118-25-00	P118-25-00 R1	1208.56	Max WS	96.36	63.03	70.6		70.61	0.000054	0.69	139.98	30.27	0.06
P118-25-00	P118-25-00 R1	1188.81	Max WS	96.21	63.01	70.6	64.82	70.61	0.000006	0.71	134.58	29.97	0.06
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	96.21	62.94	70.59		70.6	0.000063	0.73	132.41	29.45	0.06
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	96.82	62.83	70.59		70.59	0.000052	0.68	143.16	30.99	0.06
P118-25-00	P118-25-00 R1	980.2	Max WS	97.22	62.34	70.58		70.59	0.000036	0.58	168.61	35.75	0.05
P118-25-00	P118-25-00 R1	963.63	Max WS	97.22	62.25	70.58		70.58	0.000015	0.46	212.35	42.44	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	97.72	62.25	70.58	63.81	70.58	0.000018	0.44	221.65	60.45	0.03
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	97.72	61.68	70.57		70.57	0.000015	0.39	247.83	51.9	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	97.97	61.68	70.56		70.57	0.000013	0.44	224.22	50.55	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	96.16	61.16	70.56		70.57	0.000019	0.46	209.93	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	91.1	60.25	70.56		70.56	0.000013	0.39	236.45	43.42	0.03
P118-25-00	P118-25-00 R1	251.81	Max WS	72.97	58.25	70.56		70.56	0.000004	0.24	301.94	44.09	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	68.31	58.04	70.56		70.56	0.000003	0.22	308.31	44.08	0.01
P118-25-00	P118-25-00 R1	207.81*	Max WS	63.33	57.84	70.56		70.56	0.000003	0.2	314.66	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	57.34	57.63	70.56		70.56	0.000002	0.18	320.99	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	50.95	57.43	70.56		70.56	0.000002	0.16	327.32	44.04	0.01
P118-25-00	P118-25-00 R1	141.80*	Max WS	43.85	57.22	70.56		70.56	0.000001	0.13	333.66	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	35.74	57.02	70.56		70.56	0.000001	0.11	339.93	44.01	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	27.75	56.81	70.56	57.95	70.56	0	0.08	346.25	44	0.01
P118-25-01	P118-25-01	5341.48	Max WS	50.43	70.47	73.19		73.22	0.000726	1.32	38.07	24.29	0.19
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	50.15	68.9	72.75		72.76	0.000338	1.03	48.86	25.4	0.13
P118-25-01	P118-25-01	4162.47	Max WS	60.91	69.44	72.63		72.65	0.000365	1.09	55.88	28.48	0.14
P118-25-01	P118-25-01	4134.04	Max WS	61.88	69.38	72.62	70.57	72.64	0.000347	1.07	57.66	28.96	0.13
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	61.87	69.25	72.59		72.61	0.000323	1.05	59.19	29.29	0.13
P118-25-01	P118-25-01	4047.7	Max WS	63.2	69.28	72.58		72.6	0.00032	1.05	60.24	29.43	0.13
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	78.81	67.84	72.46		72.47	0.000215	0.97	81.45	33.1	0.11
P118-25-01	P118-25-01	3312.44	Max WS	87.97	67.48	72.39		72.41	0.000208	0.95	92.21	37.54	0.11
P118-25-01	P118-25-01	3014.68	Max WS	98.03	67.53	72.34		72.35	0.000159	0.93	105.84	36.53	0.1
P118-25-01	P118-25-01	2924.04	Max WS	102.73	67.71	72.32		72.33	0.00017	0.95	108.04	37.86	0.1
P118-25-01	P118-25-01	2763.33	Max WS	107.48	66.67	72.29		72.3	0.000159	0.95	112.64	37.04	0.1
P118-25-01	P118-25-01	2728.92	Max WS	108.71	66.5	72.21		72.31	0.000606	2.55	42.64	25.87	0.21
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	108.71	66.31	72.03		72.12	0.000512	2.4	45.32	30.25	0.19
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	108.69	66.04	72.06		72.09	0.000299	1.32	82.52	25.26	0.13
P118-25-01	P118-25-01	1881.88	Max WS	160.69	66.57	71.55		71.63	0.001071	2.31	69.58	24.49	0.24
P118-25-01	P118-25-01	1384.48	Max WS	159.31	66.19	71.04		71.11	0.001008	2.23	71.47	25.54	0.23
P118-25-01	P118-25-01	1245.83	Max WS	158.57	66.34	70.89		70.97	0.001046	2.3	68.95	23.97	0.24
P118-25-01	P118-25-01	584.11	Max WS	70.38	65.88	70.75		70.76	0.000107	0.79	88.75	27.42	0.08
P118-25-01	P118-25-01	60.05	Max WS	86.62	63.5	70.68		70.69	0.0001	0.83	103.81	26.4	0.07

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 IA 100yrr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	5451.53	58.25	74.32		74.79	0.002683	5.75	1674.05	980.28	0.34
P118-00-00	P118-R3-2	71854.2	Max WS	5010.37	57.83	73.64		73.86	0.000483	3.83	1715.46	999.38	0.23
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5020.18	55.05	73.17		73.36	0.00038	3.54	1699.67	447.2	0.2
P118-00-00	P118-R3-2	69527.2	Max WS	4633.05	55.28	72.8		72.95	0.000252	3.15	2069.48	520	0.17
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	3001.92	54.88	72.71		72.83	0.00021	2.84	1528.2	309.65	0.15
P118-00-00	P118-R3-2	68133	Max WS	2478.5	54.47	72.67		72.76	0.000125	2.37	1560.48	358.8	0.12
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	2129.42	54.14	72.62		72.69	0.000132	2.27	1600.31	348.15	0.12
P118-00-00	P118-R3-2	66869	Max WS	2861.03	53.96	72.31		72.48	0.00042	3.35	1017.44	185.58	0.21
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	3138.65	53.79	72.26		72.42	0.00034	3.16	1100.12	162	0.19
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2962.09	53.6	72.16		72.29	0.000215	3.07	1519.85	227.52	0.15
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	2414.07	53.52	72.17		72.23	0.000164	2.12	1513.5	278.2	0.13
P118-00-00	P118-R3-2	65434.6	Max WS	722.18	53.1	72.21		72.22	0.000013	0.73	1556.48	214.6	0.04
P118-00-00	P118-R3-2	64399.74	Max WS	3502.82	52.59	71.8		71.99	0.000305	3.64	1323.08	205.98	0.18
P118-00-00	P118-R3-2	64273.7	Max WS	4030.33	53.55	71.74	61.99	71.9	0.000307	3.22	1340.79	177.01	0.18
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	4027.67	53.3	71.72		71.87	0.000287	3.15	1339.78	173.2	0.18
P118-00-00	P118-R3-2	64200	Max WS	4027.66	53.3	71.72		71.87	0.000287	3.15	1339.55	173.2	0.18
P118-00-00	P118-R2-2	64100	Max WS	5776.35	52.61	71.69		71.83	0.000181	3.03	1983.22	8987.35	0.15
P118-00-00	P118-R2-2	64094	Max WS	5776.41	52.61	71.69	60.85	71.83	0.000181	3.03	1983.05	8986.66	0.15
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	5776.53	52.56	71.66		71.81	0.00018	3.03	1987.5	9004.3	0.15
P118-00-00	P118-R2-2	64010.4	Max WS	5775.02	52.78	71.51	63.07	71.82	0.000441	4.59	1418.11	8869.13	0.23
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	5701.31	53.04	70.6		70.99	0.000608	5.05	1256.43	6931.22	0.27
P118-00-00	P118-R2-2	63959.7	Max WS	5708.82	53.06	70.8	60.76	70.96	0.000228	3.18	1831.15	8127.5	0.17
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	5707.81	53.16	70.74		70.9	0.000239	3.24	1797.96	7909.64	0.17
P118-00-00	P118-R2-2	63756.7	Max WS	5624.39	52.4	70.4		70.91	0.000976	5.89	1245.12	205	0.32
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4225.88	50.35	70.12		70.4	0.000487	4.24	1159.41	185	0.23
P118-00-00	P118-R2-2	61905.2	Max WS	3981.83	50.77	69.9		70.05	0.000288	3.1	1286.45	132.2	0.17
P118-00-00	P118-R2-2	60625.3	Max WS	3963.07	49.52	69.72		69.86	0.000246	3.01	1317.51	121.4	0.16
P118-00-00	P118-R2-1	60595.74	Max WS	3676.31	49.48	69.51		69.66	0.000214	3.3	1250.87	131.55	0.16
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3704.58	49.68	69.5		69.64	0.000183	3.07	1336.4	139.91	0.15
P118-00-00	P118-R2-1	60571.6*	Max WS	3727.87	49.89	69.5		69.62	0.00016	2.88	1419.31	148.28	0.14
P118-00-00	P118-R2-1	60559.5*	Max WS	3746.05	50.09	69.49		69.6	0.000142	2.71	1500.11	156.63	0.13
P118-00-00	P118-R2-1	60547.5*	Max WS	3762.62	50.3	69.49		69.58	0.000129	2.56	1577.9	165	0.13
P118-00-00	P118-R2-1	60535.46	Max WS	3771.68	50.5	69.48		69.57	0.000117	2.42	1654.13	170.3	0.12
P118-00-00	P118-R2-1	60396.4*	Max WS	3755.51	50.45	69.47		69.56	0.000116	2.38	1674.26	174.32	0.12
P118-00-00	P118-R2-1	60257.3*	Max WS	3741.28	50.4	69.47		69.55	0.000115	2.34	1695.86	175.28	0.12
P118-00-00	P118-R2-1	60118.3*	Max WS	3732.54	50.35	69.46		69.54	0.000113	2.3	1719.74	176.25	0.12
P118-00-00	P118-R2-1	59979.2*	Max WS	3721.67	50.3	69.45		69.53	0.000111	2.25	1745.04	177.2	0.12
P118-00-00	P118-R2-1	59840.2*	Max WS	3716.15	50.25	69.45		69.52	0.000108	2.2	1772.02	178.16	0.11
P118-00-00	P118-R2-1	59701.1*	Max WS	3703.95	50.2	69.44		69.51	0.000104	2.15	1801.25	179.13	0.11
P118-00-00	P118-R2-1	59562.1*	Max WS	3701.05	50.15	69.43		69.5	0.000101	2.11	1831.6	180.09	0.11
P118-00-00	P118-R2-1	59423.1	Max WS	3690.1	50.1	69.42		69.49	0.000106	2.12	1862.93	181.05	0.11
P118-00-00	P118-R2-1	59307.4*	Max WS	3695.7	50.1	69.41		69.48	0.000102	2.07	1937.15	196.49	0.11
P118-00-00	P118-R2-1	59191.8*	Max WS	3699.09	50.11	69.41		69.47	0.000098	2.03	2004.02	211.94	0.11
P118-00-00	P118-R2-1	59076.2*	Max WS	3706.91	50.11	69.4		69.46	0.000094	1.99	2064.93	227.38	0.11
P118-00-00	P118-R2-1	58960.5*	Max WS	3722.46	50.11	69.39		69.45	0.000089	1.93	2118.81	242.82	0.1
P118-00-00	P118-R2-1	58844.9*	Max WS	3738.66	50.11	69.39		69.44	0.000086	1.9	2165.83	258.26	0.1
P118-00-00	P118-R2-1	58729.3*	Max WS	3755.49	50.12	69.38		69.43	0.000083	1.87	2205.33	273.71	0.1
P118-00-00	P118-R2-1	58613.7	Max WS	3777.27	50.12	69.37		69.43	0.000081	1.84	2238.25	289.15	0.1
P118-00-00	P118-R2-1	58463.86	Max WS	4725.89	47.59	69.37		69.39	0.000034	1.36	16786.41	5991.93	0.07
P118-00-00	P118-R2-1	58387.5	Max WS	4699.15	47.57	64.38	57.4	64.62	0.000449	3.95	1440.16	530.97	0.23
P118-00-00	P118-R2-1	58359.5 ALDINE-WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	4699.07	47.51	64.28		64.52	0.000456	3.98	1418.31	519.44	0.23
P118-00-00	P118-R2-1	57555.5	Max WS	4696.48	47.03	63.62		64.07	0.000792	5.42	956.02	425.13	0.29
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	4530.79	46.03	62.85		63.27	0.000769	5.19	873.18	85.16	0.29
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	4530.76	44.69	61.77		62.35	0.00121	6.12	828.98	187.68	0.35

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 IA_100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	55000	Lat Struct										
P118-00-00	P118-R2-1	54459.2	Max WS	4554.86	44.27	60.56		61.11	0.00103	5.9	771.77	76.28	0.33
P118-00-00	P118-R2-1	53881	Lat Struct										
P118-00-00	P118-R2-1	53801.7	Max WS	4755.2	43.7	60.46		60.61	0.000286	3.12	1522.49	162.12	0.18
P118-00-00	P118-R2-1	53275.7	Max WS	4775.39	43.36	60.29		60.47	0.000239	3.41	1401.61	165.8	0.16
P118-00-00	P118-R2-1	52844.3	Max WS	4906.57	43.08	60.21	50.09	60.36	0.000234	3.09	1606.49	165.74	0.17
P118-00-00	P118-R2-1	52815.3 BERTRAND RD	Bridge										
P118-00-00	P118-R2-1	52786.3	Max WS	4906.57	43.01	60.18		60.33	0.000232	3.08	1613.41	166.03	0.17
P118-00-00	P118-R2-1	52465.7	Max WS	4906.52	43.2	59.98		60.22	0.000469	3.89	1259.86	138.44	0.23
P118-00-00	P118-R2-1	52221.3	Max WS	4906.32	43.89	59.8	53.22	60.09	0.000617	4.3	1141.31	132.92	0.26
P118-00-00	P118-R2-1	52207.8 UTILITY	Bridge										
P118-00-00	P118-R2-1	52194.3	Max WS	4906.27	43.8	59.75		60.04	0.000609	4.28	1147.07	133.2	0.26
P118-00-00	P118-R2-1	51283.9	Max WS	4905.37	43.41	59.1		59.43	0.000733	4.56	1106.5	187.52	0.28
P118-00-00	P118-R2-1	51096.9	Max WS	4905.34	42.91	59.04	50.23	59.31	0.000485	4.16	1221.26	256.67	0.23
P118-00-00	P118-R2-1	51083.9 UTILITY	Bridge										
P118-00-00	P118-R2-1	51070.9	Max WS	4905.29	42.87	59.01		59.27	0.000484	4.16	1222.11	257.86	0.23
P118-00-00	P118-R2-1	50549.6	Max WS	4905.02	42.3	58.88		59.06	0.000329	3.4	1452.71	200.92	0.19
P118-00-00	P118-R2-1	50021.9	Max WS	4904.7	41.83	58.73	49.56	58.89	0.000301	3.29	1531.9	264.93	0.19
P118-00-00	P118-R2-1	49980.9 HOPPER RD	Bridge										
P118-00-00	P118-R2-1	49939.9	Max WS	4904.53	41.69	58.62		58.79	0.000298	3.27	1541.09	275.66	0.19
P118-00-00	P118-R2-1	49231.7	Max WS	4903.66	41.03	58.18		58.47	0.000627	4.31	1219.74	361.44	0.26
P118-00-00	P118-R2-1	48480.5	Max WS	4902.95	41.23	57.86		58.07	0.000406	3.69	1675.5	871.68	0.21
P118-00-00	P118-R2-1	48196.5	Max WS	4902.8	41.31	57.7	49.97	57.94	0.00049	3.92	1504.1	928.03	0.23
P118-00-00	P118-R2-1	48183.0 UTILITY	Bridge										
P118-00-00	P118-R2-1	48169.5	Max WS	4902.5	41.24	57.62		57.86	0.000492	3.93	1491.34	907.3	0.23
P118-00-00	P118-R2-1	47607.9	Max WS	4901.94	40.57	57.23		57.54	0.000685	4.52	1346.81	1011.72	0.27
P118-00-00	P118-R2-1	46939	Max WS	4901.64	40.79	56.95		57.13	0.000378	3.39	2136.73	1448.85	0.2
P118-00-00	P118-R2-1	46594.8	Max WS	4901.62	40.91	56.81	48.38	57.01	0.000318	3.68	2783.7	2083.43	0.19
P118-00-00	P118-R2-1	46584.8	Bridge										
P118-00-00	P118-R2-1	46579.8	Max WS	4901.61	40.91	56.81		56.99	0.000355	3.51	1960.77	973.56	0.2
P118-00-00	P118-R2-1	46575.8	Max WS	4901.6	40.91	56.8	48.39	56.99	0.000355	3.51	1686.07	433.04	0.2
P118-00-00	P118-R2-1	46560.8 LITTLE YORK RD	Bridge										
P118-00-00	P118-R2-1	46526.8	Max WS	4484.36	40.74	56.74		56.9	0.000263	3.31	2799.65	2104.19	0.17
P118-00-00	P118-R2-1	46516.8	Max WS	4483.54	40.74	56.74	47.9	56.9	0.0003	3.19	2993.51	2170.92	0.18
P118-00-00	P118-R2-1	46515.8	Bridge										
P118-00-00	P118-R2-1	46478.9	Max WS	4479.85	40.49	56.65		56.84	0.00041	3.5	1588.57	1227.5	0.21
P118-00-00	P118-R2-1	46468.9	Max WS	4479.7	40.49	56.65	49.29	56.84	0.00041	3.5	1583.33	1215.37	0.21
P118-00-00	P118-R2-1	46466.8	Bridge										
P118-00-00	P118-R2-1	46458.9	Max WS	4479.7	40.49	56.63		56.82	0.000414	3.51	1555.63	1151.28	0.21
P118-00-00	P118-R2-1	45952.3	Max WS	4446.96	40.12	56.24		56.51	0.000897	4.26	1915.33	1655.5	0.3
P118-00-00	P118-R2-1	45161.4	Max WS	4359.7	39.57	55.67		55.89	0.000705	3.87	1876.88	1179.03	0.24
P118-00-00	P118-R2-1	44549.9	Max WS	4285.47	38.76	55.37		55.54	0.000504	3.32	1623.68	1121.44	0.2
P118-00-00	P118-R2-1	44143.3	Max WS	4221.28	38.22	55.2		55.35	0.00042	3.11	1751.63	927.95	0.19
P118-00-00	P118-R2-1	43789.5	Max WS	4331.4	37.97	55.19		55.2	0.000034	1.55	8692.44	1672.25	0.07
P118-00-00	P118-R2-1	43739.48	Max WS	4330.96	37.93	55.18		55.2	0.000043	1.74	6172.48	1217.18	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	4330.06	37.87	55.18		55.2	0.000037	1.63	7224.89	1689.48	0.07
P118-00-00	P118-R2-1	43564.8*	Max WS	4330.04	37.81	55.18		55.19	0.000028	1.42	8782.93	1736.28	0.06
P118-00-00	P118-R2-1	43477.4*	Max WS	4330.5	37.75	55.18		55.19	0.00002	1.18	10393.9	1667.6	0.05
P118-00-00	P118-R2-1	43390.1*	Max WS	4330.95	37.68	55.18		55.19	0.000013	0.97	11981.92	1705.5	0.04
P118-00-00	P118-R2-1	43302.8*	Max WS	4330.93	37.62	55.18		55.19	0.000008	0.76	13521.6	1936.44	0.03
P118-00-00	P118-R2-1	43215.5	Max WS	4331.4	37.56	55.18		55.18	0.000006	0.66	14627.43	2385.97	0.03
P118-00-00	P118-R2-1	43116.0*	Max WS	4364.87	37.49	55.18		55.18	0.000009	0.82	13538.65	2040.92	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	4363.09	37.42	55.18		55.18	0.000012	0.93	12398.59	2037.6	0.04
P118-00-00	P118-R2-1	42922.9*	Max WS	4363.07	37.35	55.18		55.18	0.000014	1.02	11317.7	2244.77	0.04
P118-00-00	P118-R2-1	42825.49	Max WS	4361.71	37.28	55.18		55.18	0.000016	1.09	10358.69	2180.93	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	4362.15	37.22	55.18		55.18	0.000015	1.05	10884.53	1867.06	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	4361.66	37.15	55.18		55.18	0.000013	0.98	11532.95	1583.69	0.04
P118-00-00	P118-R2-1	42559.6*	Max WS	4361.2	37.09	55.17		55.18	0.00001	0.86	12121.3	1579.49	0.04
P118-00-00	P118-R2-1	42471	Max WS	4360.22	37.03	55.17		55.18	0.000005	0.61	12392.21	1630.25	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	4359.75	36.98	55.17		55.18	0.000006	0.69	12592.93	1678.4	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	4362.15	36.92	55.17		55.18	0.000004	0.53	13512.15	1621.92	0.02
P118-00-00	P118-R2-1	42245.55	Max WS	4361.18	36.87	55.17		55.18	0.000001	0.32	13919.1	1560.64	0.01
P118-00-00	P118-R2-1	42150.1*	Max WS	4359.71	36.8	55.17		55.18	0.000005	0.61	12842.77	1486.26	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	4359.69	36.74	55.17		55.18	0.000007	0.72	11117.95	1495.63	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	4359.19	36.67	55.17		55.18	0.000008	0.79	9719.59	1542.71	0.03
P118-00-00	P118-R2-1	41863.8	Max WS	4360.17	36.6	55.17		55.18	0.000007	0.77	9800.72	1475.46	0.03
P118-00-00	P118-R2-1	41771.7*	Max WS	4359.67	36.53	55.17		55.17	0.000011	0.92	9534.51	1473.18	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	4357.65	36.47	55.17		55.17	0.000013	1.02	9298.72	1547.51	0.04
P118-00-00	P118-R2-1	41587.5*	Max WS	4357.64	36.4	55.17		55.17	0.000016	1.11	9061.65	1629.16	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	4358.15	36.34	55.16		55.17	0.000017	1.16	8988.09	1623.85	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	4356.61	36.27	55.16		55.17	0.000016	1.13	9121.97	1647.84	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	4318.99	36.27	55.08	42.31	55.33	0.000008	4.04	1703.61	1940.43	0.17
P118-00-00	P118-R2-1	41243.9 JENSEN DR	Bridge										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Ait3 JA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	41203.4	Max WS	4351.57	36.25	55.15		55.31	0.000006	3.44	1713.83	1960.9	0.14
P118-00-00	P118-R2-1	41197.4	Max WS	4319.54	36.25	55.08	42.29	55.37	0.000008	4.02	1756.25	1934.33	0.17
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge										
P118-00-00	P118-R2-1	41185.7	Max WS	4305.9	36.25	55.05		55.3	0.000004	4.04	1755.02	2062.43	0.17
P118-00-00	P118-R2-1	40951.8	Max WS	4345.09	36.2	55.14	41.19	55.2	0.000005	2	4227.83	2175.73	0.09
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40886.8	Max WS	4345.09	36.19	55.14		55.2	0.000005	1.95	4115.61	2121.42	0.09
P118-00-00	P118-R2-1	40846.9	Max WS	4342.32	36.18	55.13	41.89	55.21	0.000007	2.26	4407.98	2345.16	0.11
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge										
P118-00-00	P118-R2-1	40605.5	Max WS	4336.73	36.13	55.12		55.19	0.000007	2.25	4170.68	2253.95	0.11
P118-00-00	P118-R2-1	40584.6	Max WS	4339.49	36.13	55.12	41.85	55.19	0.000008	2.21	3604.3	1947.05	0.11
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40515.6	Max WS	4336.16	36.12	55.11		55.18	0.000008	2.2	4163.95	2201.43	0.11
P118-00-00	P118-R2-1	39969.8	Max WS	4326.79	36.01	55.1		55.19	0.000017	2.48	4748.15	2509.11	0.12
P118-00-00	P118-R2-1	39829.91	Max WS	5418.15	36	55.02		55.16	0.000633	3.32	3643.31	2445.88	0.2
P118-00-00	P118-R2-1	39188.6	Max WS	5386.45	35.6	54.59		54.82	0.000807	4.33	3267.69	2179.04	0.23
P118-00-00	P118-R2-1	38423.57	Max WS	5643.13	34.76	54.01		54.27	0.000803	4.57	2830.2	1697.02	0.23
P118-00-00	P118-R2-1	38170.2	Max WS	5628.93	34.35	53.91		54.09	0.000484	3.62	3177.18	1734.32	0.19
P118-00-00	P118-R2-1	37899.37	Max WS	5607.02	34.35	53.81		53.99	0.000431	3.59	2996.09	1648.59	0.18
P118-00-00	P118-R2-1	37413.16	Max WS	5551.7	34.13	53.57		53.85	0.000658	4.32	2036.27	1400.97	0.22
P118-00-00	P118-R2-1	37258.6	Max WS	5524.38	34.02	53.45		53.75	0.000722	4.53	2142.65	1262.68	0.22
P118-00-00	P118-R2-1	36408.6	Max WS	5352.5	32.39	52.94		53.18	0.000929	4.22	2186.81	976.44	0.25
P118-00-00	P118-R2-1	36341.47	Max WS	5312.87	32.39	52.85	43.83	53.13	0.001037	4.44	1994.1	1053.64	0.26
P118-00-00	P118-R2-1	36330 UTILITY	Bridge										
P118-00-00	P118-R2-1	36321.56	Max WS	5344.47	32	52.91		53.07	0.000354	3.22	2626.02	1218.22	0.16
P118-00-00	P118-R2-1	36303.5	Max WS	5344.46	32	52.91		53.05	0.000321	3.1	2750.36	1405.51	0.15
P118-00-00	P118-R1-3	36195.78	Max WS	6736.19	32.04	52.77		53	0.000521	4	2688.83	1086.32	0.2
P118-00-00	P118-R1-3	36107.2	Max WS	6735.31	32	52.73		52.95	0.000502	3.93	2884.3	1001.12	0.19
P118-00-00	P118-R1-3	35434.7	Max WS	6727.64	31.72	52.45		52.68	0.000431	3.84	2357.42	685.75	0.18
P118-00-00	P118-R1-3	35045.7	Max WS	6722.55	31.55	52.27	40.1	52.51	0.000449	3.89	1866.37	429.76	0.18
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge										
P118-00-00	P118-R1-3	35006.1	Max WS	6720.67	31.09	52.19		52.41	0.00041	3.78	2043.77	506.29	0.18
P118-00-00	P118-R1-3	34984.3	Max WS	6719.23	30.53	52.16	40.94	52.42	0.000516	4.21	1928.8	289.7	0.2
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge										
P118-00-00	P118-R1-3	34870.3	Max WS	6718.23	30	52.1		52.34	0.000466	4.06	2092.75	428.32	0.19
P118-00-00	P118-R1-3	33920.1	Max WS	6768.51	29.63	51.18		51.65	0.001053	5.57	1546.83	611.33	0.27
P118-00-00	P118-R1-3	32749.8	Max WS	6836.41	28	49.78		50.3	0.001241	5.81	1424.46	417.56	0.29
P118-00-00	P118-R1-3	31824.3	Max WS	6891.38	26.81	48.95		49.33	0.000781	4.97	1752.97	399.27	0.24
P118-00-00	P118-R1-3	30679.3	Max WS	6961.49	27.05	48.01		48.41	0.000821	5.11	1609.94	221.91	0.24
P118-00-00	P118-R1-3	30678.1	Lat Struct										
P118-00-00	P118-R1-3	30099.1	Max WS	6999.91	27.23	47.77		48.03	0.000434	4.12	2113.3	275.88	0.18
P118-00-00	P118-R1-3	29757.8	Max WS	7028	27.34	47.58	36.4	47.86	0.000489	4.31	1782.88	298.27	0.2
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge										
P118-00-00	P118-R1-3	29704.8	Max WS	7021.17	27	47.45		47.73	0.000464	4.24	1853.87	384.07	0.19
P118-00-00	P118-R1-3	28983.7	Max WS	6945.82	26.97	46.72		47.21	0.001051	5.64	1385.06	168.46	0.27
P118-00-00	P118-R1-3	28587.3	Max WS	7874.86	26.04	46.38		46.66	0.000499	4.32	2215.89	236.92	0.2
P118-00-00	P118-R1-3	27992	Max WS	7867.57	25.42	46.15		46.46	0.000626	4.77	2850.93	421.46	0.22
P118-00-00	P118-R1-3	27567.7	Max WS	7859.67	25.74	45.93		46.23	0.000479	4.54	2581.7	327.14	0.2
P118-00-00	P118-R1-3	27317	Max WS	7855.04	25.92	45.8	35.38	46.12	0.000534	4.7	2106.9	307.51	0.21
P118-00-00	P118-R1-3	27306.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27305.8	Max WS	7850.22	25.93	45.67		46.01	0.000557	4.82	2079.59	288.46	0.21
P118-00-00	P118-R1-3	27295.8	Max WS	7850.22	25.93	45.66	35.2	46.01	0.000558	4.82	2077.91	287.67	0.21
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge										
P118-00-00	P118-R1-3	27189.8	Max WS	7838.81	25.89	45.4		45.75	0.000585	4.89	2016.93	257.51	0.22
P118-00-00	P118-R1-3	27180.8	Max WS	7838.81	25.89	45.39	35.16	45.75	0.000586	4.9	2015.5	256.76	0.22
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27167.5	Max WS	7842.06	25.84	45.45		45.73	0.000466	4.31	2171.46	290.91	0.19
P118-00-00	P118-R1-3	26816.8*	Max WS	7831.86	25.02	45.27		45.54	0.000492	4.17	2121.74	240.52	0.2
P118-00-00	P118-R1-3	26815.8	Lat Struct										
P118-00-00	P118-R1-3	26466.1	Max WS	7820.81	24.2	45.1		45.37	0.000578	4.2	2052.43	226.67	0.21
P118-00-00	P118-R1-3	26224.4*	Max WS	7836.42	23.64	44.97		45.22	0.000524	4.07	2110.26	214.74	0.2
P118-00-00	P118-R1-3	25982.8	Max WS	7840.6	23.07	44.87		45.11	0.000473	3.93	2181.35	209.48	0.19
P118-00-00	P118-R1-3	25318.4	Max WS	7821.16	23.07	44.56		44.79	0.000485	3.94	2352.54	256.24	0.19
P118-00-00	P118-R1-3	25317.4	Lat Struct										
P118-00-00	P118-R1-3	24564.2	Max WS	7789.82	21.76	44.24		44.46	0.000373	3.8	2265.69	214.78	0.17
P118-00-00	P118-R1-3	23984.6	Max WS	9142.38	20.75	43.97		44.2	0.000398	4.03	3282.33	394.56	0.18
P118-00-00	P118-R1-2	23796.2	Max WS	9742.94	24.42	43.86		44.12	0.000393	4.17	2563.72	249.53	0.2
P118-00-00	P118-R1-2	23795.2	Lat Struct										
P118-00-00	P118-R1-2	23286.2	Max WS	9745.21	20.82	43.54		43.87	0.000623	4.55	2234.38	316.83	0.22
P118-00-00	P118-R1-2	22973.4	Max WS	9729.51	20.85	43.4	31.3	43.68	0.00052	4.28	3544.15	689.62	0.2
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22929.4	Max WS	9729.51	20.49	42.95		43.24	0.000534	4.32	3473.86	676.48	0.2
P118-00-00	P118-R1-2	22928.4	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 IA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R1-2	22630.3	Max WS	9642.22	19.11	42.5	32.47	43.05	0.001282	5.91	1631.61	135.59	0.3
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22587.7	Max WS	9649.1	18.99	42.16		42.72	0.00136	6.03	1601.27	134.99	0.31
P118-00-00	P118-R1-2	22577.7	Max WS	9642.7	18.99	42.15		42.71	0.001362	6.03	1599.79	134.96	0.31
P118-00-00	P118-R1-1	22186.8	Max WS	9991.53	18.55	41.61		42.19	0.001011	6.15	1703.91	163.75	0.27
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	10292.8	18.16	41.69		41.95	0.000429	4.11	2672	209.99	0.18
P118-00-00	P118-R1-1	21589.8	Max WS	11395.11	17.9	41.19		41.74	0.000843	6.14	2164.36	172.43	0.26
P118-00-00	P118-R1-1	21362	Max WS	11362.26	17.65	40.97		41.63	0.000079	6.52	2008.41	187.31	0.28
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	11344.12	17.65	40.97	30.9	41.63	0.000079	6.51	2008.5	187.31	0.28
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	11344.12	17.62	40.9		41.56	0.00008	6.53	2001.55	186.94	0.28
P118-00-00	P118-R1-1	21010.4	Max WS	11266.27	18.08	41.03	29.14	41.46	0.000608	5.94	3109.66	249.93	0.23
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	11266.42	17.96	40.9		41.33	0.00061	5.94	3106.51	249.64	0.23
P118-00-00	P118-R1-1	20880.6	Max WS	11215.07	17.96	40.47	31.45	41.61	0.000124	8.91	2528.25	233.96	0.36
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	11215.41	17.96	40.39		41.54	0.000126	8.95	2510.55	232.95	0.36
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	10945.09	19.24	39.86		40.69	0.001648	7.39	1670.75	302.35	0.35
P118-00-00	P118-R1-1	18597.4	Max WS	11691.55	15.56	38.25		38.98	0.000958	7.05	2093.72	175.5	0.29
P118-00-00	P118-R1-1	18107.1	Max WS	11620.69	15.21	38.03		38.39	0.000865	4.83	2407.86	210.39	0.25
P118-00-00	P118-R1-1	17862.9*	Max WS	11579.64	14.55	37.89		38.21	0.000663	4.52	2561.26	202.22	0.22
P118-00-00	P118-R1-1	17618.7*	Max WS	11574.23	13.89	37.79		38.08	0.000536	4.34	2668.49	195.13	0.2
P118-00-00	P118-R1-1	17374.5*	Max WS	11572.12	13.23	37.66		37.95	0.000455	4.27	2723.39	203.07	0.19
P118-00-00	P118-R1-1	17130.3	Max WS	11611.3	12.57	37.56		37.85	0.000413	4.31	2744.16	204.16	0.18
P118-00-00	P118-R1-1	16004	Max WS	11635.3	11.24	37.06		37.34	0.000503	4.2	2788.01	207.15	0.19
P118-00-00	P118-R1-1	15045.6	Max WS	12305.15	10.55	36.2		36.67	0.000831	5.47	2286.05	179.99	0.25
P118-00-00	P118-R1-1	13937.2	Max WS	12300.07	11.62	35.54		35.94	0.000612	5.51	3904.98	423.59	0.23
P118-00-00	P118-R1-1	13341.9	Max WS	12298.38	10.38	35		35.56	0.0009	6.66	3202.17	337.72	0.27
P118-00-00	P118-R1-1	12945.5	Max WS	12297.67	9.55	34.84	25.46	35.18	0.000586	5.53	4273.26	422.49	0.22
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	12296.69	9.53	34.71		35.05	0.000602	5.58	4223.59	421.73	0.22
P118-00-00	P118-R1-1	12931.7	Max WS	12296.69	9.53	34.71	25.43	35.05	0.000602	5.58	4223.33	421.73	0.22
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	12294.59	8.77	34.35		34.67	0.000548	5.4	4394.59	424.45	0.21
P118-00-00	P118-R1-1	12117.3	Max WS	12293.13	7.23	33.97		34.29	0.000385	4.81	3329.69	271.91	0.18
P118-00-00	P118-R1-1	10905.1	Max WS	13428.32	9.54	32.91		33.51	0.000885	6.39	2638.76	245.64	0.27
P118-00-00	P118-R1-1	9879.2	Max WS	13409.77	6.26	31.54		32.45	0.001379	8.18	2570.21	218.03	0.33
P118-00-00	P118-R1-1	8777	Max WS	13401.64	4.71	30.94		31.11	0.000359	3.83	7309.19	798.83	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	13399.13	4.73	30.55		30.84	0.000444	4.74	4824.09	402.99	0.19
P118-00-00	P118-R1-1	6779.3	Max WS	13394.84	4.44	29.78		30.17	0.000674	5.29	3930.51	441.39	0.23
P118-00-00	P118-R1-1	5748.4	Max WS	13388.86	4.27	28.35		29.22	0.001571	8.06	2909.82	367.57	0.35
P118-00-00	P118-R1-1	4492	Max WS	13384.73	1.92	27.09		27.58	0.000804	5.76	2969.66	337.55	0.25
P118-00-00	P118-R1-1	3597.9	Max WS	13382.92	2.46	26.37		26.85	0.000954	6.14	3775.3	418.04	0.28
P118-00-00	P118-R1-1	2709.4	Max WS	13382.01	1.59	25.53		26.03	0.000887	6.4	4001.57	388.83	0.27
P118-00-00	P118-R1-1	1695.9	Max WS	13381.45	1.52	24.35		25.03	0.001274	7.5	3433.65	343.03	0.32
P118-00-00	P118-R1-1	678.7	Max WS	13381.41	0.81	21.8	16.38	23.18	0.0028	9.77	1865.59	231.02	0.46
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.85		49.89	0.001737	1.63	18.45	16.57	0.27
P118-08-00	P118-08-00	7839.79	Max WS	29.71	47.55	49.2		49.22	0.000817	1.14	26.15	23.21	0.19
P118-08-00	P118-08-00	7820.27	Max WS	30.83	47.46	49.18	48.28	49.21	0.001035	1.19	25.95	25.82	0.21
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	31.08	47.58	49		49.05	0.003186	1.88	16.56	19.31	0.36
P118-08-00	P118-08-00	7729.04	Max WS	33.22	46.32	48.98		48.99	0.000206	1	33.32	36.06	0.11
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	33.22	46.88	48.96		48.98	0.000487	1.29	25.79	23.1	0.16
P118-08-00	P118-08-00	7550.89	Max WS	35.76	46.66	48.93		48.95	0.000439	1.03	34.58	41.77	0.14
P118-08-00	P118-08-00	6762.47	Max WS	99.47	44.81	48.31		48.35	0.000768	1.74	62.99	42.93	0.2
P118-08-00	P118-08-00	5858.77	Max WS	148.76	44.48	47.71		47.72	0.00048	1.38	373.98	820.58	0.16
P118-08-00	P118-08-00	5845.88	Max WS	145.41	44.35	47.62		47.91	0.000309	4.27	34.54	920.35	0.43
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	145.21	44.6	47.56		47.9	0.00042	4.67	31.11	1831.37	0.49
P118-08-00	P118-08-00	5748.41	Max WS	151.44	44.22	47.73		47.81	0.001362	2.37	87.42	1276.67	0.27
P118-08-00	P118-08-00	4837.06	Max WS	181.62	41.61	46		46.13	0.002233	2.88	63.12	1131.08	0.34
P118-08-00	P118-08-00	4823.61	Max WS	182.55	41.31	46.02		46.1	0.001504	2.28	90.42	1218.39	0.28
P118-08-00	P118-08-00	4767.88	Max WS	184.37	41.28	45.87		46	0.002042	2.83	65.07	1174.64	0.33
P118-08-00	P118-08-00	4732.44	Max WS	186.38	41.13	45.86		45.94	0.000967	2.26	83.03	1159.13	0.23
P118-08-00	P118-08-00	4289.14	Max WS	203.68	41.25	44.8		45	0.002992	3.56	61.76	879.89	0.4
P118-08-00	P118-08-00	4255.48	Max WS	200.7	41.41	44.69	43.52	44.93	0.000416	3.92	51.24	823.89	0.45
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	201.74	41.23	44.72		44.92	0.000367	3.6	56.04	1394.07	0.42

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 JA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
P118-08-00	P118-08-00	4159.81	Max WS	202.24	40.8	44.75		44.9	0.001212	3.12	64.73	1138.29	0.28
P118-08-00	P118-08-00	4083.03	Culvert										
P118-08-00	P118-08-00	4007.74	Max WS	202.37	40.16	44.77		44.89	0.000883	2.85	71.03	107.65	0.25
P118-08-00	P118-08-00	3928.82	Max WS	211.13	38.97	44.78		44.81	0.000375	1.62	202.66	160.94	0.15
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	-147.13	38.34	44.28		44.3	0.00019	-1.16	203.79	292.02	0.11
P118-08-00	P118-08-00	2630.49	Max WS	178.11	37.06	43.75		43.77	0.000222	1.27	221.29	144.18	0.11
P118-08-00	P118-08-00	1901.01	Max WS	857.44	35.97	43.56		43.85	0.002523	-4.76	354.32	610.51	0.39
P118-08-00	P118-08-00	1219.08	Max WS	48.35	33.28	43.47		43.47	0.000003	0.18	310.78	632.11	0.01
P118-08-00	P118-08-00	1186.93	Max WS	366.81	34.39	42.51		42.56	0.000318	1.74	210.35	226.8	0.14
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	362.05	34.03	42.52		42.55	0.000128	1.46	541.98	283.48	0.1
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	362.05	33.5	42.43		42.47	0.000177	1.76	205.36	51.45	0.11
P118-08-00	P118-08-00	890.93	Max WS	386.78	28.97	42.41		42.43	0.000155	1.18	329.16	70.96	0.1
P118-08-00	P118-08-00	881.12	Max WS	404.35	27.91	42.39		42.41	0.000061	0.94	428.8	65.71	0.07
P118-08-00	P118-08-00	846.44	Max WS	414.64	26.44	42.39		42.4	0.00005	0.92	448.58	58.7	0.06
P118-08-00	P118-08-00	68.07	Max WS	367.41	23.63	42.41		42.41	0.000004	0.35	1168.96	131.67	0.02
P118-09-00	P118-09-00	8416.71	Max WS	120.66	52.44	57.38		57.4	0.002025	1.28	95.59	47.15	0.14
P118-09-00	P118-09-00	8415.73	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	120.17	51.25	56.98		57	0.000204	1.1	109.25	34.59	0.11
P118-09-00	P118-09-00	7947.1	Max WS	209.45	50.5	56.62		56.96	0.000181	4.69	44.67	35.53	0.35
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	205.81	50.64	56.25		56.37	0.000122	3.43	355.43	144.47	0.27
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	210.99	50.66	56.27		56.28	0.000126	0.79	582.85	162.67	0.08
P118-09-00	P118-09-00	7037.08	Max WS	270.01	50.59	55.87		55.94	0.000951	2.25	165.95	303.9	0.24
P118-09-00	P118-09-00	6335.17	Max WS	325.76	50.38	55.33		55.36	0.000609	1.75	514.74	784.54	0.23
P118-09-00	P118-09-00	6241.34	Max WS	327.11	49.73	55.25		55.42	0.000149	3.76	513.99	570.46	0.31
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	327.07	49.91	55.18		55.42	0.00019	4.23	334.88	350.78	0.35
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	318.31	49.94	55.22		55.28	0.000988	2.44	301.25	266.28	0.24
P118-09-00	P118-09-00	6006.93	Max WS	318.09	49.66	55.1		55.15	0.000889	2.23	318.34	305.61	0.23
P118-09-00	P118-09-00	5998.6	Max WS	319.89	49.63	55.08		55.15	0.000992	2.35	302.32	382.77	0.24
P118-09-00	P118-09-00	5978.1	Max WS	324.76	49.66	55.09		55.1	0.000367	1.42	813.83	960.43	0.14
P118-09-00	P118-09-00	5970.8	Max WS	326.4	49.74	55.09		55.09	0.000183	0.97	1157.1	1019.56	0.1
P118-09-00	P118-09-00	5869.16	Max WS	337.79	49.31	55.07		55.07	0.000205	1.1	1128.11	1044.76	0.11
P118-09-00	P118-09-00	5818.16	Max WS	340.34	49.47	55.05		55.1	0.000225	2.5	975.34	1043.06	0.32
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	340.34	49.13	55.03		55.16	0.000566	3.66	457.28	786.97	0.5
P118-09-00	P118-09-00	5685.64	Max WS	343.62	49.01	55.02		55.07	0.000752	2.18	422.61	518.78	0.21
P118-09-00	P118-09-00	4961.22	Max WS	373.69	47.46	54.6		54.68	0.000744	2.39	239.9	160.19	0.21
P118-09-00	P118-09-00	4862.39	Max WS	378.05	47.3	54.48		54.66	0.000559	3.54	166.1	165.39	0.5
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	377.98	47.66	54.42		54.69	0.000695	4.25	144.4	150.7	0.56
P118-09-00	P118-09-00	4717.67	Max WS	383.72	47.29	54.46		54.58	0.001027	2.79	152.56	134.73	0.25
P118-09-00	P118-09-00	4354.22	Max WS	428.25	46.81	54.06		54.18	0.000968	2.82	165.04	68.93	0.24
P118-09-00	P118-09-00	4232.29	Max WS	418.64	45.84	53.6		54.11	0.000201	5.78	77.5	71.92	0.38
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	423.35	45.75	51.79		52.87	0.000694	8.33	50.79	21.62	0.65
P118-09-00	P118-09-00	4101.99	Max WS	449.57	46.19	52.15		52.87	0.000975	6.81	65.97	21.92	0.69
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	114.24	45.18	51.5		51.54	0.000055	1.65	107.96	64.2	0.16
P118-09-00	P118-09-00	3214.67	Max WS	540.28	43.86	51.03	49.23	51.47	0.000462	5.38	128.22	173.59	0.49
P118-09-00	P118-09-00	3131.26	Max WS	547.34	43.6	50.24		51.6	0.000752	9.35	59.62	40.73	0.68
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	304.97	43.59	48.01		49.28	0.001447	9.03	33.77	14.48	0.87
P118-09-00	P118-09-00	2939.54	Max WS	553.23	43.48	48.6	49	50.54	0.003118	11.17	49.54	18.74	1.21
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	593.16	42.41	48.2		48.99	0.000956	7.32	131.94	66.35	0.7
P118-09-00	P118-09-00	1673	Max WS	607.85	39.78	47.89		48.21	0.000451	4.87	406.72	486.49	0.48
P118-09-00	P118-09-00	1610.87	Max WS	567.11	39.04	47.86		48.27	0.000339	5.41	451.31	596.63	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	566.44	38	47.48		47.94	0.000144	5.54	207.99	184.53	0.33
P118-09-00	P118-09-00	1491.18	Max WS	571.6	37.86	47.57		47.73	0.002343	3.46	276.3	184.93	0.29
P118-09-00	P118-09-00	945.12	Max WS	595.05	36.86	45.93		46.16	0.003286	4	219.96	194.79	0.35
P118-09-00	P118-09-00	435.38	Max WS	620.32	35.21	45.19		45.22	0.000144	1.36	456.72	82.53	0.1
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	613.08	35.18	45.19		45.22	0.000132	1.31	467.31	83.4	0.1

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 JA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-09-00	P118-09-00	376.38	Culvert										
P118-09-00	P118-09-00	222.06	Max WS	605.39	24.19	44.15		44.16	0.000004	0.35	1714.57	161.54	0.02
P118-09-00	P118-09-00	209.24	Max WS	604.27	24.13	44.15		44.16	0.000004	0.35	1714.95	157.75	0.02
P118-09-00	P118-09-00	139.66	Max WS	619.76	23.56	44.15		44.16	0.000004	0.34	1812.08	162.78	0.02
P118-09-00	P118-09-00	74.44	Max WS	599.64	22.87	44.15		44.15	0.000003	0.36	1674.81	111.2	0.02
P118-14-00	P118-14-00 001	13760.5	Max WS	87.45	58.1	63.82		63.82	0.000004	0.41	552.42	1185.97	0.05
P118-14-00	P118-14-00 001	13096.8	Max WS	87.27	57.3	63.79		63.8	0.000029	0.42	287.76	469.98	0.04
P118-14-00	P118-14-00 001	11983.3	Max WS	277.65	56.1	63.76		63.76	0.000037	0.55	1451.19	1410.42	0.05
P118-14-00	P118-14-00 001	11755.1	Culvert										
P118-14-00	P118-14-00 001	11526.9	Max WS	257.33	55.3	62.73		62.76	0.000195	1.26	204.47	242.19	0.11
P118-14-00	P118-14-00 001	10870.6	Max WS	416.34	55	62.39		62.45	0.000494	2	209.6	670.02	0.18
P118-14-00	P118-14-00 001	10833.25	Culvert										
P118-14-00	P118-14-00 001	10795.9	Max WS	398.8	55.5	61.77		61.86	0.000811	2.43	164.11	676.58	0.22
P118-14-00	P118-14-00 001	10606.9	Max WS	442.05	55.19	61.68		61.73	0.000372	1.89	234.21	52.12	0.16
P118-14-00	P118-14-00 001	9666.7	Max WS	656.24	54.05	61.39		61.42	0.000212	1.54	425.07	219.45	0.12
P118-14-00	P118-14-00 001	8993.1	Max WS	829.43	53.23	61.03		61.13	0.000588	2.54	362.76	717.02	0.2
P118-14-00	P118-14-00 001	8655.1	Max WS	908.77	51.98	60.77		60.92	0.000752	3.3	636.12	947.99	0.23
P118-14-00	P118-14-00 001	8532.1	Max WS	908.5	51.53	60.74		60.78	0.00027	2.06	1774.06	1637.83	0.14
P118-14-00	P118-14-00 001	8507	Culvert										
P118-14-00	P118-14-00 001	8481.9	Max WS	883.51	51.41	60.18		60.27	0.000527	2.75	1120.08	1501.44	0.19
P118-14-00	P118-14-00 001	8025.2	Max WS	876.81	50.63	59.9		60	0.000712	2.91	831.72	1168.72	0.22
P118-14-00	P118-14-00 001	7510.9	Max WS	973.73	49.74	59.61		59.66	0.000413	2.37	1817.17	1812.28	0.17
P118-14-00	P118-14-00 001	6550.7	Max WS	1150.06	48.37	59.18		59.28	0.000437	2.82	1390.64	1749.75	0.18
P118-14-00	P118-14-00 001	6479.1	Max WS	1164.77	48.26	59.16		59.22	0.00031	2.39	1821.69	2019.2	0.15
P118-14-00	P118-14-00 001	6454.1	Culvert										
P118-14-00	P118-14-00 001	6429.1	Max WS	1158.75	48.13	58.87		58.95	0.000384	2.63	1563.44	1952.81	0.17
P118-14-00	P118-14-00 001	6302.9	Max WS	1178.45	48.15	58.77		58.92	0.00084	3.25	886.85	1635.47	0.24
P118-14-00	P118-14-00 001	6179.9	Max WS	1199.65	48.17	58.69	54.21	58.8	0.000643	3.06	1283.75	1636.12	0.21
P118-14-00	P118-14-00 001	6165.4	Bridge										
P118-14-00	P118-14-00 001	6150.9	Max WS	1198.74	48.08	58.63		58.74	0.000615	3	1334.74	1660.64	0.21
P118-14-00	P118-14-00 001	5970	Max WS	1226.28	47.75	58.49		58.64	0.000749	3.53	1123.7	1887.19	0.23
P118-14-00	P118-14-00 001	5823.6	Max WS	1250.27	47.49	58.44	53.93	58.48	0.000302	2.25	2648	2396.54	0.15
P118-14-00	P118-14-00 001	5800.1	Bridge										
P118-14-00	P118-14-00 001	5776.6	Max WS	1249.66	47.36	58.34		58.38	0.000285	2.19	2723.4	2398.51	0.14
P118-14-00	P118-14-00 001	5628.5	Max WS	1272.91	47.07	58.25		58.39	0.000556	3.33	1167.95	1864.76	0.21
P118-14-00	P118-14-00 001	5509.6	Max WS	1292.51	46.83	58.23		58.27	0.000399	2.41	2608.75	2508.49	0.16
P118-14-00	P118-14-00 001	5484.6	Culvert										
P118-14-00	P118-14-00 001	5459.6	Max WS	1291.84	46.8	58.2		58.24	0.000398	2.41	2609.36	2508.52	0.16
P118-14-00	P118-14-00 001	5294.4	Max WS	1318.03	46.75	58.12		58.2	0.000356	2.68	1512.29	2061.84	0.17
P118-14-00	P118-14-00 001	5161	Max WS	1340.05	46.71	58.1		58.12	0.000152	1.74	3732.3	2894.78	0.11
P118-14-00	P118-14-00 001	5136	Culvert										
P118-14-00	P118-14-00 001	5111	Max WS	1339.77	46.69	58.06		58.08	0.000157	1.77	3674.47	2892.98	0.11
P118-14-00	P118-14-00 001	4683.7	Max WS	1410.26	46.22	57.92		58	0.000419	2.84	2012.89	2001.74	0.17
P118-14-00	P118-14-00 001	4316.3	Max WS	1463.82	45.82	57.73		57.87	0.000587	3.42	1311.32	1474.37	0.21
P118-14-00	P118-14-00 001	4164.8	Max WS	1487.94	45.65	57.7		57.74	0.000233	2.18	3067.99	2136.32	0.13
P118-14-00	P118-14-00 001	4140.3	Culvert										
P118-14-00	P118-14-00 001	4115.8	Max WS	1471.65	45.6	57.34		57.4	0.000348	2.6	2433	2007.45	0.16
P118-14-00	P118-14-00 001	3617.5	Max WS	1544.66	45.9	57.13		57.21	0.000462	2.71	2147.29	2237.31	0.18
P118-14-00	P118-14-00 001	3259.8	Max WS	1605.64	46.12	56.94		57.01	0.000532	2.79	2212.55	2270.4	0.2
P118-14-00	P118-14-00 001	3169.5	Max WS	1617.61	46.17	56.91	52.52	56.95	0.000361	2.28	2918.41	2351.8	0.16
P118-14-00	P118-14-00 001	3141.3	Bridge										
P118-14-00	P118-14-00 001	3113.1	Max WS	1617.59	46.07	56.83		56.87	0.000364	2.3	2809.46	2359.64	0.16
P118-14-00	P118-14-00 001	2974.8	Max WS	1638.75	45.87	56.78		56.83	0.000296	2.2	2486.76	2313.37	0.15
P118-14-00	P118-14-00 001	2884.9	Max WS	1653.12	45.74	56.75		56.81	0.000291	2.26	2529.68	2489.61	0.15
P118-14-00	P118-14-00 001	2836.2	Max WS	1663.07	45.67	56.72		56.81	0.000508	2.89	2228	2361.75	0.19
P118-14-00	P118-14-00 001	2771.2	Culvert										
P118-14-00	P118-14-00 001	2706.2	Max WS	1663.15	45.15	54.62		55.08	0.00256	5.48	376.45	391.23	0.42
P118-14-00	P118-14-00 001	2164.7	Max WS	1745.51	43.47	54.06		54.16	0.000363	2.57	882.37	509.86	0.17
P118-14-00	P118-14-00 001	1654.8	Max WS	1823.15	41.9	53.92		53.99	0.000225	2.16	1516.34	1683.66	0.14
P118-14-00	P118-14-00 001	1523.9	Max WS	1839.14	41.49	53.91		53.96	0.000167	1.91	2555.28	1948.69	0.12
P118-14-00	P118-14-00 001	1492.9	Culvert										
P118-14-00	P118-14-00 001	1461.9	Max WS	1839.47	41.24	53.86		53.9	0.000145	1.79	2959.62	2130.94	0.11
P118-14-00	P118-14-00 001	1132.9	Max WS	1593.07	40.69	53.31		53.53	0.001955	4.63	1319.47	1987.02	0.33
P118-14-00	P118-14-00 001	226.85	Max WS	1355.6	39.16	53.09		53.12	0.000263	1.94	2990.31	2195.92	0.13
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067	Lat Struct										
P118-21-00	P118-21-00	3066	Lat Struct										
P118-21-00	P118-21-00	2499.4	Max WS	4.55	67.88	69.56		69.56	0.002318	0.49	10.27	20.33	0.09
P118-21-00	P118-21-00	2493.18	Max WS	-4.96	67.95	69.6		69.6	0.001569	-0.4	15.11	31.49	0.07
P118-21-00	P118-21-00	2450.1	Max WS	-1	67.59	69.63		69.63	0	0.04	27.94	23.4	0.01
P118-21-00	P118-21-00	2416.26	Max WS	0.81	67.5	69.63		69.63	0	0.03	29.15	25.41	0
P118-21-00	P118-21-00	2398.11	Max WS	2.67	67.44	69.63		69.63	0.000004	0.09	29.51	22.51	0.01
P118-21-00	P118-21-00	2389.56	Max WS	4.52	67.41	69.63		69.63	0.000004	0.15	30.07	23	0.02

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Ait3 IA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2343.79	Max WS	7.78	67.54	69.63		69.63	0.000056	0.49	15.94	13.53	0.08
P118-21-00	P118-21-00	2303.58	Max WS	11.27	67.47	69.61		69.62	0.000286	0.7	16.21	12.8	0.11
P118-21-00	P118-21-00	2208.42	Max WS	-0.39	67.31	69.6		69.6	0	-0.02	20.52	15.22	0
P118-21-00	P118-21-00	2195.48	Max WS	-0.39	67.34	69.6		69.6	0	-0.02	21.64	18.77	0
P118-21-00	P118-21-00	2169.49	Max WS	-0.39	66.56	69.6		69.6	0	-0.02	23.3	12.7	0
P118-21-00	P118-21-00	2167.76	Max WS	-0.39	66.37	69.6		69.6	0	-0.01	28.46	13.96	0
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	-0.39	65.03	69.61		69.61	0	-0.01	64.1	54.39	0
P118-21-00	P118-21-00	2100.84	Max WS	-0.39	64.78	69.61		69.61	0	-0.01	63.83	39.9	0
P118-21-00	P118-21-00	1662.37	Max WS	-25.53	63.93	69.61		69.61	0.000012	-0.3	106.47	46.01	0.03
P118-21-00	P118-21-00	1144.5	Max WS	-80.49	62.63	69.61		69.62	0.000065	-0.75	108.76	23	0.06
P118-21-00	P118-21-00	595.53	Max WS	-133.01	61.49	69.64		69.64	0.00003	-0.56	239.92	47.22	0.04
P118-21-00	P118-21-00	549.31*	Max WS	-138.39	61.18	69.64		69.64	0.000029	-0.58	242.96	44.42	0.04
P118-21-00	P118-21-00	503.08*	Max WS	-143.06	60.87	69.64		69.64	0.000029	-0.59	243.73	41.62	0.04
P118-21-00	P118-21-00	456.86*	Max WS	-147.66	60.57	69.64		69.65	0.000029	-0.62	242.06	38.81	0.04
P118-21-00	P118-21-00	410.63*	Max WS	-152.25	60.26	69.64		69.65	0.00003	-0.64	238.16	36.01	0.04
P118-21-00	P118-21-00	364.41*	Max WS	-156.27	59.95	69.64		69.65	0.000032	-0.68	231.74	33.21	0.05
P118-21-00	P118-21-00	318.18*	Max WS	-159.8	59.64	69.64		69.65	0.000034	-0.72	223.1	30.41	0.05
P118-21-00	P118-21-00	271.96*	Max WS	-163.52	59.34	69.64		69.65	0.000039	-0.77	212.04	27.6	0.05
P118-21-00	P118-21-00	225.73*	Max WS	-166.5	59.03	69.64		69.65	0.000046	-0.84	198.7	24.8	0.05
P118-21-00	P118-21-00	179.51	Max WS	-168.43	58.72	69.64		69.65	0.000069	-0.92	183.04	22	0.06
P118-21-00	P118-21-00	159.41*	Max WS	-171.99	57.98	69.64		69.66	0.00006	-0.88	195.14	22.53	0.05
P118-21-00	P118-21-00	139.31*	Max WS	-167.65	57.24	69.65		69.66	0.000049	-0.81	207.73	23.06	0.05
P118-21-00	P118-21-00	119.21*	Max WS	-138.17	56.51	69.66		69.66	0.000028	-0.63	220.74	23.6	0.04
P118-21-00	P118-21-00	99.11*	Max WS	-110.43	55.77	69.66		69.67	0.000015	-0.47	234.03	24.13	0.03
P118-21-00	P118-21-00	79.01	Max WS	-83.38	55.03	69.67		69.67	0.000008	-0.34	247.62	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	74.56		74.56	0.000001	0.1	107.1	42.46	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	74.56		74.56	0.000002	0.11	94.68	41.68	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.62	70.08	74.56	70.24	74.56	0.000003	0.12	92.41	55.72	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.62	70.2	74.56		74.56	0.000003	0.13	86.72	39.56	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	11.69	70.16	74.56		74.56	0.000004	0.14	83.82	38.53	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	18.47	69.97	74.56		74.56	0.000009	0.22	83.92	32.08	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	21.12	69.88	74.56		74.56	0.000012	0.25	83.34	44.74	0.03
P118-23-00	P118-23-00 R2	7614.73	Max WS	22.93	68.92	74.56		74.56	0.000011	0.26	102.66	145.47	0.03
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	22.88	69.39	74.54		74.54	0.000008	0.22	239.15	427.88	0.02
P118-23-00	P118-23-00 R2	7567.5	Max WS	24.55	69.56	74.54		74.54	0.000014	0.28	86.58	789.72	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	34.11	68.48	74.53		74.54	0.000025	0.38	88.97	1403.72	0.04
P118-23-00	P118-23-00 R2	7369.89	Max WS	39.72	68.06	74.53		74.53	0.00003	0.43	92.44	1331.9	0.04
P118-23-00	P118-23-00 R2	7338.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	39.64	69.59	74.28		74.28	0.000013	0.27	560.42	1056.61	0.03
P118-23-00	P118-23-00 R2	7313.37	Max WS	41.08	69.5	74.28		74.28	0.000029	0.42	97.79	1019.03	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	41.83	69.12	74.28		74.28	0.000028	0.42	99.27	1005.01	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	42.85	69.43	74.27		74.28	0.00003	0.57	75.82	958.21	0.05
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	42.68	69.34	73.99		73.99	0.000022	0.36	338.27	861.28	0.04
P118-23-00	P118-23-00 R2	7257.19	Max WS	45.44	69.28	73.99		73.99	0.00003	0.38	254.95	784.41	0.04
P118-23-00	P118-23-00 R2	6786.22	Max WS	96.43	68.02	73.98		73.98	0.000027	0.37	803.58	1827.46	0.04
P118-23-00	P118-23-00 R2	6723.56	Max WS	104.06	67.37	73.97		73.98	0.000049	0.57	181.54	52.98	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	23.9	67.54	72.19		72.19	0.000051	0.4	60.36	30.91	0.05
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	25.87	67.16	72.19		72.19	0.000014	0.28	92.71	30.3	0.03
P118-23-00	P118-23-00 R2	6402.43	Max WS	28.06	67.03	72.18		72.19	0.000015	0.3	94.64	29.76	0.03
P118-23-00	P118-23-00 R2	6356.93	Max WS	29.07	66.97	72.18	67.48	72.18	0.000015	0.3	96.64	29.8	0.03
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	29.03	66.93	72.18		72.18	0.000015	0.29	98.45	30.82	0.03
P118-23-00	P118-23-00 R2	6293.27	Max WS	29.59	66.88	72.18		72.18	0.000014	0.29	100.45	30.67	0.03
P118-23-00	P118-23-00 R2	5958.59	Max WS	34.38	66.24	72.17		72.17	0.00001	0.22	154.47	59.23	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	38.69	65.7	72.17		72.17	0.000017	0.29	132.35	47.96	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	30.45	63.97	72.16		72.16	0.000004	0.19	163.2	31.87	0.01
P118-23-00	P118-23-00 R2	4947.92	Max WS	32.07	63.84	72.16	64.32	72.16	0.000002	0.15	208.75	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	32.04	63.87	72.16		72.16	0.000002	0.15	213.73	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	40.22	63.65	72.16		72.16	0.000006	0.23	176.7	37.16	0.02
P118-23-00	P118-23-00 R2	4580.38	Max WS	51.42	63.02	72.15	63.98	72.15	0.000007	0.25	209.14	46.95	0.02
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	51.41	63.16	72.15		72.15	0.000006	0.22	234.89	58.28	0.02
P118-23-00	P118-23-00 R2	4459.75	Max WS	58.93	63.55	72.15		72.15	0.000008	0.26	228.12	52.65	0.02
P118-23-00	P118-23-00 R2	4370.6	Max WS	65.17	63.42	72.15		72.15	0.000007	0.24	274.77	65.06	0.02
P118-23-00	P118-23-00 R2	4330.88	Max WS	67.22	62.88	72.15		72.15	0.000002	0.12	539.64	125.25	0.01

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 JA 100Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-23-00	P118-23-00 R2	4299.23	Culvert										
P118-23-00	P118-23-00 R2	4269.23	Max WS	67.21	63.31	72.14		72.14	0.000001	0.14	497.37	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	72.14	63.34	72.14		72.14	0.000004	0.23	314.72	51.14	0.02
P118-23-00	P118-23-00 R2	3733.5	Max WS	113.34	62.41	72.13		72.13	0.000002	0.5	225.72	34.28	0.03
P118-23-00	P118-23-00 R2	3187.46	Max WS	148.33	62.36	72.11		72.12	0.000022	0.55	270.27	40.27	0.04
P118-23-00	P118-23-00 R2	3150.64	Max WS	152.19	61.93	72.11	64	72.12	0.000021	0.5	304.02	52.14	0.04
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	152.19	61.56	72.11		72.11	0.000018	0.47	323.03	55.63	0.03
P118-23-00	P118-23-00 R2	3104.46	Max WS	154.42	61.63	72.11		72.11	0.000027	0.54	286.81	52.53	0.04
P118-23-00	P118-23-00 R2	2750.51	Max WS	185.67	60.59	72.09		72.1	0.000033	0.7	264.06	34.6	0.04
P118-23-00	P118-23-00 R2	2741.93	Max WS	186.18	60.44	72.09	62.74	72.1	0.000032	0.69	268.94	34.96	0.04
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	186.19	60.52	72.09		72.09	0.000027	0.62	302.72	42.97	0.04
P118-23-00	P118-23-00 R2	2716.57	Max WS	187.26	60.68	72.09		72.09	0.000028	0.59	317.39	52.19	0.04
P118-23-00	P118-23-00 R2	2615.37	Max WS	198.45	60.75	72.08		72.09	0.000035	0.72	276.93	37.87	0.05
P118-23-00	P118-23-00 R2	2244.98	Max WS	206.58	60.53	72.07		72.08	0.000003	0.7	296.24	35.71	0.04
P118-23-00	P118-23-00 R2	2221.06	Max WS	205.43	60.56	72.07	62.53	72.07	0.000031	0.7	294.08	36.69	0.04
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	205.44	60.59	72.05		72.06	0.000028	0.67	304.76	37.2	0.04
P118-23-00	P118-23-00 R2	2042.36	Max WS	228.03	59.78	72.05		72.05	0.000023	0.55	416.21	67.27	0.04
P118-23-00	P118-23-00 R2	1922.13	Max WS	238.1	59.56	72.04		72.05	0.000023	0.54	441.33	72.85	0.04
P118-23-00	P118-23-00 R2	1892.63	Max WS	248.81	59.68	72.04	62.51	72.05	0.000028	0.61	409.44	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	248.79	59.86	71.98		71.99	0.000051	0.86	289.48	38.81	0.06
P118-23-00	P118-23-00 R2	1829.45	Max WS	272.88	59.87	71.98		71.99	0.000003	0.61	446.76	75.5	0.04
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	368.73	59.04	71.97		71.98	0.000047	0.84	437.75	62.07	0.06
P118-23-00	P118-23-00 R1	1513.84	Max WS	956.58	59.85	71.96		71.96	0.000049	0.95	3262.32	1069.22	0.06
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	965.11	59.99	71.95	64.56	71.96	0.000033	0.69	3454.69	990.93	0.05
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	964.79	58.36	71.94		71.95	0.000024	0.63	3798.3	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	1000.29	57.88	71.94		71.95	0.000026	0.71	3788.77	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	1232.86	57.45	71.92		71.93	0.000071	1.11	2881.82	742.6	0.07
P118-23-00	P118-23-00 R1	649.49	Max WS	1472.96	57.03	71.87		71.89	0.000136	1.65	2127.48	449.67	0.1
P118-23-00	P118-23-00 R1	242.54	Max WS	1723.43	55.82	71.83	62.76	71.84	0.000025	0.58	11564.67	5571.37	0.04
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	1721.39	55.57	71.82		71.82	0.000018	0.62	12874.37	5605.21	0.04
P118-23-00	P118-23-00 R1	106.82	Max WS	1729.73	55.13	71.8		71.85	0.000114	1.93	1328.86	175.37	0.1
P118-23-00	P118-23-00 R1	58.31	Max WS	1727.24	53.78	71.77		71.85	0.000146	2.39	1024.74	83.5	0.11
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	72.03		72.03	0.000001	0.08	535.38	1240.53	0.01
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	17.64	66.69	72.03		72.03	0.000003	0.13	260.83	1191.47	0.01
P118-23-02	P118-23-02	3782.06	Max WS	38.19	66.66	72.03		72.03	0.000003	0.12	1258.39	1215.34	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	38.21	66.22	72.03		72.03	0.000001	0.04	2657.49	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	38.18	66.22	72.03		72.03	0.000001	0.05	2405.37	1252.82	0.01
P118-23-02	P118-23-02	3049.5	Max WS	37.93	65.47	72.03		72.03	0.000001	0.07	1726.1	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	82.99	65.13	72.03		72.03	0.000005	0.18	1913.5	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	85.05	65.16	72.03		72.03	0.000004	0.14	2034.97	1094.25	0.01
P118-23-02	P118-23-02	2337.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	83.6	65.26	72.01		72.01	0.000003	0.15	2197.31	1060.82	0.01
P118-23-02	P118-23-02	2278.1	Max WS	88.53	65.19	72.01		72.01	0.000006	0.23	1783.74	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	246.19	63.69	71.99		71.99	0.000032	0.58	1823.49	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	248.3	63.66	71.99	66.3	71.99	0.000027	0.58	1910.26	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	247.94	63.56	71.99		71.99	0.000019	0.47	2238.43	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	252.61	63.36	71.99		71.99	0.000015	0.32	2114.72	958.97	0.03
P118-23-02	P118-23-02	1317.96	Max WS	266.96	62.91	71.98		71.99	0.000013	0.39	2355.39	1032.32	0.03
P118-23-02	P118-23-02	1171.38	Max WS	299.46	61.86	71.98		71.98	0.000013	0.41	2701.32	1228.5	0.03
P118-23-02	P118-23-02	1083.7	Max WS	321.67	62.56	71.98		71.98	0.000015	0.42	2759.98	1249.68	0.03
P118-23-02	P118-23-02	215.24	Max WS	588.1	60.16	71.96		71.97	0.000028	0.58	3077.44	1102.12	0.04
P118-25-00	P118-25-00 R2	3232.36	Max WS	10	66.34	72.6		72.6	0	0.06	161.89	37.28	0.01
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	72.6		72.6	0	0.06	161.84	37.24	0.01
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	45.2	66.13	72.59		72.6	0.000012	0.32	140.83	31.01	0.03
P118-25-00	P118-25-00 R2	2636.62	Max WS	89.86	65.84	72.58		72.58	0.000041	0.59	151.71	33.01	0.05
P118-25-00	P118-25-00 R2	2494.17	Max WS	109.68	65.5	72.57		72.58	0.000005	0.66	166.18	35.73	0.05
P118-25-00	P118-25-00 R2	2473.31	Max WS	111.29	65.47	72.57	67.41	72.57	0.000052	0.68	164.86	35.01	0.05
P118-25-00	P118-25-00 R2	2469.143	Sunoco Pipeline										
P118-25-00	P118-25-00 R2	2465.6	Max WS	111.31	65.47	72.56		72.57	0.000051	0.66	169.1	37.73	0.05
P118-25-00	P118-25-00 R2	2465	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3_IA_100yr

River	Reach	River Sta	Profile	Q.Total (cfs)	Min Ch.El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2464	Lat Struct										
P118-25-00	P118-25-00 R2	2414.49	Max WS	113.42	65.38	72.56		72.57	0.000049	0.66	170.58	35.28	0.05
P118-25-00	P118-25-00 R2	2046.09	Max WS	114.74	64.63	72.54		72.55	0.000031	0.55	207.37	40.52	0.04
P118-25-00	P118-25-00 R1	1929.3	Max WS	251.75	64.22	72.5		72.53	0.000231	1.42	177.49	39.73	0.12
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	204.59	64.03	72.45		72.47	0.000114	1.11	184.16	33.08	0.08
P118-25-00	P118-25-00 R1	1208.56	Max WS	145.96	63.03	72.44		72.45	0.000046	0.75	195.77	30.27	0.05
P118-25-00	P118-25-00 R1	1188.81	Max WS	141.32	63.01	72.44	65.24	72.45	0.000047	0.74	189.82	29.97	0.05
P118-25-00	P118-25-00 R1	1181.605 Wooden Foot Br	Bridge										
P118-25-00	P118-25-00 R1	1175.29	Max WS	140.45	62.94	72.43		72.44	0.000049	0.75	186.73	29.45	0.05
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	134.86	62.83	72.43		72.44	0.000037	0.66	203.15	33.01	0.05
P118-25-00	P118-25-00 R1	980.2	Max WS	142.44	62.34	72.43		72.43	0.000029	0.61	234.66	35.75	0.04
P118-25-00	P118-25-00 R1	963.63	Max WS	145.93	62.25	72.43		72.43	0.000014	0.53	277	45.01	0.03
P118-25-00	P118-25-00 R1	950.55	Max WS	146.2	62.25	72.43	64.13	72.43	0.000015	0.43	388.36	95	0.03
P118-25-00	P118-25-00 R1	930.1377 Hill Road	Bridge										
P118-25-00	P118-25-00 R1	901.58	Max WS	144.88	61.68	72.41		72.41	0.000012	0.41	395.22	86	0.03
P118-25-00	P118-25-00 R1	886.91	Max WS	144.91	61.68	72.4		72.41	0.000012	0.5	288.64	51.01	0.03
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	146.19	61.16	72.4		72.41	0.000018	0.52	279.35	37.72	0.03
P118-25-00	P118-25-00 R1	490.93	Max WS	240.96	60.25	72.38		72.39	0.000038	0.76	316.67	44.02	0.05
P118-25-00	P118-25-00 R1	251.81	Max WS	303.02	58.25	72.37		72.38	0.000035	0.79	381.76	44.09	0.05
P118-25-00	P118-25-00 R1	229.81*	Max WS	301.97	58.04	72.37		72.38	0.000033	0.78	388.08	44.08	0.05
P118-25-00	P118-25-00 R1	207.81*	Max WS	300.25	57.84	72.37		72.38	0.000029	0.76	394.4	44.07	0.04
P118-25-00	P118-25-00 R1	185.81*	Max WS	297.75	57.63	72.37		72.38	0.000028	0.74	400.7	44.05	0.04
P118-25-00	P118-25-00 R1	163.80*	Max WS	294.23	57.43	72.37		72.38	0.000027	0.72	406.99	44.04	0.04
P118-25-00	P118-25-00 R1	141.80*	Max WS	290.12	57.22	72.37		72.38	0.000025	0.7	413.31	44.03	0.04
P118-25-00	P118-25-00 R1	119.80*	Max WS	284.29	57.02	72.37		72.38	0.000022	0.68	419.57	44.01	0.04
P118-25-00	P118-25-00 R1	97.8	Max WS	278.51	56.81	72.37	60.44	72.37	0.000021	0.65	425.92	44	0.04
P118-25-01	P118-25-01	5341.48	Max WS	12.7	70.47	75.28		75.28	0.000003	0.12	103.13	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	217.5	68.9	74.92		74.97	0.000587	1.87	119.45	39.71	0.19
P118-25-01	P118-25-01	4162.47	Max WS	237.41	69.44	74.73		74.78	0.000555	1.83	129.93	41.34	0.18
P118-25-01	P118-25-01	4134.04	Max WS	242.18	69.38	74.71	71.74	74.76	0.000555	1.83	132.57	42.3	0.18
P118-25-01	P118-25-01	4110.08 Pipeline Crossin	Bridge										
P118-25-01	P118-25-01	4086.12	Max WS	242.17	69.25	74.65		74.7	0.000542	1.81	133.47	42.22	0.18
P118-25-01	P118-25-01	4047.7	Max WS	241.84	69.28	74.63		74.68	0.000521	1.8	134.21	41.4	0.18
P118-25-01	P118-25-01	4041	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	262.63	67.84	74.44		74.48	0.000379	1.65	159.18	43.72	0.15
P118-25-01	P118-25-01	3312.44	Max WS	264.99	67.48	74.35		74.38	0.000306	1.48	179.54	50.13	0.14
P118-25-01	P118-25-01	3014.68	Max WS	249.02	67.53	74.28		74.3	0.000212	1.33	187.41	45.99	0.12
P118-25-01	P118-25-01	2924.04	Max WS	247.29	67.71	74.26		74.29	0.000199	1.29	192.35	47.25	0.11
P118-25-01	P118-25-01	2763.33	Max WS	207.23	66.67	74.25		74.27	0.000127	1.06	195.39	44.92	0.09
P118-25-01	P118-25-01	2728.92	Max WS	208.13	66.5	74.08		74.24	0.003467	3.27	63.6	29.03	0.39
P118-25-01	P118-25-01	2639.28 Aldine Mail Rte	Culvert										
P118-25-01	P118-25-01	2546.4	Max WS	205.94	66.31	73.28		73.49	0.000879	3.64	56.56	34.27	0.26
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	208.73	66.04	73.37		73.42	0.000408	1.76	118.29	28.72	0.15
P118-25-01	P118-25-01	1881.88	Max WS	222.93	65.57	73.05		73.11	0.000591	2.01	110.79	30.51	0.19
P118-25-01	P118-25-01	1384.48	Max WS	224.05	66.19	72.8		72.85	0.000467	1.82	123.04	33.2	0.17
P118-25-01	P118-25-01	1245.83	Max WS	223.72	66.34	72.73		72.78	0.000474	1.88	119.07	30.58	0.17
P118-25-01	P118-25-01	584.11	Max WS	156.67	65.88	72.59		72.6	0.000136	1.11	141.67	29.02	0.09
P118-25-01	P118-25-01	60.05	Max WS	138.26	63.5	72.54		72.55	0.00008	0.9	154.04	27.03	0.07

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 IA 500yrr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq-ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R3-2	72405.2	Max WS	6912.15	58.25	75.76		75.97	0.002981	4.46	3206.99	1297.82	0.27
P118-00-00	P118-R3-2	71854.2	Max WS	6295.57	57.83	74.92		75.12	0.000396	3.8	3904.65	2053.52	0.21
P118-00-00	P118-R3-2	71754.2	Lat Struct										
P118-00-00	P118-R3-2	71000	Lat Struct										
P118-00-00	P118-R3-2	70744.2	Max WS	5009.76	55.05	74.59		74.72	0.000222	2.97	2334.63	447.2	0.16
P118-00-00	P118-R3-2	69527.2	Max WS	4435.76	55.28	74.43		74.51	0.000129	2.48	2914.61	520	0.13
P118-00-00	P118-R3-2	69000	Lat Struct										
P118-00-00	P118-R3-2	68670	Max WS	2879.87	54.88	74.38		74.45	0.000108	2.24	2045.18	309.65	0.11
P118-00-00	P118-R3-2	68133	Max WS	2393.09	54.47	74.36		74.41	0.000068	1.9	2177.72	369.7	0.09
P118-00-00	P118-R3-2	68000	Lat Struct										
P118-00-00	P118-R3-2	67511.6	Max WS	1959.99	54.14	74.34		74.38	0.000062	1.7	2217.35	365.8	0.08
P118-00-00	P118-R3-2	66869	Max WS	2508.56	53.96	74.22		74.29	0.000166	2.3	1390.54	207.89	0.13
P118-00-00	P118-R3-2	66800	Lat Struct										
P118-00-00	P118-R3-2	66774	Max WS	2587.01	53.79	74.21		74.28	0.000131	2.06	1461.81	199.53	0.12
P118-00-00	P118-R3-2	66500	Lat Struct										
P118-00-00	P118-R3-2	66190	Max WS	2362.52	53.6	74.18		74.24	0.000075	2.01	1979.82	227.52	0.09
P118-00-00	P118-R3-2	66000	Lat Struct										
P118-00-00	P118-R3-2	65955.8	Max WS	1956.88	53.52	74.19		74.21	0.000049	1.32	2075.86	278.2	0.07
P118-00-00	P118-R3-2	65434.6	Max WS	856.22	53.1	74.22		74.22	0.000011	0.71	1986.75	214.6	0.03
P118-00-00	P118-R3-2	64399.74	Max WS	3285.08	52.59	73.98		74.08	0.000141	2.75	1773.46	206.63	0.13
P118-00-00	P118-R3-2	64273.7	Max WS	3660.53	53.55	73.98	61.58	74.06	0.000121	2.32	1820.78	218.1	0.12
P118-00-00	P118-R3-2	64247.2	Bridge										
P118-00-00	P118-R3-2	64220.7	Max WS	3656.99	53.3	73.92		74	0.000117	2.31	1720.63	173.2	0.12
P118-00-00	P118-R3-2	64200	Max WS	3651.12	53.3	73.93		74.01	0.000116	2.3	1721.88	173.2	0.12
P118-00-00	P118-R2-2	64100	Max WS	6514.74	52.61	73.83		73.96	0.000135	2.91	2376.48	9487.88	0.13
P118-00-00	P118-R2-2	64094	Max WS	6158.52	52.61	73.86	61.1	73.97	0.00012	2.74	2381.73	9493.84	0.13
P118-00-00	P118-R2-2	64059.0 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	64024	Max WS	6500.7	52.56	73.81		73.94	0.000133	2.9	2381.66	9493.77	0.13
P118-00-00	P118-R2-2	64010.4	Max WS	7791.9	52.78	73.5	64.62	73.57	0.00014	2.86	11164.38	9475.26	0.13
P118-00-00	P118-R2-2	63985.4 RAILROAD	Bridge										
P118-00-00	P118-R2-2	63960.4	Max WS	7703.74	53.04	71.71		72.28	0.000797	6.16	1408.82	8753.73	0.31
P118-00-00	P118-R2-2	63959.7	Max WS	7300.62	53.06	71.96	61.71	72.17	0.000276	3.68	2040.09	8958.35	0.18
P118-00-00	P118-R2-2	63908.2 HARDY TOLL ROAD	Bridge										
P118-00-00	P118-R2-2	63856.7	Max WS	7219.61	53.16	71.84		72.06	0.000287	3.72	1993.78	8792.19	0.19
P118-00-00	P118-R2-2	63756.7	Max WS	6966.21	52.4	71.45		72.05	0.001034	6.47	1461.76	205	0.34
P118-00-00	P118-R2-2	63751	Lat Struct										
P118-00-00	P118-R2-2	63750	Lat Struct										
P118-00-00	P118-R2-2	62823.2	Max WS	4951	50.35	71.27		71.56	0.00046	4.41	1371.82	185	0.23
P118-00-00	P118-R2-2	61905.2	Max WS	4158.83	50.77	71.15		71.28	0.000215	2.86	1451.75	132.2	0.15
P118-00-00	P118-R2-2	60625.3	Max WS	3955.03	49.52	71.04		71.15	0.000171	2.68	1477.59	121.4	0.14
P118-00-00	P118-R2-1	60595.74	Max WS	3676.99	49.48	70.9		71.01	0.000145	2.9	1433.82	131.55	0.13
P118-00-00	P118-R2-1	60594.74	Lat Struct										
P118-00-00	P118-R2-1	60594	Lat Struct										
P118-00-00	P118-R2-1	60583.6*	Max WS	3703.92	49.68	70.89		71	0.000124	2.7	1531.46	139.91	0.12
P118-00-00	P118-R2-1	60571.6*	Max WS	3728.12	49.89	70.89		70.98	0.000109	2.54	1626.44	148.28	0.12
P118-00-00	P118-R2-1	60559.5*	Max WS	3742.37	50.09	70.89		70.97	0.000096	2.38	1719.32	156.63	0.11
P118-00-00	P118-R2-1	60547.5*	Max WS	3758.84	50.3	70.89		70.96	0.000087	2.26	1809.24	165	0.11
P118-00-00	P118-R2-1	60535.46	Max WS	3765.85	50.5	70.89		70.95	0.000079	2.14	1897.15	173.36	0.1
P118-00-00	P118-R2-1	60396.4*	Max WS	3760.45	50.45	70.88		70.95	0.000078	2.1	1919.55	174.32	0.1
P118-00-00	P118-R2-1	60257.3*	Max WS	3758.38	50.4	70.88		70.94	0.000078	2.07	1942.93	175.28	0.1
P118-00-00	P118-R2-1	60118.3*	Max WS	3757.7	50.35	70.87		70.93	0.000076	2.03	1968.59	176.25	0.1
P118-00-00	P118-R2-1	59979.2*	Max WS	3753.5	50.3	70.87		70.93	0.000075	1.99	1995.63	177.2	0.1
P118-00-00	P118-R2-1	59840.2*	Max WS	3756.62	50.25	70.86		70.92	0.000073	1.96	2024.34	178.16	0.1
P118-00-00	P118-R2-1	59701.1*	Max WS	3759.94	50.2	70.86		70.91	0.000071	1.92	2055.31	179.13	0.09
P118-00-00	P118-R2-1	59562.1*	Max WS	3764.8	50.15	70.85		70.91	0.000069	1.89	2087.39	180.09	0.09
P118-00-00	P118-R2-1	59423.1	Max WS	3768.05	50.1	70.84		70.9	0.000075	1.92	2120.44	181.05	0.09
P118-00-00	P118-R2-1	59307.4*	Max WS	3792.58	50.1	70.84		70.89	0.000072	1.88	2216.96	196.49	0.09
P118-00-00	P118-R2-1	59191.8*	Max WS	3819.48	50.11	70.83		70.88	0.00007	1.85	2306.17	211.94	0.09
P118-00-00	P118-R2-1	59076.2*	Max WS	3846.46	50.11	70.83		70.88	0.000068	1.82	2389.46	227.38	0.09
P118-00-00	P118-R2-1	58960.5*	Max WS	3880.5	50.11	70.82		70.87	0.000063	1.76	2465.84	242.82	0.09
P118-00-00	P118-R2-1	58844.9*	Max WS	3908.82	50.11	70.82		70.86	0.000061	1.73	2535.36	258.26	0.09
P118-00-00	P118-R2-1	58729.3*	Max WS	3946.14	50.12	70.81		70.86	0.00006	1.71	2597.43	273.71	0.09
P118-00-00	P118-R2-1	58613.7	Max WS	3984.21	50.12	70.81		70.85	0.000058	1.69	2652.9	289.15	0.08
P118-00-00	P118-R2-1	58463.86	Max WS	5810.37	47.59	70.81		70.82	0.000021	1.13	25387.15	5991.93	0.05
P118-00-00	P118-R2-1	58387.5	Max WS	5795.39	47.57	64.97	58.21	65.28	0.000543	4.53	1792.61	738.59	0.25
P118-00-00	P118-R2-1	58359.5 ALDINE WESTFIELD	Bridge										
P118-00-00	P118-R2-1	58331.5	Max WS	5795.44	47.51	64.86		65.17	0.000554	4.56	1756.67	708.73	0.25
P118-00-00	P118-R2-1	57555.5	Max WS	5795.38	47.03	64		64.63	0.001073	6.4	1198.64	816.09	0.34
P118-00-00	P118-R2-1	56998	Lat Struct										
P118-00-00	P118-R2-1	56513.3	Max WS	4149.63	46.03	63.64		63.94	0.000525	4.39	1039.57	326.03	0.24
P118-00-00	P118-R2-1	56000	Lat Struct										
P118-00-00	P118-R2-1	55557.7	Max WS	4149.42	44.69	63.03		63.38	0.000703	4.83	1205.16	461.08	0.27
P118-00-00	P118-R2-1	55000	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 IA 500yrr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	54459.2	Max WS	5135.96	44.27	61.8		62.35	0.000952	5.91	884.18	162.38	0.32
P118-00-00	P118-R2-1	53881	Lat Struct										
P118-00-00	P118-R2-1	53801.7	Max WS	5858.01	43.7	61.63		61.81	0.000311	3.41	1728.58	250.99	0.19
P118-00-00	P118-R2-1	53275.7	Max WS	5881.15	43.36	61.43		61.66	0.000278	3.86	1528.09	124.65	0.18
P118-00-00	P118-R2-1	52844.3	Max WS	6038.65	43.08	61.35	50.91	61.53	0.000251	3.42	1800.25	174.39	0.18
P118-00-00	P118-R2-1	52815.3	BERTRAND RD										
P118-00-00	P118-R2-1	52786.3	Max WS	6038.65	43.01	61.28		61.46	0.000252	3.42	1799.67	174.34	0.18
P118-00-00	P118-R2-1	52465.7	Max WS	6038.37	43.2	61.06		61.34	0.000512	4.28	1421.65	229.32	0.24
P118-00-00	P118-R2-1	52221.3	Max WS	6038.27	43.89	60.85	53.95	61.2	0.000672	4.7	1303.89	196.86	0.27
P118-00-00	P118-R2-1	52207.8	UTILITY										
P118-00-00	P118-R2-1	52194.3	Max WS	6038.12	43.8	60.8		61.14	0.000665	4.68	1310.22	199.43	0.27
P118-00-00	P118-R2-1	51283.9	Max WS	6036.81	43.41	60.1		60.48	0.000788	4.98	1417.58	471.56	0.29
P118-00-00	P118-R2-1	51096.9	Max WS	6036.27	42.91	60.01	51.17	60.34	0.000563	4.63	1645.08	712.8	0.25
P118-00-00	P118-R2-1	51083.9	UTILITY										
P118-00-00	P118-R2-1	51070.9	Max WS	6036.44	42.87	59.97		60.3	0.000563	4.64	1643.09	709.37	0.25
P118-00-00	P118-R2-1	50549.6	Max WS	6035.93	42.3	59.82		60.03	0.000368	3.76	2022.1	1551.56	0.21
P118-00-00	P118-R2-1	50021.9	Max WS	6035.73	41.83	59.65	50.38	59.84	0.000324	3.6	2566.08	2462.17	0.2
P118-00-00	P118-R2-1	49980.9	HOPPER RD										
P118-00-00	P118-R2-1	49939.9	Max WS	6035.02	41.69	59.47		59.67	0.000329	3.62	2490.26	2362.23	0.2
P118-00-00	P118-R2-1	49231.7	Max WS	6033.76	41.03	59.03		59.36	0.000685	4.69	2051.49	2217.23	0.27
P118-00-00	P118-R2-1	48480.5	Max WS	6033.17	41.23	58.66		58.89	0.000432	3.99	2746.01	2228.21	0.22
P118-00-00	P118-R2-1	48196.5	Max WS	5580.46	41.31	58.53	50.51	58.74	0.000426	3.83	2893.08	2479.86	0.22
P118-00-00	P118-R2-1	48183.0	UTILITY										
P118-00-00	P118-R2-1	48169.5	Max WS	5580.44	41.24	58.49		58.7	0.000419	3.8	2969.78	2547.49	0.22
P118-00-00	P118-R2-1	47607.9	Max WS	5580.34	40.57	58.21		58.45	0.000541	4.19	2982.05	2409.64	0.24
P118-00-00	P118-R2-1	46939	Max WS	5579.21	40.79	57.93		58.06	0.000315	3.11	3971.35	2456.17	0.19
P118-00-00	P118-R2-1	46594.8	Max WS	5577.66	40.91	57.8	48.86	57.98	0.000274	3.62	5605.85	3926.01	0.18
P118-00-00	P118-R2-1	46584.8	Bridge										
P118-00-00	P118-R2-1	46579.8	Max WS	5577.55	40.91	57.79		57.97	0.00033	3.51	4029.77	3529.22	0.19
P118-00-00	P118-R2-1	46575.8	Max WS	5577.35	40.91	57.78	48.87	57.98	0.000348	3.61	2956.29	2562.56	0.2
P118-00-00	P118-R2-1	46560.8	LITTLE YORK RD										
P118-00-00	P118-R2-1	46526.8	Max WS	5576.71	40.74	57.75		57.91	0.000285	3.47	5905.73	4378.66	0.18
P118-00-00	P118-R2-1	46516.8	Max WS	5576.64	40.74	57.75	48.71	57.9	0.000329	3.28	6001.81	4048.5	0.19
P118-00-00	P118-R2-1	46515.8	Bridge										
P118-00-00	P118-R2-1	46478.9	Max WS	5574.47	40.49	57.61		57.81	0.000424	3.71	3952.59	3584.36	0.22
P118-00-00	P118-R2-1	46468.9	Max WS	5574.46	40.49	57.6	50.1	57.8	0.000425	3.71	3936.75	3568.71	0.22
P118-00-00	P118-R2-1	46466.8	Bridge										
P118-00-00	P118-R2-1	46458.9	Max WS	5574.32	40.49	57.59		57.79	0.000427	3.72	3895.19	3527.32	0.22
P118-00-00	P118-R2-1	45952.3	Max WS	5565.9	40.12	57.33		57.52	0.000646	3.82	4778.7	3892.8	0.26
P118-00-00	P118-R2-1	45161.4	Max WS	5540.84	39.57	56.9		57.08	0.000566	3.7	4897.68	3245.43	0.22
P118-00-00	P118-R2-1	44549.9	Max WS	5518.64	38.76	56.68		56.83	0.000421	3.29	4684.7	3353.67	0.19
P118-00-00	P118-R2-1	44143.3	Max WS	5504.04	38.22	56.56		56.69	0.000348	3.06	5039.82	3632.98	0.17
P118-00-00	P118-R2-1	43789.5	Max WS	5680.26	37.97	56.54		56.55	0.000037	1.71	13094.24	4141.93	0.07
P118-00-00	P118-R2-1	43739.48	Max WS	5679.51	37.93	56.53		56.55	0.000047	1.93	9836.58	3723.48	0.08
P118-00-00	P118-R2-1	43652.1*	Max WS	5679.86	37.87	56.53		56.55	0.000039	1.76	11391.26	3886.61	0.07
P118-00-00	P118-R2-1	43564.8*	Max WS	5679.42	37.81	56.53		56.54	0.00003	1.53	13090.94	4145.79	0.06
P118-00-00	P118-R2-1	43477.4*	Max WS	5679.39	37.75	56.53		56.54	0.000021	1.29	14815.8	4151.82	0.05
P118-00-00	P118-R2-1	43390.1*	Max WS	5680.25	37.68	56.53		56.54	0.000014	1.07	16476.85	4140.57	0.04
P118-00-00	P118-R2-1	43302.8*	Max WS	5679.35	37.62	56.53		56.53	0.000009	0.85	18158.39	4062.76	0.04
P118-00-00	P118-R2-1	43215.5	Max WS	5680.2	37.56	56.53		56.53	0.000007	0.75	19357.72	4038.64	0.03
P118-00-00	P118-R2-1	43118.0*	Max WS	5731.1	37.49	56.53		56.53	0.00001	0.92	18121.29	3918	0.04
P118-00-00	P118-R2-1	43020.4*	Max WS	5731.06	37.42	56.53		56.53	0.000013	1.03	16794.86	4121.23	0.04
P118-00-00	P118-R2-1	42922.9*	Max WS	5730.6	37.35	56.53		56.53	0.000016	1.13	15749.24	4012.28	0.05
P118-00-00	P118-R2-1	42825.49	Max WS	5731.08	37.28	56.52		56.53	0.000018	1.21	14774.97	3982.05	0.05
P118-00-00	P118-R2-1	42736.8*	Max WS	5729.61	37.22	56.52		56.53	0.000017	1.17	15154.22	3974.64	0.05
P118-00-00	P118-R2-1	42648.2*	Max WS	5729.08	37.15	56.52		56.53	0.000014	1.09	15573.5	3981.7	0.05
P118-00-00	P118-R2-1	42559.6*	Max WS	5728.5	37.09	56.52		56.53	0.000011	0.97	15934.69	3983.87	0.04
P118-00-00	P118-R2-1	42471	Max WS	5727.97	37.03	56.52		56.52	0.000006	0.7	15932.84	3919.2	0.03
P118-00-00	P118-R2-1	42395.8*	Max WS	5729.02	36.98	56.52		56.52	0.000007	0.79	16049.14	3725.56	0.03
P118-00-00	P118-R2-1	42320.7*	Max WS	5729.57	36.92	56.52		56.52	0.000004	0.62	16923.92	3673.69	0.03
P118-00-00	P118-R2-1	42245.55	Max WS	5729.54	36.87	56.52		56.52	0.000002	0.37	17274.49	3661.83	0.02
P118-00-00	P118-R2-1	42150.1*	Max WS	5727.82	36.8	56.52		56.52	0.000006	0.7	16117.22	3566.38	0.03
P118-00-00	P118-R2-1	42054.6*	Max WS	5727.77	36.74	56.52		56.52	0.000008	0.82	14440.5	3497.15	0.03
P118-00-00	P118-R2-1	41959.2*	Max WS	5727.18	36.67	56.52		56.52	0.000009	0.9	12972.62	3479.56	0.04
P118-00-00	P118-R2-1	41863.8	Max WS	5728.96	36.6	56.52		56.52	0.000009	0.89	13102.02	3410.63	0.04
P118-00-00	P118-R2-1	41771.7*	Max WS	5727.74	36.53	56.52		56.52	0.000013	1.07	12972.75	3404.91	0.04
P118-00-00	P118-R2-1	41679.6*	Max WS	5726.49	36.47	56.51		56.52	0.000016	1.18	12795.48	3412.99	0.05
P118-00-00	P118-R2-1	41587.5*	Max WS	5727.09	36.4	56.51		56.52	0.000018	1.27	12542.47	3392.17	0.05
P118-00-00	P118-R2-1	41495.4*	Max WS	5725.16	36.34	56.51		56.52	0.00002	1.32	12485.88	3526.7	0.05
P118-00-00	P118-R2-1	41403.3	Max WS	5725.11	36.27	56.51		56.52	0.000019	1.28	12615.5	3660.21	0.05
P118-00-00	P118-R2-1	41285.4	Max WS	5685.68	36.27	56.41	43.48	56.78	0.000011	4.94	2243.42	3517.49	0.2
P118-00-00	P118-R2-1	41243.9	JENSEN DR										
P118-00-00	P118-R2-1	41203.4	Max WS	5726.32	36.25	56.51		56.72	0.000008	4.1	2325.26	3768.23	0.16

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Alt3 IA_500Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R2-1	41197.4	Max WS	5688.41	36.25	56.41	43.45	56.77	0.000011	4.92	2280.51	3440.11	0.2
P118-00-00	P118-R2-1	41197.2 UTILITY	Bridge										
P118-00-00	P118-R2-1	41185.7	Max WS	5646.73	36.25	56.32		56.69	0.000006	4.95	2245.6	3426.76	0.2
P118-00-00	P118-R2-1	40951.8	Max WS	5688.67	36.2	56.41	42.07	56.49	0.000006	2.34	7725.44	3260.45	0.1
P118-00-00	P118-R2-1	40919.3 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40886.8	Max WS	5685.88	36.19	56.4		56.48	0.000006	2.28	7518.13	3224.8	0.1
P118-00-00	P118-R2-1	40846.9	Max WS	5681.55	36.18	56.4	42.88	56.5	0.000009	2.62	8153.78	3529.29	0.12
P118-00-00	P118-R2-1	40726.2 US HWY 59 (ML)	Bridge										
P118-00-00	P118-R2-1	40605.5	Max WS	5680.81	36.13	56.38		56.48	0.000009	2.62	7776.32	3372.41	0.12
P118-00-00	P118-R2-1	40584.6	Max WS	5677.96	36.13	56.38	42.84	56.48	0.00001	2.54	6871.68	3132.73	0.12
P118-00-00	P118-R2-1	40550.1 US HWY 59 (FR)	Bridge										
P118-00-00	P118-R2-1	40515.6	Max WS	5677.96	36.12	56.37		56.46	0.00001	2.52	7776.56	3459.69	0.12
P118-00-00	P118-R2-1	39969.8	Max WS	5668.16	36.01	56.36		56.46	0.000018	2.7	9005.16	4150.11	0.13
P118-00-00	P118-R2-1	39829.31	Max WS	7358.33	36	56.33		56.41	0.000397	2.9	7487.72	3823.67	0.17
P118-00-00	P118-R2-1	39188.6	Max WS	7341.64	35.6	56.09		56.21	0.000467	3.59	7606.4	4015.86	0.18
P118-00-00	P118-R2-1	38423.57	Max WS	7816.22	34.76	55.77		55.91	0.00048	3.88	6479.85	2532.36	0.19
P118-00-00	P118-R2-1	38170.2	Max WS	7808.82	34.35	55.69		55.82	0.000376	3.47	7120.78	2845.02	0.17
P118-00-00	P118-R2-1	37899.37	Max WS	7802.61	34.35	55.63		55.75	0.000319	3.38	7077.88	3025.15	0.16
P118-00-00	P118-R2-1	37413.16	Max WS	7790.49	34.13	55.52		55.69	0.000449	3.94	6133.06	2882.91	0.18
P118-00-00	P118-R2-1	37258.6	Max WS	7778.91	34.02	55.44		55.63	0.000488	4.1	6157.12	2681.04	0.19
P118-00-00	P118-R2-1	36408.6	Max WS	7738.41	32.39	55.23		55.34	0.000453	3.41	7394.3	3192.79	0.18
P118-00-00	P118-R2-1	36341.47	Max WS	7734.82	32.39	55.2	45.86	55.31	0.000463	3.45	7102.99	2871.44	0.18
P118-00-00	P118-R2-1	36330 UTILITY	Bridge										
P118-00-00	P118-R2-1	36321.56	Max WS	7723.64	32	55.16		55.27	0.000271	3.13	7302.23	2704	0.14
P118-00-00	P118-R2-1	36303.5	Max WS	7724.23	32	55.16		55.26	0.000231	2.92	7483.51	2742.15	0.13
P118-00-00	P118-R1-3	36195.78	Max WS	9258.71	32.04	55.03		55.22	0.000392	3.86	6228.21	2035.03	0.17
P118-00-00	P118-R1-3	36107.2	Max WS	9258.73	32	55		55.18	0.000389	3.85	6101.2	1779.09	0.17
P118-00-00	P118-R1-3	35434.7	Max WS	9257.87	31.72	54.74		55.02	0.000456	4.36	4856.76	1461.83	0.19
P118-00-00	P118-R1-3	35045.7	Max WS	9256.33	31.55	54.53	41.58	54.85	0.000506	4.56	3625.25	1096.88	0.2
P118-00-00	P118-R1-3	35025.9 RAILROAD	Bridge										
P118-00-00	P118-R1-3	35006.1	Max WS	9255.65	31.09	54.4		54.7	0.00047	4.45	4016.21	1226.02	0.19
P118-00-00	P118-R1-3	34984.3	Max WS	9255.41	30.53	54.38	42.54	54.72	0.000581	4.89	3403.48	1007.95	0.21
P118-00-00	P118-R1-3	34927.3 HIRSCH RD	Bridge										
P118-00-00	P118-R1-3	34870.3	Max WS	9253.58	30	54.12		54.45	0.000544	4.79	3712.81	1089.29	0.21
P118-00-00	P118-R1-3	33920.1	Max WS	9336.68	29.63	53.4		53.82	0.000894	5.69	3829.32	1342.44	0.25
P118-00-00	P118-R1-3	32749.8	Max WS	9428.41	28	52.28		52.74	0.00098	5.84	3413.06	1097.95	0.27
P118-00-00	P118-R1-3	31824.3	Max WS	9501.25	26.81	51.54		51.93	0.000697	5.28	3690.75	1364.69	0.23
P118-00-00	P118-R1-3	30679.1	Max WS	9573.87	27.05	50.72		51.14	0.000739	5.47	3553.63	1468.64	0.24
P118-00-00	P118-R1-3	30678.1	Lat Struct										
P118-00-00	P118-R1-3	30099.1	Max WS	9569.25	27.23	50.46		50.77	0.000441	4.62	3774.64	1363.27	0.19
P118-00-00	P118-R1-3	29757.8	Max WS	9589.44	27.34	50.28	37.96	50.62	0.000493	4.83	4386.21	1852.66	0.2
P118-00-00	P118-R1-3	29731.3 PARKER RD	Bridge										
P118-00-00	P118-R1-3	29704.8	Max WS	9567.93	27	50.06		50.34	0.000422	4.49	4641.58	2044.24	0.19
P118-00-00	P118-R1-3	28983.7	Max WS	9475.37	26.97	49.47		50.01	0.000949	6.07	2559.7	1157.31	0.27
P118-00-00	P118-R1-3	28387.3	Max WS	10558.11	26.04	49.15		49.49	0.00048	4.75	3592.75	1201.24	0.2
P118-00-00	P118-R1-3	27992	Max WS	10573.93	25.42	48.97		49.3	0.000562	5.08	4312.95	815.65	0.21
P118-00-00	P118-R1-3	27567.7	Max WS	10567.68	25.74	48.79		49.09	0.000435	4.82	4596.74	1173.09	0.19
P118-00-00	P118-R1-3	27317	Max WS	10567.4	25.92	48.7	36.89	48.99	0.000441	4.78	5466.56	2147.99	0.19
P118-00-00	P118-R1-3	27306.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27305.8	Max WS	10542.36	25.93	48.38		48.8	0.000568	5.41	4843.85	2029.21	0.22
P118-00-00	P118-R1-3	27295.8	Max WS	10542.35	25.93	48.37	36.74	48.8	0.000569	5.41	4831.62	2026.61	0.22
P118-00-00	P118-R1-3	27242.8 HOMESTEAD RD	Bridge										
P118-00-00	P118-R1-3	27189.8	Max WS	10485.66	25.89	47.82		48.3	0.000652	5.68	3864.04	1624.51	0.24
P118-00-00	P118-R1-3	27180.8	Max WS	10483.78	25.89	47.81	36.67	48.3	0.000653	5.69	3853.81	1622.63	0.24
P118-00-00	P118-R1-3	27179.0 UTILITY	Bridge										
P118-00-00	P118-R1-3	27167.5	Max WS	10494.36	25.84	47.9		48.22	0.000461	4.73	3955.9	1644.86	0.2
P118-00-00	P118-R1-3	26816.8*	Max WS	10469.16	25.02	47.71		48.03	0.000496	4.65	3131.64	1039.86	0.2
P118-00-00	P118-R1-3	26815.8	Lat Struct										
P118-00-00	P118-R1-3	26466.1	Max WS	10396.35	24.2	47.55		47.86	0.000565	4.59	2840.06	619.52	0.21
P118-00-00	P118-R1-3	26224.4*	Max WS	10493.18	23.64	47.41		47.72	0.000528	4.52	2720.24	281.86	0.2
P118-00-00	P118-R1-3	25982.8	Max WS	10530.73	23.07	47.3		47.59	0.000478	4.39	2896.68	348.99	0.2
P118-00-00	P118-R1-3	25318.4	Max WS	10465.78	23.07	47		47.28	0.000476	4.32	3130.53	500.99	0.19
P118-00-00	P118-R1-3	25317.4	Lat Struct										
P118-00-00	P118-R1-3	24564.2	Max WS	10317.74	21.76	46.65		46.94	0.000397	4.33	3431.63	1039.29	0.18
P118-00-00	P118-R1-3	23984.6	Max WS	12224.96	20.75	46.4		46.68	0.000408	4.49	4336.69	540.78	0.19
P118-00-00	P118-R1-2	23796.2	Max WS	12809.98	24.42	46.29		46.6	0.00038	4.57	3661.62	691.11	0.2
P118-00-00	P118-R1-2	23795.2	Lat Struct										
P118-00-00	P118-R1-2	23286.2	Max WS	12884.01	20.82	45.98		46.36	0.000598	4.98	3268.24	513.72	0.22
P118-00-00	P118-R1-2	22973.4	Max WS	12883.81	20.85	45.83	32.76	46.17	0.000523	4.77	5761.62	1433.56	0.21
P118-00-00	P118-R1-2	22951.4 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22929.4	Max WS	12883.91	20.49	45.43		45.78	0.000532	4.8	5645.83	1114.36	0.21
P118-00-00	P118-R1-2	22928.4	Lat Struct										
P118-00-00	P118-R1-2	22630.3	Max WS	12837.82	19.11	44.97	34.39	45.62	0.001307	6.49	1984.76	162.38	0.31

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 JA 500Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-00-00	P118-R1-2	22609.0 RAILROAD	Bridge										
P118-00-00	P118-R1-2	22587.7	Max WS	12836.52	18.99	44.58		45.26	0.0014	6.63	1943.4	160.55	0.32
P118-00-00	P118-R1-2	22577.7	Max WS	12836.52	18.99	44.56		45.25	0.001405	6.63	1942.38	164.16	0.32
P118-00-00	P118-R1-1	22186.8	Max WS	12031.11	18.55	44.15		44.76	0.000906	6.32	2175.49	243.17	0.26
P118-00-00	P118-R1-1	22186	Lat Struct										
P118-00-00	P118-R1-1	22185.8	Lat Struct										
P118-00-00	P118-R1-1	21829	Max WS	12068.97	18.16	44.21		44.47	0.000351	4.12	3313.94	315.23	0.17
P118-00-00	P118-R1-1	21589.8	Max WS	13703.21	17.9	43.74		44.32	0.000745	6.34	2657.47	226.99	0.25
P118-00-00	P118-R1-1	21362	Max WS	13697.91	17.65	43.52		44.23	0.000071	6.79	2556.05	317.54	0.27
P118-00-00	P118-R1-1	21361	Lat Struct										
P118-00-00	P118-R1-1	21360	Max WS	13697.85	17.65	43.52	32.02	44.23	0.000071	6.8	2554.73	316.85	0.27
P118-00-00	P118-R1-1	21333.0 WAYSIDE DR	Bridge										
P118-00-00	P118-R1-1	21304	Max WS	13695.76	17.62	43.44		44.15	0.000072	6.81	2539.75	308.9	0.27
P118-00-00	P118-R1-1	21010.4	Max WS	13696.33	18.08	43.54	30.3	44.04	0.000616	6.43	3848.2	427.76	0.23
P118-00-00	P118-R1-1	20948.9 TIDWELL RD (WB)	Bridge										
P118-00-00	P118-R1-1	20887.4	Max WS	13694.57	17.96	43.41		43.91	0.000616	6.43	3846.23	425.98	0.23
P118-00-00	P118-R1-1	20880.6	Max WS	13673.96	17.96	42.98	32.87	44.25	0.000119	9.47	3158.26	268.84	0.36
P118-00-00	P118-R1-1	20869.6 TIDWELL RD (EB)	Bridge										
P118-00-00	P118-R1-1	20858.6	Max WS	13672.2	17.96	42.94		44.21	0.00012	9.49	3148.3	268.25	0.36
P118-00-00	P118-R1-1	20857.6	Lat Struct										
P118-00-00	P118-R1-1	19860	Max WS	13295.8	19.24	42.57		43.38	0.001287	7.36	2211.5	542.06	0.32
P118-00-00	P118-R1-1	18597.4	Max WS	14327.59	15.56	41.18		41.94	0.000837	7.29	2639.05	200.78	0.28
P118-00-00	P118-R1-1	18107.1	Max WS	14332.44	15.21	41.12		41.45	0.000631	4.63	3171.01	331.97	0.22
P118-00-00	P118-R1-1	17862.9*	Max WS	14329.02	14.55	41.02		41.32	0.000493	4.43	3366.82	344.04	0.2
P118-00-00	P118-R1-1	17618.7*	Max WS	14343.38	13.89	40.94		41.23	0.000411	4.34	3531.58	355.67	0.18
P118-00-00	P118-R1-1	17374.5*	Max WS	14416.43	13.23	40.82		41.12	0.000375	4.39	3462.79	296.75	0.18
P118-00-00	P118-R1-1	17130.3	Max WS	14688.65	12.57	40.71		41.02	0.000368	4.55	3487.21	298.18	0.18
P118-00-00	P118-R1-1	16004	Max WS	15487.17	11.24	40.22		40.53	0.000462	4.55	3752.43	680.44	0.19
P118-00-00	P118-R1-1	15045.6	Max WS	16354.45	10.55	39.38		39.91	0.000785	5.89	3045.01	363.56	0.25
P118-00-00	P118-R1-1	13937.2	Max WS	16352.92	11.62	38.82		39.24	0.000552	5.83	5520.97	598.74	0.22
P118-00-00	P118-R1-1	13341.9	Max WS	16352.07	10.38	38.35		38.91	0.000786	6.95	4400.79	386.53	0.26
P118-00-00	P118-R1-1	12945.5	Max WS	16352.16	9.55	38.23	27.29	38.56	0.000496	5.67	5904.94	605.26	0.21
P118-00-00	P118-R1-1	12935.0 UTILITY	Bridge										
P118-00-00	P118-R1-1	12932.7	Max WS	16352.08	9.53	38.09		38.43	0.000509	5.72	5832.8	596.13	0.21
P118-00-00	P118-R1-1	12931.7	Max WS	16352.08	9.53	38.09	27.27	38.43	0.000509	5.72	5832.49	596.09	0.21
P118-00-00	P118-R1-1	12904.8 MESA RD	Bridge										
P118-00-00	P118-R1-1	12877.9	Max WS	16351.29	8.77	37.26		37.59	0.000517	5.75	5786.66	590.16	0.21
P118-00-00	P118-R1-1	12117.3	Max WS	16351.12	7.23	36.85		37.23	0.0004	5.34	4206.96	350.56	0.19
P118-00-00	P118-R1-1	10905.1	Max WS	17955.79	9.54	35.66		36.44	0.000944	7.28	3440.37	352.72	0.29
P118-00-00	P118-R1-1	9879.2	Max WS	17940.12	6.26	34.17		35.32	0.001518	9.36	3191.42	246.78	0.36
P118-00-00	P118-R1-1	8777	Max WS	17934.2	4.71	33.57		33.76	0.000344	4.16	9505.1	873.99	0.17
P118-00-00	P118-R1-1	8024.4	Max WS	17931.01	4.73	33.15		33.51	0.000481	5.39	5901.34	426.69	0.21
P118-00-00	P118-R1-1	6779.3	Max WS	17927.94	4.44	32.35		32.81	0.000684	5.88	5164.29	513.98	0.24
P118-00-00	P118-R1-1	5748.4	Max WS	17922.6	4.27	30.93		31.91	0.001556	8.82	3937.21	428.82	0.35
P118-00-00	P118-R1-1	4492	Max WS	17918.98	1.92	29.63		30.24	0.000835	6.47	3902.64	395.98	0.26
P118-00-00	P118-R1-1	3597.9	Max WS	17917.66	2.46	28.93		29.49	0.000941	6.76	4995.84	545.34	0.28
P118-00-00	P118-R1-1	2709.4	Max WS	17916.83	1.59	28.04		28.67	0.000961	7.28	5096.86	479.4	0.29
P118-00-00	P118-R1-1	1695.9	Max WS	17916.47	1.52	26.78		27.61	0.001347	8.42	4304.71	372.14	0.33
P118-00-00	P118-R1-1	678.7	Max WS	17916.39	0.81	24.14	18.89	25.78	0.0028	10.78	2428.28	249.72	0.47
P118-08-00	P118-08-00	8341.69	Max WS	30	48.34	49.88		49.92	0.001603	1.58	18.97	16.71	0.26
P118-08-00	P118-08-00	7839.79	Max WS	29.99	47.55	49.35		49.37	0.00058	1.01	29.69	24.3	0.16
P118-08-00	P118-08-00	7820.27	Max WS	31.74	47.46	49.34	48.29	49.35	0.000738	1.06	30.06	27.7	0.18
P118-08-00	P118-08-00	7778.68	Bridge										
P118-08-00	P118-08-00	7762.13	Max WS	31.73	47.58	49.23		49.26	0.001681	1.49	21.31	21.73	0.27
P118-08-00	P118-08-00	7729.04	Max WS	35.68	46.32	49.21		49.23	0.000177	0.98	36.39	38.02	0.1
P118-08-00	P118-08-00	7672.92	Culvert										
P118-08-00	P118-08-00	7613.92	Max WS	35.68	46.88	49.2		49.22	0.000385	1.23	28.89	24.29	0.15
P118-08-00	P118-08-00	7550.89	Max WS	42.59	46.66	49.17		49.19	0.000414	1.06	40.01	88.64	0.14
P118-08-00	P118-08-00	6762.47	Max WS	123.69	44.81	48.52		48.58	0.000909	1.95	73.35	53.15	0.22
P118-08-00	P118-08-00	5858.77	Max WS	180.83	44.48	48.04		48.04	0.000239	1.04	760.91	1617.51	0.11
P118-08-00	P118-08-00	5845.88	Max WS	181.04	44.35	47.97		48.32	0.000333	4.76	45.14	1907.53	0.45
P118-08-00	P118-08-00	5812.35	Culvert										
P118-08-00	P118-08-00	5779.72	Max WS	174.16	44.6	47.91		48.29	0.000412	4.99	34.88	2226.95	0.49
P118-08-00	P118-08-00	5748.41	Max WS	184.21	44.22	48.05		48.12	0.001131	2.31	173.98	2198.68	0.25
P118-08-00	P118-08-00	4837.06	Max WS	231.19	41.61	46.44		46.58	0.002256	3.02	76.68	1713.22	0.35
P118-08-00	P118-08-00	4823.61	Max WS	232.27	41.31	46.48		46.55	0.001415	2.21	150.23	1974.47	0.27
P118-08-00	P118-08-00	4767.88	Max WS	235.1	41.28	46.33		46.47	0.001859	3	83.74	1730	0.32
P118-08-00	P118-08-00	4732.44	Max WS	237.73	41.13	46.32		46.41	0.001004	2.48	104.27	1941.41	0.24
P118-08-00	P118-08-00	4289.14	Max WS	260.45	41.25	45.13		45.37	0.003368	3.96	77.13	1159.95	0.43
P118-08-00	P118-08-00	4255.48	Max WS	254.17	41.41	44.99	43.81	45.29	0.000475	4.39	57.84	1046.47	0.49
P118-08-00	P118-08-00	4225.44	Bridge										
P118-08-00	P118-08-00	4191.19	Max WS	256.29	41.23	45.03		45.28	0.000407	4.01	63.9	2004.26	0.45
P118-08-00	P118-08-00	4159.81	Max WS	255.46	40.8	45.04		45.25	0.001511	3.66	69.7	1595.24	0.32

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_JA_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-08-00	P118-08-00	4083.03	Culvert										
P118-08-00	P118-08-00	4007.74	Max WS	256.95	40.16	45.07		45.25	0.00113	3.38	76.13	305.61	0.28
P118-08-00	P118-08-00	3928.82	Max WS	270.69	38.97	45.09		45.13	0.000476	1.87	235.49	293.08	0.17
P118-08-00	P118-08-00	3927.82	Lat Struct										
P118-08-00	P118-08-00	3407.5	Max WS	314.93	38.34	44.5		44.57	0.000653	2.2	280.93	399.71	0.2
P118-08-00	P118-08-00	2630.49	Max WS	96.58	37.06	44.29		44.29	0.000039	0.57	353.65	426.48	0.05
P118-08-00	P118-08-00	1901.01	Max WS	-341.11	35.97	44.32		44.34	0.00018	-1.38	790.81	1243.44	0.11
P118-08-00	P118-08-00	1219.08	Max WS	-739.56	33.28	44.45		44.5	0.000306	-2.01	724.38	1235.17	0.14
P118-08-00	P118-08-00	1186.93	Max WS	-737.64	34.39	44.46		44.52	0.000388	-2.09	672.3	1208.73	0.16
P118-08-00	P118-08-00	1185.93	Lat Struct										
P118-08-00	P118-08-00	1184.93	Lat Struct										
P118-08-00	P118-08-00	1152.13	Max WS	-709.3	34.03	44.49		44.51	0.000176	-1.2	1273.46	738.63	0.1
P118-08-00	P118-08-00	1046.19	Culvert										
P118-08-00	P118-08-00	935.77	Max WS	-709.57	33.5	44.54		44.62	0.000743	-2.25	357.68	219.49	0.21
P118-08-00	P118-08-00	890.93	Max WS	-730.36	28.97	44.69		44.72	0.000156	-1.38	571.93	168.63	0.1
P118-08-00	P118-08-00	881.12	Max WS	-737.09	27.91	44.72		44.74	0.00008	-1.71	640.76	131.44	0.08
P118-08-00	P118-08-00	846.44	Max WS	-747.47	26.44	44.74		44.76	0.000083	-1.23	630.59	127.74	0.08
P118-08-00	P118-08-00	68.07	Max WS	-803.9	23.63	44.76		44.77	0.00001	-0.62	1521.06	190.7	0.03
P118-09-00	P118-09-00	8416.71	Max WS	167.3	52.44	57.93		57.96	0.002162	1.43	129.48	75.99	0.14
P118-09-00	P118-09-00	8415.71	Lat Struct										
P118-09-00	P118-09-00	8054.36	Max WS	158.31	51.25	57.5		57.52	0.000231	1.24	132.59	123.65	0.12
P118-09-00	P118-09-00	7947.1	Max WS	272.15	50.5	56.97		57.48	0.00025	5.73	47.48	37.31	0.41
P118-09-00	P118-09-00	7842.82	Culvert										
P118-09-00	P118-09-00	7742.76	Max WS	278.63	50.64	56.63		56.81	0.000165	4.2	404.04	161.68	0.32
P118-09-00	P118-09-00	7741.76	Lat Struct										
P118-09-00	P118-09-00	7692.1	Max WS	283.51	50.66	56.66		56.67	0.000165	0.95	648.21	186.31	0.1
P118-09-00	P118-09-00	7037.08	Max WS	362.01	50.59	56.19		56.28	0.001098	2.51	307.44	589.03	0.26
P118-09-00	P118-09-00	6335.17	Max WS	407.44	50.38	55.65		55.67	0.000486	1.53	825.43	1178.22	0.2
P118-09-00	P118-09-00	6241.34	Max WS	406.37	49.73	55.58		55.75	0.000158	4.04	714.73	833	0.32
P118-09-00	P118-09-00	6208.53	Culvert										
P118-09-00	P118-09-00	6182.3	Max WS	406.11	49.91	55.45		55.73	0.000219	4.72	437.01	459.85	0.38
P118-09-00	P118-09-00	6180.3	Lat Struct										
P118-09-00	P118-09-00	6152.7	Max WS	390.64	49.94	55.49		55.56	0.001009	2.54	386.81	366.77	0.24
P118-09-00	P118-09-00	6006.93	Max WS	382.42	49.66	55.38		55.43	0.000847	2.24	419.86	448.51	0.22
P118-09-00	P118-09-00	5998.6	Max WS	384.29	49.63	55.36		55.42	0.000904	2.31	437.94	590.2	0.23
P118-09-00	P118-09-00	5978.1	Max WS	390.55	49.66	55.36		55.37	0.000286	1.29	1096.47	1078.78	0.13
P118-09-00	P118-09-00	5970.8	Max WS	392.97	49.74	55.36		55.37	0.000155	0.92	1452.98	1133.2	0.09
P118-09-00	P118-09-00	5869.16	Max WS	408.97	49.31	55.35		55.35	0.000163	1.01	1430.81	1090.24	0.1
P118-09-00	P118-09-00	5818.16	Max WS	412.14	49.47	55.34		55.37	0.000169	2.26	1283.75	1121.3	0.28
P118-09-00	P118-09-00	5784.29	Culvert										
P118-09-00	P118-09-00	5758.62	Max WS	412.12	49.13	55.32		55.41	0.000484	3.28	744.03	1165.49	0.46
P118-09-00	P118-09-00	5685.64	Max WS	415.73	49.01	55.3		55.35	0.000694	2.16	619.69	909.87	0.2
P118-09-00	P118-09-00	4961.22	Max WS	441.25	47.46	54.91		54.99	0.000768	2.49	308.1	267.66	0.22
P118-09-00	P118-09-00	4862.39	Max WS	448.9	47.3	54.82		54.98	0.000426	3.36	236.18	271.49	0.44
P118-09-00	P118-09-00	4824.5	Culvert										
P118-09-00	P118-09-00	4795.65	Max WS	448.9	47.66	54.77		55.01	0.000579	4.04	222.66	336.16	0.52
P118-09-00	P118-09-00	4717.67	Max WS	457.22	47.29	54.76		54.9	0.001164	3.04	173.72	384.37	0.27
P118-09-00	P118-09-00	4354.22	Max WS	520.04	46.81	54.26		54.42	0.001235	3.24	185.67	118.91	0.28
P118-09-00	P118-09-00	4232.29	Max WS	418.67	45.84	53.6		54.31	0.000201	5.78	77.5	71.94	0.38
P118-09-00	P118-09-00	4198.57	Culvert										
P118-09-00	P118-09-00	4169.23	Max WS	468.74	45.75	51.96		53.2	0.000763	8.93	52.48	22.38	0.69
P118-09-00	P118-09-00	4101.99	Max WS	549.73	46.19	52.61		53.41	0.000986	7.18	76.57	23.78	0.71
P118-09-00	P118-09-00	4100.99	Lat Struct										
P118-09-00	P118-09-00	4099.99	Lat Struct										
P118-09-00	P118-09-00	3604.68	Max WS	114.69	45.18	51.7		51.73	0.000046	1.55	120.86	68.4	0.15
P118-09-00	P118-09-00	3214.67	Max WS	677.1	43.86	51.47	49.73	51.97	0.000494	5.79	248.69	327.86	0.52
P118-09-00	P118-09-00	3131.26	Max WS	686.99	43.6	50.85		52.53	0.000827	10.48	111.37	175.78	0.73
P118-09-00	P118-09-00	3075.7	Culvert										
P118-09-00	P118-09-00	3013.16	Max WS	305.14	43.59	48.03		49.28	0.001421	8.98	33.96	14.53	0.86
P118-09-00	P118-09-00	2939.54	Max WS	694.49	43.48	49.08	49.59	51.24	0.003101	11.79	58.89	20.43	1.22
P118-09-00	P118-09-00	2938.54	Lat Struct										
P118-09-00	P118-09-00	2383.3	Max WS	755.77	42.41	48.65	48.06	49.6	0.001071	8.08	164.03	85.14	0.75
P118-09-00	P118-09-00	1673	Max WS	733.74	39.78	48.37		48.63	0.00038	4.65	692.43	663.44	0.44
P118-09-00	P118-09-00	1610.87	Max WS	667.61	39.04	48.34		48.73	0.000136	5.54	762.3	876.31	0.32
P118-09-00	P118-09-00	1586.71	Culvert										
P118-09-00	P118-09-00	1552.98	Max WS	645.58	38	47.88	43.21	48.4	0.000156	5.93	297.7	347.58	0.34
P118-09-00	P118-09-00	1491.18	Max WS	654.09	37.86	47.98		48.12	0.00211	3.4	376.12	351.06	0.28
P118-09-00	P118-09-00	945.12	Max WS	661.7	36.86	47.1		47.16	0.001341	2.3	716.98	1055.67	0.24
P118-09-00	P118-09-00	435.38	Max WS	688.14	35.21	46.76		46.78	0.000082	1.17	589.85	85.41	0.08
P118-09-00	P118-09-00	434.38	Lat Struct										
P118-09-00	P118-09-00	433.38	Lat Struct										
P118-09-00	P118-09-00	422.42	Max WS	656.55	35.18	46.76		46.78	0.00007	1.09	601.05	85.29	0.07
P118-09-00	P118-09-00	376.38	Culvert										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_JA_500yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-09-00	P118-09-00	222.06	Max WS	650.03	24.19	46.62		46.62	0.000002	0.31	2118.93	164.23	0.02
P118-09-00	P118-09-00	209.24	Max WS	642.47	24.13	46.62		46.62	0.000002	0.3	2111.93	161.61	0.01
P118-09-00	P118-09-00	139.66	Max WS	582.8	23.56	46.62		46.62	0.000002	0.26	2225.72	170.49	0.01
P118-09-00	P118-09-00	74.44	Max WS	582.93	22.87	46.62		46.62	0.000002	0.3	1949.62	111.2	0.01
P118-14-00	P118-14-00.001	13760.5	Max WS	101.01	58.3	64.72		64.72	0.000004	0.16	2126.62	1402.08	0.02
P118-14-00	P118-14-00.001	13096.8	Max WS	100.88	57.3	64.72		64.72	0.000009	0.27	835.56	1208	0.02
P118-14-00	P118-14-00.001	11983.3	Max WS	321.38	56.1	64.71		64.71	0.00001	0.33	3128.09	1473.23	0.03
P118-14-00	P118-14-00.001	11755.1											
P118-14-00	P118-14-00.001	11526.9	Max WS	291.83	55.3	63.35		63.37	0.000165	1.23	237.85	491.29	0.1
P118-14-00	P118-14-00.001	10870.6	Max WS	499.39	55	63.03		63.1	0.000441	2.05	250.55	1105.65	0.17
P118-14-00	P118-14-00.001	10833.25											
P118-14-00	P118-14-00.001	10795.9	Max WS	475.12	55.5	62.13		62.23	0.000889	2.63	180.62	932.25	0.24
P118-14-00	P118-14-00.001	10606.9	Max WS	530.53	55.19	62.02		62.09	0.000436	2.1	252.19	54.61	0.17
P118-14-00	P118-14-00.001	9666.7	Max WS	817.11	54.05	61.64		61.69	0.000293	1.83	447.33	273.3	0.14
P118-14-00	P118-14-00.001	8993.1	Max WS	1055.12	53.23	61.23		61.38	0.000819	3.08	410.35	858.4	0.24
P118-14-00	P118-14-00.001	8655.1	Max WS	1163.93	51.98	60.88		61.09	0.001087	4.01	724.07	983.1	0.27
P118-14-00	P118-14-00.001	8532.1	Max WS	1163.7	51.53	60.83		60.88	0.000384	2.47	1911.69	1655.17	0.16
P118-14-00	P118-14-00.001	8507											
P118-14-00	P118-14-00.001	8481.9	Max WS	1147.93	51.41	60.51		60.58	0.000518	2.82	1604.14	1616.7	0.19
P118-14-00	P118-14-00.001	8025.2	Max WS	1140.93	50.63	60.21		60.31	0.000738	3.07	1348.09	1569.18	0.23
P118-14-00	P118-14-00.001	7510.9	Max WS	1282.13	49.74	59.89		59.95	0.000462	2.59	2353.61	1958.7	0.18
P118-14-00	P118-14-00.001	6550.7	Max WS	1530.83	48.37	59.33		59.47	0.000636	3.44	1674.83	1900.44	0.22
P118-14-00	P118-14-00.001	6479.1	Max WS	1551.01	48.26	59.31		59.38	0.000388	2.71	2486.53	2231.04	0.17
P118-14-00	P118-14-00.001	6454.1											
P118-14-00	P118-14-00.001	6429.1	Max WS	1547.94	48.13	59.22		59.28	0.000364	2.63	2572.75	2239.45	0.16
P118-14-00	P118-14-00.001	6302.9	Max WS	1578.01	48.15	59.12		59.26	0.000899	3.5	1520.51	1971.97	0.25
P118-14-00	P118-14-00.001	6179.9	Max WS	1609.05	48.17	59.02	55.04	59.13	0.000719	3.32	1869.7	1855.81	0.23
P118-14-00	P118-14-00.001	6165.4											
P118-14-00	P118-14-00.001	6150.9	Max WS	1607.05	48.08	58.97		59.07	0.00068	3.24	1934.34	1871.78	0.22
P118-14-00	P118-14-00.001	5970	Max WS	1648.36	47.75	58.82		58.97	0.000832	3.83	1815.62	2292.48	0.25
P118-14-00	P118-14-00.001	5823.6	Max WS	1684.2	47.49	58.76	54.87	58.8	0.000314	2.36	3412.81	2415.29	0.15
P118-14-00	P118-14-00.001	5800.1											
P118-14-00	P118-14-00.001	5776.6	Max WS	1683.27	47.36	58.65		58.68	0.000305	2.33	3454.4	2415.89	0.15
P118-14-00	P118-14-00.001	5628.5	Max WS	1718.21	47.07	58.54		58.71	0.000702	3.83	1750.84	2160.16	0.23
P118-14-00	P118-14-00.001	5509.6	Max WS	1747.76	46.83	58.51		58.55	0.000425	2.56	3317.52	2543.91	0.17
P118-14-00	P118-14-00.001	5484.6											
P118-14-00	P118-14-00.001	5459.6	Max WS	1747.62	46.8	58.5		58.54	0.00041	2.51	3370.89	2546.22	0.17
P118-14-00	P118-14-00.001	5294.4	Max WS	1788.44	46.75	58.4		58.51	0.000468	3.15	2145.95	2376.56	0.19
P118-14-00	P118-14-00.001	5163	Max WS	1821.02	46.71	58.38		58.4	0.000181	1.95	4546.41	2924.76	0.12
P118-14-00	P118-14-00.001	5136											
P118-14-00	P118-14-00.001	5111	Max WS	1821.02	46.69	58.35		58.38	0.000184	1.96	4524.24	2923.88	0.12
P118-14-00	P118-14-00.001	4683.7	Max WS	1924.68	46.27	58.18		58.28	0.000542	3.3	2547.98	2189.23	0.2
P118-14-00	P118-14-00.001	4316.3	Max WS	1999.48	45.82	57.89		58.11	0.000926	4.36	1576.74	1777.05	0.26
P118-14-00	P118-14-00.001	4164.8	Max WS	2034.42	45.65	57.84		57.9	0.00037	2.78	3385.77	2311.95	0.17
P118-14-00	P118-14-00.001	4140.3											
P118-14-00	P118-14-00.001	4115.8	Max WS	2034	45.6	57.74		57.8	0.000388	2.83	3259.22	2255.04	0.17
P118-14-00	P118-14-00.001	3617.5	Max WS	2097.26	45.9	57.5		57.58	0.000485	2.88	3008.58	2392.11	0.19
P118-14-00	P118-14-00.001	3259.8	Max WS	2185.42	46.12	57.29		57.36	0.000576	3.01	3047.17	2473.47	0.21
P118-14-00	P118-14-00.001	3169.5	Max WS	2197.44	46.17	57.26	53.51	57.3	0.000385	2.44	3760.08	2528.72	0.17
P118-14-00	P118-14-00.001	3141.3											
P118-14-00	P118-14-00.001	3113.1	Max WS	2197.44	46.07	57.05		57.1	0.000456	2.63	3487.11	2456.89	0.18
P118-14-00	P118-14-00.001	2974.8	Max WS	2228.91	45.87	56.98		57.05	0.000418	2.67	2950.84	2374.36	0.18
P118-14-00	P118-14-00.001	2884.9	Max WS	2251.36	45.74	56.93		57.02	0.000432	2.8	3007.9	2749.38	0.18
P118-14-00	P118-14-00.001	2836.2	Max WS	2266.74	45.67	56.89		57.01	0.000758	3.59	2580.3	2557.85	0.24
P118-14-00	P118-14-00.001	2771.2											
P118-14-00	P118-14-00.001	2706.2	Max WS	1819.89	45.15	55.63		55.87	0.001258	4.3	1202.2	1652.61	0.3
P118-14-00	P118-14-00.001	2164.7	Max WS	1515.24	43.47	55.36		55.39	0.00013	1.64	2560.91	2126.84	0.1
P118-14-00	P118-14-00.001	1654.8	Max WS	1511.54	41.9	55.32		55.33	0.000055	1.19	4644.93	2572.69	0.07
P118-14-00	P118-14-00.001	1523.9	Max WS	1517.82	41.49	55.31		55.32	0.000038	1	5696.07	2388.56	0.06
P118-14-00	P118-14-00.001	1492.9											
P118-14-00	P118-14-00.001	1461.9	Max WS	1508.41	41.24	55.3		55.31	0.000031	0.92	6263.88	2430.53	0.05
P118-14-00	P118-14-00.001	1132.9	Max WS	1524.49	40.69	55.29		55.29	0.000064	1.01	6429.51	2899.4	0.06
P118-14-00	P118-14-00.001	226.85	Max WS	1514.32	39.16	55.28		55.28	0.000024	0.69	9391.4	3398.71	0.04
P118-21-00	P118-21-00	3067.74	Max WS	5	69.13	71.6		71.6	0.000002	0.03	193.74	91.18	0
P118-21-00	P118-21-00	3067											
P118-21-00	P118-21-00	3066											
P118-21-00	P118-21-00	2499.4	Max WS	-7.9	67.88	70.92		70.92	0.000172	-0.24	39.25	21.34	0.03
P118-21-00	P118-21-00	2493.18	Max WS	-8.56	67.95	70.92		70.92	0.0001	-0.18	56.73	31.49	0.02
P118-21-00	P118-21-00	2450.3	Max WS	-14.99	67.59	70.92		70.92	0.000007	-0.3	59.24	24.34	0.03
P118-21-00	P118-21-00	2416.26	Max WS	-19.32	67.5	70.92		70.92	0.000024	-0.34	62.2	25.7	0.04
P118-21-00	P118-21-00	2398.13	Max WS	-21.09	67.44	70.92		70.92	0.000029	-0.36	59.52	23.38	0.04
P118-21-00	P118-21-00	2389.56	Max WS	-21.62	67.41	70.92		70.92	0.000011	-0.36	63.28	26	0.04
P118-21-00	P118-21-00	2343.79	Max WS	-23.4	67.54	70.91		70.92	0.000044	-0.71	37.57	17	0.08

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HEC-RAS Plan: Ait3_IA_500yrr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elev (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-21-00	P118-21-00	2303.58	Max WS	-23.22	67.47	70.92		70.92	0.000125	-0.68	34.66	14.2	0.08
P118-21-00	P118-21-00	2208.42	Max WS	-24.65	67.31	70.93		70.93	0.000074	-0.5	50.68	25	0.06
P118-21-00	P118-21-00	2195.48	Max WS	-24.78	67.34	70.93		70.93	0.000022	-0.45	65.59	39.01	0.05
P118-21-00	P118-21-00	2169.49	Max WS	-23.7	66.56	70.93		70.94	0.000025	-0.57	56.99	32.94	0.06
P118-21-00	P118-21-00	2167.76	Max WS	-23.59	66.37	70.93		70.94	0.000016	-0.48	62.83	32.46	0.05
P118-21-00	P118-21-00	2161.6	Culvert										
P118-21-00	P118-21-00	2135.78	Max WS	-23.99	65.03	70.97		70.97	0.000003	-0.18	146.72	51	0.02
P118-21-00	P118-21-00	2100.84	Max WS	-31.3	64.78	70.97		70.97	0.000013	-0.3	127.11	50.22	0.03
P118-21-00	P118-21-00	1662.37	Max WS	-67.25	63.91	70.97		70.97	0.000029	-0.56	169.03	46.01	0.04
P118-21-00	P118-21-00	1144.5	Max WS	-99.65	62.63	70.98		70.99	0.000047	-0.72	140.2	23	0.05
P118-21-00	P118-21-00	595.53	Max WS	-138.99	61.49	71		71	0.000016	-0.46	304.22	47.22	0.03
P118-21-00	P118-21-00	549.31*	Max WS	-144.79	61.18	71		71	0.000016	-0.48	303.42	44.42	0.03
P118-21-00	P118-21-00	503.08*	Max WS	-149.86	60.87	71		71	0.000016	-0.5	300.36	41.62	0.03
P118-21-00	P118-21-00	456.86*	Max WS	-154.78	60.57	71		71	0.000017	-0.53	294.85	38.81	0.03
P118-21-00	P118-21-00	410.63*	Max WS	-158.91	60.26	71		71	0.000018	-0.56	287.12	36.01	0.03
P118-21-00	P118-21-00	364.41*	Max WS	-162.96	59.95	71		71.01	0.00002	-0.59	276.89	33.21	0.04
P118-21-00	P118-21-00	318.18*	Max WS	-166.47	59.64	71		71.01	0.000022	-0.63	264.42	30.41	0.04
P118-21-00	P118-21-00	271.96*	Max WS	-169.23	59.34	71		71.01	0.000026	-0.68	249.54	27.6	0.04
P118-21-00	P118-21-00	225.73*	Max WS	-171.35	59.03	71		71.01	0.00003	-0.74	232.39	24.8	0.04
P118-21-00	P118-21-00	179.51	Max WS	-172.61	58.72	71		71.01	0.000048	-0.81	212.93	22	0.05
P118-21-00	P118-21-00	159.41*	Max WS	-175.51	57.98	71		71.01	0.000043	-0.78	225.73	22.53	0.04
P118-21-00	P118-21-00	139.31*	Max WS	-172.16	57.24	71.01		71.01	0.000035	-0.72	239	23.06	0.04
P118-21-00	P118-21-00	119.21*	Max WS	-147.57	55.51	71.01		71.02	0.000022	-0.58	252.69	23.5	0.03
P118-21-00	P118-21-00	99.11*	Max WS	-124.59	55.77	71.02		71.02	0.000014	-0.47	266.66	24.13	0.02
P118-21-00	P118-21-00	79.01	Max WS	-101.88	55.03	71.02		71.02	0.000008	-0.36	280.94	24.66	0.02
P118-23-00	P118-23-00 R2	7756.32	Max WS	10	68.89	75.24		75.24	0.000001	0.08	141.97	144.45	0.01
P118-23-00	P118-23-00 R2	7743.32	Max WS	10	69.94	75.24		75.24	0.000001	0.09	126.67	154.26	0.01
P118-23-00	P118-23-00 R2	7738.5	Max WS	10.81	70.08	75.24	70.25	75.24	0.000001	0.1	146.55	141.39	0.01
P118-23-00	P118-23-00 R2	7736.4	Bridge										
P118-23-00	P118-23-00 R2	7733.4	Max WS	10.81	70.2	75.24		75.24	0.000002	0.1	137.91	169.95	0.01
P118-23-00	P118-23-00 R2	7726.83	Max WS	12.23	70.16	75.24		75.24	0.000002	0.12	114.89	125.4	0.01
P118-23-00	P118-23-00 R2	7654.51	Max WS	21.14	69.97	75.24		75.24	0.000006	0.2	103.52	157.39	0.02
P118-23-00	P118-23-00 R2	7632.63	Max WS	24.61	69.88	75.24		75.24	0.000008	0.24	128.11	287.76	0.02
P118-23-00	P118-23-00 R2	7614.73	Max WS	26.98	68.92	75.24		75.24	0.000006	0.19	388.06	697.11	0.02
P118-23-00	P118-23-00 R2	7597.04	Culvert										
P118-23-00	P118-23-00 R2	7584.04	Max WS	27.02	69.39	75.24		75.24	0.000002	0.12	1011.57	1724.56	0.01
P118-23-00	P118-23-00 R2	7567.5	Max WS	29.22	69.56	75.24		75.24	0.000013	0.26	169.81	2072.77	0.03
P118-23-00	P118-23-00 R2	7426.94	Max WS	41.84	68.48	75.23		75.23	0.00002	0.37	155.17	2264.9	0.03
P118-23-00	P118-23-00 R2	7369.89	Max WS	49.21	68.06	75.23		75.23	0.000027	0.44	112.2	2121.76	0.04
P118-23-00	P118-23-00 R2	7358.91	Culvert										
P118-23-00	P118-23-00 R2	7325.91	Max WS	48.26	69.59	74.86		74.86	0.000004	0.16	1288.24	1547.43	0.01
P118-23-00	P118-23-00 R2	7313.37	Max WS	50.07	69.5	74.86		74.86	0.000029	0.42	144.66	1649.27	0.04
P118-23-00	P118-23-00 R2	7305.97	Max WS	50.98	69.12	74.86		74.86	0.000028	0.42	159.93	1672.29	0.04
P118-23-00	P118-23-00 R2	7294.91	Max WS	52.23	69.43	74.86		74.86	0.000004	0.17	1281.05	1714.53	0.02
P118-23-00	P118-23-00 R2	7280.57	Culvert										
P118-23-00	P118-23-00 R2	7260.57	Max WS	52.25	69.34	74.86		74.86	0.000004	0.17	1451.64	1864.88	0.01
P118-23-00	P118-23-00 R2	7237.19	Max WS	55.77	69.28	74.86		74.86	0.000008	0.22	799.04	1983.53	0.02
P118-23-00	P118-23-00 R2	6786.22	Max WS	120.82	68.02	74.85		74.86	0.000007	0.22	1786.51	2339.78	0.02
P118-23-00	P118-23-00 R2	6723.56	Max WS	130.52	67.37	74.85		74.86	0.000004	0.56	232.54	60.08	0.05
P118-23-00	P118-23-00 R2	6675.9	Culvert										
P118-23-00	P118-23-00 R2	6655.9	Max WS	25.53	67.54	74.17		74.17	0.000006	0.18	145.3	53.38	0.02
P118-23-00	P118-23-00 R2	6655	Lat Struct										
P118-23-00	P118-23-00 R2	6654	Lat Struct										
P118-23-00	P118-23-00 R2	6563.37	Max WS	27.5	67.16	74.17		74.17	0.000003	0.16	174.23	46.02	0.01
P118-23-00	P118-23-00 R2	6402.43	Max WS	29.71	67.03	74.17		74.17	0.000004	0.17	171.29	41.6	0.02
P118-23-00	P118-23-00 R2	6356.93	Max WS	30.92	66.97	74.16	67.51	74.17	0.000004	0.18	175.97	47.47	0.02
P118-23-00	P118-23-00 R2	6337.93	Bridge										
P118-23-00	P118-23-00 R2	6324.93	Max WS	30.92	66.93	74.16		74.16	0.000004	0.17	184.81	53.71	0.02
P118-23-00	P118-23-00 R2	6293.27	Max WS	32.21	66.88	74.16		74.16	0.000005	0.18	179.54	52.38	0.02
P118-23-00	P118-23-00 R2	5958.59	Max WS	65.68	66.24	74.16		74.16	0.000006	0.23	287.68	68.26	0.02
P118-23-00	P118-23-00 R2	5652.94	Max WS	77.1	65.7	74.15		74.15	0.000012	0.29	263.65	71.03	0.03
P118-23-00	P118-23-00 R2	5045.34	Max WS	48.09	63.97	74.15		74.15	0.000003	0.21	226.54	31.87	0.01
P118-23-00	P118-23-00 R2	4947.92	Max WS	44.53	63.84	74.15	64.46	74.15	0.000002	0.15	292.19	41.98	0.01
P118-23-00	P118-23-00 R2	4925.91	Bridge										
P118-23-00	P118-23-00 R2	4915.91	Max WS	44.53	63.87	74.15		74.15	0.000001	0.16	282.9	34.77	0.01
P118-23-00	P118-23-00 R2	4783.1	Max WS	47.54	63.65	74.15		74.15	0.000003	0.19	250.64	37.16	0.01
P118-23-00	P118-23-00 R2	4580.38	Max WS	50.76	63.02	74.14	63.97	74.15	0.000002	0.17	302.63	46.95	0.01
P118-23-00	P118-23-00 R2	4564.28	Bridge										
P118-23-00	P118-23-00 R2	4553.28	Max WS	50.76	63.16	74.14		74.14	0.000002	0.14	351.1	58.28	0.01
P118-23-00	P118-23-00 R2	4459.75	Max WS	53.91	63.55	74.14		74.14	0.000002	0.16	333.15	52.65	0.01
P118-23-00	P118-23-00 R2	4370.6	Max WS	56.21	63.42	74.14		74.14	0.000001	0.14	404.6	65.06	0.01
P118-23-00	P118-23-00 R2	4330.88	Max WS	56.77	62.88	74.14		74.14	0	0.07	789.56	125.25	0.01
P118-23-00	P118-23-00 R2	4299.23	Culvert										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3 JA 500Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch1
P118-23-00	P118-23-00 R2	4269.23	Max WS	56.77	63.31	74.14		74.14	0	0.09	649.4	76.06	0.01
P118-23-00	P118-23-00 R2	4229.24	Max WS	61.43	63.34	74.14		74.14	0.000001	0.15	416.96	51.14	0.01
P118-23-00	P118-23-00 R2	3733.5	Max WS	100.96	62.41	74.13		74.13	0.000007	0.34	294.46	34.28	0.02
P118-23-00	P118-23-00 R2	3187.46	Max WS	139.52	62.36	74.13		74.13	0.000009	0.4	351.36	40.27	0.02
P118-23-00	P118-23-00 R2	3150.64	Max WS	142.18	61.93	74.13	63.93	74.13	0.000007	0.35	409.02	52.14	0.02
P118-23-00	P118-23-00 R2	3133.39	Bridge										
P118-23-00	P118-23-00 R2	3126.39	Max WS	142.18	61.56	74.12		74.13	0.000006	0.33	435.12	55.63	0.02
P118-23-00	P118-23-00 R2	3104.46	Max WS	144.2	61.63	74.12		74.13	0.000009	0.37	392.7	52.53	0.02
P118-23-00	P118-23-00 R2	2750.53	Max WS	173.71	60.59	74.12		74.12	0.000015	0.52	334.11	34.6	0.03
P118-23-00	P118-23-00 R2	2741.93	Max WS	174.29	60.44	74.12	62.66	74.12	0.000014	0.51	339.71	34.96	0.03
P118-23-00	P118-23-00 R2	2733.96	Bridge										
P118-23-00	P118-23-00 R2	2725.96	Max WS	174.29	60.52	74.11		74.12	0.000011	0.45	389.82	42.97	0.03
P118-23-00	P118-23-00 R2	2716.57	Max WS	175.33	60.68	74.11		74.12	0.00001	0.41	423.19	52.19	0.03
P118-23-00	P118-23-00 R2	2615.37	Max WS	186.5	60.75	74.11		74.11	0.000015	0.53	353.82	37.87	0.03
P118-23-00	P118-23-00 R2	2244.98	Max WS	224.82	60.53	74.1		74.11	0.000019	0.61	368.84	35.71	0.03
P118-23-00	P118-23-00 R2	2221.06	Max WS	227.44	60.56	74.1	62.68	74.11	0.00002	0.62	368.67	36.69	0.03
P118-23-00	P118-23-00 R2	2198.07	Bridge										
P118-23-00	P118-23-00 R2	2187.07	Max WS	227.39	60.59	74.09		74.09	0.000018	0.6	380.54	37.2	0.03
P118-23-00	P118-23-00 R2	2042.36	Max WS	275.79	59.78	74.08		74.09	0.000014	0.5	553.26	67.27	0.03
P118-23-00	P118-23-00 R2	1922.11	Max WS	313.25	59.56	74.08		74.09	0.000016	0.53	589.72	72.85	0.03
P118-23-00	P118-23-00 R2	1892.63	Max WS	332.4	59.68	74.08	62.98	74.08	0.000021	0.61	544.5	66.31	0.04
P118-23-00	P118-23-00 R2	1882.46	Bridge										
P118-23-00	P118-23-00 R2	1863.46	Max WS	332.4	59.86	74.03		74.04	0.000045	0.9	368.9	38.81	0.05
P118-23-00	P118-23-00 R2	1829.45	Max WS	369.87	59.87	74.03		74.04	0.000022	0.62	601.33	75.5	0.04
P118-23-00	P118-23-00 R2	1800	Lat Struct										
P118-23-00	P118-23-00 R2	1611.06	Max WS	521.16	59.04	74.01		74.02	0.000043	0.92	564.72	62.07	0.05
P118-23-00	P118-23-00 R1	1513.84	Max WS	1526.5	59.85	74.01		74.01	0.000028	0.84	5457.95	1069.22	0.05
P118-23-00	P118-23-00 R1	1490	Lat Struct										
P118-23-00	P118-23-00 R1	1454.72	Max WS	1531.32	59.99	74.01	65.57	74.01	0.000021	0.67	5490.69	990.93	0.04
P118-23-00	P118-23-00 R1	1414.55	Bridge										
P118-23-00	P118-23-00 R1	1380.55	Max WS	1534.31	58.36	74		74	0.000018	0.65	5717.22	933.17	0.04
P118-23-00	P118-23-00 R1	1354.02	Max WS	1571.75	57.88	74		74	0.00002	0.72	5674.52	916.81	0.04
P118-23-00	P118-23-00 R1	1010.56	Max WS	1888.82	57.45	73.98		73.99	0.000048	1.07	4415.15	742.6	0.06
P118-23-00	P118-23-00 R1	649.49	Max WS	2254.78	57.03	73.94		73.96	0.000112	1.72	3060.83	449.67	0.09
P118-23-00	P118-23-00 R1	242.54	Max WS	2469.72	55.82	73.91	64.02	73.91	0.000006	0.35	24413.62	6832.53	0.02
P118-23-00	P118-23-00 R1	200	Bridge										
P118-23-00	P118-23-00 R1	169.28	Max WS	2469.72	55.57	73.9		73.9	0.000005	0.39	24698.73	5675.66	0.02
P118-23-00	P118-23-00 R1	106.82	Max WS	2412.73	55.13	73.89		73.95	0.000115	2.17	1695.75	175.37	0.1
P118-23-00	P118-23-00 R3	58.31	Max WS	2409.98	53.78	73.86		73.97	0.000176	2.87	1199.3	83.5	0.13
P118-23-02	P118-23-02	4138.85	Max WS	10	67.78	74.05		74.05	0	0.01	3877.56	1274.25	0
P118-23-02	P118-23-02	4137	Lat Struct										
P118-23-02	P118-23-02	3790.71	Max WS	66.98	66.69	74.05		74.05	0	0.06	3728.16	1253.32	0.01
P118-23-02	P118-23-02	3782.06	Max WS	90.35	66.66	74.05		74.05	0.000001	0.08	3777.32	1251.96	0.01
P118-23-02	P118-23-02	3748.42	Culvert										
P118-23-02	P118-23-02	3714.78	Max WS	90.35	66.22	74.05		74.05	0	0.04	5197.82	1255.44	0
P118-23-02	P118-23-02	3692.61	Max WS	95.64	66.22	74.05		74.05	0	0.06	4940.4	1252.82	0
P118-23-02	P118-23-02	3049.5	Max WS	196.63	65.47	74.05		74.05	0.000003	0.14	4092.46	1169.75	0.01
P118-23-02	P118-23-02	2386.67	Max WS	320.24	65.13	74.05		74.05	0.000007	0.27	4086.27	1074.84	0.02
P118-23-02	P118-23-02	2372.17	Max WS	323.26	65.16	74.05		74.05	0.000006	0.23	4246.92	1094.25	0.02
P118-23-02	P118-23-02	2357.89	Culvert										
P118-23-02	P118-23-02	2303.61	Max WS	323.26	65.26	74.05		74.05	0.000006	0.25	4361.21	1060.82	0.02
P118-23-02	P118-23-02	2278.1	Max WS	328.82	65.19	74.05		74.05	0.000008	0.32	3942.06	1058.12	0.02
P118-23-02	P118-23-02	1453.34	Max WS	552.46	63.69	74.03		74.03	0.000021	0.56	3795.2	964.79	0.04
P118-23-02	P118-23-02	1445.67	Max WS	554.55	63.66	74.03	67.67	74.03	0.000019	0.57	3875.22	961.46	0.04
P118-23-02	P118-23-02	1430.58	Bridge										
P118-23-02	P118-23-02	1415.48	Max WS	555.04	63.56	74.03		74.03	0.000015	0.5	4202.07	962.09	0.03
P118-23-02	P118-23-02	1392.09	Max WS	562.48	63.36	74.03		74.03	0.00001	0.3	4072.05	958.97	0.02
P118-23-02	P118-23-02	1317.96	Max WS	585.02	62.91	74.03		74.03	0.000009	0.38	4462.92	1032.32	0.02
P118-23-02	P118-23-02	1171.38	Max WS	632.91	61.86	74.03		74.03	0.000008	0.37	5209.94	1228.5	0.02
P118-23-02	P118-23-02	1083.7	Max WS	659.78	62.56	74.02		74.02	0.000008	0.37	5312.6	1249.68	0.02
P118-23-02	P118-23-02	215.24	Max WS	1005.34	60.16	74.01		74.01	0.000016	0.49	5337.15	1102.12	0.03
P118-25-00	P118-25-00 R2	3252.36	Max WS	10	66.34	74.33		74.33	0	0.04	226.4	37.28	0
P118-25-00	P118-25-00 R2	3203.12	Max WS	10	66.34	74.33		74.33	0	0.04	226.28	37.24	0
P118-25-00	P118-25-00 R2	3203	Lat Struct										
P118-25-00	P118-25-00 R2	3202	Lat Struct										
P118-25-00	P118-25-00 R2	2930.66	Max WS	41.23	66.13	74.33		74.33	0.000004	0.21	194.58	31.01	0.01
P118-25-00	P118-25-00 R2	2636.62	Max WS	73.18	65.84	74.32		74.33	0.00001	0.35	209.3	33.03	0.02
P118-25-00	P118-25-00 R2	2494.17	Max WS	84.12	65.5	74.32		74.32	0.000011	0.37	228.8	35.73	0.03
P118-25-00	P118-25-00 R2	2473.31	Max WS	85.26	65.47	74.32	67.19	74.32	0.000012	0.38	226.26	35.01	0.03
P118-25-00	P118-25-00 R2	2469.143 Sunoco Pipeline	Bridge										
P118-25-00	P118-25-00 R2	2465.6	Max WS	85.26	65.47	74.32		74.32	0.000011	0.36	235.42	37.73	0.03
P118-25-00	P118-25-00 R2	2465	Lat Struct										
P118-25-00	P118-25-00 R2	2464	Lat Struct										

Impact Analysis Alternative 3 (Recommended)
HEC-RAS Results

HFC-RAS Plan: Alt3_IA_500Yr

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
P118-25-00	P118-25-00 R2	2414.49	Max WS	87.85	65.38	74.32		74.32	0.000012	0.38	232.66	35.28	0.03
P118-25-00	P118-25-00 R2	2046.09	Max WS	71.87	64.63	74.32		74.32	0.000005	0.26	279.2	40.52	0.02
P118-25-00	P118-25-00 R1	1929.3	Max WS	257.73	64.22	74.3		74.31	0.000087	1.04	248.78	39.73	0.07
P118-25-00	P118-25-00 R1	1929	Lat Struct										
P118-25-00	P118-25-00 R1	1928	Lat Struct										
P118-25-00	P118-25-00 R1	1565.52	Max WS	215.43	64.03	74.28		74.29	0.000055	0.88	244.59	33.08	0.06
P118-25-00	P118-25-00 R1	1208.56	Max WS	162.24	63.03	74.28		74.28	0.000028	0.65	251.26	30.27	0.04
P118-25-00	P118-25-00 R1	1188.81	Max WS	158.49	63.01	74.27	65.37	74.28	0.000029	0.65	244.77	29.97	0.04
P118-25-00	P118-25-00 R1	1181.605	Wooden Foot Br										
P118-25-00	P118-25-00 R1	1175.29	Max WS	158.49	62.94	74.27		74.28	0.00003	0.66	240.8	29.45	0.04
P118-25-00	P118-25-00 R1	1175	Lat Struct										
P118-25-00	P118-25-00 R1	1174	Lat Struct										
P118-25-00	P118-25-00 R1	1132.07	Max WS	153.85	62.83	74.27		74.27	0.000023	0.58	263.76	33.01	0.04
P118-25-00	P118-25-00 R1	980.2	Max WS	142.13	62.34	74.27		74.27	0.000014	0.47	300.47	35.75	0.03
P118-25-00	P118-25-00 R1	963.63	Max WS	142.75	62.25	74.27		74.27	0.000007	0.42	341.42	45.01	0.02
P118-25-00	P118-25-00 R1	950.55	Max WS	143.02	62.25	74.27	64.12	74.27	0.000006	0.3	563.28	95	0.02
P118-25-00	P118-25-00 R1	930.1377	Hill Road										
P118-25-00	P118-25-00 R1	901.58	Max WS	136.47	61.68	74.25		74.25	0.000004	0.29	553.91	86	0.02
P118-25-00	P118-25-00 R1	886.91	Max WS	136.63	61.68	74.25		74.25	0.000005	0.39	353.25	51.01	0.02
P118-25-00	P118-25-00 R1	881	Lat Struct										
P118-25-00	P118-25-00 R1	880	Lat Struct										
P118-25-00	P118-25-00 R1	839.05	Max WS	138.41	61.16	74.25		74.25	0.000009	0.4	349.01	37.72	0.02
P118-25-00	P118-25-00 R1	490.93	Max WS	152.49	60.25	74.25		74.25	0.000008	0.38	398.78	44.02	0.02
P118-25-00	P118-25-00 R1	251.81	Max WS	141.85	58.25	74.25		74.25	0.000004	0.31	464.59	44.09	0.02
P118-25-00	P118-25-00 R1	229.81*	Max WS	136.65	58.04	74.25		74.25	0.000004	0.29	470.92	44.08	0.02
P118-25-00	P118-25-00 R1	207.81*	Max WS	130.86	57.84	74.25		74.25	0.000003	0.27	477.23	44.07	0.01
P118-25-00	P118-25-00 R1	185.81*	Max WS	124.48	57.63	74.25		74.25	0.000003	0.26	483.52	44.05	0.01
P118-25-00	P118-25-00 R1	163.80*	Max WS	117.55	57.43	74.25		74.25	0.000003	0.24	489.8	44.04	0.01
P118-25-00	P118-25-00 R1	141.80*	Max WS	110.06	57.22	74.25		74.25	0.000002	0.22	496.1	44.03	0.01
P118-25-00	P118-25-00 R1	119.80*	Max WS	100.72	57.02	74.25		74.25	0.000002	0.2	502.36	44.01	0.01
P118-25-00	P118-25-00 R1	97.8	Max WS	89.14	56.81	74.25	58.88	74.25	0.000001	0.18	508.63	44	0.01
P118-25-01	P118-25-01	5341.48	Max WS	19.18	70.47	76		76	0.000003	0.15	129.12	36.03	0.01
P118-25-01	P118-25-01	5341	Lat Struct										
P118-25-01	P118-25-01	5340	Lat Struct										
P118-25-01	P118-25-01	4477.47	Max WS	325.08	68.9	75.5		75.58	0.000781	2.27	143.3	42.03	0.22
P118-25-01	P118-25-01	4162.47	Max WS	332.27	69.44	75.27		75.34	0.000666	2.18	152.7	42.02	0.2
P118-25-01	P118-25-01	4134.04	Max WS	338.23	69.38	75.25	72.16	75.32	0.000664	2.17	155.7	43.02	0.2
P118-25-01	P118-25-01	4110.08	Pipeline Crossin										
P118-25-01	P118-25-01	4086.12	Max WS	337.6	69.25	75.18		75.26	0.000655	2.16	156.21	43.02	0.2
P118-25-01	P118-25-01	4047.7	Max WS	337.63	69.28	75.16		75.23	0.000641	2.16	156.18	42.03	0.2
P118-25-01	P118-25-01	4043	Lat Struct										
P118-25-01	P118-25-01	4040	Lat Struct										
P118-25-01	P118-25-01	3617.56	Max WS	327.58	67.84	74.96		75.01	0.000391	1.8	181.99	44.03	0.16
P118-25-01	P118-25-01	3312.44	Max WS	322.05	67.48	74.87		74.9	0.000299	1.56	206.01	51.15	0.14
P118-25-01	P118-25-01	3014.68	Max WS	287.04	67.53	74.81		74.84	0.000192	1.35	211.98	45.99	0.11
P118-25-01	P118-25-01	2924.04	Max WS	276.9	67.71	74.8		74.82	0.000169	1.27	217.85	47.25	0.1
P118-25-01	P118-25-01	2763.33	Max WS	204.34	66.67	74.8		74.82	0.000085	0.93	220.21	44.92	0.07
P118-25-01	P118-25-01	2728.92	Max WS	185.18	66.5	74.73		74.81	0.001205	2.24	82.64	29.03	0.23
P118-25-01	P118-25-01	2639.28	Aldine Mail Rte										
P118-25-01	P118-25-01	2546.4	Max WS	180.35	66.31	74.46		74.54	0.001336	2.17	83.22	37.04	0.25
P118-25-01	P118-25-01	2541	Lat Struct										
P118-25-01	P118-25-01	2540	Lat Struct										
P118-25-01	P118-25-01	2475.84	Max WS	179.43	66.04	74.46		74.48	0.000153	1.19	150.67	30.76	0.09
P118-25-01	P118-25-01	1881.88	Max WS	145.53	66.57	74.4		74.41	0.000098	0.94	155.25	34	0.08
P118-25-01	P118-25-01	1384.48	Max WS	123.53	66.19	74.37		74.38	0.000049	0.7	177.52	35.03	0.05
P118-25-01	P118-25-01	1245.83	Max WS	122.11	66.34	74.37		74.37	0.000052	0.69	177.12	37.72	0.06
P118-25-01	P118-25-01	584.11	Max WS	85.02	65.88	74.35		74.35	0.000016	0.44	192.9	29.02	0.03
P118-25-01	P118-25-01	60.05	Max WS	185.92	63.5	74.31		74.32	0.000067	0.92	201.85	27.03	0.06

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	73.05	72.86	-0.19
71854.2	72.93	72.73	-0.2
70744.2	72.6	72.33	-0.27
69527.2	72.33	72.01	-0.32
68670	72.03	71.69	-0.34
68131	71.81	71.46	-0.35
67511.6	71.51	71.08	-0.43
66869	71	70.52	-0.48
66774	71.02	70.55	-0.47
66190	70.86	70.34	-0.52
65955.8	70.75	70.37	-0.38
65434.6	70.56	70.41	-0.15
64399.74	70.07	69.87	-0.2
64273.7	70.1	69.89	-0.21
64220.7	70.08	69.87	-0.21
64200	70.08	69.87	-0.21
64100	70.08	69.87	-0.21
64094	70.08	69.87	-0.21
64024	70.05	69.84	-0.21
64010.4	69.95	69.75	-0.2
63960.4	69.59	69.43	-0.16
63959.7	69.7	69.54	-0.16
63856.7	69.67	69.51	-0.16
63756.7	69.45	69.3	-0.15
62823.2	69.17	69.03	-0.14
61905.2	68.92	68.79	-0.13
60625.3	68.76	68.64	-0.12
60595.74	68.58	68.45	-0.13
60583.6*	68.58	68.45	-0.13
60571.6*	68.58	68.45	-0.13
60559.5*	68.57	68.44	-0.13
60547.5*	68.57	68.44	-0.13
60535.46	68.57	68.44	-0.13
60396.4*	68.56	68.43	-0.13
60257.3*	68.56	68.43	-0.13
60118.3*	68.55	68.42	-0.13
59979.2*	68.55	68.42	-0.13
59840.2*	68.54	68.41	-0.13
59701.1*	68.54	68.41	-0.13
59562.1*	68.53	68.4	-0.13
59423.1	68.53	68.4	-0.13
59307.4*	68.52	68.39	-0.13
59191.8*	68.52	68.39	-0.13
59076.2*	68.51	68.38	-0.13

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	68.51	68.38	-0.13
58844.9*	68.51	68.38	-0.13
58729.3*	68.5	68.37	-0.13
58613.7	68.5	68.37	-0.13
58463.86	68.5	68.37	-0.13
58387.5	61.36	60.91	-0.45
58331.5	61.25	60.8	-0.45
57555.5	60.63	60.18	-0.45
56513.3	59.88	59.44	-0.44
55557.7	58.87	58.47	-0.4
54459.2	57.82	57.48	-0.34
53801.7	57.7	57.36	-0.34
53275.7	57.59	57.26	-0.33
52844.3	57.5	57.17	-0.33
52786.3	57.47	57.14	-0.33
52465.7	57.29	56.96	-0.33
52221.3	57.12	56.79	-0.33
52194.3	57.08	56.75	-0.33
51283.9	56.37	56.04	-0.33
51096.9	56.33	56.01	-0.32
51070.9	56.3	55.98	-0.32
50549.6	56.17	55.85	-0.32
50021.9	56.03	55.72	-0.31
49939.9	56	55.68	-0.32
49231.7	55.6	55.29	-0.31
48480.5	55.3	55	-0.3
48196.5	55.16	54.87	-0.29
48169.5	55.13	54.84	-0.29
47607.9	54.77	54.5	-0.27
46939	54.56	54.29	-0.27
46594.8	54.46	54.19	-0.27
46584.8	0	0	0
46579.8	54.44	54.18	-0.26
46575.8	54.44	54.18	-0.26
46526.8	54.41	54.15	-0.26
46516.8	54.41	54.15	-0.26
46515.8	0	0	0
46478.9	54.32	54.06	-0.26
46468.9	54.32	54.06	-0.26
46466.8	0	0	0
46458.9	54.29	54.03	-0.26
45952.3	53.67	53.44	-0.23
45161.4	52.74	52.56	-0.18
44549.9	52.16	52.01	-0.15

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
44143.3	51.87	51.7	-0.17
43789.5	51.82	51.63	-0.19
43739.48	51.81	51.63	-0.18
43652.1*	51.81	51.63	-0.18
43564.8*	51.81	51.63	-0.18
43477.4*	51.81	51.63	-0.18
43390.1*	51.81	51.63	-0.18
43302.8*	51.81	51.63	-0.18
43215.5	51.81	51.63	-0.18
43118.0*	51.81	51.63	-0.18
43020.4*	51.81	51.62	-0.19
42922.9*	51.81	51.62	-0.19
42825.49	51.81	51.62	-0.19
42736.8*	51.8	51.62	-0.18
42648.2*	51.8	51.62	-0.18
42559.6*	51.8	51.62	-0.18
42471	51.8	51.62	-0.18
42395.8*	51.8	51.62	-0.18
42320.7*	51.8	51.62	-0.18
42245.55	51.8	51.62	-0.18
42150.1*	51.8	51.62	-0.18
42054.6*	51.8	51.61	-0.19
41959.2*	51.8	51.61	-0.19
41863.8	51.8	51.61	-0.19
41771.7*	51.8	51.61	-0.19
41679.6*	51.8	51.61	-0.19
41587.5*	51.79	51.61	-0.18
41495.4*	51.79	51.61	-0.18
41403.3	51.79	51.6	-0.19
41285.4	51.72	51.54	-0.18
41203.4	51.76	51.57	-0.19
41197.4	51.72	51.54	-0.18
41185.7	51.71	51.52	-0.19
40951.8	51.8	51.61	-0.19
40886.8	51.8	51.61	-0.19
40846.9	51.78	51.59	-0.19
40605.5	51.77	51.59	-0.18
40584.6	51.77	51.59	-0.18
40515.6	51.77	51.58	-0.19
39969.8	51.73	51.55	-0.18
39829.91	51.52	51.34	-0.18
39188.6	50.6	50.45	-0.15
38423.57	49.71	49.6	-0.11
38170.2	49.65	49.54	-0.11

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
37899.37	49.52	49.41	-0.11
37413.16	49.16	49.06	-0.1
37258.6	49.02	48.92	-0.1
36408.6	48.29	48.21	-0.08
36341.47	48.22	48.14	-0.08
36321.56	48.36	48.28	-0.08
36303.5	48.36	48.27	-0.09
36195.78	48.22	48.14	-0.08
36107.2	48.17	48.09	-0.08
35434.7	47.91	47.83	-0.08
35045.7	47.76	47.69	-0.07
35006.1	47.72	47.64	-0.08
34984.3	47.67	47.6	-0.07
34870.3	47.62	47.55	-0.07
33920.1	46.78	46.72	-0.06
32749.8	45.35	45.29	-0.06
31824.3	44.48	44.42	-0.06
30679.1	43.52	43.47	-0.05
30678.1	0	0	0
30099.1	43.25	43.2	-0.05
29757.8	43.07	43.02	-0.05
29704.8	43.01	42.97	-0.04
28983.7	42.18	42.13	-0.05
28387.3	41.7	41.66	-0.04
27992	41.35	41.31	-0.04
27567.7	41.12	41.07	-0.05
27317	40.98	40.93	-0.05
27305.8	40.95	40.91	-0.04
27295.8	40.95	40.91	-0.04
27189.8	40.78	40.74	-0.04
27180.8	40.78	40.73	-0.05
27167.5	40.82	40.78	-0.04
26816.8*	40.61	40.57	-0.04
26466.1	40.41	40.37	-0.04
26224.4*	40.28	40.23	-0.05
25982.8	40.18	40.14	-0.04
25318.4	39.84	39.8	-0.04
24564.2	39.54	39.5	-0.04
23984.6	39.24	39.21	-0.03
23796.2	39.13	39.09	-0.04
23286.2	38.84	38.8	-0.04
22973.4	38.71	38.67	-0.04
22929.4	38.29	38.25	-0.04
22630.3	37.9	37.86	-0.04

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
22587.7	37.68	37.65	-0.03
22577.7	37.67	37.64	-0.03
22186.8	37.33	37.3	-0.03
21829	37.28	37.25	-0.03
21589.8	36.92	36.89	-0.03
21362	36.81	36.78	-0.03
21360	36.81	36.78	-0.03
21304	36.77	36.74	-0.03
21010.4	36.81	36.78	-0.03
20887.4	36.73	36.7	-0.03
20880.6	36.48	36.46	-0.02
20858.6	36.43	36.4	-0.03
19860	35.35	35.32	-0.03
18597.4	33.59	33.56	-0.03
18107.1	33.22	33.19	-0.03
17862.9*	33.09	33.06	-0.03
17618.7*	33	32.97	-0.03
17374.5*	32.9	32.87	-0.03
17130.3	32.82	32.79	-0.03
16004	32.31	32.28	-0.03
15045.6	31.56	31.53	-0.03
13937.2	30.87	30.84	-0.03
13341.9	30.28	30.25	-0.03
12945.5	30.04	30.02	-0.02
12932.7	29.95	29.92	-0.03
12931.7	29.95	29.92	-0.03
12877.9	29.69	29.66	-0.03
12117.3	29.37	29.35	-0.02
10905.1	28.49	28.47	-0.02
9879.2	27.36	27.34	-0.02
8777	26.75	26.73	-0.02
8024.4	26.41	26.38	-0.03
6779.3	25.66	25.64	-0.02
5748.4	24.27	24.24	-0.03
4492	23.11	23.09	-0.02
3597.9	22.35	22.33	-0.02
2709.4	21.55	21.53	-0.02
1695.9	20.48	20.46	-0.02
678.7	18.1	18.08	-0.02
8341.69	49.85	49.85	0
7839.79	49.11	49.11	0
7820.27	49.08	49.08	0
7762.13	48.76	48.76	0
7729.04	48.69	48.69	0

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7613.92	48.64	48.64	0
7550.89	48.59	48.59	0
6762.47	47.98	47.98	0
5858.77	47.29	47.29	0
5845.88	47.2	47.2	0
5779.72	47.15	47.15	0
5748.41	47.27	47.27	0
4837.06	45.31	45.31	0
4823.61	45.32	45.32	0
4767.88	45.18	45.18	0
4732.44	45.18	45.18	0
4289.14	44.27	44.27	0
4255.48	44.19	44.19	0
4191.19	44.2	44.2	0
4159.81	44.23	44.23	0
4007.74	44.25	44.25	0
3928.82	44.25	44.25	0
3407.5	43.88	43.88	0
2630.49	43.59	43.59	0
1901.01	43.51	43.51	0
1219.08	43.49	43.5	0.01
1186.93	36.05	36.05	0
1152.13	38	37.97	-0.03
935.77	37.97	37.94	-0.03
890.93	37.85	37.82	-0.03
881.12	37.82	37.79	-0.03
846.44	37.8	37.76	-0.04
68.07	37.8	37.76	-0.04
8416.71	56.27	56.27	0
8054.36	55.79	55.79	0
7947.1	55.58	55.58	0
7742.76	55.41	55.41	0
7692.1	55.43	55.43	0
7037.08	55.11	55.11	0
6335.17	54.54	54.54	0
6241.34	54.44	54.44	0
6182.3	54.42	54.42	0
6152.7	54.44	54.44	0
6006.93	54.26	54.26	0
5998.6	54.23	54.23	0
5978.1	54.23	54.23	0
5970.8	54.23	54.23	0
5869.16	54.15	54.15	0
5818.16	54.04	54.04	0

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5758.62	54.04	54.04	0
5685.64	54.13	54.13	0
4961.22	53.35	53.35	0
4862.39	53.03	53.03	0
4795.65	52.68	52.68	0
4717.67	52.96	52.96	0
4354.22	52.39	52.39	0
4232.29	52.02	52.02	0
4169.23	52	52.01	0.01
4101.99	52.02	52.02	0
3604.68	52	52	0
3214.67	50.44	50.44	0
3131.26	50.08	50.08	0
3013.16	48	48	0
2939.54	47.81	47.81	0
2383.3	47.23	47.23	0
1673	46.71	46.71	0
1610.87	46.75	46.75	0
1552.98	46.78	46.78	0
1491.18	46.81	46.81	0
945.12	44.87	44.87	0
435.38	43.93	43.93	0
422.42	43.93	43.93	0
222.06	39.35	39.32	-0.03
209.24	39.35	39.32	-0.03
139.66	39.35	39.32	-0.03
74.44	39.35	39.32	-0.03
13760.5	62.66	62.66	0
13096.8	62.6	62.6	0
11983.3	62.47	62.47	0
11526.9	61.85	61.85	0
10870.6	61.52	61.52	0
10795.9	61.17	61.17	0
10606.9	61.09	61.09	0
9666.7	60.88	60.88	0
8993.1	60.68	60.68	0
8655.1	60.53	60.53	0
8532.1	60.51	60.51	0
8481.9	59.6	59.6	0
8025.2	59.38	59.38	0
7510.9	59.18	59.18	0
6550.7	58.93	58.93	0
6479.1	58.92	58.92	0
6429.1	58.41	58.41	0

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
6302.9	58.35	58.35	0
6179.9	58.3	58.3	0
6150.9	58.27	58.27	0
5970	58.2	58.2	0
5823.6	58.17	58.17	0
5776.6	58.01	58.01	0
5628.5	57.95	57.95	0
5509.6	57.93	57.93	0
5459.6	57.77	57.77	0
5294.4	57.72	57.72	0
5161	57.71	57.71	0
5111	57.57	57.57	0
4683.7	57.48	57.48	0
4316.3	57.39	57.39	0
4164.8	57.38	57.38	0
4115.8	56.57	56.57	0
3617.5	56.41	56.41	0
3259.8	56.27	56.27	0
3169.5	56.2	56.2	0
3113.1	56.1	56.11	0.01
2974.8	56.1	56.1	0
2884.9	56.08	56.08	0
2836.2	56.06	56.06	0
2706.2	53.49	53.49	0
2164.7	53.31	53.31	0
1654.8	53.27	53.27	0
1523.9	53.27	53.27	0
1461.9	53.13	53.13	0
1132.9	52.87	52.87	0
226.85	48.76	48.7	-0.06
3067.74	71.6	71.6	0
2499.4	69.26	69.26	0
2493.18	69.18	69.18	0
2450.1	69.06	69.06	0
2416.26	69.06	69.05	-0.01
2398.11	69.05	69.05	0
2389.56	69.05	69.05	0
2343.79	69.02	69.02	0
2303.58	68.96	68.96	0
2208.42	68.82	68.75	-0.07
2195.48	68.82	68.73	-0.09
2169.49	68.82	68.73	-0.09
2167.76	68.82	68.74	-0.08
2135.78	68.69	68.57	-0.12

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2100.84	68.69	68.57	-0.12
1662.37	68.69	68.56	-0.13
1144.5	68.69	68.56	-0.13
595.53	68.69	68.56	-0.13
549.31*	68.69	68.56	-0.13
503.08*	68.69	68.56	-0.13
456.86*	68.69	68.56	-0.13
410.63*	68.69	68.56	-0.13
364.41*	68.69	68.56	-0.13
318.18*	68.69	68.56	-0.13
271.96*	68.69	68.56	-0.13
225.73*	68.69	68.56	-0.13
179.51	68.69	68.56	-0.13
159.41*	68.69	68.56	-0.13
139.31*	68.69	68.56	-0.13
119.21*	68.7	68.57	-0.13
99.11*	68.7	68.57	-0.13
79.01	68.71	68.58	-0.13
7756.32	72.94	72.9	-0.04
7743.32	72.94	72.9	-0.04
7738.5	72.94	72.9	-0.04
7733.4	72.94	72.9	-0.04
7726.83	72.94	72.9	-0.04
7654.51	72.94	72.89	-0.05
7632.63	72.93	72.89	-0.04
7614.73	72.93	72.89	-0.04
7584.04	72.85	72.81	-0.04
7567.5	72.85	72.81	-0.04
7426.94	72.84	72.79	-0.05
7369.89	72.83	72.78	-0.05
7325.91	72.65	72.6	-0.05
7313.37	72.67	72.62	-0.05
7305.97	72.67	72.62	-0.05
7294.91	72.66	72.62	-0.04
7260.57	72.48	72.43	-0.05
7237.19	72.48	72.43	-0.05
6786.22	72.4	72.35	-0.05
6723.56	72.39	72.34	-0.05
6655.9	71.23	71.16	-0.07
6563.37	71.16	71.07	-0.09
6402.43	71.06	70.96	-0.1
6356.93	71.02	70.92	-0.1
6324.93	71	70.9	-0.1
6293.27	70.98	70.88	-0.1

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5958.59	70.81	70.68	-0.13
5652.94	70.79	70.64	-0.15
5045.34	70.77	70.62	-0.15
4947.92	70.77	70.61	-0.16
4915.91	70.76	70.61	-0.15
4783.1	70.76	70.6	-0.16
4580.38	70.75	70.59	-0.16
4553.28	70.74	70.59	-0.15
4459.75	70.74	70.58	-0.16
4370.6	70.74	70.58	-0.16
4330.88	70.74	70.58	-0.16
4269.23	70.72	70.56	-0.16
4229.24	70.72	70.56	-0.16
3733.5	70.7	70.55	-0.15
3187.46	70.63	70.45	-0.18
3150.64	70.63	70.44	-0.19
3126.39	70.62	70.43	-0.19
3104.46	70.61	70.42	-0.19
2750.51	70.54	70.34	-0.2
2741.93	70.54	70.34	-0.2
2725.96	70.53	70.33	-0.2
2716.57	70.53	70.33	-0.2
2615.37	70.51	70.31	-0.2
2244.98	70.46	70.26	-0.2
2221.06	70.46	70.25	-0.21
2187.07	70.44	70.23	-0.21
2042.36	70.43	70.22	-0.21
1922.11	70.42	70.21	-0.21
1892.63	70.42	70.2	-0.22
1863.46	70.33	70.11	-0.22
1829.45	70.34	70.12	-0.22
1611.06	70.31	70.09	-0.22
1513.84	70.29	70.07	-0.22
1454.72	70.28	70.06	-0.22
1380.55	70.27	70.06	-0.21
1354.02	70.27	70.05	-0.22
1010.56	70.25	70.04	-0.21
649.49	70.22	70	-0.22
242.54	70.19	69.98	-0.21
169.28	70.17	69.95	-0.22
106.82	70.16	69.95	-0.21
58.31	70.16	69.94	-0.22
4138.85	70.95	70.9	-0.05
3790.71	70.88	70.83	-0.05

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
3782.06	70.83	70.76	-0.07
3714.78	70.82	70.76	-0.06
3692.61	70.8	70.73	-0.07
3049.5	70.43	70.33	-0.1
2386.67	70.37	70.13	-0.24
2372.17	70.37	70.13	-0.24
2303.61	70.36	70.11	-0.25
2278.1	70.36	70.11	-0.25
1453.34	70.33	70.09	-0.24
1445.67	70.33	70.09	-0.24
1415.48	70.32	70.08	-0.24
1392.09	70.32	70.08	-0.24
1317.96	70.32	70.08	-0.24
1171.38	70.32	70.08	-0.24
1083.7	70.32	70.08	-0.24
215.24	70.3	70.08	-0.22
3232.36	71.12	70.68	-0.44
3203.12	71.12	70.68	-0.44
2930.66	71.12	70.68	-0.44
2636.62	71.12	70.68	-0.44
2494.17	71.12	70.68	-0.44
2473.31	71.12	70.68	-0.44
2465.6	71.12	70.68	-0.44
2414.49	71.12	70.67	-0.45
2046.09	71.13	70.68	-0.45
1929.3	71.11	70.66	-0.45
1565.52	71.07	70.62	-0.45
1208.56	71.05	70.6	-0.45
1188.81	71.05	70.6	-0.45
1175.29	71.03	70.59	-0.44
1132.07	71.03	70.59	-0.44
980.2	71.03	70.58	-0.45
963.63	71.03	70.58	-0.45
950.55	71.03	70.58	-0.45
901.58	71.02	70.57	-0.45
886.91	71.02	70.56	-0.46
839.05	71.02	70.56	-0.46
490.93	71.02	70.56	-0.46
251.81	71.02	70.56	-0.46
229.81*	71.02	70.56	-0.46
207.81*	71.02	70.56	-0.46
185.81*	71.02	70.56	-0.46
163.80*	71.02	70.56	-0.46
141.80*	71.02	70.56	-0.46

Impact Analysis 10-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
119.80*	71.02	70.56	-0.46
97.8	71.02	70.56	-0.46
5341.48	73.2	73.19	-0.01
4477.47	72.76	72.75	-0.01
4162.47	72.65	72.63	-0.02
4134.04	72.64	72.62	-0.02
4086.12	72.61	72.59	-0.02
4047.7	72.6	72.58	-0.02
3617.56	72.48	72.46	-0.02
3312.44	72.42	72.39	-0.03
3014.68	72.36	72.34	-0.02
2924.04	72.35	72.32	-0.03
2763.33	72.32	72.29	-0.03
2728.92	72.24	72.21	-0.03
2546.4	72.06	72.03	-0.03
2475.84	72.09	72.06	-0.03
1881.88	71.62	71.55	-0.07
1384.48	71.26	71.04	-0.22
1245.83	71.27	70.89	-0.38
584.11	71.18	70.75	-0.43
60.05	71.12	70.68	-0.44

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	74.71	74.32	-0.39
71854.2	74.01	73.64	-0.37
70744.2	73.62	73.17	-0.45
69527.2	73.34	72.8	-0.54
68670	73.06	72.71	-0.35
68131	72.89	72.67	-0.22
67511.6	72.74	72.62	-0.12
66869	72.48	72.31	-0.17
66774	72.48	72.26	-0.22
66190	72.4	72.16	-0.24
65955.8	72.36	72.17	-0.19
65434.6	72.28	72.21	-0.07
64399.74	71.81	71.8	-0.01
64273.7	71.83	71.74	-0.09
64220.7	71.81	71.72	-0.09
64200	71.81	71.72	-0.09
64100	71.78	71.69	-0.09
64094	71.78	71.69	-0.09
64024	71.75	71.66	-0.09
64010.4	71.59	71.51	-0.08
63960.4	70.66	70.6	-0.06
63959.7	70.86	70.8	-0.06
63856.7	70.8	70.74	-0.06
63756.7	70.45	70.4	-0.05
62823.2	70.19	70.12	-0.07
61905.2	69.97	69.9	-0.07
60625.3	69.8	69.72	-0.08
60595.74	69.59	69.51	-0.08
60583.6*	69.58	69.5	-0.08
60571.6*	69.58	69.5	-0.08
60559.5*	69.57	69.49	-0.08
60547.5*	69.57	69.49	-0.08
60535.46	69.56	69.48	-0.08
60396.4*	69.56	69.47	-0.09
60257.3*	69.55	69.47	-0.08
60118.3*	69.54	69.46	-0.08
59979.2*	69.53	69.45	-0.08
59840.2*	69.53	69.45	-0.08
59701.1*	69.52	69.44	-0.08
59562.1*	69.51	69.43	-0.08
59423.1	69.5	69.42	-0.08
59307.4*	69.5	69.41	-0.09
59191.8*	69.49	69.41	-0.08
59076.2*	69.48	69.4	-0.08

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	69.48	69.39	-0.09
58844.9*	69.47	69.39	-0.08
58729.3*	69.46	69.38	-0.08
58613.7	69.46	69.37	-0.09
58463.86	69.46	69.37	-0.09
58387.5	64.43	64.38	-0.05
58331.5	64.33	64.28	-0.05
57555.5	63.66	63.62	-0.04
56513.3	62.93	62.85	-0.08
55557.7	61.88	61.77	-0.11
54459.2	60.67	60.56	-0.11
53801.7	60.56	60.46	-0.1
53275.7	60.39	60.29	-0.1
52844.3	60.32	60.21	-0.11
52786.3	60.29	60.18	-0.11
52465.7	60.09	59.98	-0.11
52221.3	59.9	59.8	-0.1
52194.3	59.85	59.75	-0.1
51283.9	59.21	59.1	-0.11
51096.9	59.14	59.04	-0.1
51070.9	59.1	59.01	-0.09
50549.6	58.98	58.88	-0.1
50021.9	58.82	58.73	-0.09
49939.9	58.71	58.62	-0.09
49231.7	58.27	58.18	-0.09
48480.5	57.95	57.86	-0.09
48196.5	57.79	57.7	-0.09
48169.5	57.7	57.62	-0.08
47607.9	57.31	57.23	-0.08
46939	57.03	56.95	-0.08
46594.8	56.9	56.81	-0.09
46584.8	0	0	0
46579.8	56.9	56.81	-0.09
46575.8	56.9	56.8	-0.1
46526.8	56.84	56.74	-0.1
46516.8	56.84	56.74	-0.1
46515.8	0	0	0
46478.9	56.74	56.65	-0.09
46468.9	56.74	56.65	-0.09
46466.8	0	0	0
46458.9	56.72	56.63	-0.09
45952.3	56.34	56.24	-0.1
45161.4	55.75	55.67	-0.08
44549.9	55.43	55.37	-0.06

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
44143.3	55.27	55.2	-0.07
43789.5	55.25	55.19	-0.06
43739.48	55.24	55.18	-0.06
43652.1*	55.24	55.18	-0.06
43564.8*	55.24	55.18	-0.06
43477.4*	55.24	55.18	-0.06
43390.1*	55.24	55.18	-0.06
43302.8*	55.24	55.18	-0.06
43215.5	55.24	55.18	-0.06
43118.0*	55.24	55.18	-0.06
43020.4*	55.24	55.18	-0.06
42922.9*	55.24	55.18	-0.06
42825.49	55.24	55.18	-0.06
42736.8*	55.24	55.18	-0.06
42648.2*	55.24	55.18	-0.06
42559.6*	55.24	55.17	-0.07
42471	55.24	55.17	-0.07
42395.8*	55.23	55.17	-0.06
42320.7*	55.23	55.17	-0.06
42245.55	55.23	55.17	-0.06
42150.1*	55.23	55.17	-0.06
42054.6*	55.23	55.17	-0.06
41959.2*	55.23	55.17	-0.06
41863.8	55.23	55.17	-0.06
41771.7*	55.23	55.17	-0.06
41679.6*	55.23	55.17	-0.06
41587.5*	55.23	55.17	-0.06
41495.4*	55.22	55.16	-0.06
41403.3	55.22	55.16	-0.06
41285.4	55.13	55.08	-0.05
41203.4	55.21	55.15	-0.06
41197.4	55.13	55.08	-0.05
41185.7	55.1	55.05	-0.05
40951.8	55.2	55.14	-0.06
40886.8	55.2	55.14	-0.06
40846.9	55.18	55.13	-0.05
40605.5	55.17	55.12	-0.05
40584.6	55.17	55.12	-0.05
40515.6	55.16	55.11	-0.05
39969.8	55.15	55.1	-0.05
39829.91	55.08	55.02	-0.06
39188.6	54.65	54.59	-0.06
38423.57	54.08	54.01	-0.07
38170.2	53.98	53.91	-0.07

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
37899.37	53.89	53.81	-0.08
37413.16	53.64	53.57	-0.07
37258.6	53.53	53.45	-0.08
36408.6	53.03	52.94	-0.09
36341.47	52.94	52.85	-0.09
36321.56	53	52.91	-0.09
36303.5	53	52.91	-0.09
36195.78	52.85	52.77	-0.08
36107.2	52.82	52.73	-0.09
35434.7	52.54	52.45	-0.09
35045.7	52.36	52.27	-0.09
35006.1	52.28	52.19	-0.09
34984.3	52.24	52.16	-0.08
34870.3	52.18	52.1	-0.08
33920.1	51.28	51.18	-0.1
32749.8	49.88	49.78	-0.1
31824.3	49.06	48.95	-0.11
30679.1	48.12	48.01	-0.11
30678.1	0	0	0
30099.1	47.87	47.77	-0.1
29757.8	47.68	47.58	-0.1
29704.8	47.55	47.45	-0.1
28983.7	46.81	46.72	-0.09
28387.3	46.47	46.38	-0.09
27992	46.25	46.15	-0.1
27567.7	46.03	45.93	-0.1
27317	45.89	45.8	-0.09
27305.8	45.75	45.67	-0.08
27295.8	45.74	45.66	-0.08
27189.8	45.47	45.4	-0.07
27180.8	45.46	45.39	-0.07
27167.5	45.53	45.45	-0.08
26816.8*	45.34	45.27	-0.07
26466.1	45.17	45.1	-0.07
26224.4*	45.04	44.97	-0.07
25982.8	44.94	44.87	-0.07
25318.4	44.62	44.56	-0.06
24564.2	44.3	44.24	-0.06
23984.6	44.03	43.97	-0.06
23796.2	43.92	43.86	-0.06
23286.2	43.6	43.54	-0.06
22973.4	43.46	43.4	-0.06
22929.4	43.01	42.95	-0.06
22630.3	42.56	42.5	-0.06

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
22587.7	42.21	42.16	-0.05
22577.7	42.2	42.15	-0.05
22186.8	41.66	41.61	-0.05
21829	41.74	41.69	-0.05
21589.8	41.24	41.19	-0.05
21362	41.02	40.97	-0.05
21360	41.02	40.97	-0.05
21304	40.95	40.9	-0.05
21010.4	41.08	41.03	-0.05
20887.4	40.95	40.9	-0.05
20880.6	40.51	40.47	-0.04
20858.6	40.44	40.39	-0.05
19860	39.91	39.86	-0.05
18597.4	38.3	38.25	-0.05
18107.1	38.08	38.03	-0.05
17862.9*	37.94	37.89	-0.05
17618.7*	37.84	37.79	-0.05
17374.5*	37.71	37.66	-0.05
17130.3	37.61	37.56	-0.05
16004	37.11	37.06	-0.05
15045.6	36.25	36.2	-0.05
13937.2	35.59	35.54	-0.05
13341.9	35.05	35	-0.05
12945.5	34.9	34.84	-0.06
12932.7	34.76	34.71	-0.05
12931.7	34.76	34.71	-0.05
12877.9	34.39	34.35	-0.04
12117.3	34.02	33.97	-0.05
10905.1	32.95	32.91	-0.04
9879.2	31.58	31.54	-0.04
8777	30.98	30.94	-0.04
8024.4	30.59	30.55	-0.04
6779.3	29.81	29.78	-0.03
5748.4	28.39	28.35	-0.04
4492	27.13	27.09	-0.04
3597.9	26.41	26.37	-0.04
2709.4	25.57	25.53	-0.04
1695.9	24.38	24.35	-0.03
678.7	21.83	21.8	-0.03
8341.69	49.85	49.85	0
7839.79	49.21	49.2	-0.01
7820.27	49.19	49.18	-0.01
7762.13	49	49	0
7729.04	48.97	48.98	0.01

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7613.92	48.95	48.96	0.01
7550.89	48.92	48.93	0.01
6762.47	48.32	48.31	-0.01
5858.77	47.71	47.71	0
5845.88	47.63	47.62	-0.01
5779.72	47.57	47.56	-0.01
5748.41	47.73	47.73	0
4837.06	46	46	0
4823.61	46.02	46.02	0
4767.88	45.87	45.87	0
4732.44	45.86	45.86	0
4289.14	44.8	44.8	0
4255.48	44.69	44.69	0
4191.19	44.72	44.72	0
4159.81	44.75	44.75	0
4007.74	44.77	44.77	0
3928.82	44.78	44.78	0
3407.5	44.24	44.28	0.04
2630.49	43.72	43.75	0.03
1901.01	43.51	43.56	0.05
1219.08	43.46	43.47	0.01
1186.93	42.57	42.51	-0.06
1152.13	42.57	42.52	-0.05
935.77	42.48	42.43	-0.05
890.93	42.46	42.41	-0.05
881.12	42.45	42.39	-0.06
846.44	42.45	42.39	-0.06
68.07	42.46	42.41	-0.05
8416.71	57.38	57.38	0
8054.36	56.98	56.98	0
7947.1	56.62	56.62	0
7742.76	56.25	56.25	0
7692.1	56.27	56.27	0
7037.08	55.87	55.87	0
6335.17	55.33	55.33	0
6241.34	55.25	55.25	0
6182.3	55.18	55.18	0
6152.7	55.22	55.22	0
6006.93	55.1	55.1	0
5998.6	55.08	55.08	0
5978.1	55.09	55.09	0
5970.8	55.09	55.09	0
5869.16	55.07	55.07	0
5818.16	55.05	55.05	0

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5758.62	55.03	55.03	0
5685.64	55.02	55.02	0
4961.22	54.6	54.6	0
4862.39	54.48	54.48	0
4795.65	54.42	54.42	0
4717.67	54.46	54.46	0
4354.22	54.06	54.06	0
4232.29	53.6	53.6	0
4169.23	51.79	51.79	0
4101.99	52.15	52.15	0
3604.68	51.51	51.5	-0.01
3214.67	51.03	51.03	0
3131.26	50.24	50.24	0
3013.16	48.01	48.01	0
2939.54	48.6	48.6	0
2383.3	48.2	48.2	0
1673	47.89	47.89	0
1610.87	47.86	47.86	0
1552.98	47.48	47.48	0
1491.18	47.57	47.57	0
945.12	45.95	45.93	-0.02
435.38	45.22	45.19	-0.03
422.42	45.22	45.19	-0.03
222.06	44.22	44.15	-0.07
209.24	44.22	44.15	-0.07
139.66	44.22	44.15	-0.07
74.44	44.21	44.15	-0.06
13760.5	63.82	63.82	0
13096.8	63.79	63.79	0
11983.3	63.76	63.76	0
11526.9	62.73	62.73	0
10870.6	62.39	62.39	0
10795.9	61.77	61.77	0
10606.9	61.68	61.68	0
9666.7	61.39	61.39	0
8993.1	61.03	61.03	0
8655.1	60.77	60.77	0
8532.1	60.74	60.74	0
8481.9	60.18	60.18	0
8025.2	59.9	59.9	0
7510.9	59.61	59.61	0
6550.7	59.18	59.18	0
6479.1	59.16	59.16	0
6429.1	58.87	58.87	0

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
6302.9	58.77	58.77	0
6179.9	58.69	58.69	0
6150.9	58.63	58.63	0
5970	58.49	58.49	0
5823.6	58.44	58.44	0
5776.6	58.34	58.34	0
5628.5	58.25	58.25	0
5509.6	58.23	58.23	0
5459.6	58.2	58.2	0
5294.4	58.12	58.12	0
5161	58.1	58.1	0
5111	58.06	58.06	0
4683.7	57.92	57.92	0
4316.3	57.73	57.73	0
4164.8	57.7	57.7	0
4115.8	57.34	57.34	0
3617.5	57.13	57.13	0
3259.8	56.94	56.94	0
3169.5	56.91	56.91	0
3113.1	56.83	56.83	0
2974.8	56.78	56.78	0
2884.9	56.75	56.75	0
2836.2	56.72	56.72	0
2706.2	54.61	54.62	0.01
2164.7	54.05	54.06	0.01
1654.8	53.91	53.92	0.01
1523.9	53.9	53.91	0.01
1461.9	53.85	53.86	0.01
1132.9	53.37	53.31	-0.06
226.85	53.18	53.09	-0.09
3067.74	71.6	71.6	0
2499.4	69.58	69.56	-0.02
2493.18	69.61	69.6	-0.01
2450.1	69.64	69.63	-0.01
2416.26	69.64	69.63	-0.01
2398.11	69.64	69.63	-0.01
2389.56	69.64	69.63	-0.01
2343.79	69.64	69.63	-0.01
2303.58	69.64	69.61	-0.03
2208.42	69.65	69.6	-0.05
2195.48	69.65	69.6	-0.05
2169.49	69.65	69.6	-0.05
2167.76	69.65	69.6	-0.05
2135.78	69.68	69.61	-0.07

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2100.84	69.68	69.61	-0.07
1662.37	69.68	69.61	-0.07
1144.5	69.69	69.61	-0.08
595.53	69.72	69.64	-0.08
549.31*	69.72	69.64	-0.08
503.08*	69.72	69.64	-0.08
456.86*	69.72	69.64	-0.08
410.63*	69.72	69.64	-0.08
364.41*	69.72	69.64	-0.08
318.18*	69.72	69.64	-0.08
271.96*	69.72	69.64	-0.08
225.73*	69.72	69.64	-0.08
179.51	69.72	69.64	-0.08
159.41*	69.72	69.64	-0.08
139.31*	69.73	69.65	-0.08
119.21*	69.74	69.66	-0.08
99.11*	69.74	69.66	-0.08
79.01	69.74	69.67	-0.07
7756.32	74.57	74.56	-0.01
7743.32	74.57	74.56	-0.01
7738.5	74.57	74.56	-0.01
7733.4	74.56	74.56	0
7726.83	74.56	74.56	0
7654.51	74.56	74.56	0
7632.63	74.56	74.56	0
7614.73	74.56	74.56	0
7584.04	74.54	74.54	0
7567.5	74.54	74.54	0
7426.94	74.54	74.53	-0.01
7369.89	74.53	74.53	0
7325.91	74.28	74.28	0
7313.37	74.28	74.28	0
7305.97	74.28	74.28	0
7294.91	74.28	74.27	-0.01
7260.57	74	73.99	-0.01
7237.19	74	73.99	-0.01
6786.22	73.98	73.98	0
6723.56	73.98	73.97	-0.01
6655.9	72.36	72.19	-0.17
6563.37	72.36	72.19	-0.17
6402.43	72.35	72.18	-0.17
6356.93	72.35	72.18	-0.17
6324.93	72.35	72.18	-0.17
6293.27	72.35	72.18	-0.17

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5958.59	72.34	72.17	-0.17
5652.94	72.34	72.17	-0.17
5045.34	72.33	72.16	-0.17
4947.92	72.33	72.16	-0.17
4915.91	72.33	72.16	-0.17
4783.1	72.33	72.16	-0.17
4580.38	72.32	72.15	-0.17
4553.28	72.32	72.15	-0.17
4459.75	72.32	72.15	-0.17
4370.6	72.32	72.15	-0.17
4330.88	72.32	72.15	-0.17
4269.23	72.31	72.14	-0.17
4229.24	72.31	72.14	-0.17
3733.5	72.29	72.13	-0.16
3187.46	72.27	72.11	-0.16
3150.64	72.27	72.11	-0.16
3126.39	72.27	72.11	-0.16
3104.46	72.27	72.11	-0.16
2750.51	72.25	72.09	-0.16
2741.93	72.24	72.09	-0.15
2725.96	72.24	72.09	-0.15
2716.57	72.24	72.09	-0.15
2615.37	72.23	72.08	-0.15
2244.98	72.21	72.07	-0.14
2221.06	72.21	72.07	-0.14
2187.07	72.19	72.05	-0.14
2042.36	72.19	72.05	-0.14
1922.11	72.18	72.04	-0.14
1892.63	72.18	72.04	-0.14
1863.46	72.1	71.98	-0.12
1829.45	72.11	71.98	-0.13
1611.06	72.08	71.97	-0.11
1513.84	72.07	71.96	-0.11
1454.72	72.07	71.95	-0.12
1380.55	72.06	71.94	-0.12
1354.02	72.05	71.94	-0.11
1010.56	72.02	71.92	-0.1
649.49	71.96	71.87	-0.09
242.54	71.92	71.83	-0.09
169.28	71.9	71.82	-0.08
106.82	71.88	71.8	-0.08
58.31	71.85	71.77	-0.08
4138.85	72.17	72.03	-0.14
3790.71	72.17	72.03	-0.14

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
3782.06	72.17	72.03	-0.14
3714.78	72.17	72.03	-0.14
3692.61	72.17	72.03	-0.14
3049.5	72.17	72.03	-0.14
2386.67	72.17	72.03	-0.14
2372.17	72.17	72.03	-0.14
2303.61	72.14	72.01	-0.13
2278.1	72.14	72.01	-0.13
1453.34	72.12	71.99	-0.13
1445.67	72.12	71.99	-0.13
1415.48	72.11	71.99	-0.12
1392.09	72.11	71.99	-0.12
1317.96	72.11	71.98	-0.13
1171.38	72.11	71.98	-0.13
1083.7	72.11	71.98	-0.13
215.24	72.08	71.96	-0.12
3232.36	72.67	72.6	-0.07
3203.12	72.67	72.6	-0.07
2930.66	72.67	72.59	-0.08
2636.62	72.65	72.58	-0.07
2494.17	72.65	72.57	-0.08
2473.31	72.64	72.57	-0.07
2465.6	72.64	72.56	-0.08
2414.49	72.64	72.56	-0.08
2046.09	72.62	72.54	-0.08
1929.3	72.58	72.5	-0.08
1565.52	72.54	72.45	-0.09
1208.56	72.53	72.44	-0.09
1188.81	72.53	72.44	-0.09
1175.29	72.52	72.43	-0.09
1132.07	72.52	72.43	-0.09
980.2	72.51	72.43	-0.08
963.63	72.51	72.43	-0.08
950.55	72.52	72.43	-0.09
901.58	72.49	72.41	-0.08
886.91	72.49	72.4	-0.09
839.05	72.49	72.4	-0.09
490.93	72.49	72.38	-0.11
251.81	72.49	72.37	-0.12
229.81*	72.49	72.37	-0.12
207.81*	72.49	72.37	-0.12
185.81*	72.49	72.37	-0.12
163.80*	72.49	72.37	-0.12
141.80*	72.49	72.37	-0.12

Impact Analysis 100-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
119.80*	72.49	72.37	-0.12
97.8	72.49	72.37	-0.12
5341.48	75.27	75.28	0.01
4477.47	74.91	74.92	0.01
4162.47	74.72	74.73	0.01
4134.04	74.7	74.71	0.01
4086.12	74.65	74.65	0
4047.7	74.63	74.63	0
3617.56	74.44	74.44	0
3312.44	74.34	74.35	0.01
3014.68	74.27	74.28	0.01
2924.04	74.26	74.26	0
2763.33	74.25	74.25	0
2728.92	74.08	74.08	0
2546.4	73.3	73.28	-0.02
2475.84	73.39	73.37	-0.02
1881.88	73.08	73.05	-0.03
1384.48	72.84	72.8	-0.04
1245.83	72.78	72.73	-0.05
584.11	72.65	72.59	-0.06
60.05	72.62	72.54	-0.08

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
72405.2	75.93	75.76	-0.17
71854.2	75.17	74.92	-0.25
70744.2	74.86	74.59	-0.27
69527.2	74.73	74.43	-0.3
68670	74.61	74.38	-0.23
68131	74.56	74.36	-0.2
67511.6	74.5	74.34	-0.16
66869	74.4	74.22	-0.18
66774	74.39	74.21	-0.18
66190	74.35	74.18	-0.17
65955.8	74.35	74.19	-0.16
65434.6	74.32	74.22	-0.1
64399.74	74.05	73.98	-0.07
64273.7	74.16	73.98	-0.18
64220.7	74.07	73.92	-0.15
64200	74.08	73.93	-0.15
64100	73.95	73.83	-0.12
64094	74	73.86	-0.14
64024	73.91	73.81	-0.1
64010.4	73.8	73.5	-0.3
63960.4	71.83	71.71	-0.12
63959.7	72.09	71.96	-0.13
63856.7	71.95	71.84	-0.11
63756.7	71.54	71.45	-0.09
62823.2	71.36	71.27	-0.09
61905.2	71.24	71.15	-0.09
60625.3	71.14	71.04	-0.1
60595.74	71	70.9	-0.1
60583.6*	71	70.89	-0.11
60571.6*	71	70.89	-0.11
60559.5*	71	70.89	-0.11
60547.5*	70.99	70.89	-0.1
60535.46	70.99	70.89	-0.1
60396.4*	70.99	70.88	-0.11
60257.3*	70.98	70.88	-0.1
60118.3*	70.98	70.87	-0.11
59979.2*	70.97	70.87	-0.1
59840.2*	70.97	70.86	-0.11
59701.1*	70.96	70.86	-0.1
59562.1*	70.96	70.85	-0.11
59423.1	70.95	70.84	-0.11
59307.4*	70.94	70.84	-0.1
59191.8*	70.94	70.83	-0.11
59076.2*	70.93	70.83	-0.1

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
58960.5*	70.93	70.82	-0.11
58844.9*	70.93	70.82	-0.11
58729.3*	70.92	70.81	-0.11
58613.7	70.92	70.81	-0.11
58463.86	70.92	70.81	-0.11
58387.5	65.01	64.97	-0.04
58331.5	64.9	64.86	-0.04
57555.5	64.03	64	-0.03
56513.3	63.7	63.64	-0.06
55557.7	63.12	63.03	-0.09
54459.2	61.9	61.8	-0.1
53801.7	61.72	61.63	-0.09
53275.7	61.51	61.43	-0.08
52844.3	61.44	61.35	-0.09
52786.3	61.36	61.28	-0.08
52465.7	61.13	61.06	-0.07
52221.3	60.93	60.85	-0.08
52194.3	60.87	60.8	-0.07
51283.9	60.16	60.1	-0.06
51096.9	60.08	60.01	-0.07
51070.9	60.03	59.97	-0.06
50549.6	59.88	59.82	-0.06
50021.9	59.71	59.65	-0.06
49939.9	59.53	59.47	-0.06
49231.7	59.1	59.03	-0.07
48480.5	58.73	58.66	-0.07
48196.5	58.6	58.53	-0.07
48169.5	58.56	58.49	-0.07
47607.9	58.28	58.21	-0.07
46939	57.99	57.93	-0.06
46594.8	57.86	57.8	-0.06
46584.8	0	0	0
46579.8	57.85	57.79	-0.06
46575.8	57.84	57.78	-0.06
46526.8	57.81	57.75	-0.06
46516.8	57.81	57.75	-0.06
46515.8	0	0	0
46478.9	57.66	57.61	-0.05
46468.9	57.65	57.6	-0.05
46466.8	0	0	0
46458.9	57.64	57.59	-0.05
45952.3	57.39	57.33	-0.06
45161.4	56.96	56.9	-0.06
44549.9	56.73	56.68	-0.05

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
44143.3	56.62	56.56	-0.06
43789.5	56.59	56.54	-0.05
43739.48	56.58	56.53	-0.05
43652.1*	56.58	56.53	-0.05
43564.8*	56.58	56.53	-0.05
43477.4*	56.58	56.53	-0.05
43390.1*	56.58	56.53	-0.05
43302.8*	56.58	56.53	-0.05
43215.5	56.58	56.53	-0.05
43118.0*	56.58	56.53	-0.05
43020.4*	56.58	56.53	-0.05
42922.9*	56.58	56.53	-0.05
42825.49	56.58	56.52	-0.06
42736.8*	56.58	56.52	-0.06
42648.2*	56.57	56.52	-0.05
42559.6*	56.57	56.52	-0.05
42471	56.57	56.52	-0.05
42395.8*	56.57	56.52	-0.05
42320.7*	56.57	56.52	-0.05
42245.55	56.57	56.52	-0.05
42150.1*	56.57	56.52	-0.05
42054.6*	56.57	56.52	-0.05
41959.2*	56.57	56.52	-0.05
41863.8	56.57	56.52	-0.05
41771.7*	56.57	56.52	-0.05
41679.6*	56.57	56.51	-0.06
41587.5*	56.56	56.51	-0.05
41495.4*	56.56	56.51	-0.05
41403.3	56.56	56.51	-0.05
41285.4	56.46	56.41	-0.05
41203.4	56.56	56.51	-0.05
41197.4	56.46	56.41	-0.05
41185.7	56.36	56.32	-0.04
40951.8	56.45	56.41	-0.04
40886.8	56.45	56.4	-0.05
40846.9	56.44	56.4	-0.04
40605.5	56.43	56.38	-0.05
40584.6	56.43	56.38	-0.05
40515.6	56.41	56.37	-0.04
39969.8	56.4	56.36	-0.04
39829.91	56.38	56.33	-0.05
39188.6	56.14	56.09	-0.05
38423.57	55.82	55.77	-0.05
38170.2	55.74	55.69	-0.05

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
37899.37	55.68	55.63	-0.05
37413.16	55.57	55.52	-0.05
37258.6	55.5	55.44	-0.06
36408.6	55.28	55.23	-0.05
36341.47	55.25	55.2	-0.05
36321.56	55.21	55.16	-0.05
36303.5	55.21	55.16	-0.05
36195.78	55.08	55.03	-0.05
36107.2	55.05	55	-0.05
35434.7	54.79	54.74	-0.05
35045.7	54.58	54.53	-0.05
35006.1	54.45	54.4	-0.05
34984.3	54.42	54.38	-0.04
34870.3	54.16	54.12	-0.04
33920.1	53.44	53.4	-0.04
32749.8	52.32	52.28	-0.04
31824.3	51.58	51.54	-0.04
30679.1	50.75	50.72	-0.03
30678.1	0	0	0
30099.1	50.5	50.46	-0.04
29757.8	50.31	50.28	-0.03
29704.8	50.1	50.06	-0.04
28983.7	49.5	49.47	-0.03
28387.3	49.19	49.15	-0.04
27992	49	48.97	-0.03
27567.7	48.82	48.79	-0.03
27317	48.73	48.7	-0.03
27305.8	48.41	48.38	-0.03
27295.8	48.4	48.37	-0.03
27189.8	47.84	47.82	-0.02
27180.8	47.84	47.81	-0.03
27167.5	47.92	47.9	-0.02
26816.8*	47.73	47.71	-0.02
26466.1	47.56	47.55	-0.01
26224.4*	47.43	47.41	-0.02
25982.8	47.32	47.3	-0.02
25318.4	47.02	47	-0.02
24564.2	46.67	46.65	-0.02
23984.6	46.41	46.4	-0.01
23796.2	46.3	46.29	-0.01
23286.2	45.99	45.98	-0.01
22973.4	45.84	45.83	-0.01
22929.4	45.45	45.43	-0.02
22630.3	44.99	44.97	-0.02

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
22587.7	44.6	44.58	-0.02
22577.7	44.59	44.56	-0.03
22186.8	44.18	44.15	-0.03
21829	44.24	44.21	-0.03
21589.8	43.77	43.74	-0.03
21362	43.55	43.52	-0.03
21360	43.55	43.52	-0.03
21304	43.47	43.44	-0.03
21010.4	43.56	43.54	-0.02
20887.4	43.44	43.41	-0.03
20880.6	43.01	42.98	-0.03
20858.6	42.97	42.94	-0.03
19860	42.6	42.57	-0.03
18597.4	41.2	41.18	-0.02
18107.1	41.15	41.12	-0.03
17862.9*	41.05	41.02	-0.03
17618.7*	40.97	40.94	-0.03
17374.5*	40.85	40.82	-0.03
17130.3	40.74	40.71	-0.03
16004	40.24	40.22	-0.02
15045.6	39.41	39.38	-0.03
13937.2	38.85	38.82	-0.03
13341.9	38.38	38.35	-0.03
12945.5	38.26	38.23	-0.03
12932.7	38.12	38.09	-0.03
12931.7	38.12	38.09	-0.03
12877.9	37.28	37.26	-0.02
12117.3	36.88	36.85	-0.03
10905.1	35.68	35.66	-0.02
9879.2	34.19	34.17	-0.02
8777	33.6	33.57	-0.03
8024.4	33.17	33.15	-0.02
6779.3	32.37	32.35	-0.02
5748.4	30.96	30.93	-0.03
4492	29.66	29.63	-0.03
3597.9	28.96	28.93	-0.03
2709.4	28.07	28.04	-0.03
1695.9	26.8	26.78	-0.02
678.7	24.16	24.14	-0.02
8341.69	49.88	49.88	0
7839.79	49.35	49.35	0
7820.27	49.34	49.34	0
7762.13	49.23	49.23	0
7729.04	49.21	49.21	0

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
7613.92	49.2	49.2	0
7550.89	49.17	49.17	0
6762.47	48.52	48.52	0
5858.77	48.04	48.04	0
5845.88	47.97	47.97	0
5779.72	47.91	47.91	0
5748.41	48.05	48.05	0
4837.06	46.44	46.44	0
4823.61	46.48	46.48	0
4767.88	46.33	46.33	0
4732.44	46.31	46.32	0.01
4289.14	45.13	45.13	0
4255.48	44.99	44.99	0
4191.19	45.03	45.03	0
4159.81	45.04	45.04	0
4007.74	45.07	45.07	0
3928.82	45.09	45.09	0
3407.5	44.51	44.5	-0.01
2630.49	44.29	44.29	0
1901.01	44.33	44.32	-0.01
1219.08	44.46	44.45	-0.01
1186.93	44.47	44.46	-0.01
1152.13	44.51	44.49	-0.02
935.77	44.56	44.54	-0.02
890.93	44.72	44.69	-0.03
881.12	44.75	44.72	-0.03
846.44	44.76	44.74	-0.02
68.07	44.79	44.76	-0.03
8416.71	57.93	57.93	0
8054.36	57.5	57.5	0
7947.1	56.97	56.97	0
7742.76	56.63	56.63	0
7692.1	56.66	56.66	0
7037.08	56.19	56.19	0
6335.17	55.65	55.65	0
6241.34	55.58	55.58	0
6182.3	55.45	55.45	0
6152.7	55.49	55.49	0
6006.93	55.38	55.38	0
5998.6	55.36	55.36	0
5978.1	55.36	55.36	0
5970.8	55.36	55.36	0
5869.16	55.35	55.35	0
5818.16	55.34	55.34	0

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5758.62	55.32	55.32	0
5685.64	55.3	55.3	0
4961.22	54.91	54.91	0
4862.39	54.82	54.82	0
4795.65	54.77	54.77	0
4717.67	54.76	54.76	0
4354.22	54.26	54.26	0
4232.29	53.6	53.6	0
4169.23	51.96	51.96	0
4101.99	52.61	52.61	0
3604.68	51.75	51.7	-0.05
3214.67	51.47	51.47	0
3131.26	50.85	50.85	0
3013.16	48.03	48.03	0
2939.54	49.08	49.08	0
2383.3	48.65	48.65	0
1673	48.37	48.37	0
1610.87	48.34	48.34	0
1552.98	47.88	47.88	0
1491.18	47.99	47.98	-0.01
945.12	47.11	47.1	-0.01
435.38	46.77	46.76	-0.01
422.42	46.78	46.76	-0.02
222.06	46.64	46.62	-0.02
209.24	46.64	46.62	-0.02
139.66	46.64	46.62	-0.02
74.44	46.64	46.62	-0.02
13760.5	64.72	64.72	0
13096.8	64.72	64.72	0
11983.3	64.71	64.71	0
11526.9	63.35	63.35	0
10870.6	63.03	63.03	0
10795.9	62.13	62.13	0
10606.9	62.02	62.02	0
9666.7	61.64	61.64	0
8993.1	61.23	61.23	0
8655.1	60.88	60.88	0
8532.1	60.83	60.83	0
8481.9	60.51	60.51	0
8025.2	60.21	60.21	0
7510.9	59.89	59.89	0
6550.7	59.33	59.33	0
6479.1	59.31	59.31	0
6429.1	59.22	59.22	0

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
6302.9	59.12	59.12	0
6179.9	59.02	59.02	0
6150.9	58.97	58.97	0
5970	58.81	58.82	0.01
5823.6	58.76	58.76	0
5776.6	58.65	58.65	0
5628.5	58.54	58.54	0
5509.6	58.51	58.51	0
5459.6	58.5	58.5	0
5294.4	58.4	58.4	0
5161	58.38	58.38	0
5111	58.35	58.35	0
4683.7	58.18	58.18	0
4316.3	57.89	57.89	0
4164.8	57.84	57.84	0
4115.8	57.73	57.74	0.01
3617.5	57.5	57.5	0
3259.8	57.29	57.29	0
3169.5	57.26	57.26	0
3113.1	57.05	57.05	0
2974.8	56.98	56.98	0
2884.9	56.93	56.93	0
2836.2	56.89	56.89	0
2706.2	55.65	55.63	-0.02
2164.7	55.4	55.36	-0.04
1654.8	55.36	55.32	-0.04
1523.9	55.36	55.31	-0.05
1461.9	55.35	55.3	-0.05
1132.9	55.33	55.29	-0.04
226.85	55.33	55.28	-0.05
3067.74	71.6	71.6	0
2499.4	71.03	70.92	-0.11
2493.18	71.03	70.92	-0.11
2450.1	71.03	70.92	-0.11
2416.26	71.03	70.92	-0.11
2398.11	71.03	70.92	-0.11
2389.56	71.03	70.92	-0.11
2343.79	71.03	70.91	-0.12
2303.58	71.03	70.92	-0.11
2208.42	71.05	70.93	-0.12
2195.48	71.05	70.93	-0.12
2169.49	71.05	70.93	-0.12
2167.76	71.05	70.93	-0.12
2135.78	71.07	70.97	-0.1

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
2100.84	71.07	70.97	-0.1
1662.37	71.07	70.97	-0.1
1144.5	71.09	70.98	-0.11
595.53	71.1	71	-0.1
549.31*	71.1	71	-0.1
503.08*	71.1	71	-0.1
456.86*	71.1	71	-0.1
410.63*	71.1	71	-0.1
364.41*	71.1	71	-0.1
318.18*	71.1	71	-0.1
271.96*	71.1	71	-0.1
225.73*	71.1	71	-0.1
179.51	71.1	71	-0.1
159.41*	71.1	71	-0.1
139.31*	71.11	71.01	-0.1
119.21*	71.11	71.01	-0.1
99.11*	71.12	71.02	-0.1
79.01	71.12	71.02	-0.1
7756.32	75.24	75.24	0
7743.32	75.24	75.24	0
7738.5	75.24	75.24	0
7733.4	75.24	75.24	0
7726.83	75.24	75.24	0
7654.51	75.24	75.24	0
7632.63	75.24	75.24	0
7614.73	75.24	75.24	0
7584.04	75.24	75.24	0
7567.5	75.24	75.24	0
7426.94	75.24	75.23	-0.01
7369.89	75.23	75.23	0
7325.91	74.87	74.86	-0.01
7313.37	74.87	74.86	-0.01
7305.97	74.87	74.86	-0.01
7294.91	74.87	74.86	-0.01
7260.57	74.87	74.86	-0.01
7237.19	74.87	74.86	-0.01
6786.22	74.86	74.85	-0.01
6723.56	74.86	74.85	-0.01
6655.9	74.32	74.17	-0.15
6563.37	74.32	74.17	-0.15
6402.43	74.32	74.17	-0.15
6356.93	74.32	74.16	-0.16
6324.93	74.32	74.16	-0.16
6293.27	74.32	74.16	-0.16

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
5958.59	74.31	74.16	-0.15
5652.94	74.31	74.15	-0.16
5045.34	74.3	74.15	-0.15
4947.92	74.3	74.15	-0.15
4915.91	74.3	74.15	-0.15
4783.1	74.29	74.15	-0.14
4580.38	74.29	74.14	-0.15
4553.28	74.29	74.14	-0.15
4459.75	74.29	74.14	-0.15
4370.6	74.29	74.14	-0.15
4330.88	74.29	74.14	-0.15
4269.23	74.28	74.14	-0.14
4229.24	74.28	74.14	-0.14
3733.5	74.28	74.13	-0.15
3187.46	74.27	74.13	-0.14
3150.64	74.27	74.13	-0.14
3126.39	74.26	74.12	-0.14
3104.46	74.26	74.12	-0.14
2750.51	74.25	74.12	-0.13
2741.93	74.25	74.12	-0.13
2725.96	74.25	74.11	-0.14
2716.57	74.25	74.11	-0.14
2615.37	74.24	74.11	-0.13
2244.98	74.23	74.1	-0.13
2221.06	74.23	74.1	-0.13
2187.07	74.21	74.09	-0.12
2042.36	74.21	74.08	-0.13
1922.11	74.2	74.08	-0.12
1892.63	74.2	74.08	-0.12
1863.46	74.13	74.03	-0.1
1829.45	74.14	74.03	-0.11
1611.06	74.11	74.01	-0.1
1513.84	74.1	74.01	-0.09
1454.72	74.1	74.01	-0.09
1380.55	74.09	74	-0.09
1354.02	74.09	74	-0.09
1010.56	74.06	73.98	-0.08
649.49	74	73.94	-0.06
242.54	73.95	73.91	-0.04
169.28	73.95	73.9	-0.05
106.82	73.93	73.89	-0.04
58.31	73.94	73.86	-0.08
4138.85	74.17	74.05	-0.12
3790.71	74.17	74.05	-0.12

Impact Analysis 500-Year
Water Surface Elevation Comparison

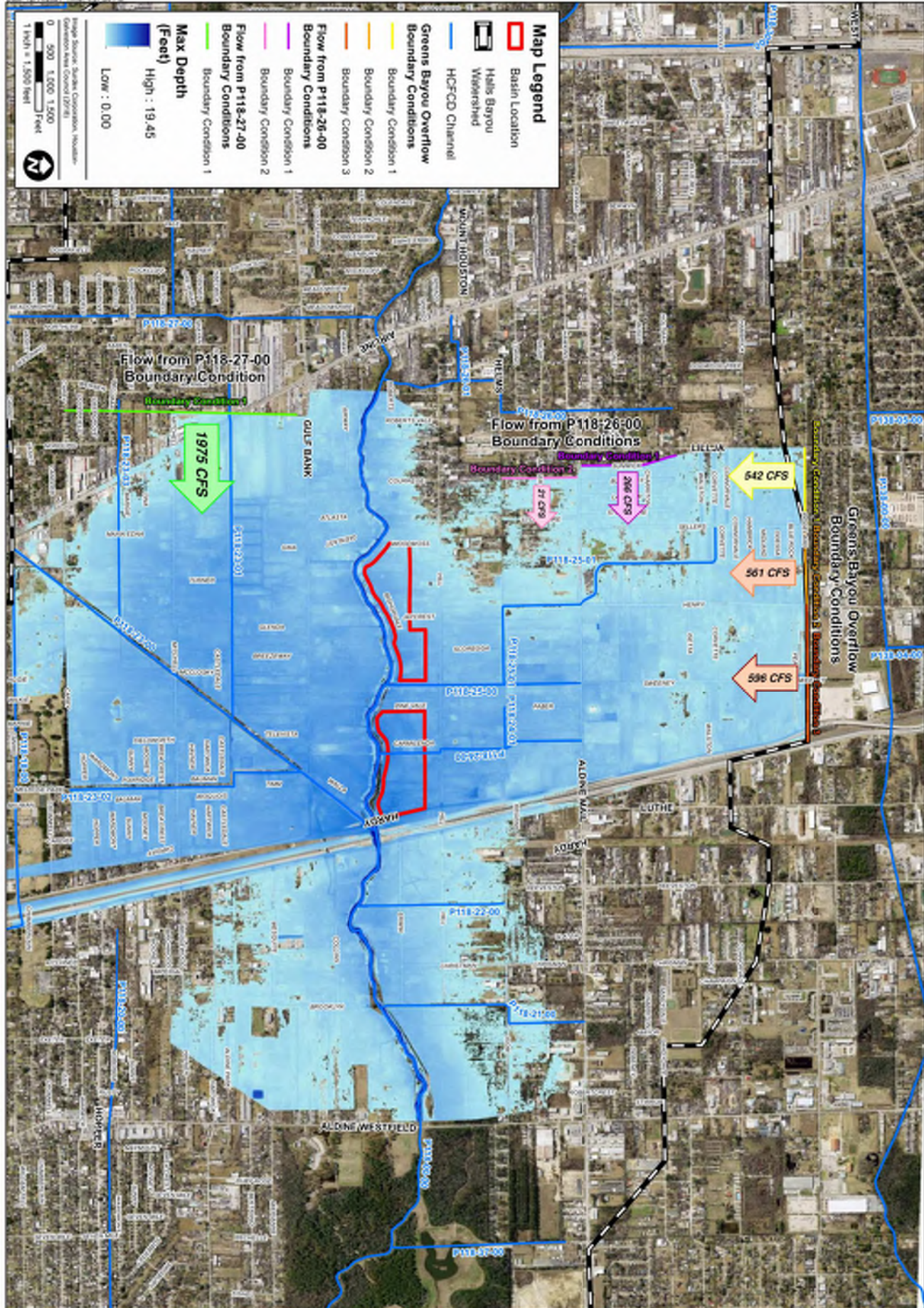
River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
3782.06	74.17	74.05	-0.12
3714.78	74.17	74.05	-0.12
3692.61	74.17	74.05	-0.12
3049.5	74.17	74.05	-0.12
2386.67	74.16	74.05	-0.11
2372.17	74.16	74.05	-0.11
2303.61	74.16	74.05	-0.11
2278.1	74.16	74.05	-0.11
1453.34	74.14	74.03	-0.11
1445.67	74.14	74.03	-0.11
1415.48	74.13	74.03	-0.1
1392.09	74.13	74.03	-0.1
1317.96	74.13	74.03	-0.1
1171.38	74.13	74.03	-0.1
1083.7	74.13	74.02	-0.11
215.24	74.11	74.01	-0.1
3232.36	74.5	74.33	-0.17
3203.12	74.5	74.33	-0.17
2930.66	74.5	74.33	-0.17
2636.62	74.5	74.32	-0.18
2494.17	74.49	74.32	-0.17
2473.31	74.49	74.32	-0.17
2465.6	74.49	74.32	-0.17
2414.49	74.49	74.32	-0.17
2046.09	74.49	74.32	-0.17
1929.3	74.47	74.3	-0.17
1565.52	74.45	74.28	-0.17
1208.56	74.45	74.28	-0.17
1188.81	74.45	74.27	-0.18
1175.29	74.44	74.27	-0.17
1132.07	74.44	74.27	-0.17
980.2	74.44	74.27	-0.17
963.63	74.44	74.27	-0.17
950.55	74.44	74.27	-0.17
901.58	74.43	74.25	-0.18
886.91	74.42	74.25	-0.17
839.05	74.42	74.25	-0.17
490.93	74.42	74.25	-0.17
251.81	74.42	74.25	-0.17
229.81*	74.42	74.25	-0.17
207.81*	74.42	74.25	-0.17
185.81*	74.42	74.25	-0.17
163.80*	74.42	74.25	-0.17
141.80*	74.42	74.25	-0.17

Impact Analysis 500-Year
Water Surface Elevation Comparison

River Station	Baseline	Alternative 3 (Recommended)	
	WSEL (ft)	WSEL (ft)	Difference
119.80*	74.42	74.25	-0.17
97.8	74.42	74.25	-0.17
5341.48	76	76	0
4477.47	75.51	75.5	-0.01
4162.47	75.29	75.27	-0.02
4134.04	75.27	75.25	-0.02
4086.12	75.21	75.18	-0.03
4047.7	75.19	75.16	-0.03
3617.56	75.01	74.96	-0.05
3312.44	74.93	74.87	-0.06
3014.68	74.88	74.81	-0.07
2924.04	74.87	74.8	-0.07
2763.33	74.88	74.8	-0.08
2728.92	74.81	74.73	-0.08
2546.4	74.62	74.46	-0.16
2475.84	74.61	74.46	-0.15
1881.88	74.56	74.4	-0.16
1384.48	74.54	74.37	-0.17
1245.83	74.53	74.37	-0.16
584.11	74.52	74.35	-0.17
60.05	74.48	74.31	-0.17

Appendix R

Boundary Conditions – 500-Year Storm Event



HARRIS COUNTY
FLOOD CONTROL DISTRICT

9900 Northwest Freeway
 Houston, Texas 77099

DATE: SEP 2021
 SCALE: AS NOTED
 EXHIBIT

Lockwood, Andrews & Newman, Inc.
 A S&B GROUP COMPANY

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 2818 West Loop South - Houston, TX 77027-3885
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PREPARED:	BJI
CHECKED:	DMB
APPROVED:	DMB

HCFCD HALLS BAYOU WATERSHED
 HARDY WEST ALTERNATIVES ANALYSIS

**BOUNDARY CONDITIONS
 500-YEAR STORM EVENT**



TEXAS

AUSTIN
COLLEGE STATION
CORPUS CHRISTI
DALLAS
FORT WORTH
FRISCO
HOUSTON
LAREDO
MONTGOMERY COUNTY
SAN ANTONIO
SAN MARCOS
WACO

CALIFORNIA

LOS ANGELES
ORANGE
SAN JOSE

FLORIDA

MIAMI

ILLINOIS

CHICAGO

MICHIGAN

FLINT
LANSING

OKLAHOMA

NORMAN

Date: March 12, 2021
Prepared By: David Barton, PE, CFM
Chadley Box, EIT
Project #: 120-12170-109
Project Name: P118-08-00 Alternatives Analysis
Subject: P118-08-00 Final Model Revision Summary Memo



David M. Barton

1.0 Introduction

In August 2019 LAN completed the Halls Bayou Watershed Flood Risk Reduction Phasing Study which updated the 2013 Halls Ahead Study Vision Plan and developed a phasing strategy for identified bond projects. This Alternatives Analysis study is the next step towards getting Phase 1 of the bond projects constructed. This Alternatives Analysis for P118-08-00 described and analyzed a series of potential flood risk mitigation projects, evaluated project performance metrics, recommend a project solution, assessed mitigation potential for adverse impacts downstream, summarized key findings, and delivered concept plans for stakeholder communication.

The final report for this Alternatives Analysis study was submitted on December 4, 2020. Right-of-way (ROW) discussions between Union Pacific Railroad (UPRR) and Harris County Flood Control District (HCFCD) determined that more space was required between the railroad and the proposed basin in the recommended alternative. LAN was contacted to make alterations to the recommended alternative to meet ROW requirements. While this memo outlines one configuration of the alternative that will satisfy the current needs, optimization of this alternative is expected during the PER phase of this project.

2.0 Revised Recommended Alternative

2.1 Revised Alternative 1 Layout

The revised Alternative 1 consists of a grass-lined trapezoidal channel along P118-08-00 and basins in place similarly to Alternative 1 in the final report. However, in this revision the basin and channel between the railroad and Tidwell road was converted to a 6.5 ft deep inline basin with a 2 ft deep pilot channel to allow more space east of the railroad. Additionally, the inline basin was extended to the south within UPRR property down to Dewitt Rd while maintaining the requested 150 feet east of the railroad. The existing pipelines are not planned to be disturbed. The existing roadside ditch along Parkhurst Rd along with a proposed 24-inch RCP will connect the northern and southern portions of the basins. The Wayside Basin is also expanded eastward to Wayside Dr. to provide extra detention volume. These modifications have a projected total cost of \$29 million and would provide a 500-year LOS under the region's current normal depth downstream boundary conditions.

Compared to the previous Alternative 1, the culverts under the railroad and Tidwell Road were modeled as two 8' x 8' RCBs and one 8' x 5' RCB respectively. The latter is meant to represent a blocking

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of the current 8' x 8' RCBs under the current Tidwell Rd. crossing. The southern weir where the pipelines cross contains a 24-inch RCP to allow low flow from the basin. Refer to **Exhibit 1** and the figure below for the Amended Alternative 1 layout.



FIGURE 1: AMENDED ALT. 1 LAYOUT

2.2 HEC-RAS Geometry

The Alternative 1 HEC-RAS 5.0.5 model served as the starting point for the revised model. The inline basin was modeled using 1D cross sections with 2D for the overbanks. The portion of the inline basin extending south was modeled by creating a new reach with 1D cross sections and editing the 2D area. The undisturbed pipeline ground acted as a berm and was modeled using an inline structure. Channel modifications were cut into the terrain using RASMapper and basins within the 2D area were created in GIS to be combined with the new terrain. As with the previous model, lateral structures are in place to allow flow between the 2D flow areas and 1D channel. Refer to **Exhibit 2** for the Amended Alternative 1 HEC-RAS Geometry. The figures below compare the previous and amended Alternative 1 geometries.

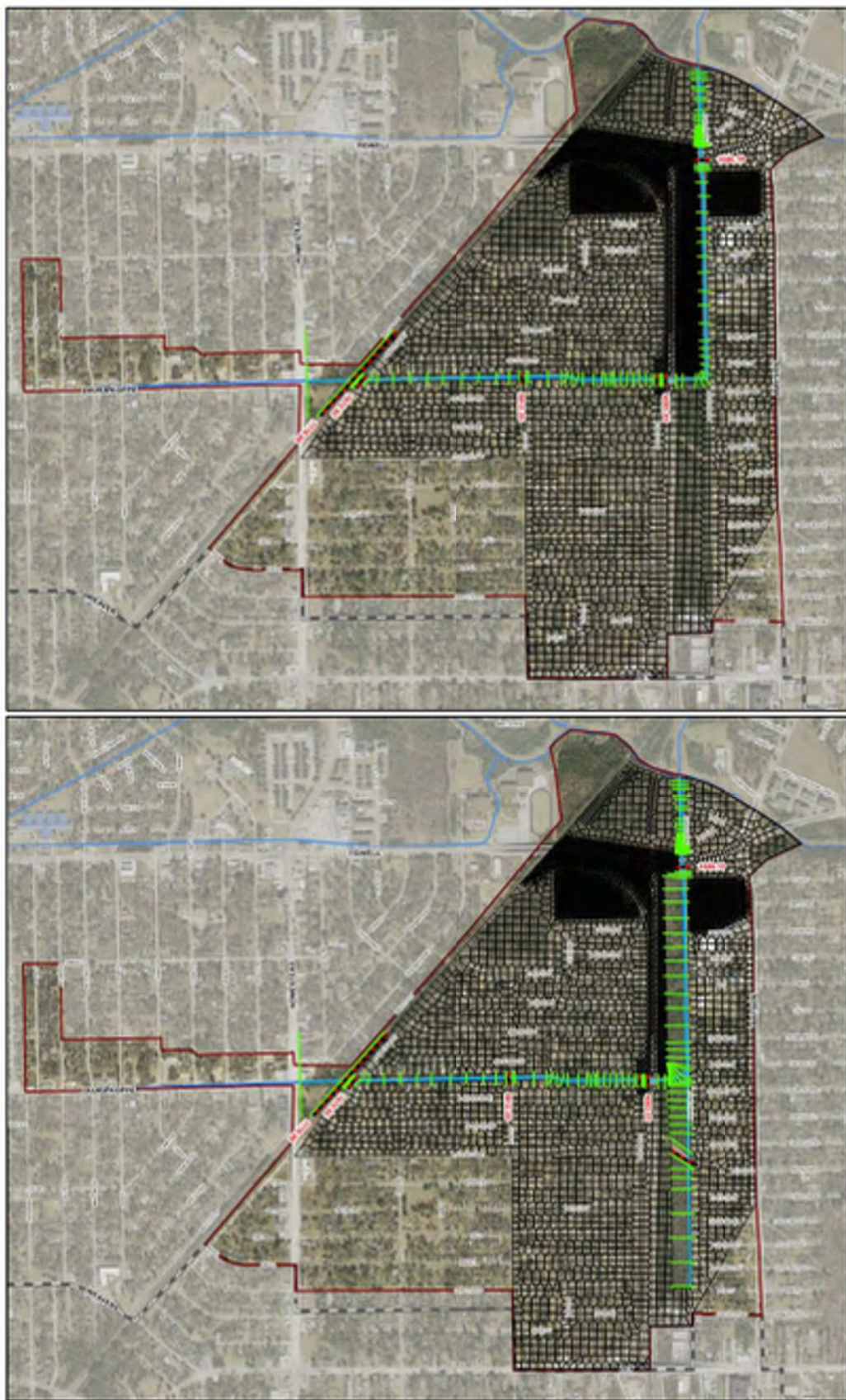


FIGURE 2: HEC-RAS GEOMETRY COMPARISON - ALT. 1 (TOP) VS AMENDED ALT. 1 (BOTTOM)

2.3 Boundary Conditions

As with the Alternative 1 model, inflow hydrographs are applied via boundary conditions using DSS connections to the Baseline Conditions HEC-HMS model. Flows were applied identically to the previous model with one exception. Flows from the area between Parkhurst and the railroad south of the channel were applied uniformly to the new reach rather than the few cross sections just downstream of the railroad. This was done since the new basin takes up most of that area and will more accurately reflect future conditions.

2.4 Results

As with the previous iteration of the model, the Revised Recommended Alternative brings the entire P118-08-00 service area up to a 500-year LOS for the normal depth downstream boundary condition, which reflects the future conditions after implementation of the Halls Bayou improvement projects. The resulting downstream hydrograph for the 500-year event closely matches the downstream hydrograph obtained from the previous iteration in both timing and magnitude, so no downstream impacts can be expected.

Performance metrics are the same as in the report, and a comparison between the two versions of the model are given in the tables below. Overall, metrics are comparable with the disparity being a max of three extra structures within the floodplain on several of the storm events. Changes in floodplain acreage is expected due to the expansion of the basins. Refer to Exhibits 3-10 for performance metrics and floodplains of each storm event. For the 500-year event, the Baseline conditions floodplain is reduced from 182 acres to 69 acres in the amended Alternative 1. It should be noted that the amended model increased the floodplain from 61 acres due to the expansion of the basins rather than from out of banks flooding.

TABLE 1: PERFORMANCE METRICS - ALT. 1 VS AMENDED ALT. 1 - NORMAL DEPTH BC

Performance Metric	Study Area	10-year Floodplain			50-year Floodplain			100-year Floodplain			500-year Floodplain		
		Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1
Structures	1591	45	0	0	125	3	7	195	3	3	315	24	25
Flooded Structures (based on FFE)	-	13	0	0	35	0	0	50	0	0	125	8	8
Inundated Roadway (miles)	19.4	0.4	0.1	0.1	1.1	0.2	0.2	1.6	0.2	0.2	3.0	0.4	0.5
Floodplain (acre)	-	49	29	39	96	38	46	122	40	52	182	61	69

TABLE 2: PERFORMANCE METRICS - ALT. 1 VS AMENDED ALT. 1 - STAGE HYDROGRAPH TAILWATER BC

Performance Metric	Study Area	10-year Floodplain			50-year Floodplain			100-year Floodplain			500-year Floodplain		
		Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1	Basel.	Alt. 1	Amd. Alt. 1
Structures	1591	46	1	0	126	4	7	200	18	20	351	104	106
Flooded Structures (based on FFE)	-	13	0	0	35	0	0	51	3	3	131	37	37
Inundated Roadway (miles)	19.4	0.5	0.2	0.2	1.1	0.2	0.3	1.7	0.7	0.8	4.1	2.2	2.2
Floodplain (acre)	-	57	38	46	106	49	62	140	79	86	233	130	142

The new matrix score for Alternative 1 decreases to 2.9 compared with 3.1 previously. With comparable performance metrics, the change is driven by the new probable costs. The amended Alternative 1 remains the highest score among the alternatives within the matrix. While Alternative 5 will also be affected by UPRR ROW requirements, it was not updated for this amendment. Similarly to Alternative 1, the score for an updated Alternative 5 would also be expected to drop compared to the original analysis. Refer to the table below for a comparison between the alternatives and baseline conditions.

TABLE 3: ALTERNATIVES SCORING MATRIX

Alternative	Attributes						Final Scores
	Cost Information		500yr Stage Hydrograph Condition				
	Total Estimated Cost	Cost of ROW Acquisition	Number of Structures in Floodplain Removed	Number of Flooded Structures Removed	Miles of Inundated Roadway Removed	Acres of Inundated Land Removed	
	20%	10%	15%	25%	15%	15%	
Baseline	5.0	5.0	0.0	0.0	0.0	0.0	1.5
Amd. Alternative 1	0.0	2.1	4.1	4.7	3.2	3.0	2.9
Alternative 5	0.3	1.9	2.6	3.6	2.7	2.4	2.3

2.5 Right-of-Way Requirement

Compared with the original layout, the Tidwell Basin will be both thinner (about 200 feet) and longer stretching along Parkhurst Dr roughly 4900 feet. This totals to 25 total acres of UPRR ROW for this basin, up from the previous 16 acres. The Wayside Basin extension requires 6 full parcels of undeveloped commercial land and part of one commercial property which will not affect the current structure. ROW costs increase from \$8.4 million to \$9.3 million from the extension and additional parcels. Refer to Exhibit 11 and ROW costs in the next section.

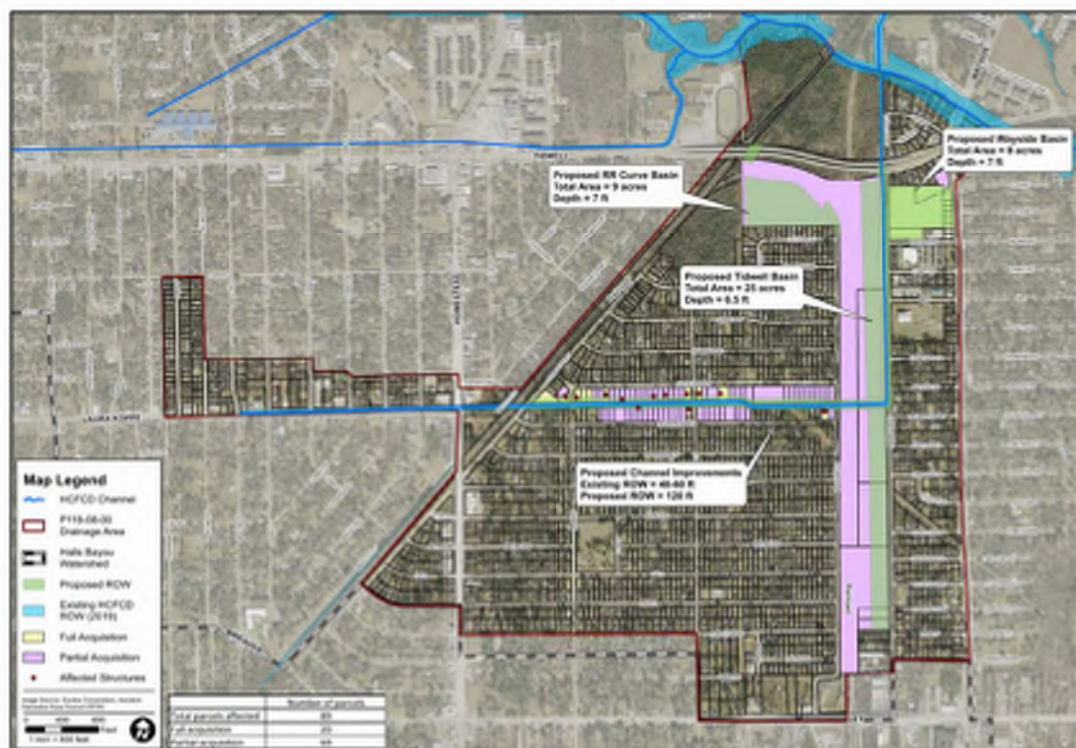


FIGURE 3: PROPOSED ROW - AMENDED ALTERNATIVE 1

2.6 Opinion of Probable Construction Cost

An opinion of probable construction cost for the Revised Recommended Alternative can be found in the table below. Unit costs and methodology followed the same methods as the previous recommended alternative. Final costs were gathered by including the new ROW and changes in improvements described above. The OPCC for the new Recommended Alternative increased from \$22.5 million to \$29 million. The primary changes in probable costs are due to additional excavation and ROW requirements.

TABLE 4: AMENDED OPCC

Item Description	Costs
RR Curve E Basin	\$ 2,372,817.58
Excavation & Off-site Disposal	\$ 1,562,400.00
Features	\$ 211,772.50
ROW Acquisition	\$ 598,645.08
Wayside Basin	\$ 3,217,838.62
Excavation & Off-site Disposal	\$ 1,080,282.00
Features	\$ 332,670.10
ROW Acquisition	\$ 1,804,886.52
Tidwell Basin	\$ 7,386,608.75
Excavation & Off-site Disposal	\$ 5,496,876.00
Features	\$ 239,732.75
ROW Acquisition	\$ 1,650,000.00
Channel Improvements	\$ 9,498,863.32
Excavation & Off-site Disposal	\$ 663,600.00
Features	\$ 980,504.49
ROW Acquisition	\$ 5,229,805.17
Pipeline Relocation	\$ 2,624,953.66
Tidwell Road Drainage Cut	\$ 59,762.50
Excavation & Off-site Disposal	\$ 21,000.00
Features	\$ 22,262.50
ROW Acquisition	\$ 16,500.00
Replacing Curve Area Culvert and Drainage Ditch	\$ 15,007.50
Excavation & Off-site Disposal	\$ 4,200.00
Features	\$ 907.50
ROW Acquisition	\$ 9,900.00
<i>ROW Acquisition:</i>	\$ 9,309,736.78
<i>Pipeline Relocation:</i>	\$ 2,624,953.66
<i>Direct Construction Cost (DCC):</i>	\$ 10,617,000.00
Subtotal:	\$ 22,551,690.43
Planning, Engineering, and Design (15% of DCC):	\$ 1,592,550.00
Mobilization/Demobilization (5% of DCC):	\$ 530,850.00
Construction Management (10% of DCC):	\$ 1,061,700.00
Contingency (30% of DCC):	\$ 3,185,100.00
Total:	\$ 28,930,000.00

3.0 Summary and Conclusions

LAN was tasked with amending the recommended alternative after UPRR requested more space for future track expansion to the east of the existing railroad tracks. Upon review of the new basin width, LAN determined that the existing basin did not meet the needs for additional detention volume and was too narrow to remain an off-line basin, so it was converted to an inline detention basin. As a result, more detention volume was required compared to previously in order to offset the inefficiency from the inline basin. So the Tidwell Basin was extended to the south to Dewitt Rd and the Wayside Basin was extended to the east all the way to Wayside Drive. The resulting amended alternative closely replicates the results of the previous recommended alternative in both downstream peak flows and mitigation performance. No downstream impacts are expected due to the downstream peak flows matching the previous iteration in both timing and magnitude.

While not optimized, the current layout shows that it is possible with the existing vacant properties to meet the detention needs while allowing the required space for UPRR's needs and providing the same level of service as the original Alternative 1. However, the additional detention volume and properties cause the OPCC go up to \$29 million compared to the previous \$22.5 million. The new alternative scoring matrix goes from 2.9 to 3.1 for Alternative 1, which it still outweighs both the baseline and alternative 5. LAN recommends the revised alternative 1 as the recommended alternative going forward into the Preliminary Engineering Report.

List of Exhibits

Exhibit 1 – Amended Alternative 1 Layout

Exhibit 2 – Amended Alternative 1 HEC-RAS Geometry

Exhibit 3 – 10 Year Amended Alternative 1 Performance Metrics (Normal Depth Tailwater)

Exhibit 4 – 50 Year Amended Alternative 1 Performance Metrics (Normal Depth Tailwater)

Exhibit 5 – 100 Year Amended Alternative 1 Performance Metrics (Normal Depth Tailwater)

Exhibit 6 – 500 Year Amended Alternative 1 Performance Metrics (Normal Depth Tailwater)

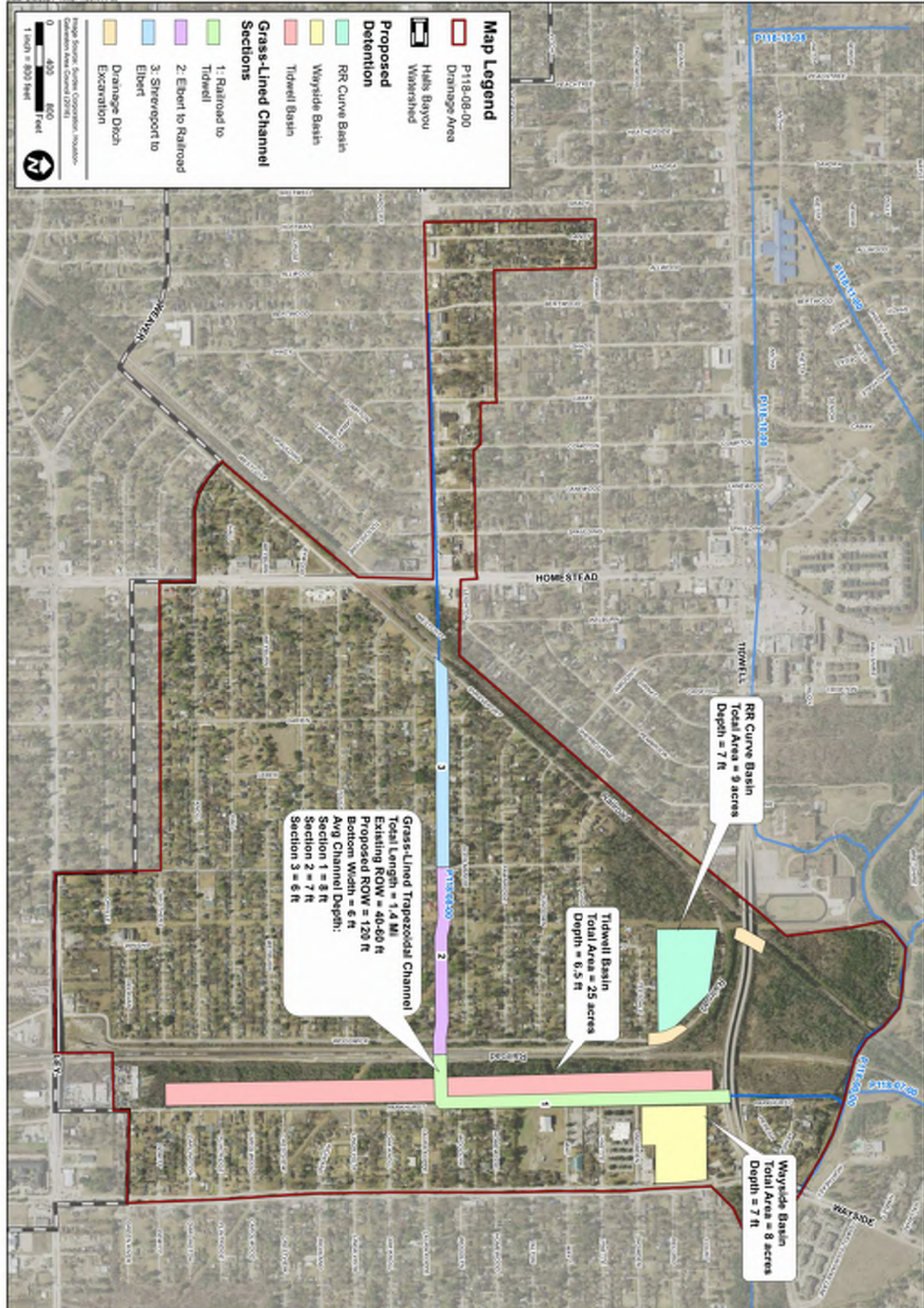
Exhibit 7 – 10 Year Amended Alternative 1 Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 8 – 50 Year Amended Alternative 1 Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 9 – 100 Year Amended Alternative 1 Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 10 – 500 Year Amended Alternative 1 Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 11 – Amended Alternative 1 Proposed ROW



Map Legend

- P118-08-00 Drainage Areas
- Halls Bayou Watershed
- Proposed Detention
- RR Curve Basin
- Wayside Basins
- Tidwell Basins
- Grass-Lined Channel Sections
- 1: Railroad to Tidwell
- 2: Elbert to Railroad
- 3: Stevesport to Elbert
- Drainage Ditch Excavation

Scale: 1 inch = 800 feet

North Arrow

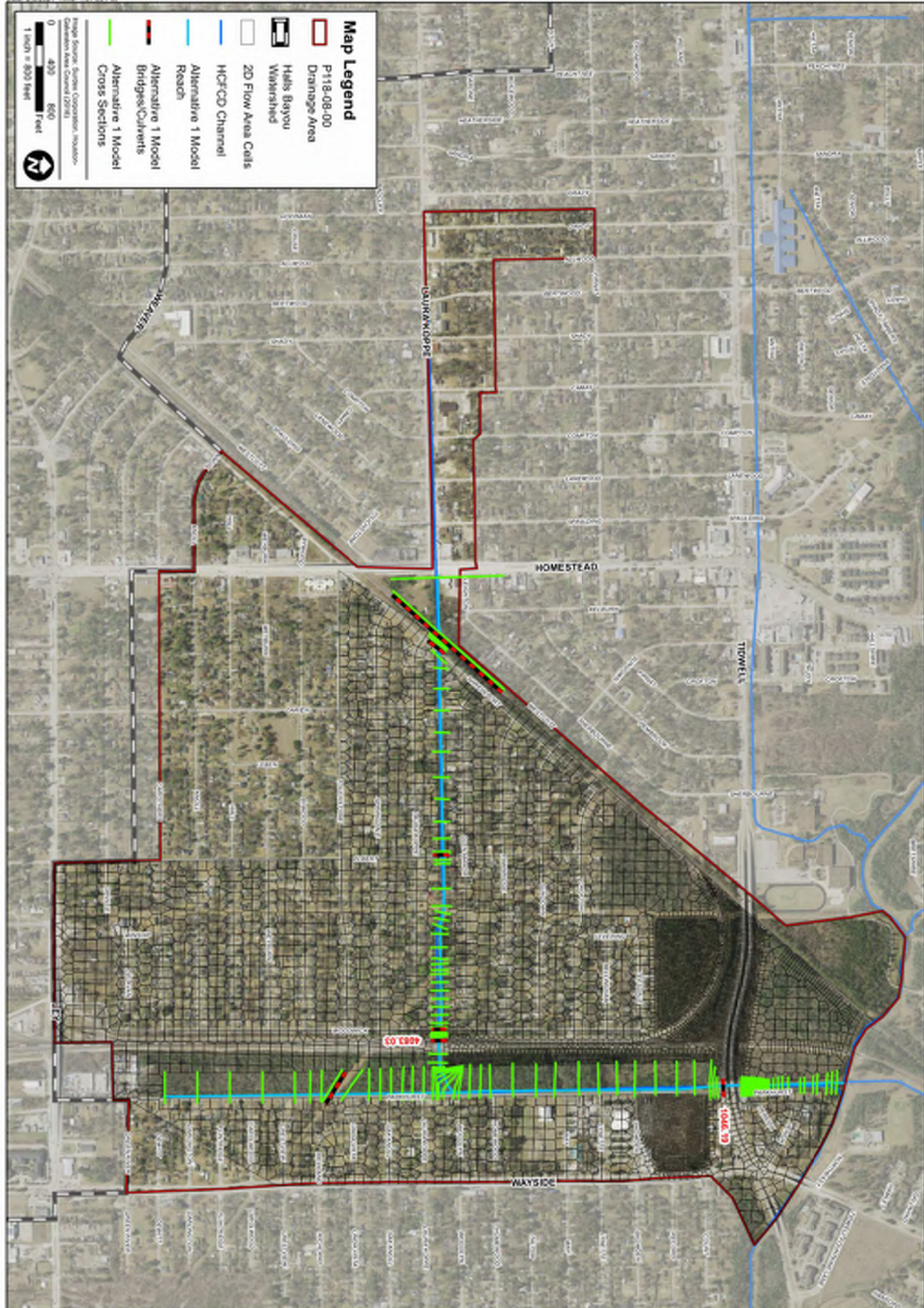
Grass-Lined Trapezoidal Channel
 Total Length = 1.4 MI
 Existing ROW = 40-60 ft
 Proposed ROW = 120 ft
 Bottom Width = 6 ft
 Avg Channel Depth:
 Section 1 = 8 ft
 Section 2 = 7 ft
 Section 3 = 6 ft

RR Curve Basin
 Total Area = 9 acres
 Depth = 7 ft

Tidwell Basin
 Total Area = 25 acres
 Depth = 6.5 ft

Wayside Basin
 Total Area = 8 acres
 Depth = 7 ft

<p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p> <p>9800 Northwest Freeway Houston, Texas 77028</p>	<p>Lockwood, Andrews & Newnam, Inc. A 100% SBA COMPANY</p> <p>2000 Woodloch Blvd. • Houston, TX 77055-5705 281-486-8800 • F 281-486-8800 www.laninc.com • info@laninc.com</p>	PREPARED: CWB	HCFCF HALLS BAYOU WATERSHED P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS PLANNING LEVEL ANALYSIS AMENDED ALTERNATIVE 1 LAYOUT GRASS-LINED CHANNELS WITH DETENTION
		CHECKED: DB	
		APPROVED: DB	
DATE: FEB 2011 SCALE: AS NOTED	EXHIBIT 1		



Map Legend

- ▭ P118-08-00 Drainage Area
- ▭ Halls Bayou Watershed
- ▭ 2D Flow Area Cells
- ▭ HCFCO Channel
- ▭ Alternative 1 Model Reach
- ▭ Alternative 1 Model Bridges/Culverts
- ▭ Alternative 1 Model Cross Sections
- ▭ Map Source: Google Corporation, Imagery: Contributor User, Content: Esri

Scale: 1 inch = 800 feet

HARRIS COUNTY FLOOD CONTROL DISTRICT
 9900 Northwest Freeway
 Houston, Texas 77036

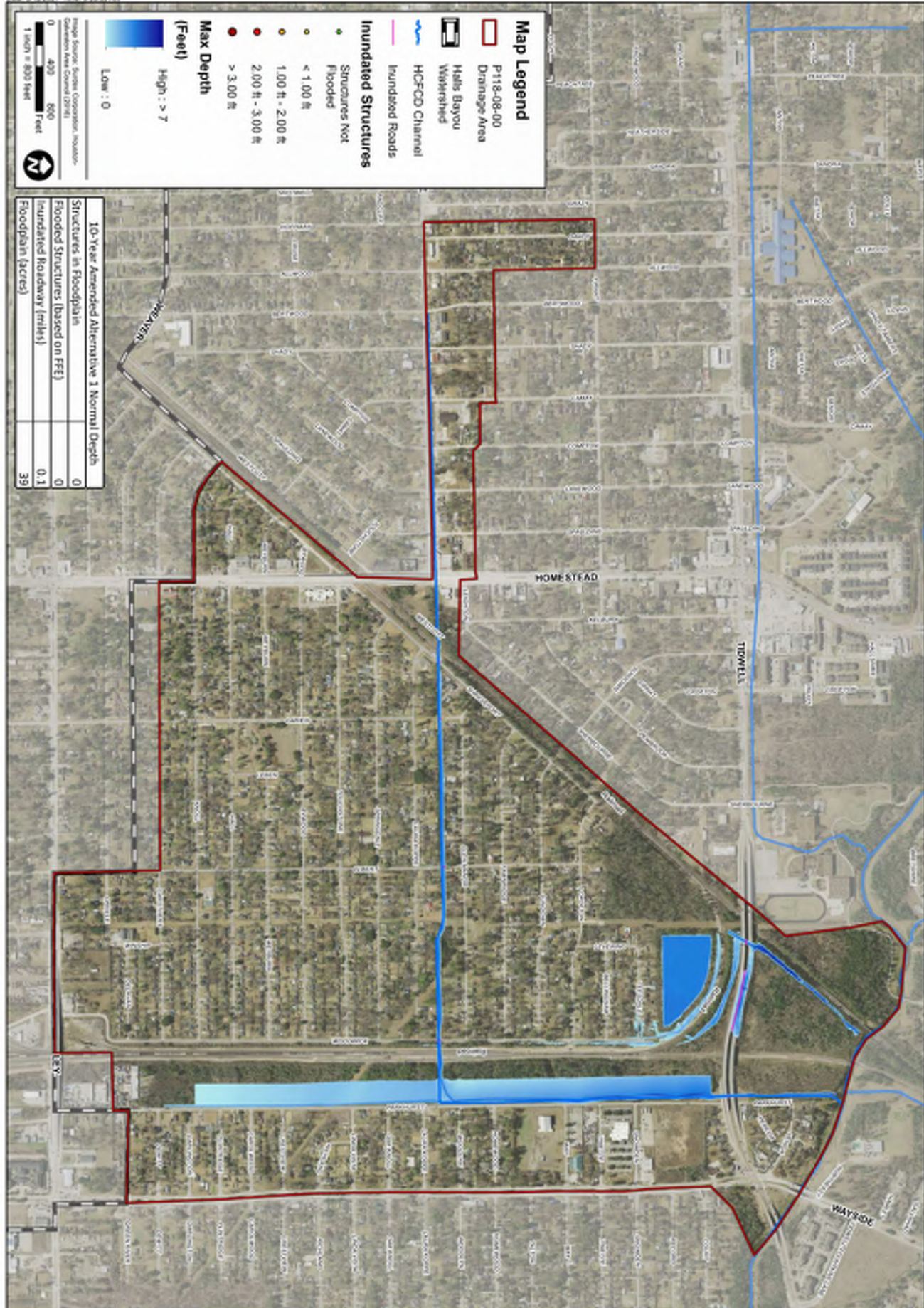
DATE: FEB 2021
 SCALE: AS NOTED

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PREPARED:	CWB
CHECKED:	DB
APPROVED:	DB

HCFCO HALLS BAYOU WATERSHED
 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS

**HEC-RAS GEOMETRY
 AMENDED ALTERNATIVE 1**



Map Legend

- P118-08-00 Drainage Area
- HCFCO Channel
- Halls Bayou Watershed
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

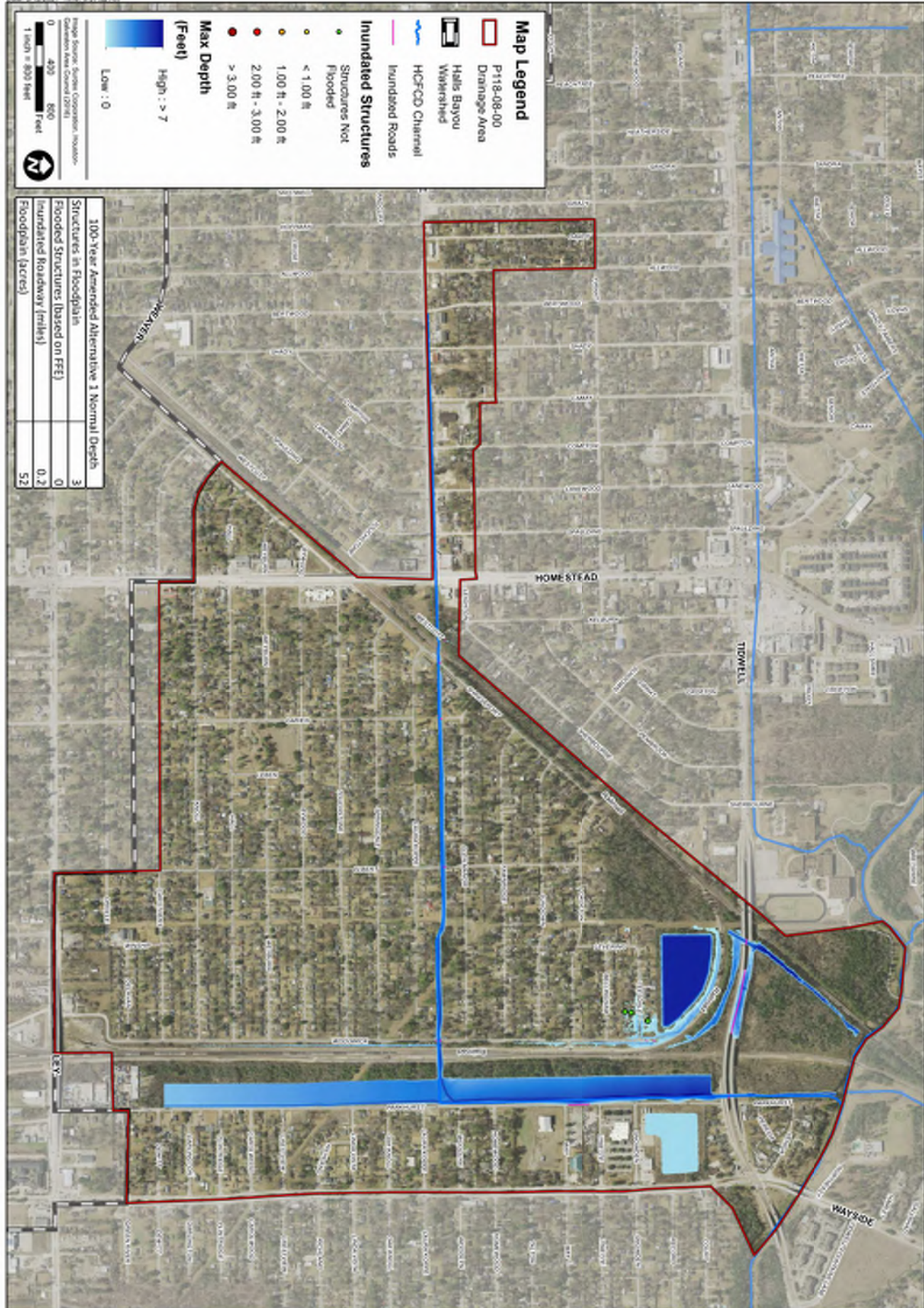
Max Depth (Feet)
 High : > 7
 Low : 0

Scale: 1 inch = 800 feet

10-Year Amended Alternative 1 Normal Depth	
Structures in Floodplain	0
Flooded Structures (based on FFE)	0
Inundated Roadway (miles)	0.1
Floodplain (acres)	39

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LUNN & LUNN COMPANY</p>	PREPARED: CWB
		CHECKED: DB
		APPROVED: DB

**HCFCO HALLS BAYOU WATERSHED
 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 AMENDED ALTERNATIVE 1 PERFORMANCE METRICS
 NORMAL DEPTH DOWNSTREAM BOUNDARY CONDITION
 10-YEAR STORM EVENT**



Map Legend

- P118-08-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

Max Depth (Feet)

High : > 7

Low : 0

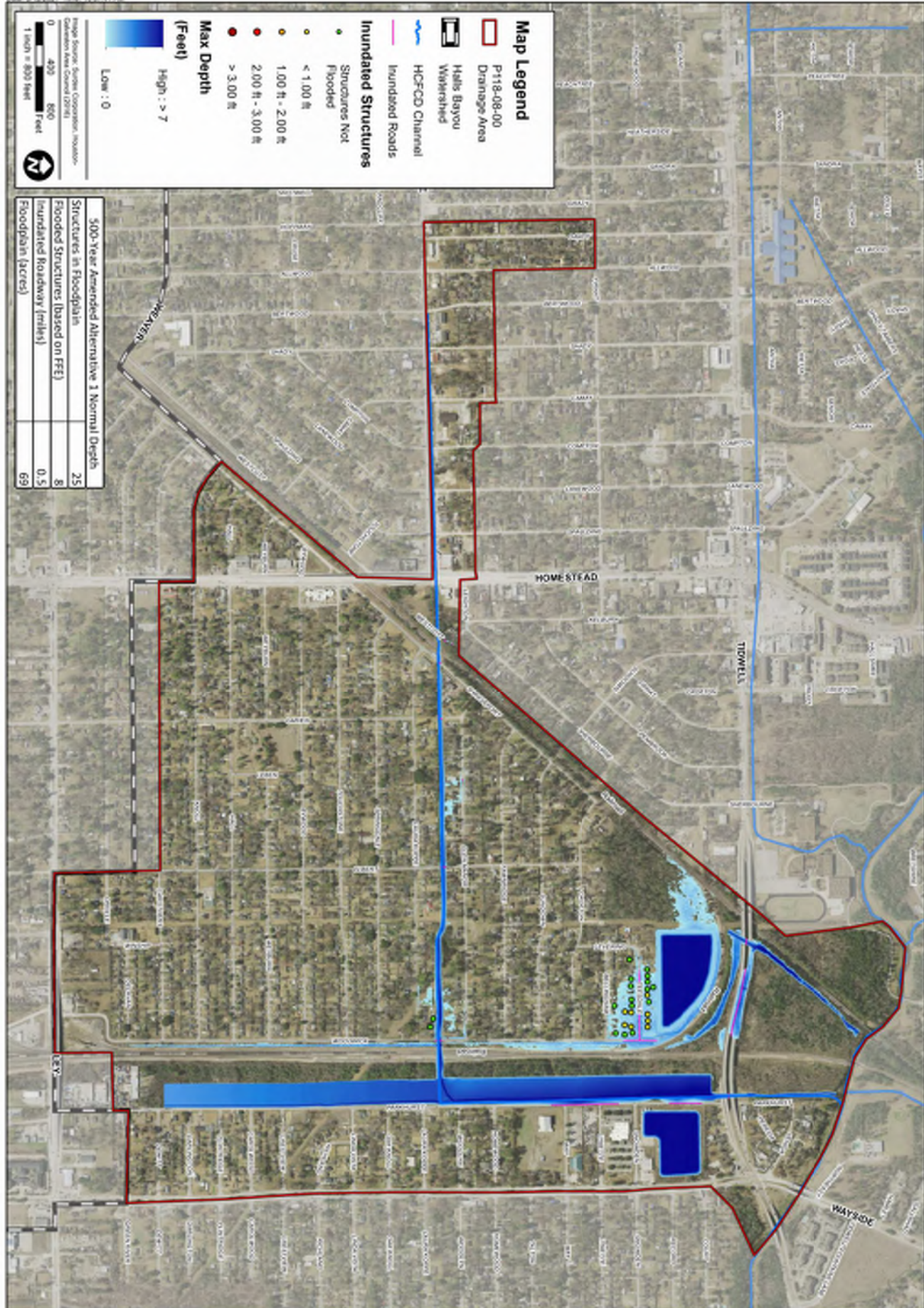
Scale: 1 inch = 800 feet

North Arrow

100-Year Amended Alternative 1 Normal Depth	Structures in Floodplain	Flooded Structures (based on FFE)	Inundated Roadway (miles)	Floodplain (acres)
	3	0	0.2	52

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LUNN & LUNN COMPANY</p>	PREPARED: CWB
		CHECKED: DB
		APPROVED: DB

**HCFCO HALLS BAYOU WATERSHED
 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 AMENDED ALTERNATIVE 1 PERFORMANCE METRICS
 NORMAL DEPTH DOWNSTREAM BOUNDARY CONDITION
 100-YEAR STORM EVENT**



Map Legend

- P118-08-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

Max Depth (Feet)
 High : > 7
 Low : 0

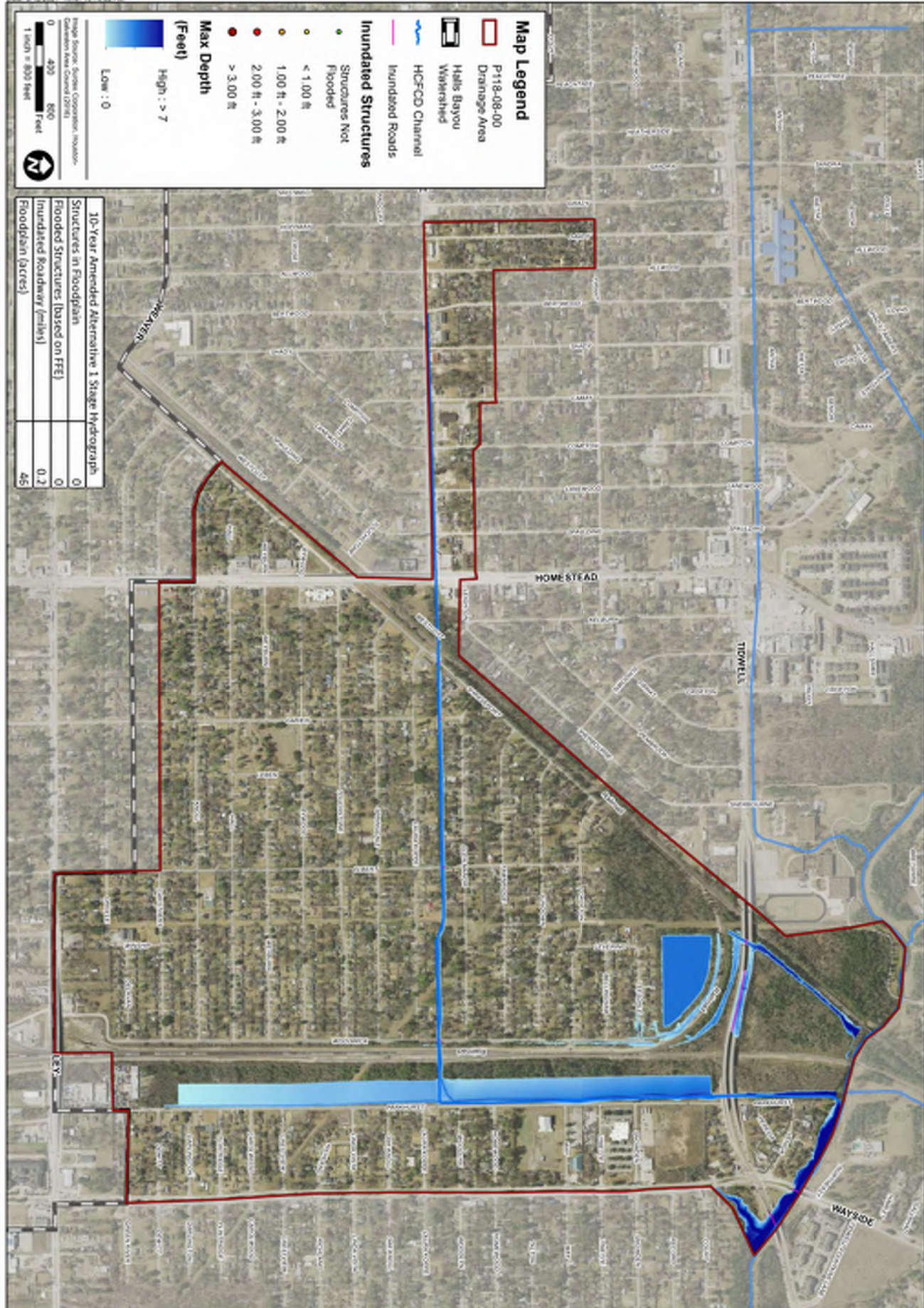
Scale: 1 inch = 800 feet

North Arrow

500-Year Amended Alternative 1 Normal Depth	Structures in Floodplain	Flooded Structures (based on FFE)	Inundated Roadway (miles)	Floodplain (acres)
	25	8	0.5	69

<p>HARRIS COUNTY FLOOD CONTROL DISTRICT 5900 Northwest Freeway Houston, Texas 77056</p>	<p>Lockwood, Andrews & Newman, Inc. A LONN & SONS COMPANY 1992 Parkway Drive Houston, TX 77058-5708 713.866.8800 • F 713.866.8800 www.laninc.com • info@laninc.com</p>	PREPARED: CWB
		CHECKED: DB
		APPROVED: DB

**HCFCO HALLS BAYOU WATERSHED
 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 AMENDED ALTERNATIVE 1 PERFORMANCE METRICS
 NORMAL DEPTH DOWNSTREAM BOUNDARY CONDITION
 500-YEAR STORM EVENT**



Map Legend

- P118-08-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

Max Depth (Feet)

High : > 7

Low : 0

Map Source: Source: Corporation, Inundation: Corporation, Inundation: Corporation, Inundation: Corporation

Scale: 1 inch = 800 feet

10-Year Amended Alternative 1 Stage Hydrograph

Structures in Floodplain	0
Flooded Structures (based on FFE)	0
Inundated Roadway (miles)	0.2
Floodplain (acres)	46

HARRIS COUNTY FLOOD CONTROL DISTRICT

3900 Northwood Parkway
Houston, Texas 77058

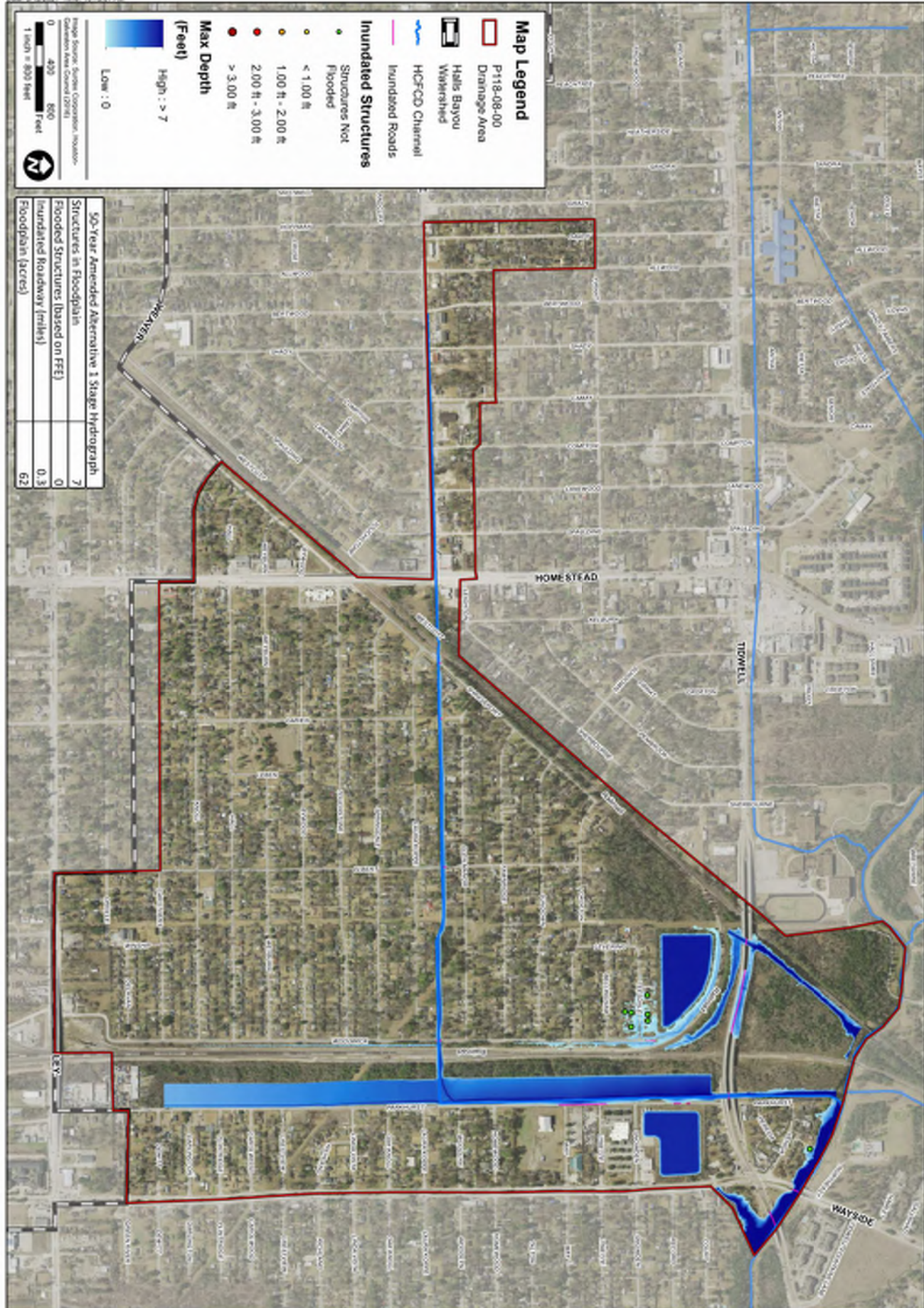
DATE: FEB 2021
SCALE: AS NOTED

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APPROVED:	DB

HCFCD HALLS BAYOU WATERSHED
 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 AMENDED ALTERNATIVE 1 PERFORMANCE METRICS
 STAGE HYDROGRAPH BOUNDARY CONDITION
 10-YEAR STORM EVENT



Map Legend

- P118-08-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

Max Depth (Feet)

High : > 7

Low : 0

Map Source: Source: Corporation, Inundation: Corporation
 Corporation Name: Source: (Data)

0 400 800 Feet
 1 inch = 800 feet

50-Year Amended Alternative 1 Stage Hydrograph	
Structures in Floodplain	7
Flooded Structures (based on FFE)	0
Inundated Roadway (miles)	0.3
Floodplain (acres)	62

HARRIS COUNTY FLOOD CONTROL DISTRICT

5900 Northwest Freeway
 Houston, Texas 77056

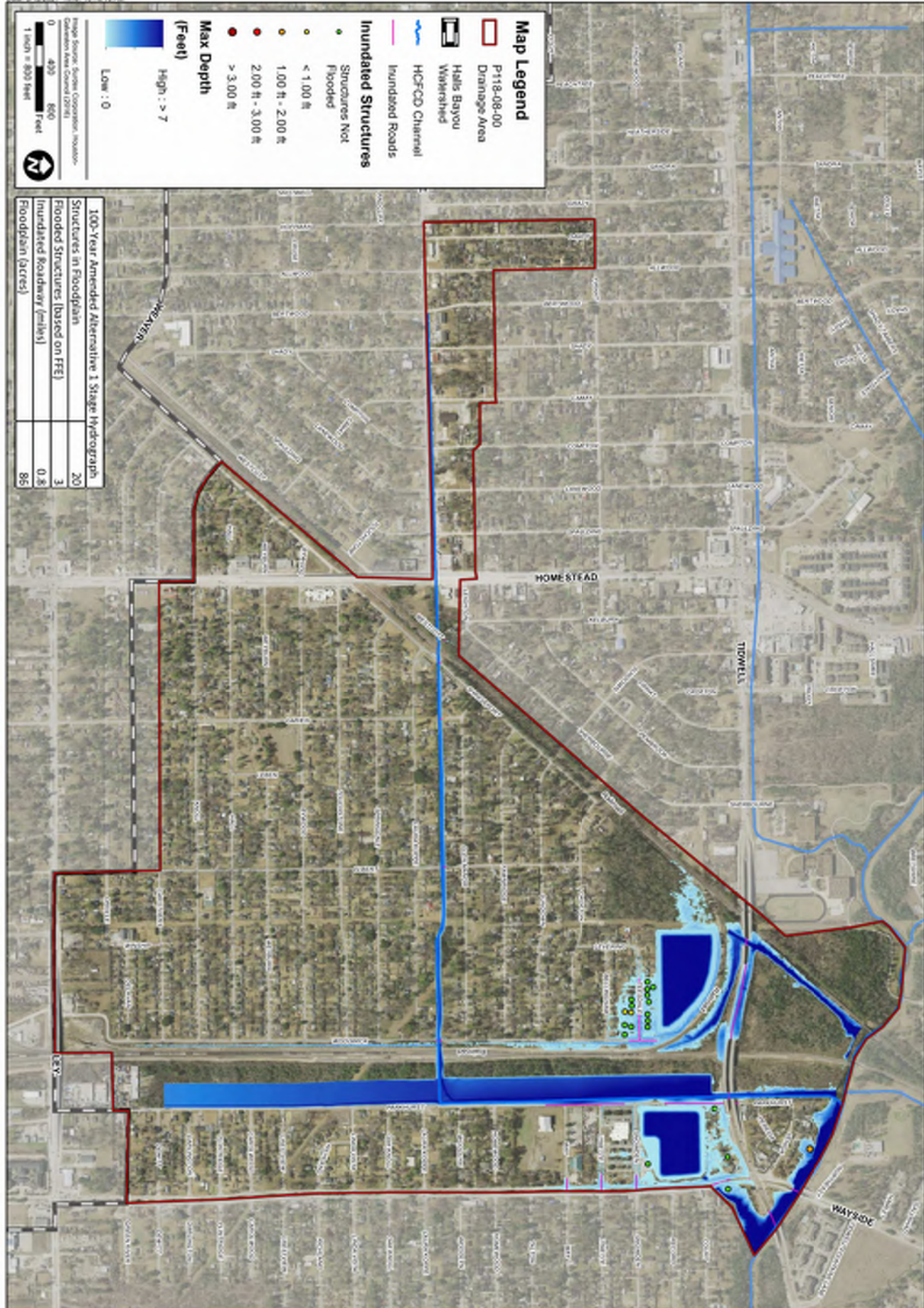
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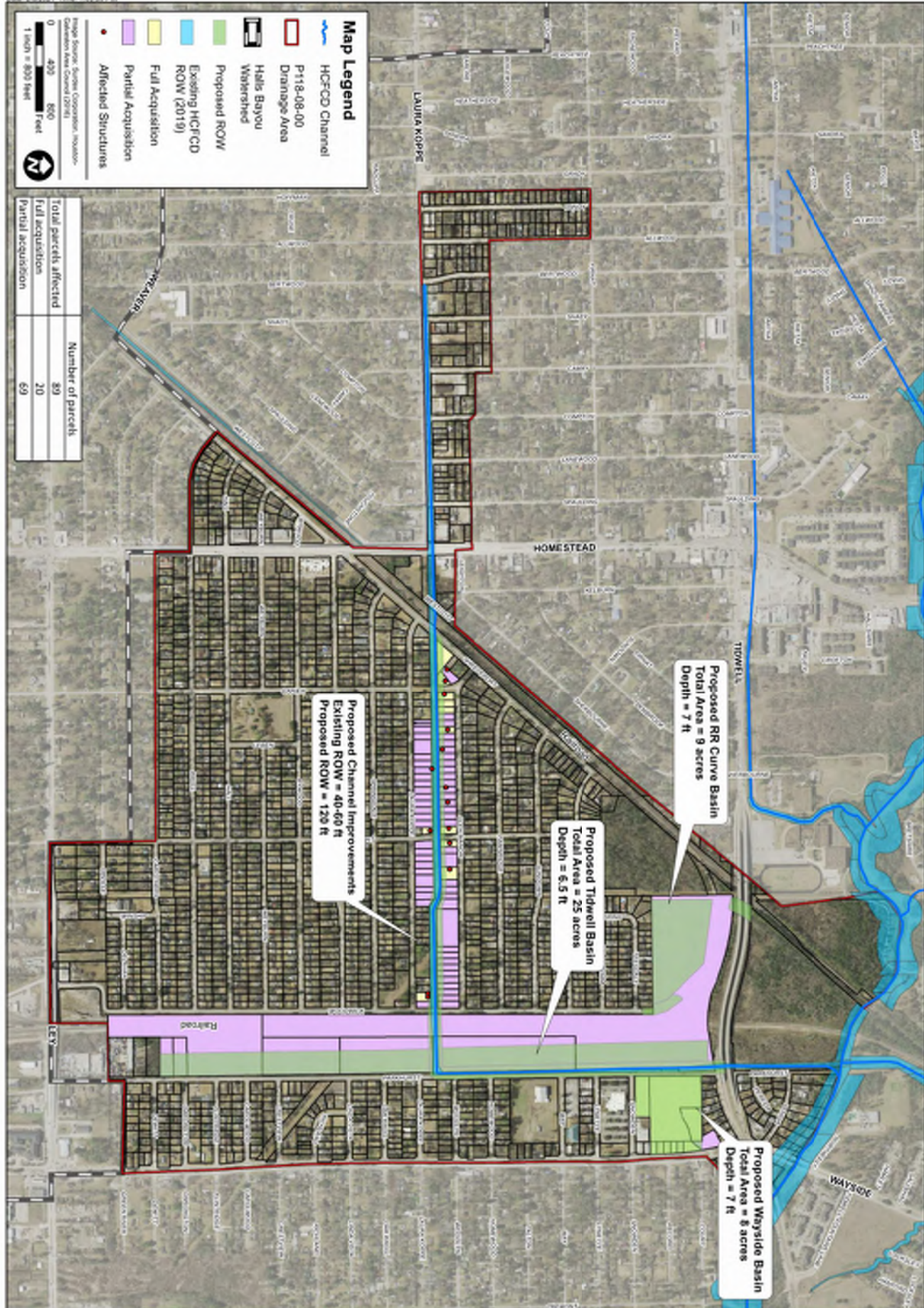
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 P118-08-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 AMENDED ALTERNATIVE 1 PERFORMANCE METRICS
 STAGE HYDROGRAPH BOUNDARY CONDITION
 50-YEAR STORM EVENT





Halls Bayou Tributary Unit No. P118-27-00 Alternatives Analysis Summary Report

Harris County Flood Control District



12/18/2020



Lockwood, Andrews
& Newnam, Inc.
A LEO A DALY COMPANY

TIPE Firm No. 2634

Executive Summary

The Harris County Flood Control District (HCFCD) authorized Lockwood, Andrews & Newnam, Inc. (LAN) in March 2020 to conduct an Alternatives Analysis Study on Tributary P118-27-00 located within the Halls Bayou (HCFCD Unit No. P118-00-00) watershed. The purpose of this study is to analyze and describe the existing flooding conditions within the P118-27-00 catchment area, whereupon targeted flood risk mitigation alternatives are developed based on results. The Recommended Alternative derived from this Alternatives Analysis is intended to be incorporated into a Preliminary Engineering Report (PER), which can efficiently be carried into detailed design.

H&H models were developed for the 10%, 2%, 1%, and 0.2% design storm events (pre-Atlas 14 update) based on HCFCD criteria using the HEC-HMS and HEC-RAS software. Existing and Proposed conditions models include two downstream boundary conditions: Normal Depth and Tailwater. For this P118-27-00 Alternatives Analysis, Normal Depth downstream assumption was used for the formulation process and when developing the proposed conditions. However, the Tailwater condition (Stage Hydrograph) was analyzed to evaluate the impacts from the stage in Halls Bayou.

In total, six (6) improvement features were identified as potential flooding mitigation solutions. They include detention basins and channel improvements. They were selected based on their location at hydraulically influential locations, topographically integrable, and are relatively unobtrusive to residents. Three (3) alternatives were developed from the improvement features which were subsequently modeled and evaluated. The proposed improvements were based on the pre-Atlas 14 500-year storm event, which roughly approximates the updated Atlas 14 100-year storm event.

In coordination with HCFCD, LAN recommends Alternative 2 to carry for advancement to a PER Study. Compared to Alternative 1, Alternative 2 is less expensive (\$15.6 million vs. \$25.4 million), and also requires less ROW acquisition, eliminating the need to acquire the parking lot serving Sunny Flea Market. The costs include construction and acquisition of approximately 16 acres of ROW.

Alternative 1 consists of a concrete-lined trapezoidal channel along P118-27-00 with the Shevchenko and Gulf Bank basins in place to provide storage volume and to mitigate increased peak flows. The channel improvements will occur along 3,050 feet of P118-27-00 from the existing concrete-lined channel segment to the Pin Oak Mobile Home Community, having a bottom width of 6 feet with 2:1 side slopes. Alternative 2 achieves nearly the same benefit as Alternative 1 and does not require the Gulf Bank basin ROW acquisition that is required for Alternative 1, making Alternative 2 less expensive by approximately \$9.8 million while still showing substantial benefit. Alternative 3 was designed to provide a viable alternative that did not have as much ROW acquisition needs of the previous alternatives.

Alternative 3 consists of a grass-lined trapezoidal channel along P118-27-00, with the Karen and Dow basins in place to provide storage volume and to mitigate increased peak flows. Alternative 3 does not provide as much benefit as Alternative 2.

Alternative 2 incorporates two features, (1) concrete-lined channel improvements from the existing concrete-lined channel (River Station 3374) to Pin Oak Mobile Home Community (River Station 310), which is approximately 930 feet north of Gulf Bank Road, and (2) the 85 acre-feet Shevchenko Basin located in the footprint of Pin Oak Mobile Home Community. While the Shevchenko basin requires the acquisition and relocation of approximately 124 mobile homes, the entire community is deep within the effective 100-year floodplain of Halls Bayou, with depths exceeding four feet at multiple locations. Two homes in the Pin Oak Mobile Home Community have documented flooding claims, one being flooded during Hurricane Harvey. The neighboring residences directly west of the mobile home community show significant flooding claims, possibly indicating flooding in the mobile home community that was not

P118-27-00 Alternatives Analysis Summary Report

reported. Channel improvements are trapezoidal and concrete-lined with a 6 feet bottom width and 2:1 side slopes, and are designed to minimize ROW acquisition needs along the length of the channel. Four (4) pipelines were also identified crossing perpendicular to P118-27-00 south of Access Road 2 (running along the southern boundary of the Sunny Flea Market). These pipelines will need to be relocated prior to construction of the recommended alternative's proposed improvements.

Locally, Alternative 2 provides a 100-year (pre-Atlas 14 update) level-of-service (LOS), and reduces the number of structures in the floodplain from 154 to 0 (including structural buyouts), and removes all flooded structures based on finished floor elevation (FFE). Alternative 2 results in no adverse impacts to P118-27-00, Halls Bayou, and the surrounding region, up to and including the 500-year storm event (pre-Atlas 14 update).

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1 Introduction

1.1 Purpose

The efforts described in this report are submitted in fulfillment of the services described in the Scope of Services and Fee Proposal of the Professional Services Agreement between Lockwood, Andrews & Newnam, Inc. (LAN) and HCFCD. The overall purpose of this report is to provide a clear and concise summary of the hydrology and hydraulics (H&H) analysis for P118-27-00 – which will recommend a potential HCFCD construction project to improve drainage conditions along P118-27-00 and to mitigate flood risks in the contributing drainage area.

Refer to **Figure 1-1** for the workflow followed in the Alternatives Analysis Study.

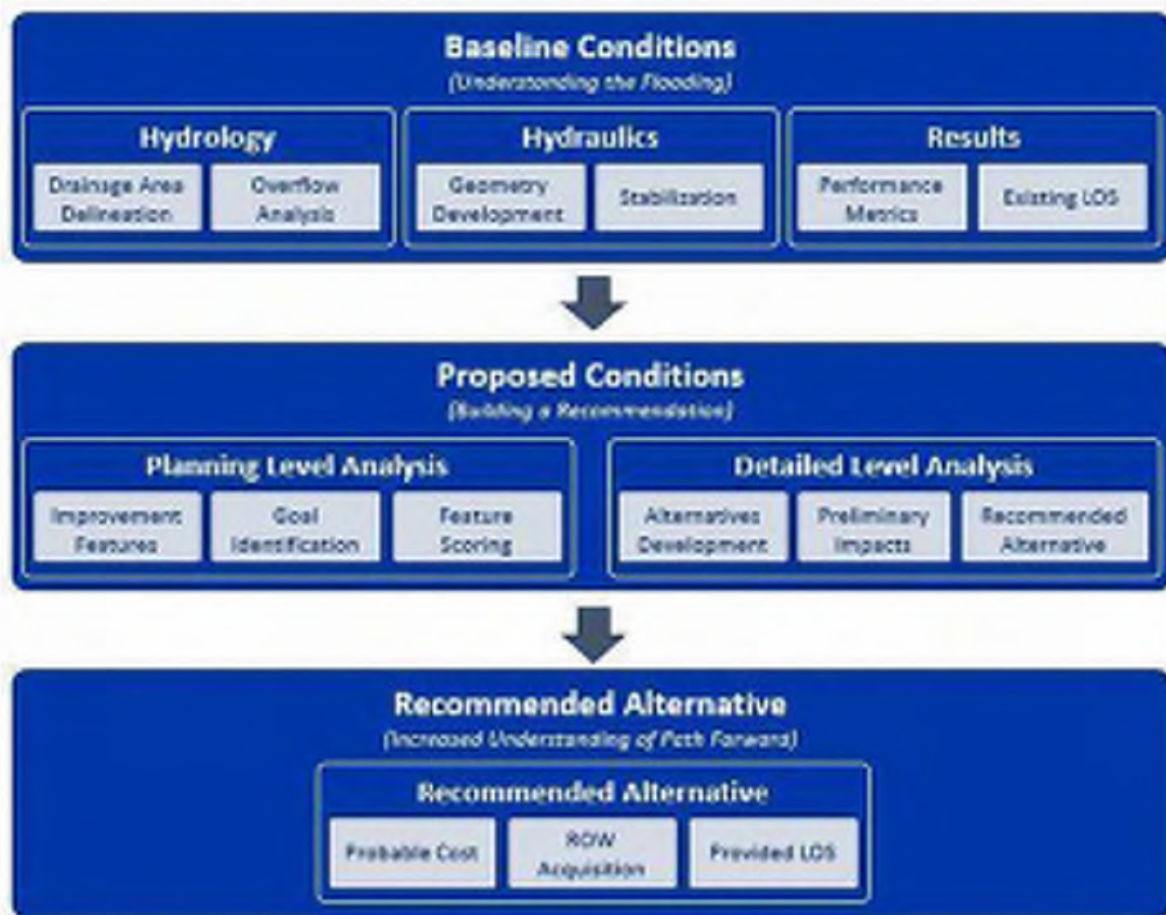


Figure 1-1: Alternatives Analysis Workflow

1.2 Background

Tributary P118-27-00 was identified in the 2018 HCFCD Bond Program for Partnership Projects of Right-of-Way (ROW), design, and construction of channel conveyance improvements. The baseline conditions analysis of the Alternatives Analysis Study is the first step towards identifying what improvements should be made on the tributary.

1.3 Study Area

P118-27-00 is located within the Halls Bayou (HCFCD Unit No. P118-00-00) watershed in the northern portion of Harris County, Texas – refer to [Exhibit 1](#). The project limits encompass the length of the tributary, beginning upstream at East Canino Road and ending at the confluence with Halls Bayou. The study area has a drainage area of approximately 0.85 square miles (546 acres) and consists of approximately 2.33 miles (12,310 feet) of open channel (P118-27-00: 1.19 miles [6,300 feet]; P118-27-01: 1.14 miles [6,010 feet]). The land use consists primarily of high density and residential development.

2 Baseline Conditions Analysis

2.1 Data Collection

H&H models were developed by LAN as part of the HCFCD Halls Bayou Flood Risk Reduction Phasing Study (LAN, September 2018) utilizing Harris County Appraisal District (HCAD) 2004 parcel data, Houston-Galveston Area Council (H-GAC) 2018 aerial imagery, H-GAC 2008 and 2018 Light Detection and Ranging (LiDAR), channel survey data from Baseline Corporation Professional Surveyors, Federal Emergency Management Agency (FEMA) Effective HEC-RAS and HEC-HMS models, and 2018 Structure Inventory Data from HCFCD. The FEMA Flood Insurance Rate Map (FIRM) for this project is shown in [Exhibit 2](#), HCAD parcel data in [Exhibit 3](#), and available HCFCD Right-of-Way (ROW) information in [Exhibit 4](#).

2.1.1 Prior Studies

Prior studies, including relevant H&H models, analyses, and reports were reviewed in order to account for additional hydraulic insights that may serve to benefit the Baseline Conditions modeling efforts.

- FEMA Effective H&H models (FEMA, June 2014). After Tropical Storm Allison in 2001, FEMA and the HCFCD together developed a countywide study, Tropical Storm Allison Recovery Project (TSARP) to assess the flood risks associated with the major flooding sources and that became a Flood Insurance Study (FIS) and Effective Model. As part of the project, FEMA revised the H&H models and remapped the floodplains.
- Halls Bayou flood loss data past storm events (FEMA, HCFCD). Heatmaps based on this data are included in [Appendix B](#). These exhibits depict flood losses from storms Harvey and Imelda, areas of repetitive flood loss, as well as FEMA loss claims in the area. Approximately 298 and 114 flood losses were documented from Harvey and Imelda, respectively, along with 73 repetitive flood losses and 352 FEMA loss claims total. A high concentration of losses were shown south of P118-27-00, as well as multiple instances of repetitive losses in the area.
- Halls Bayou Watershed Flood Risk Reduction Phasing Study (LAN, September 2018). The H&H models from the Phasing Study served as the basis for this Baseline Conditions model development.

2.1.2 Site Conditions / Site Visit

On May 13th, 2020, LAN performed a site visit to photograph and document the drainage area. Major takeaways from the site visit included:

- A 24" outfall pipe going into the upstream end of P118-27-00 at the headwall
- A temporary wood bridge along the pipeline easement upstream of Sunny Flea Market
- The concrete footbridge upstream of Shevchenko Road has been removed by HCFCD
- Culvert blockage by land and dirt build up under Access Road 2 upstream of Sunny Flea Market

Refer to [Figures 2-1](#) through [2-3](#) and [Appendix C](#) for photographic documentation.



Figure 2-1: 24-inch culvert outfalling into the upstream end of P118-27-00



Figure 2-2: Temporary Pipeline Easement Wood Bridge



Figure 2-3: Culvert blockage under Access Road 1 upstream of Sunny Flea Market

Access Road 1 and Access Road 2 culvert geometries were updated in the model based on site visit photos. Shown in [Figure 2-4](#) below is a photo of the Access Road 2 culvert with its updated corresponding model geometry. The culverts have been blocked up to a certain depth due to land and dirt blockage seen during the site visit.

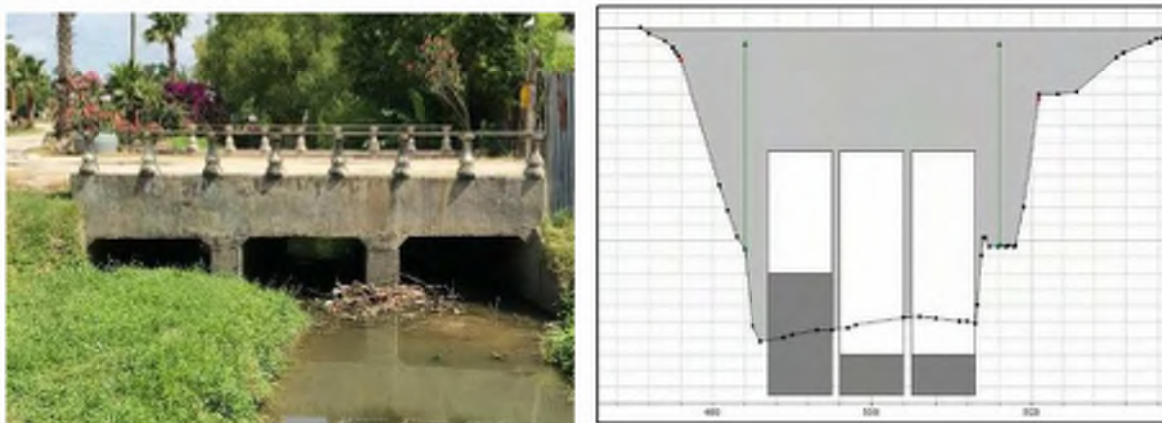


Figure 2-4: Access Road 2 Culvert Blockage

2.1.3 HCFCD Watershed Environmental Baseline (WEB) Program

The HCFCD WEB program was created to document the baseline environmental conditions of Harris County's watersheds. The program has integrated data from multiple sources for planning-level desktop analyses, including potential wetlands, cultural resource sites, threatened and endangered species locations, hazardous and toxic materials sites, pipelines, oil and gas well locations, stream habitat quality assessments, and FEMA floodplains. The WEB desktop analysis for this project is included in [Exhibit 5](#).

In the WEB desktop analysis for P118-27-00, several potential environmental impact sites were noted. There are two identified waste-water treatment facilities (WWTF) located along P118-27-00: Balaban

Apartment WWTF in the north, and Durke Manor WWTF toward the south end on the east bank. Canino Motorworks, located at the upstream end of P118-27-00, is also identified as a potential Priority 3 Hazardous Materials site. These facilities may influence potential ROW acquisition decisions at their locations.

Four (4) pipelines were also identified crossing perpendicular to P118-27-00 south of Access Road 2 (running along the southern boundary of the Sunny Flea Market). Sizes range from 8" to 20" in diameter and are owned by ExxonMobil (3) and Magellan (1). These pipelines are currently located below the existing P118-27-00 channel, though during the May 13th, 2020 site visit it appeared construction was underway throughout the pipeline corridor. These pipelines will need to be relocated prior to construction of the recommended alternative's proposed improvements, with a pipeline relocation cost of \$683,500. The pipeline relocation cost estimate was provided by CobbFendley and can be seen in [Appendix H](#).

In addition to the WEB-DST data, Hollaway Environmental + Communication Services, Inc. was contracted to assist LAN with identifying potential environmental and cultural concerns. Hollaway conducted both a Preliminary Wetland and Threatened and Endangered Species Habitat Assessment, and a Phase I Environmental Site Assessment Report. These can be found in [Appendix I](#) & [Appendix J](#) respectively. There are no environmental concerns within the proposed improvements area for the recommended alternative.

2.2 Hydrology and Hydraulics Analysis

The methodology used to study the P118-27-00 project area involved H&H analysis and modeling in HEC-HMS and HEC-RAS. The hydrologic results presented in this report were completed using HEC-HMS Version 3.4, and the hydraulic results were modeled with HEC-RAS Version 5.0.5 for the P118-27-00 standalone model. The Baseline Conditions model will establish an existing condition for conducting a flood risk assessment within the P118-27-00 watershed.

2.2.1 Hydrology

The meteorological model was developed to include the 10-year, 50-year, 100-year, and 500-year design storm based on Harris County Hydrologic Region 2 (HCFCD, December 2009). These precipitation frequency estimates are associated with TP-40 (U.S. Weather Bureau, 1961) and Hydro-35 (NOAA, 1977) and were effective during the initial scoping of this project.

In September 2018, the National Oceanic and Atmospheric Administration (NOAA) released the "NOAA Atlas 14 Precipitation-Frequency Atlas of the United States, Volume 11 Version 2.0: Texas" (commonly referred to as NOAA Atlas 14). The NOAA Atlas 14 precipitation frequency estimates are planned to supersede previous estimates associated with TP-40 and Hydro-35. The new data is based on records extending through June 2018. In general, the NOAA Atlas 14 data shows increased rainfall values throughout Harris County. Most notably: the 100-year, 24-hour storm event increased from 13.2 inches to 16.9 inches within Halls Bayou.

While this project is based on the older precipitation frequency estimates, the updated NOAA Atlas 14 100-year rainfall depths and resulting water surface elevations (WSELs) can be approximated by the previous effective 500-year storm event included in this study.

2.2.1.1 Drainage Area Delineation

The effective model sub-basin that covers P118-27-00 is named "P118J". The drainage area was further subdivided into four (4) smaller areas, representing flow change locations, which are serving to provide appropriate boundary conditions for the dynamic HEC-RAS model.

P118-27-00 Alternatives Analysis Summary Report

To re-evaluate the delineation of drainage area "P118J" and drainage subdivides, LAN developed a Rain-on-Mesh model in HEC-RAS, where precipitation is applied directly to the surface to determine overland flow paths. This procedure was conducted for the 10-, 50-, 100-, and 500-year storm events. **Figure 2-5** shows the result of a 100-year storm event with HEC-RAS's particle tracking feature to show flow paths and the contributing area draining to the P118-27-00 channel. Flow change locations in the HEC-RAS model were connected to the HEC-HMS's Data Storage System (DSS) output for sub-basin P118J. Multipliers were set based on area-based ratios of subdivided drainage areas (HCFCD, March 2018).

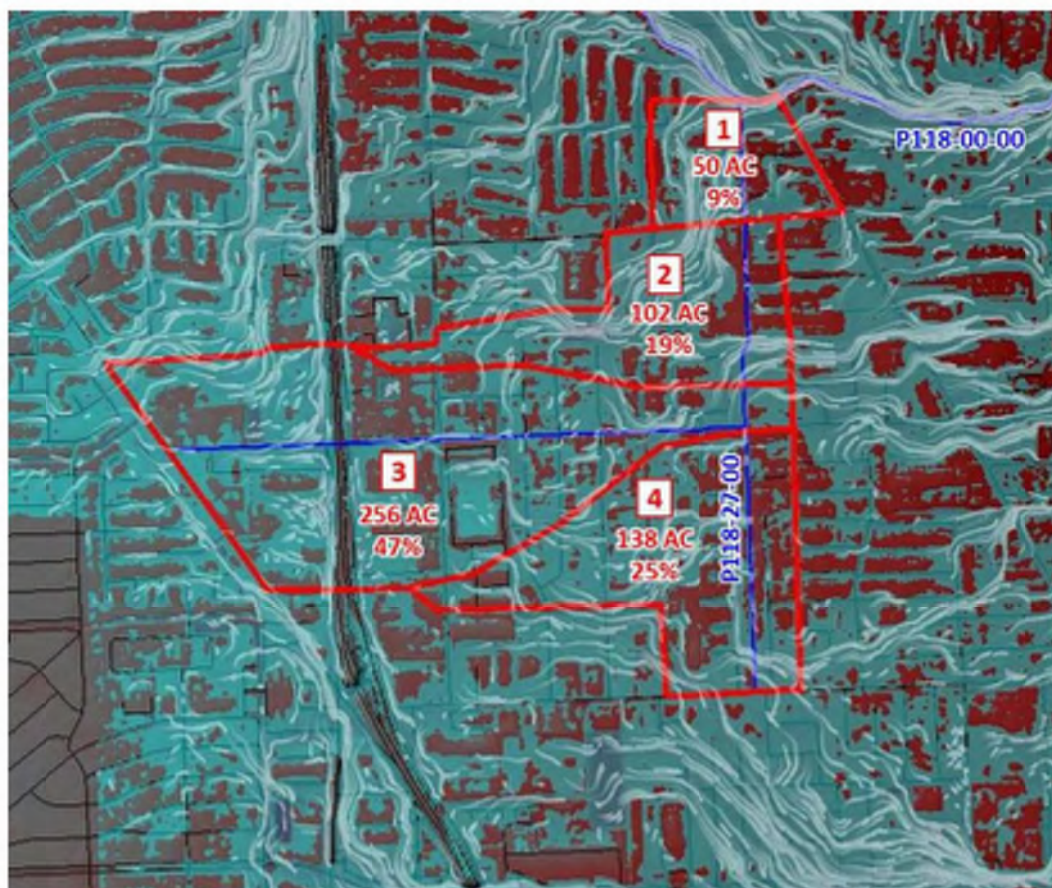


Figure 2-5: P118-27-00 Drainage Area "P118J" with Subdivides – HEC-RAS Rain-on-Mesh Model (100-Year Rainfall Event)

Analysis by LAN indicated that the existing 683-acre (1.07 square miles) drainage area of P118J required boundary adjustments. Consideration was given to the results from the Rain-on-Mesh model, as well as available storm sewer and roadside ditch information. Drainage area boundaries in the north, west and south corners were adjusted based on these factors. In total, approximately 136 acres (0.22 square miles) were removed from the subbasin. P118J now consists of approximately 546 acres. The P118J subbasin subdivides were minorly adjusted based on the removed area. Refer to **Exhibit 6** for the removed areas and **Exhibit 7** for the drainage area delineation subdivides.

2.2.2 Hydrograph Development

The hydrology model utilized to create the Baseline Conditions model came from the "Halls Bayou Watershed Flood Risk Reduction Phasing Study", which was based on the FEMA effective HEC-HMS model and updated to reflect more current conditions. HEC-HMS version 3.4 (USACE 2009) was used

P118-27-00 Alternatives Analysis Summary Report

throughout this analysis and was consistent with the Effective M3 hydrologic model development. Harris County Appraisal District (HCAD) 2004 parcel data, used in the development of the Halls Federal General Revaluation Report (GRR) and Halls Ahead Vision Studies, and 2019 aerial imagery were referenced to verify and update the land use parameters. Percent impervious and Percent Land Urbanization (DLU) were calculated by digitizing the land use categories from HCAD 2004 parcel data and verified based on 2019 aerial imagery. Subbasin area, watershed length and length to centroid were updated to reflect the modified P118J subbasin. Time of Concentration (TC) & Storage Coefficient (R) parameters were developed using the HCFCD hydrologic methodology (HCFCD 2009). Channel slope and overland slope values were updated based on 2008 LIDAR data. Subbasin P118J encompassed the P118-27-00 drainage area and had TC&R values of 1.39 hours and 4.19 hours, respectively.

The Baseline Conditions HEC-HMS model was used to generate hydrographs, which were then ratioed for each subbasin based on their percentage of total contributing drainage area. Refer to **Table 1** and Section 2.2.2.5 for resulting ratio of peak flows and its application in the HEC-RAS Baseline Conditions model.

Table 1: Prorated Flows by Percent Area

Sub-Area	Drainage Area Acres (sq. mi.)	Drainage Area (%)	500-year Peak Flow (cfs)
1	50 (0.08)	9%	91
2	102 (0.16)	19%	192
3	256 (0.40)	47%	474
4	138 (0.22)	25%	252
Total	546 (0.85)	100%	

2.2.3 Hydraulics

The development of the combined 1D/2D Baseline Conditions Model focused on four key hydraulic features: (1) 1D cross-sections, (2) 2D flow areas, (3) lateral structures, and (4) boundary conditions. LAN followed the process described in *Section 3: Development of a Combined 1D/2D Model*, of the "HEC-RAS 2D Modeling User's Manual" (USACE, February 2016) when developing this model.

As a starting point for the Baseline Conditions model, LAN used a fully 1D unsteady standalone model of P118-27-00 that was developed as part of the Halls Bayou Phasing Study. LAN was scoped to convert this model from HEC-RAS Version 5.0.3 to Version 5.0.5, modify the hydraulic 1D model to a combined 1D/2D model, and stabilize the model for the 10-, 50-, 100-, and 500-year return period. In addition, two downstream boundary conditions were analyzed: Scenario #1: Assuming that P118-27-00 is *not* influenced by Halls Bayou at river confluence (Normal Depth assumption), and Scenario #2: Assuming that P118-27-00 is influenced by Halls Bayou (Stage Hydrograph).

2.2.3.1 1D Channel Geometry

In the Halls Bayou Phasing Study, channel cross-sections for the fully 1D unsteady standalone model of P118-27-00 were created based on terrain data from 2008 LiDAR and channel surveys. Several steps were taken to convert that model to a combined 1D/2D model. Ineffective flow areas were added and modified as needed, and blocked obstructions were set in the cross-sections where they overlapped with the 2D area to prevent HEC-RAS from double counting storage in the 1D overbank. Manning's n values were set to 0.040 and 0.013 for grass-lined and concrete-lined portions of the channel, respectively (HCFCD, July 2019). **Figure 2-6** shows an example of the geometry and RAS Mapper view of the 1D cross-sections for the Baseline Conditions Model.

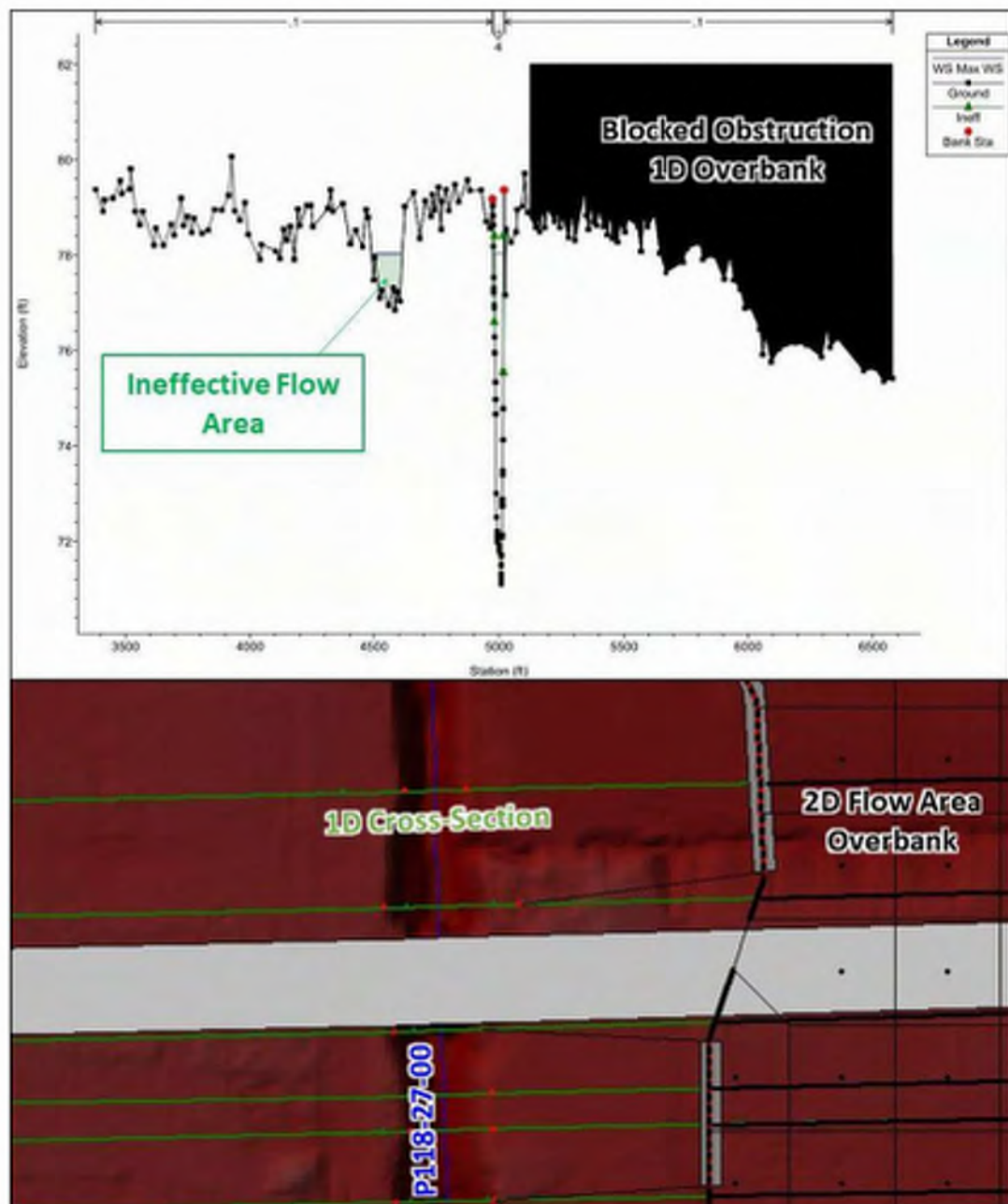


Figure 2-6: HEC-RAS Baseline Conditions Model Geometry – 1D Cross-Sections

2.2.3.2 2D Flow Areas

LAN created one initial 2D flow area located partially within subbasin P118J for the Baseline Conditions model with a 50 square foot cell size – refer to **Figure 2-7**. The 2D flow area extends outside of the P118-27-00 drainage area to capture overflow flowing out of the channel banks and cascading outside of the drainage area. East of P118-27-00, the 2D flow area is bound to the north by West Gulf Bank Road, to the south by East John Alber Road, to the west by P118-27-00, and extends approximately 1,650 feet east of P118-27-00. West of P118-27-00, the 2D flow area is bound to the south by Meadowlink Street, to the east by P118-27-00, and extends approximately 1,950 feet north of Meadowlink Street and approximately 970 feet west of P118-27-00. As per HCFCD's "2D Modeling Guidelines", break lines were created for all major roadways contained within the new 2D mesh boundaries.

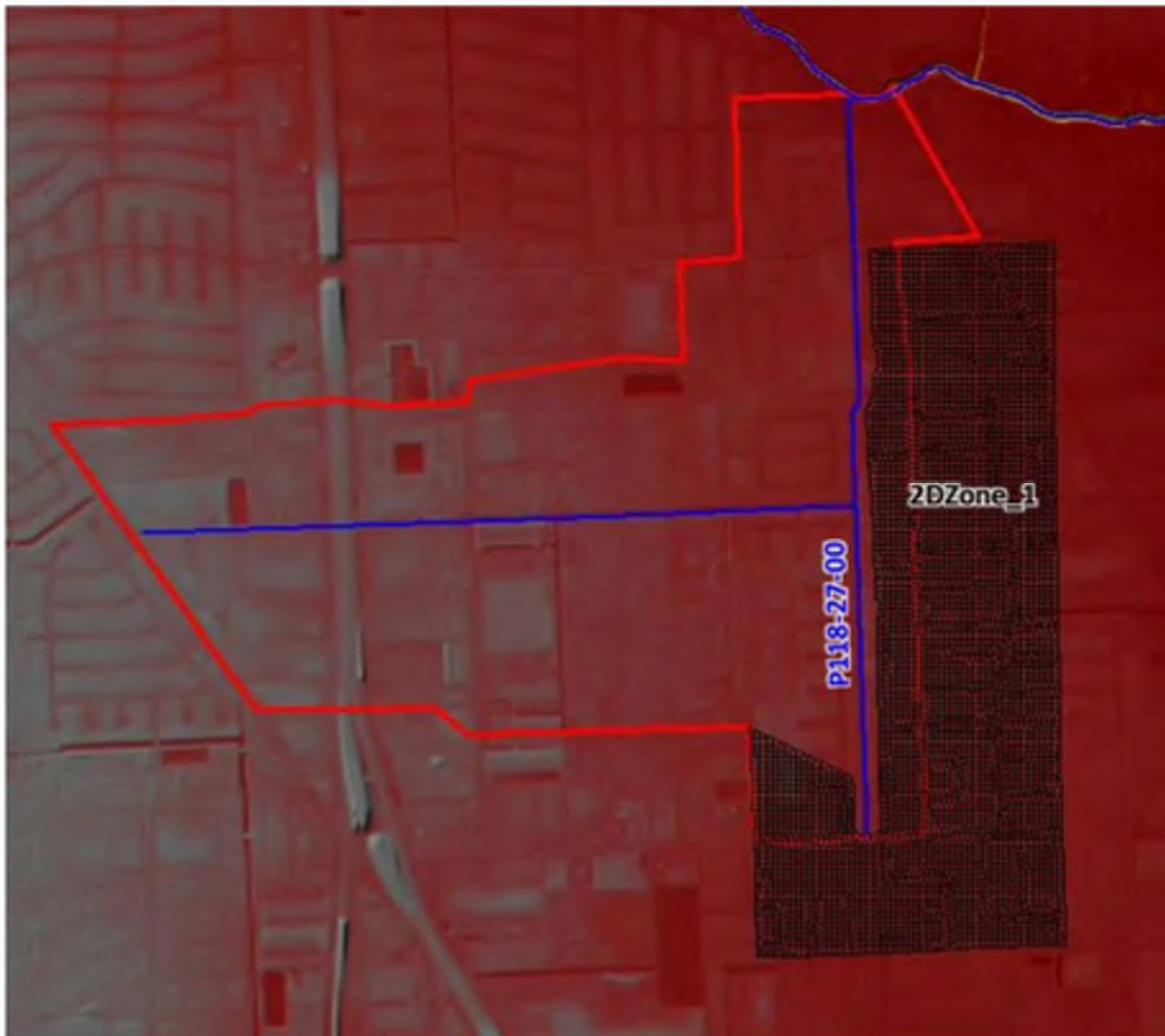


Figure 2-7: 2D Flow Area

2.2.3.3 Lateral Structures – 1D/2D Model Interaction

Lateral structures were set in HEC-RAS to connect the 1D river/reach to the 2D flow area. As the 1D channel fills up and reaches the banks, the lateral structures allow the water to leave the 1D channel and enter the 2D overbanks. LAN placed lateral structures on left and right banks between inline structures along the entire length of the tributaries. For the weir coefficients of the lateral structures and 2D connectors, Table 3-1 of the HEC-RAS 2D Manual recommended 0.2 to 0.5 for flow escaping the main river (USACE, February 2016). Refer to [Figure 2-8](#) and [Exhibit 8](#) for the final Baseline Conditions combined 1D/2D HEC-RAS geometry.

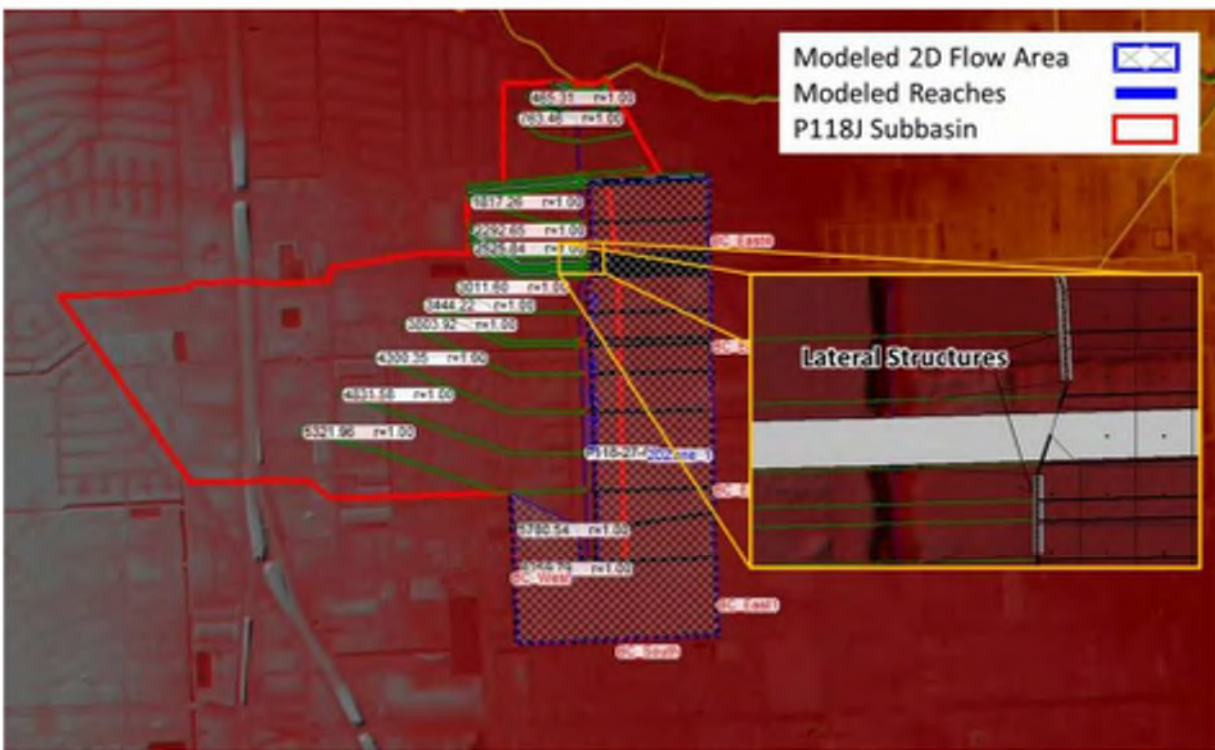


Figure 2-8: HEC-RAS Baseline Conditions Model Geometry – Lateral Structures

2.2.3.4 Tailwater Conditions

Two tailwater boundary conditions scenarios were modeled: (1) assuming the WSEL of P118-27-00 is not influenced by tailwater conditions of Halls Bayou (Normal Depth assumption), and (2) assuming the WSEL of P118-27-00 is influenced by tailwater conditions of Halls Bayou using stage hydrographs computed from Halls Bayou Phasing Study at the P118-27-00 outfall.

For Scenario #1, LAN applied a normal depth channel slope representative of the average slope along P118-27-00. The normal depth scenario essentially assumes that Halls Bayou does not have backwater flowing into P118-27-00, allowing P118-27-00 to gravity drain freely. Because Halls Bayou tributaries are highly influenced by tailwater conditions in the Halls Bayou mainstem, Scenario #2 uses a stage hydrograph boundary condition pulled from the cross-section just upstream of the confluence with P118-27-00 in the Halls Phasing Study Baseline Conditions model. **Figure 2-9** shows the significant influence Halls Bayou has on P118-27-00, with a maximum increase in WSEL of nearly 12 feet at the downstream end for a 500-year storm event. Scenario #2 is included to demonstrate the significant influence of Halls Bayou on the tributary. Proposed improvements will be based on Scenario #1, ensuring that P118-27-00 can convey flow efficiently during local storm events without the influence of Halls Bayou tailwater.

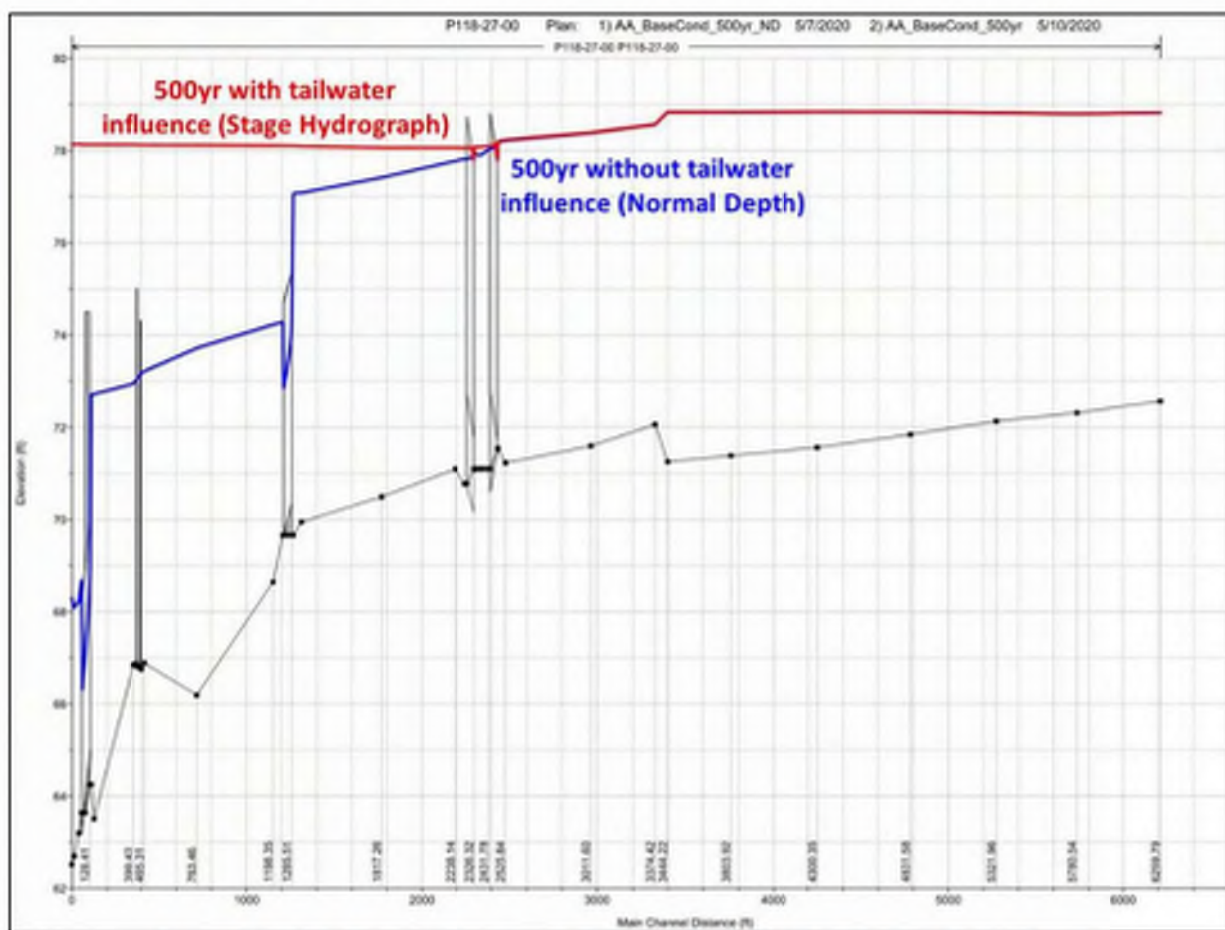


Figure 2-9: Halls Bayou Influence on WSEL of P118-27-00 – 500-Year Storm Event

P118-27-00 Alternatives Analysis Summary Report

2.2.3.5 Inflow Boundary Conditions

Inflow hydrographs are applied via boundary conditions using DSS connections to the Baseline Conditions HEC-HMS model. **Table 2** provides a summary of the HEC-RAS inflow connections. Note: a baseflow of 5 cfs was added at river station (RS) 6259.79 to keep the cross-section from going dry for model stability.

Table 2: Baseline Conditions HEC-RAS Unsteady Flow Connections

#	Reach	River Station	HEC-RAS Boundary Condition	HEC-HMS Subbasin	Multiplier	500-year Peak Flow (cfs)
1	P118-27-00	6259.79	Flow Hydrograph	P118J	-	5
2	P118-27-00	5780.54	Uniform Lateral Inflow	P118J	0.25 (25%)	252
3	P118-27-00	3444.22	Lateral Inflow Hydrograph	P118J	0.47 (47%)	474
4	P118-27-00	3011.60	Uniform Lateral Inflow	P118J	0.19 (19%)	192
5	P118-27-00	1255.05	Uniform Lateral Inflow	P118J	0.09 (9%)	91
6	P118-27-00	47.31	Normal Depth	P118J	-	-

2.2.3.6 Model Stabilization

In general, there were few model stabilization challenges with the P118-27-00 hydraulic model. Some basic modeling techniques were performed to help stability, including adding a baseflow at the initial start of the model, updating HTab parameters, and maintaining adequate cross-section spacing.

2.2.4 2018 LiDAR Update and Re-Evaluation

In February 2018, H-GAC released approximately 10,000 square miles of new, high-resolution LiDAR data of Harris County and the surrounding coastal area. This data is used to support floodplain management and planning, emergency management operations, water quality modeling, and stream restoration. The 2018 LiDAR uses a 1.0-meter cell size and provides more accurate results than the 2008 LiDAR, which uses a 1.5-meter cell size (**Figure 2-10**). The 2018 LiDAR also shows land improvements constructed over the past ten years.

To compare the effects of using the new data, the raster calculator tool in GIS was used to calculate the elevation differences in the P118-27-00 project area. Elevation differences between the two datasets were found to be ranging from approximately 1-3 feet along the channel banks for the entire length of P118-27-00. After further evaluation, LAN concluded that there is a shift between the two LiDAR datasets. On the east side of P118-27-00 the 2018 LiDAR elevations are greater than that of the 2008 LiDAR, and on the west side of P118-27-00 the 2018 LiDAR elevations are less than that of the 2008 LiDAR by the same difference. The overall standard deviation between the two datasets falls within the margin of error. Areas along the channel banks outside of the margin of error fall within a standard deviation of 4-6 inches; this is due to the shift in the dataset. There are no significant differences between the two LiDAR datasets within the P118-27-00 project area.

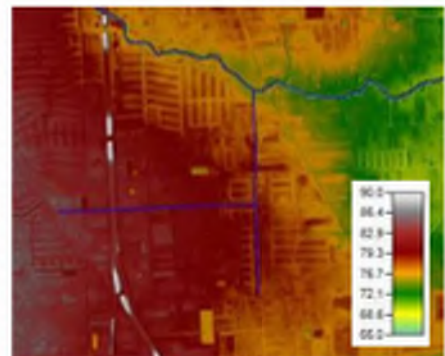
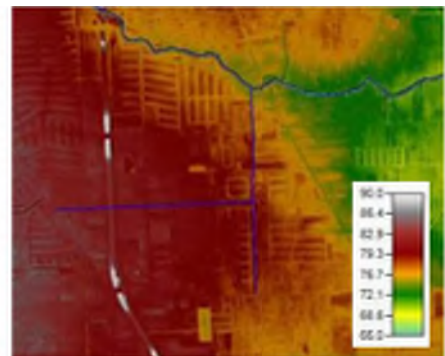


Figure 2-10: 2008 (Top) and 2018 (Bottom) LiDAR of the P118-27-00 Project Area

While it is recommended that future projects use the 2018 LiDAR to incorporate terrain changes and increased accuracy, the 2008 LiDAR is sufficient for current hydrologic and hydraulic studies.

2.3 Baseline Conditions Results

The Baseline Conditions model demonstrated widespread ponding across the catchment. Maximum ponding extents and depths along with performance metrics for all four storm events can be seen in [Exhibits 9](#) through [16](#) for the normal depth and stage hydrograph condition. Water surface profiles for all four storm events can be seen in [Appendix A](#).

2.3.1 Overflow Analysis

In larger storm events, a significant amount of stormwater from P118-27-00 overflows eastward out of the channel, ultimately sheet-flowing into P118-23-00. Stormwater also overflows to the south at the upstream end of P118-27-00 into several neighborhoods including Bellmar Estates, Durkee Manor, and Assumption Heights. [Exhibits 9](#) through [16](#) show the locations and magnitude of these overflow locations. Based on the hydraulic analysis, the undersized channel and culverts near Gulf Bank Road play a significant role in restricting the conveyance of stormwater toward Halls Bayou, resulting in these overflows. This effect can be seen in the hydraulic profiles in [Appendix A](#), where high headlosses are observed around the Gulf Bank Road crossing. From this profile it should also be noted that the concrete-lined channel in the upstream reach of P118-27-00 results in a relatively flat WSE. This suggests that further improvements to this section of channel would not significantly reduce WSEs in the upstream reaches, until the constriction near Gulf Bank Road is first addressed.

2.3.2 Performance Metrics

The HEC-RAS results were used to generate a set of performance metrics to measure proposed improvement alternatives. Metrics include acreage of floodplain, miles of inundated roadway, number of structures in the floodplain, and number of flooded structures based on finished floor elevation (FFE). To determine the structure counts in the floodplain, maximum floodplain extents were exported from HEC-RAS for all four design storms (10-, 50-, 100-, and 500-year) for the Normal Depth downstream boundary conditions (without tailwater influence from Halls Bayou) to GIS and intersected with the 2018 HCFCD structural inventory (SI) data. The SI is a point dataset of building centroids with FFE's populated from either survey or an assumed adjustment based on LiDAR. There are still data points with no assigned FFE data, and in these cases, the associated 2008 LiDAR elevation fields were used and adjusted by adding 0.5 feet to approximate FFE values for use in developing the performance metrics.

Flooded structure counts and the degree of inundation were generated by exporting WSEL raster of the maximum ponding from HEC-RAS and extracting raster values to the SI points. A structure with a model WSEL value higher than its FFE was considered flooded. Miles of roadway measures the length of roadway resulting from an intersection of the maximum inundation boundary with the HGAC StarMaps roadway centerline shapefile. Refer to [Table 3](#) for a summary of the Baseline Conditions performance metrics for the 10-, 50-, 100-, and 500-year storm events.

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Table 3: Baseline Conditions Performance Metrics – Normal Depth Boundary Condition

Metric	10-year Floodplain	50-year Floodplain	100-year Floodplain	500-year Floodplain
Structures in Floodplain	4	84	154	303
Flooded Structures (based on FFE)	0	10	15	53
Miles of Inundated Road	1.5	3.2	3.7	4.7
Acres of Inundated Land (Floodplain)	33	88	114	168

All performance metrics were calculated within the boundaries of the subbasin P118J and the 2D flow area extending outside the drainage boundary. The 2D flow area was included in the performance metrics calculations due to significant overflows cascading eastward from P118-27-00 primarily into Bellmar Estates and Assumption Heights neighborhoods and south of East Canino Road. Although the flooding outside of the P118J drainage boundary does not account for rainfall, it shows the considerable amount of overflow coming out of P118-27-00. The analysis of the 500-year Floodplain shows that 95% of flooded structures experience flooding at inundation depths between 0.0 – 0.5 feet.

2.3.3 Existing Level-of-Service

Existing Level-of-Service (LOS) was evaluated by comparing Service Elevations (minimum elevation of the right and left channel overbank; ROB and LOB, respectively) for each cross-section with modeled WSEL for a 10-, 50-, 100-, and 500-year return period. **Figure 2-11** and **Exhibit 17** demonstrate existing LOS for the Normal Depth boundary condition. Approximately 0.94 miles (79%) of P118-27-00 has a LOS of less than 10 years. A 50-Year LOS is provided by P118-27-00 at the downstream end for approximately 0.25 miles (21%) of the tributary.



Figure 2-11: P118-27-00 Existing LOS (without Halls Bayou Influence)

The culverts at the Gulf Bank Road crossing contribute to P118-27-00's poor LOS. In the 10-year storm event, there is nearly three feet of headloss at these culverts, indicating they are undersized. This results in high WSELs, particularly upstream of Gulf Bank Road, forcing water out of banks further upstream in the channel. Water surface profiles for all four storm events can be seen in [Appendix A](#). A summary of Baseline Conditions WSELs at roadway crossings along P118-27-00 is shown in [Table 4](#).

Table 4: Baseline Conditions WSELs at Roadway Crossings

Road	Type	High Chord (ft)	Low Chord (ft)	WSEL (ft)			
				10-yr	50-yr	100-yr	500-yr
Access Road 2	3-8'x6' RCB	79.2	N/A	77.37	77.89	78.03	78.33
Access Road 1	3-8'x6' RCB	79.2	N/A	77.15	77.56	77.67	77.88
W. Gulf Bank Road	2-60" RCP	77.9	N/A	76.16	76.67	76.79	77.02
N/A	Bridge	74.9	73.9	72.22	72.89	73.15	73.78
N/A	Bridge	76.6	75.0	72.13	72.82	73.08	73.72
Shevchenko	2-60" RCP	74.5	N/A	71.69	72.50	72.80	73.52

3 Proposed Conditions Analysis

All alternatives considered in this Alternatives Analysis Summary Report evaluated flood damage reduction potential under existing (Baseline) hydrologic conditions. Other planned infrastructure projects that may affect the P118-27-00 service area and total flows are not considered as part of this analysis unless explicitly stated. All alternatives include planned improvements to the Gulf Bank Road crossing which are currently under design by Harris County. The Baseline Conditions HEC-RAS model was used as a starting point for developing the various Proposed Conditions models.

3.1 Alternatives Development

LAN started by identifying potential improvement features and estimated their effectiveness in the planning level analysis. After the planning level analysis was completed, LAN combined various features to form alternatives in the detailed alternatives analysis as described in Section 3.3.

3.2 Planning Level Drainage Improvement Features

LAN identified six drainage improvement features along P118-27-00 (see **Figure 3-1**). They include two channel improvement features (1, 2) and four detention basins (3-6). Once identified, features are to be combined to make up different parts of each alternative. The location and size of the drainage improvements were based on (1) most hydraulically influential locations, (2) topography of the watershed, (3) best availability of ROW, and (4) least infrastructural and environmental intervention.

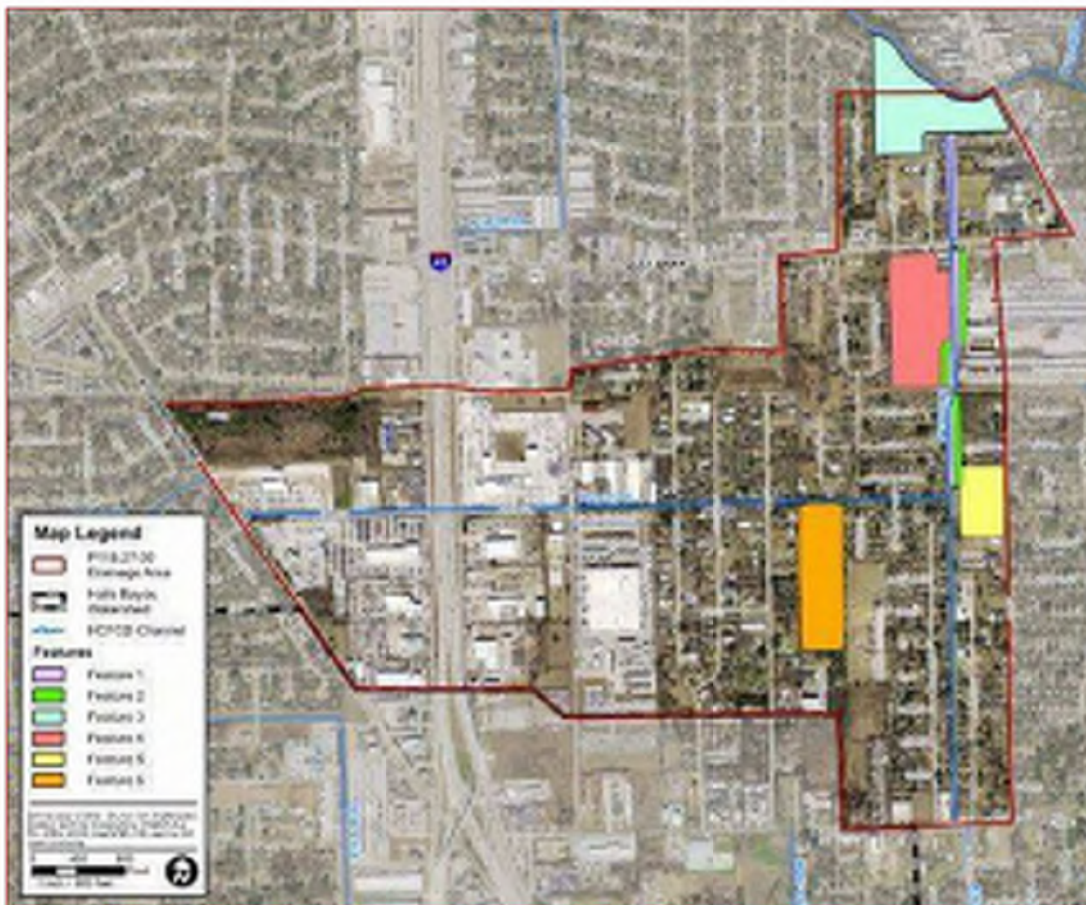


Figure 3-1: Combined Features Map

3.2.1 Feature 1 – Concrete-lined Channel Improvements

Feature 1 improvements will be implemented from the existing concrete-lined channel segment to Pin Oak Mobile Home Community (see **Figure 3-2**). It attempts to maximize the capacity of the P118-27-00 channel while minimizing the additional ROW required. The proposed channel improvement will be a concrete trapezoidal design with a bottom width of 6 feet and 2:1 side slopes. The channel slope is approximately 0.22%. Culverts and boxes were adjusted as necessary per alternative.



Figure 3-2: Feature 1 – Concrete-lined Channel Improvements

3.2.2 Feature 2 – Grass-lined Channel Improvements

Feature 2 improvements will be implemented from the existing concrete-lined channel segment to Gulf Bank Road. (see [Figure 3-3](#)). It attempts to maximize the capacity of the P118-27-00 channel with a grass-lined engineered channel design. The proposed channel improvement has a bottom width of 6 feet and 4:1 side slopes. The channel slope is approximately 0.07%. Culverts and boxes were adjusted as necessary per alternative.

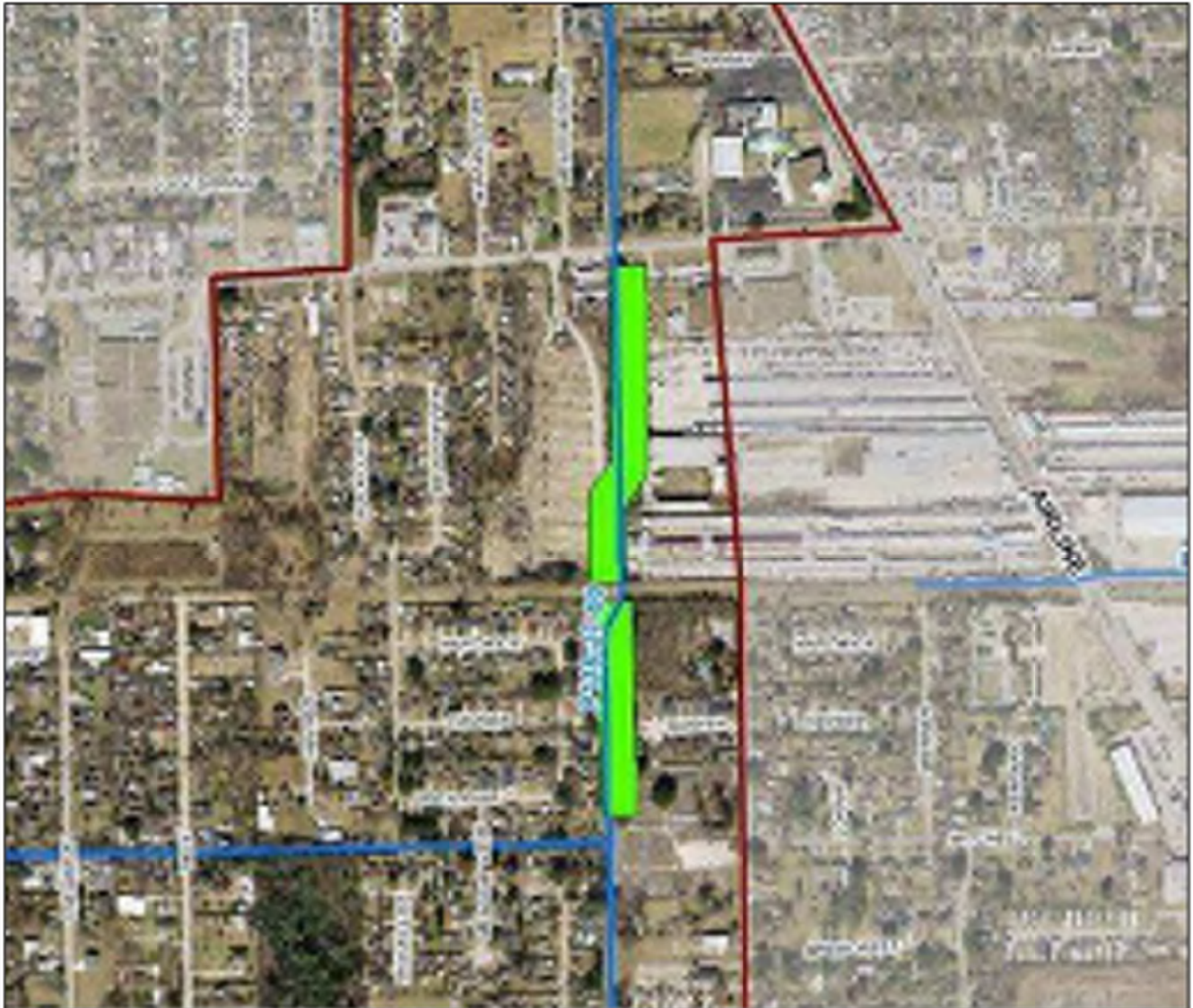


Figure 3-3: Feature 2 – Grass-lined Channel Improvements

3.2.6 Feature 6 – Detention Basin “Dow”

Dow Detention Basin is located just south of tributary P118-27-01 and east of Dow II Park (see [Figure 3-7](#)). The basin has a designed depth of 7 feet and provides a storage volume of approximately 40 acre-feet with 1-foot of freeboard. A total of 10.8 acres would be necessary to be acquired by HCFCFD for ROW, and there aren't currently any structures within the basin's footprint.

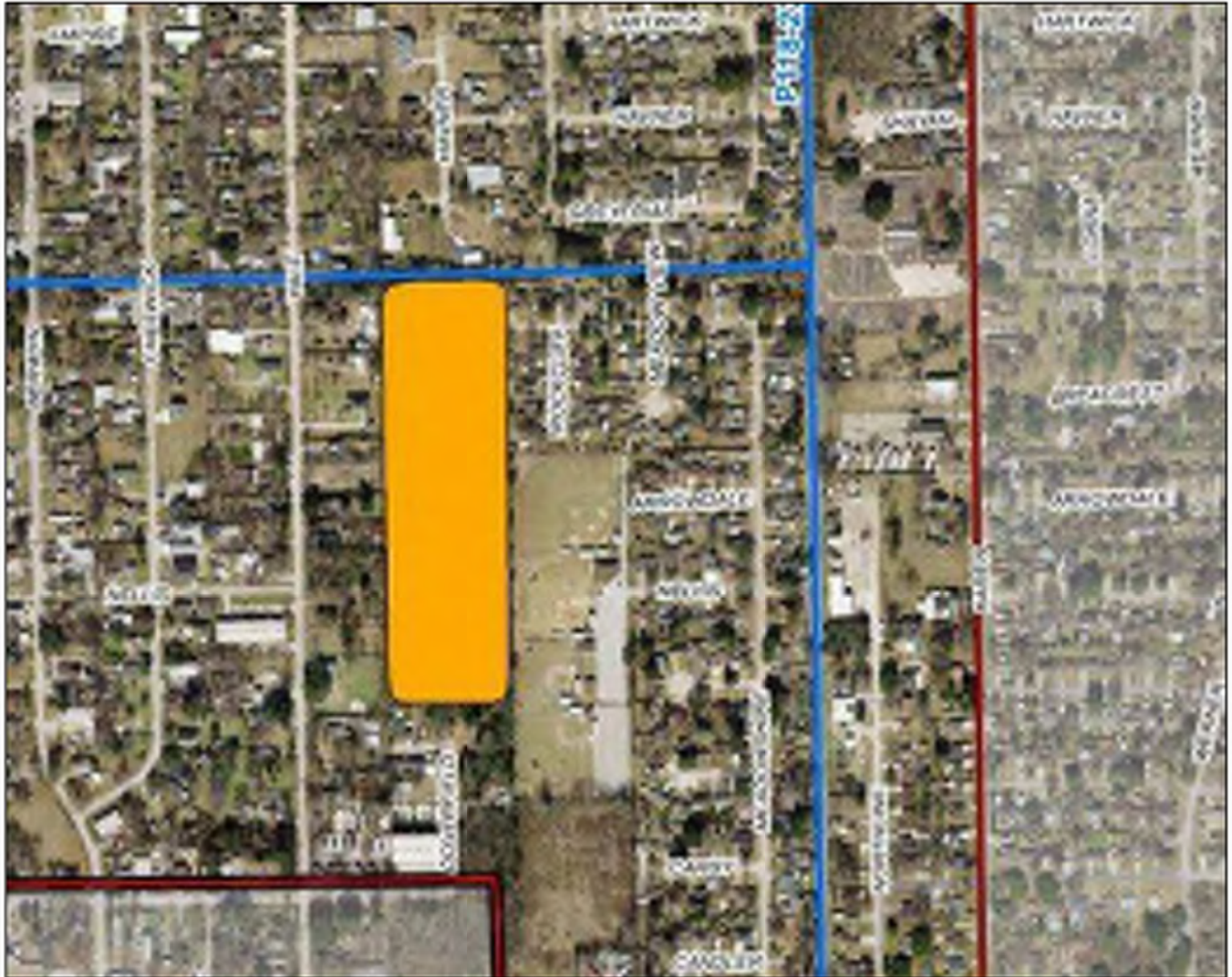


Figure 3-7: Feature 6 – Detention Basin “Dow”

3.3 Detailed Level Alternatives

LAN developed three (3) Alternatives under pre-Atlas 14 conditions. The three Alternative layouts can be seen in [Exhibits 18 through 20](#). [Table 5](#) below summarizes the modeled alternatives with their individual components.

Table 5: Summary of Modeled Alternatives

	Features
Alternative 1	Concrete-lined Channel, Shevchenko Basin, Gulf Bank Basin
Alternative 2	Concrete-lined Channel, Shevchenko Basin
Alternative 3	Grass-lined Channel, Karen Basin, Dow Basin

In developing the alternatives, LAN assumed an improved drainage system in the surrounding neighborhoods. This allowed the alternatives to be modeled in a “worst-case scenario” in terms of volume of water in the channel.

3.3.1 Alternative 1

Alternative 1 consists of a concrete-lined trapezoidal channel along P118-27-00 with the Shevchenko and Gulf Bank basins in place to provide storage volume and to mitigate increased peak flows. The channel improvements will occur along 3,050 feet of P118-27-00 from the existing concrete-lined channel segment to the Pin Oak Mobile Home Community, having a bottom width of 6 feet with 2:1 side slopes. An additional 20 to 30 feet of ROW will need to be acquired along the length of the proposed channel improvements. The channel slope is approximately 0.22%. The Shevchenko basin is 11 feet deep and has a 13.6-acre footprint, providing a storage volume of 85 acre-feet, including 1 foot of freeboard. The Gulf Bank basin is 8 feet deep and has a 13.2-acre footprint, providing a storage volume of 65 acre-feet, including 1 foot of freeboard. The specifications include a 30-foot maintenance berm and 4:1 side slopes for both detention basins. Also, in coordination with the Gulf Bank Road Extension, the existing dual 60-inch RCP culverts at Gulf Bank Road will be replaced with 2-10'x8' RCBs. Detailed hydraulic calculations and floodplain maps with performance metrics are shown in [Appendix N](#) and [Appendix M](#), respectively. Water surface profiles along P118-27-00 for all four storm events can be found in [Appendix E](#). Comparison profiles between Baseline Conditions and the Alternative 3 are attached - see [Appendix F](#).

These modifications have a projected total cost of \$25.8 million, including utility pipeline relocation costs, and would provide a 100-year LOS under the region's current normal depth downstream boundary conditions. ROW acquisition costs alone are approximately \$18.8 million for Alternative 1 primarily due to acquisition of the Pin Oak Mobile Home Community, which includes 125 structures, and a parking lot that serves Sunny Flea Market. The Alternative 1 layout is shown in [Exhibit 18](#) and below in [Figure 3-8](#). The detailed estimate of probable costs for Alternative 1 can be seen in [Appendix H](#).

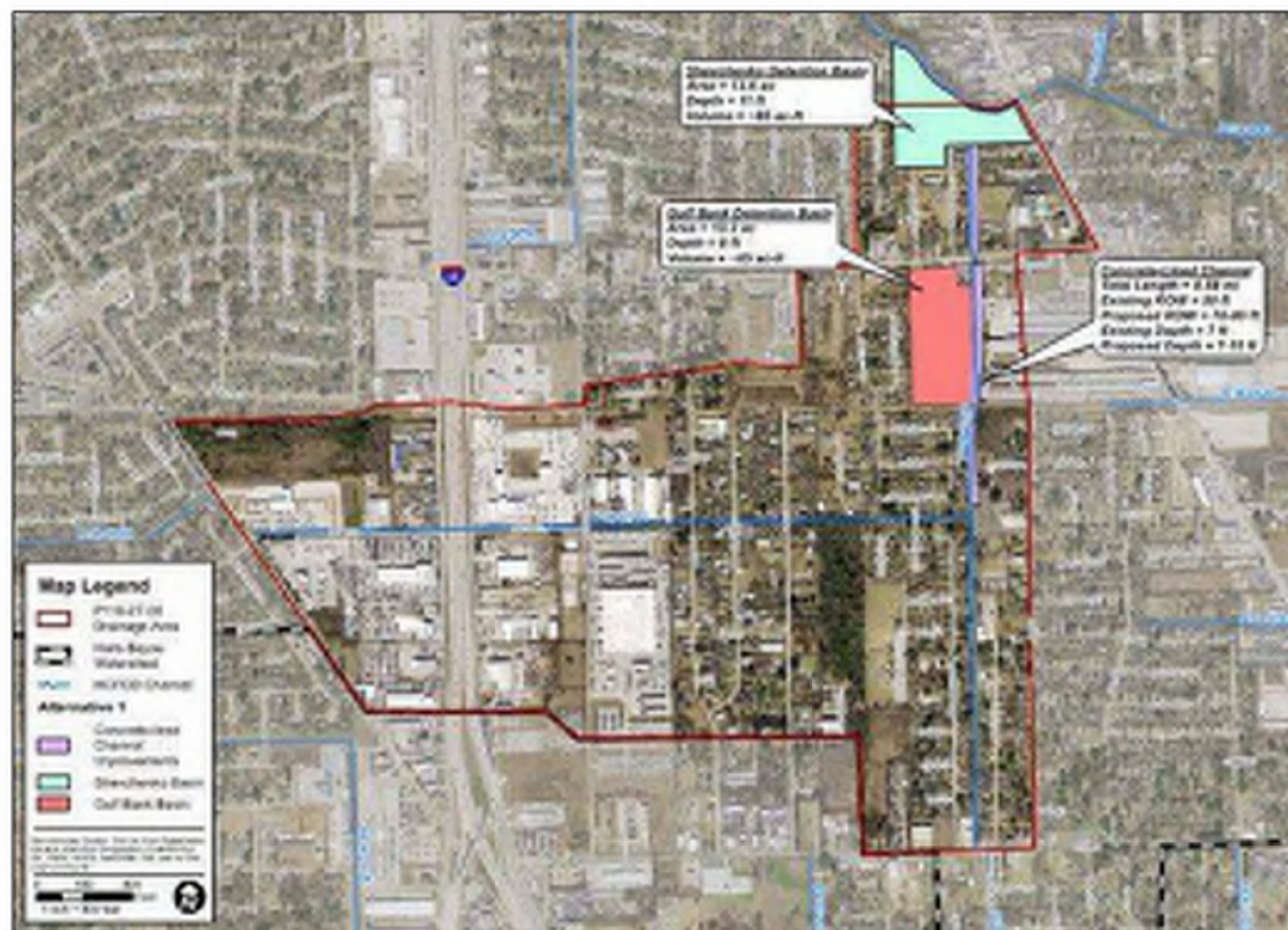


Figure 3-8: Alternative 1 Layout

3.3.2 Alternative 2

Alternative 2 is identical to Alternative 1 except for the elimination of the Gulf Bank basin. Alternative 2 consists of a concrete-lined trapezoidal channel along P118-27-00 with the Shevchenko basin in place to provide storage volume and to mitigate increased peak flows. The channel improvements will occur along 3,050 feet of P118-27-00 from the existing concrete-lined channel segment to the Pin Oak Mobile Home Community, having a bottom width of 6 feet with 2:1 side slopes. An additional 20 to 30 feet of ROW will need to be acquired along the length of the proposed channel improvements. The channel slope is approximately 0.22%. The Shevchenko basin is 11 feet deep and has a 13.6-acre footprint, providing a storage volume of 85 acre-feet, including 1 foot of freeboard. The basin specifications include a 30-foot maintenance berm and 4:1 side slopes. Also, in coordination with the Gulf Bank Road Extension, the existing dual 60-inch RCP culverts at Gulf Bank Road will be replaced with 2-10'x8' RCBs. Detailed hydraulic calculations are shown in [Appendix N](#).

These modifications have a projected total cost of \$15.6 million, including utility pipeline relocation costs, and would also provide a 100-year LOS under the region's current normal depth downstream boundary conditions. ROW acquisition costs alone are approximately \$8.1 million for Alternative 2 primarily due to acquisition of the Pin Oak Mobile Home Community, which includes 125 structures. The Alternative 2 layout is shown in [Exhibit 19](#) and below in [Figure 3-9](#). The detailed estimate of probable costs for Alternative 2 can be seen in [Appendix H](#).

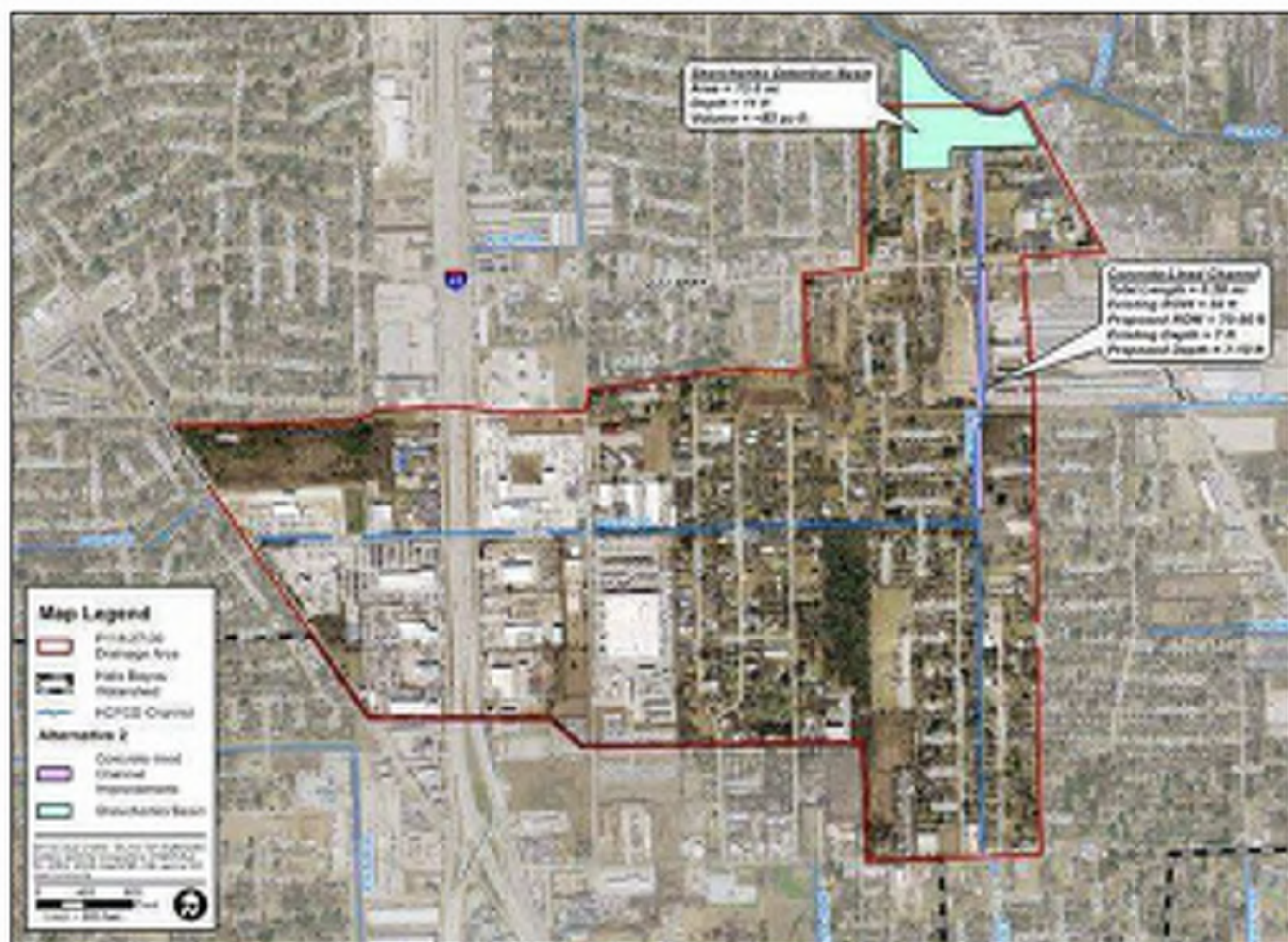


Figure 3-9: Alternative 2 Layout

3.3.3 Alternative 3

Alternative 3 was designed to provide a viable alternative that did not have as much ROW acquisition needs of the previous alternatives. Alternative 3 consists of a grass-lined trapezoidal channel along P118-27-00, with the Karen and Dow basins in place to provide storage volume and to mitigate increased peak flows. The channel improvements will occur along 2,050 feet of P118-27-00 from the existing concrete-lined channel segment to Gulf Bank Road having a bottom width of 6 feet and 4:1 side slopes. An additional 80 feet of ROW will need to be acquired along the length of the proposed channel improvements. The channel slope is approximately 0.07%. The Karen basin is 8 feet deep and has a 5.5-acre footprint, providing a storage volume of 20 acre-feet, including 1 foot of freeboard. The Dow basin is 8 feet deep and has a 10.8-acre footprint, providing a storage volume of 40 acre-feet, including 1 foot of freeboard. The basin specifications include a 30-foot maintenance berm and 4:1 side slopes. Also, in coordination with the Gulf Bank Road Extension, the existing dual 60-inch RCP culverts at Gulf Bank Road will be replaced with 2-10'x8' RCBs. Detailed hydraulic calculations and floodplain maps with performance metrics are shown in [Appendix N](#) and [Appendix M](#), respectively. Water surface profiles along P118-27-00 for all four storm events can be found in [Appendix E](#). Comparison profiles between Baseline Conditions and the Alternative 3 are attached - see [Appendix F](#).

These modifications have a projected total cost of \$9.1 million, including utility pipeline relocation costs, and would provide a 50-year LOS under the region's current normal depth downstream boundary conditions. ROW acquisition costs are approximately \$4.8 million for Alternative 3. The Alternative 3 layout is shown in [Exhibit 20](#) and below in [Figure 3-10](#). The detailed estimate of probable costs for Alternative 3 can be seen in [Appendix H](#).



Figure 3-10: Alternative 3 Layout

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3.3.4 Detailed Alternatives Analysis Alternative Scoring

To score each of these alternatives, LAN considered six attributes and gave weight to each attribute: (1) Total Estimated Cost (including utility pipeline relocation) [20%], (2) Cost of ROW Acquisition [10%], (3) Number of Structures Removed from Floodplain [15%], (4) Number of Flooded Structures Removed [25%], (5) Miles of Inundated Roadway Removed [15%], (6) Acres of Inundated Land Removed [15%]. 70% of the weight was given to performance metrics and 30% to cost information. The scoring matrix was based on the Tailwater (Stage Hydrograph) boundary condition. The Stage Hydrograph boundary condition gives a more accurate depiction of what occurs in P118-27-00, particularly during extreme storm events. The Normal Depth boundary condition was used for design purposes when developing proposed improvements, while the Stage Hydrograph boundary condition was used to evaluate impacts and benefits that will be seen after construction. The alternatives' performances were compared to Baseline Conditions. Refer to **Table 6** for results of the scoring process.

Table 6: Alternative Scoring Matrix

Alternative	Attributes						Final Scores
	Cost Information		500yr Stage Hydrograph Condition				
	Total Estimated Cost	Cost of ROW Acquisition	Number of Structures in Floodplain Removed	Number of Flooded Structures Removed	Miles of Inundated Roadway Removed	Acres of Inundated Land Removed	
	20%	10%	15%	15%	15%	15%	
Baseline	5.0	5.0	0.0	0.0	0.0	0.0	1.5
Alternative 1	0.7	0.3	4.6	4.1	2.2	2.5	2.6
Alternative 2	2.4	3.0	4.6	4.0	2.0	2.4	3.1
Alternative 3	3.5	3.8	1.5	1.3	0.8	0.6	1.8

As shown, Alternative 2 ranked the highest with a score of 3.1 on the scale of 0 to 5. The estimated cost lowered Alternative 1's final score, and the metrics lowered Alternative 3's score. These rankings were linearly interpolated between zero and the max values shown below in **Table 7**:

Table 7: Attribute Scoring Matrix Values

Attribute	Weight	Max
Estimated Cost	20%	\$ 30,000,000.00
Cost or ROW Acquisition	10%	\$ 20,000,000.00
Number of Structures in Floodplain	15%	300
Number of Flooded Structures	25%	100
Miles of Inundated Roadway	15%	3
Acres of Inundated Land	15%	150

To put things into perspective on an absolute scale, the performance metrics and costs of each alternative are summarized in **Table 8** shown below. In Table 8, the number of structures in the floodplain and number of flooded structures for Alternatives 1 and 2 include the 125 structures in the Shevchenko basin footprint. These structures will be acquired and bought out.

Table 8: Performance Metrics and Costs

Alternative	Attributes					
	Cost Information		500yr Stage Hydrograph Condition			
	Total Estimated Cost	Cost of ROW Acquisition	Number of Structures in Floodplain	Number of Flooded Structures	Miles of Inundated Roadway	Acres of Inundated Land
Baseline	\$ -	\$ -	1114	609	12.0	443
Alternative 1	\$ 25,837,973.00	\$ 18,816,133.00	836	528	10.7	369
Alternative 2	\$ 15,644,128.00	\$ 8,096,853.00	841	529	10.8	370
Alternative 3	\$ 9,131,749.00	\$ 4,790,474.00	1024	583	11.5	426

4 Recommended Alternative

4.1 Results

As previously mentioned, the Recommended Alternative brings the P118-27-00 service area up to a 100-year LOS for the normal depth downstream boundary condition, which reflects the future conditions after implementation of the Halls Bayou improvement projects. The Recommended Alternative HEC-RAS geometry can be seen in [Exhibit 21](#). Water surface profiles along P118-27-00 for all four storm events can be found in [Appendix E](#). Comparison profiles between Baseline Conditions and the Recommended Alternative are attached - see [Appendix F](#).

As with Baseline Conditions, performance metrics include acreage of floodplain, miles of inundated roadway, number of structures in the floodplain, and number of flooded structures based on FFE for the 10-, 50-, 100-, and 500-year storm events. The use of performance metrics allows for a quantitative evaluation of potential flood damage reduction benefits. Locally, Alternative 2 provides a 100-year level-of-service (LOS), and reduces the number of structures in the floodplain from 154 to 0 (including structural buyouts), and removes all flooded structures based on finished floor elevation (FFE). There are approximately 2,233 structures in the P118-27-00 project area and immediate surrounding area. Alternative 2 results in no adverse impacts to P118-27-00, Halls Bayou, and the surrounding region, up to and including the 500-year storm event.

By providing a 100-year LOS under the normal depth downstream boundary conditions, the 100-year floodplain is reduced from 114 acres to 22 acres. The structures in the floodplain are reduced from 154 to 0, and the number of flooded structures is down to 0 from the original 15 (including structural buyouts). The original 3.7 miles of inundated roadway is reduced to 0.4 miles. Refer to [Table 9](#) for the performance metrics for the normal depth boundary conditions and [Table 10](#) for the current Halls Bayou tailwater boundary conditions. In Tables 9 and 10 below, the 125 structures within the basin footprint of Alternative 2 are counted as structures removed from the floodplain. These structures will be acquired and bought out. In the 100-year storm event, the Recommended Alternative eliminates flooding and overflow from P118-27-00 in several neighborhoods just upstream of P118-27-00 including Bellmar Estates, Durkee Manor, and Assumption Heights. Ponding extents and depths along with performance metrics for all four storm events are included in [Exhibits 22 through 29](#) for the normal depth and stage hydrograph condition. Ponding depth comparisons between baseline conditions and the recommended alternative for the 10-, 50-, 100-, and 500-year storm events can be seen in [Exhibits 30 through 37](#). Detailed hydraulic calculations are shown in [Appendix N](#).

Table 9: Performance Metrics - Baseline versus Recommended Alternative 2 - Normal Depth Boundary Condition

Performance Metric	10-year Floodplain		50-year Floodplain		100-year Floodplain		500-year Floodplain	
	Basel.	Rec. Alt.	Basel.	Rec. Alt.	Basel.	Rec. Alt.	Basel.	Rec. Alt.
Structures in Floodplain	4	0	84	0	154	0	303	10
Flooded Structures (based on FFE)	0	0	10	0	15	0	53	1
Inundated Roadway (miles)	1.48	0.09	3.20	0.13	3.72	0.39	4.68	1.75
Floodplain (acre)	33	18	88	20	114	22	168	47

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Table 10: Performance Metrics - Baseline versus Recommended Alternative 2 - Stage Hydrograph Tailwater Boundary Condition

Performance Metric	10-year Floodplain		50-year Floodplain		100-year Floodplain		500-year Floodplain	
	Basel.	Rec. Alt.	Basel.	Rec. Alt.	Basel.	Rec. Alt.	Basel.	Rec. Alt.
Structures in Floodplain	248	135	605	385	764	468	1114	717
Flooded Structures (based on FFE)	111	29	302	165	375	220	609	406
Inundated Roadway (miles)	4.11	2.57	8.74	5.66	9.93	7.13	11.99	10.83
Floodplain (acre)	126	99	271	201	323	238	443	370

4.2 Right-of-Way Requirement

HCFCDD owns 10.8 acres of ROW in the study area. With the Recommended Alternative 2, an additional 16 acres would need to be acquired, including 13 partial parcel acquisitions and 4 full parcel acquisitions. An expected 125 structures would lie within the proposed ROW limits – refer to [Exhibit 38](#). The structures affected fall under the following categories: 123 mobile homes, all of which are located within the 100-year FEMA floodplain and 50 within the regulatory floodway, 1 single-family residential, and 1 commercial.

LAN identified 12 parcels where partial ROW acquisition will be required and 5 parcels where full acquisition will be required along P118-27-00. Full acquisition would be required for the parcels in the footprint of the Shevchenko Basin, and in one parcel along the proposed concrete-lined channel ROW. Refer to [Appendix G](#) for a listing of affected parcels.

The proposed 70 to 80-foot ROW width for the channel considers a 20-foot maintenance berm on the left side of the channel and a 15-foot maintenance berm on the right side. It has a 6-ft bottom width with 2:1 side slopes in accordance to HCFCDD standards. Refer to [Figure 4-1](#) for a cross-section representation for typical channel design standards.

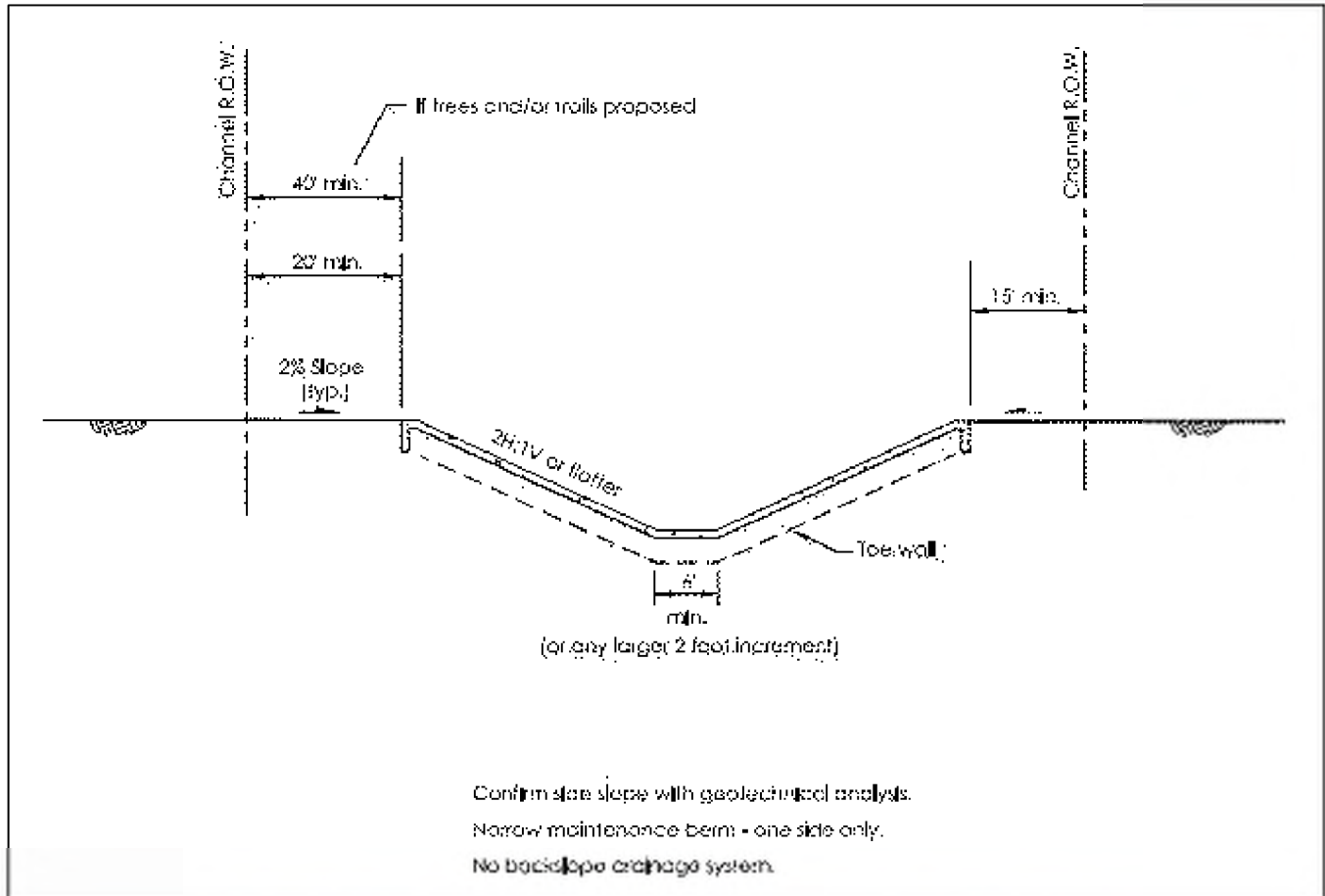


Figure 4-1: HCFCD Concrete-lined Trapezoidal Channel Design (HCFCD, 2019)

4.3 Opinion of Probable Construction Cost

An opinion of probable construction cost for the Recommended Alternative can be found in [Table 11](#). Detailed estimates of probable costs for each alternative are also provided in [Appendix H](#). Unit cost values utilized the latest TxDOT and HCFCD average low bid tab and HCAD appraised land values. The costs consider clearing, grubbing, excavation and disposal, backslope drainage system swales, concrete interceptor structures, culverts, headwalls and wingwalls, concrete channel lining, asphalt, concrete slope paving, removal & disposal, turf establishment, ROW acquisition, and pipeline relocation. LAN assumes 10% of direct construction costs for Planning, Engineering, and Design, 5% for Mobilization/Demobilization, 10% for Construction Management, and 20% for Contingency.

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Table 11: Recommended Alternative Opinion of Probable Construction Cost

Item Description	Costs
Shevchenko Basin	\$10,483,548.00
Excavation & Off-site Disposal	\$2,419,995.00
Basin Features	\$449,100.00
ROW Acquisition	\$7,614,453.00
Channel Improvements	\$2,134,480.00
Excavation & Off-site Disposal	-
Channel Features	\$1,652,080.00
ROW Acquisition	\$482,400.00

ROW Acquisition: \$8,096,853.00

Pipeline Relocation: \$683,500.00

Direct Construction Cost (DCC): \$5,204,675.00

Subtotal: \$13,301,528.00

+ Planning, Engineering, and Design (10% of DCC): \$520,600.00

+ Mobilization/Demobilization (5% of DCC): \$260,300.00

+ Construction Management (10% of DCC): \$520,600.00

+ Contingency (20% of DCC): \$1,041,100.00

Total: \$15,644,128.00

5 Preliminary Impact Analysis

A preliminary assessment of potential impacts was performed on Halls Bayou as the result of the Recommended Alternative. The impacts model for Halls Bayou was developed based on the latest Halls Bayou model from the HCFCD Halls Bayou Phasing Study. This analysis focused on the effect that the Recommended Alternative will potentially have on WSELs along Halls Bayou.

To conduct the preliminary impacts analysis, LAN combined the P118-00-00 Halls Phasing HEC-RAS model and the standalone model of P118-27-00. Geometries were created for both Baseline and Alternative 2 conditions, with the respective boundary conditions and hydrology changes. The corresponding model was run in HEC-RAS 5.0.5. The Recommended Alternative resulted in maximum WSEL decreases of 0.2' upstream of the confluence of P118-27-00 and Halls Bayou for both the 100- and 500-year storm events. Downstream of the confluence of P118-27-00, WSELs show an average decrease of 0.04' and 0.02' in the 100- and 500-year storm events, respectively. At the confluence itself, a local increase in WSEL along Halls Bayou is observed in the 100- and 500-year storm events. However, this increase is attributed to differences in modeling methodology, as the P118-27-00 Baseline Condition at this location is modeled with cross sections, while the recommended alternative contains a 2D surface for the detention basin. The Baseline Condition is artificially forcing the flow to pass through the junction, where in reality the runoff would flow from the overbanks into Halls Bayou similar to the proposed alternative model. Lastly, there is one other location in the 100-year model where an increase is shown in WSEL significantly downstream of this project near P118-08-00. This however is attributed to model instability at the P118-08-00 junction and is not a reflection of improvements made at P118-27-00. Just upstream of this location, there are no WSEL impacts, and the hydrograph in the channel shows no flow impacts or significant changes in timing. Therefore, impacts at this location can be disregarded, or further refined during future project phases.

Overall, the Recommended Alternative 2 is effective in reducing WSELs both within P118-27-00 and along Halls Bayou. Further model refinement should be explored in the Preliminary Engineering phase of the project to eliminate all adverse impacts for all storm events. Refer to [Appendix L](#) for a WSEL comparison profile plot.

LAN recommends considering this option in the PER and design phases of the project for the final Drainage Impact Analysis to ensure no adverse impacts.

6 Summary and Conclusion

The Harris County Flood Control District (HCFCD) authorized Lockwood, Andrews & Newnam, Inc. (LAN) to conduct an Alternatives Analysis Study on Tributary P118-27-00, located within the Halls Bayou (HCFCD Unit No. P118-00-00) watershed. The purpose of this study is to analyze and describe the existing flooding conditions within the P118-27-00 drainage area, whereupon targeted flood risk mitigation alternatives are developed based on results. The Recommended Alternative ultimately derived from the Alternatives Analysis is intended to be incorporated into a PER, which can efficiently be carried into detailed design.

H&H models were developed for the 10%, 2%, 1%, and 0.2% design storm events (pre-Atlas 14 update) based on HCFCD criteria using the HEC-HMS Version 3.4 and HEC-RAS Version 5.0.5 software. Two tailwater boundary conditions scenarios were modeled: (1) assuming the WSEL of P118-27-00 is not influenced by tailwater conditions of Halls Bayou (normal depth assumption), and (2) assuming the WSEL of P118-27-00 is influenced by tailwater conditions of Halls Bayou using stage hydrographs computed from Halls Bayou Phasing Study at the P118-27-00 outfall.

Baseline conditions results revealed the existing LOS for tributary P118-27-00 area is mainly driven by undersized culverts and a significant amount of flow coming from the west side of our project area and flowing into P118-27-00, causing overflows in each storm event. The HEC-RAS results were used and processed in GIS to generate a set of performance metrics to ultimately measure proposed improvement alternatives. The model outcome for a 500-year design storm (pre-Atlas 14 update) shows 1114 in the floodplain, with 609 structures being flooded. Most flooded homes are located in the Assumption Heights neighborhood.

In total, six improvement features were identified as potential flooding mitigation solutions. They include detention basins and channel improvements. They were selected because they are located at hydraulically influential locations, topographically integrable, and are relatively unobtrusive to residents. Three alternatives were developed from the improvement features which were subsequently modeled and evaluated.

In coordination with HCFCD, LAN recommends Alternative 2 to carry for advancement to a PER Study. It offers the best cost to benefit ratio, at \$15.6 million, compared to Alternative 1 (\$25.4 million). Compared to Alternative 1, Alternative 2 also requires less ROW acquisition, eliminating the need to acquire the parking lot serving Sunny Flea Market. The costs include construction and acquisition of 13 partial and 4 full tracts, approximately 16 acres, of ROW.

Alternative 2 incorporates two features, (1) concrete-lined channel improvements from the existing concrete-lined channel to Pin Oak Mobile Home Community and (2) the 85 acre-foot Shevchenko Basin located in the footprint of Pin Oak Mobile Home Community. Channel improvements are trapezoidal with a 6-foot bottom width, 2:1 side slopes, and a 0.22% longitudinal slope.

For the Normal Depth downstream boundary conditions, Alternative 2 provides a 100-year LOS, and reduces the number of structures in the floodplain from 154 to 0 (including structural buyouts), and removes all flooded structures based on FFE. For the Tailwater downstream boundary conditions, Alternative 2 reduces number of structures in the floodplain from 764 to 468 and the number of flooded structures from 375 to 220 (including structural buyouts).

It is recommended to coordinate the proposed P118-27-00 project with Harris County Engineering on their local drainage improvement projects and continue Alternative 2 in a Preliminary Engineering Report.

7 References

- Brown & Gay Engineers, Inc. (2013). "Halls Ahead Study Vision Plan Engineering Appendix," updated August 2013.
- Federal Emergency Management Agency. "Flood Insurance Study," revised June 9, 2014.
- Harris County Flood Control District. (2019). "Hydrology & Hydraulics Guidance Manual," updated June 2019.
- Harris County Flood Control District. (2019). "Policy Criteria & Procedure Manual for Approval and Acceptance of Infrastructure" updated October 2019.
- Harris County Flood Control District. (2018). "Two-Dimensional Modeling Guidelines" updated July 2018.
- Harris County Flood Control District. (2018). "Preliminary Guidelines for Unstudied Tributaries in Halls Bayou (DRAFT)" updated March 2018.
- Harris County Flood Control District. (2016). "Quality Assurance / Quality Control Memorandum" updated February 2016.
- United States Army Corps of Engineers (USACE). (2009). "HEC-HMS Hydrologic Modeling System Version 3.4 User's Manual," Institute for Water Resources, Hydrologic Engineering Center, Davis, CA. updated August 2009.
- United States Army Corps of Engineers (USACE). (2016). "HEC-RAS River Analysis System 2D Modeling User's Manual Version 5.0," Institute for Water Resources, Hydrologic Engineering Center, Davis, CA. updated February 2016.
- United States Army Corps of Engineers (USACE). (2016). "HEC-RAS River Analysis System Version 5.0 2D Modeling Users Manual," Institute for Water Resources, Hydrologic Engineering Center, Davis, CA. updated February 2016.

8 List of Exhibits

Exhibit 1 – Vicinity Map

Exhibit 2 – FEMA Effective Floodplain

Exhibit 3 – Land Use (2004 HCAD Parcels)

Exhibit 4 – Existing HCFCD ROW

Exhibit 5 – Drainage Area Revisions

Exhibit 6 – Drainage Area Delineation and Subdivides

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Exhibit 8 – Watershed Environmental Baseline (WEB) Map Data Summary Tool (DST) Data

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Exhibit 10 – 50-Year Baseline Conditions Performance Metrics (Normal Depth Tailwater)

Exhibit 11 – 100-Year Baseline Conditions Performance Metrics (Normal Depth Tailwater)

Exhibit 12 – 500-Year Baseline Conditions Performance Metrics (Normal Depth Tailwater)

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Exhibit 20 – Alternative 3 Layout

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Exhibit 23 – 50-Year Recommended Alternative (Alt. 2) Performance Metrics (Normal Depth Tailwater)

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Exhibit 27 – 50-Year Recommended Alternative (Alt. 2) Performance Metrics (Stage Hydrograph Tailwater)

P118-27-00 Alternatives Analysis Summary Report

Exhibit 28 – 100-Year Recommended Alternative (Alt. 2) Performance Metrics (Stage Hydrograph Tailwater)

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Exhibit 34 – 10-Year Recommended Alternative (Alt. 2) vs. Baseline Conditions Comparison Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 35 – 50-Year Recommended Alternative (Alt. 2) vs. Baseline Conditions Comparison Performance Metrics (Stage Hydrograph Tailwater)

Exhibit 36 – 100-Year Recommended Alternative (Alt. 2) vs. Baseline Conditions Comparison Performance Metrics (Stage Hydrograph Tailwater)

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Exhibit 38 – Proposed ROW Alternative 2 (Recommended)

9 Appendices

Appendix A – Baseline Conditions Water Surface Profiles

Appendix B – Historic Losses Heat Maps

Appendix C – Site Visit Photo Documentation

Appendix D – Summary Table of Alternatives

Appendix E – Water Surface Elevation Profiles

Appendix F – Baseline Conditions vs. Alternatives Water Surface Profiles

Appendix G – Proposed ROW for Recommended Alternative

Appendix H – Detailed Opinion of Probable Cost and Pipeline Relocation Cost Estimate

Appendix I – Preliminary Wetland and Threatened and Endangered Species Habitat Assessment

Appendix J – Phase I Environmental Site Assessment Report

Appendix K – Attribute Scoring and Ranking Form and Harris County Flood Control District Project Scoring Form

Appendix L – Impact Analysis Baseline vs. Recommended Alternative Water Surface Profiles

Appendix M – Alternative 1 and Alternative 3 Metrics and Floodplain Maps

Appendix N – Detailed Hydraulic Calculations

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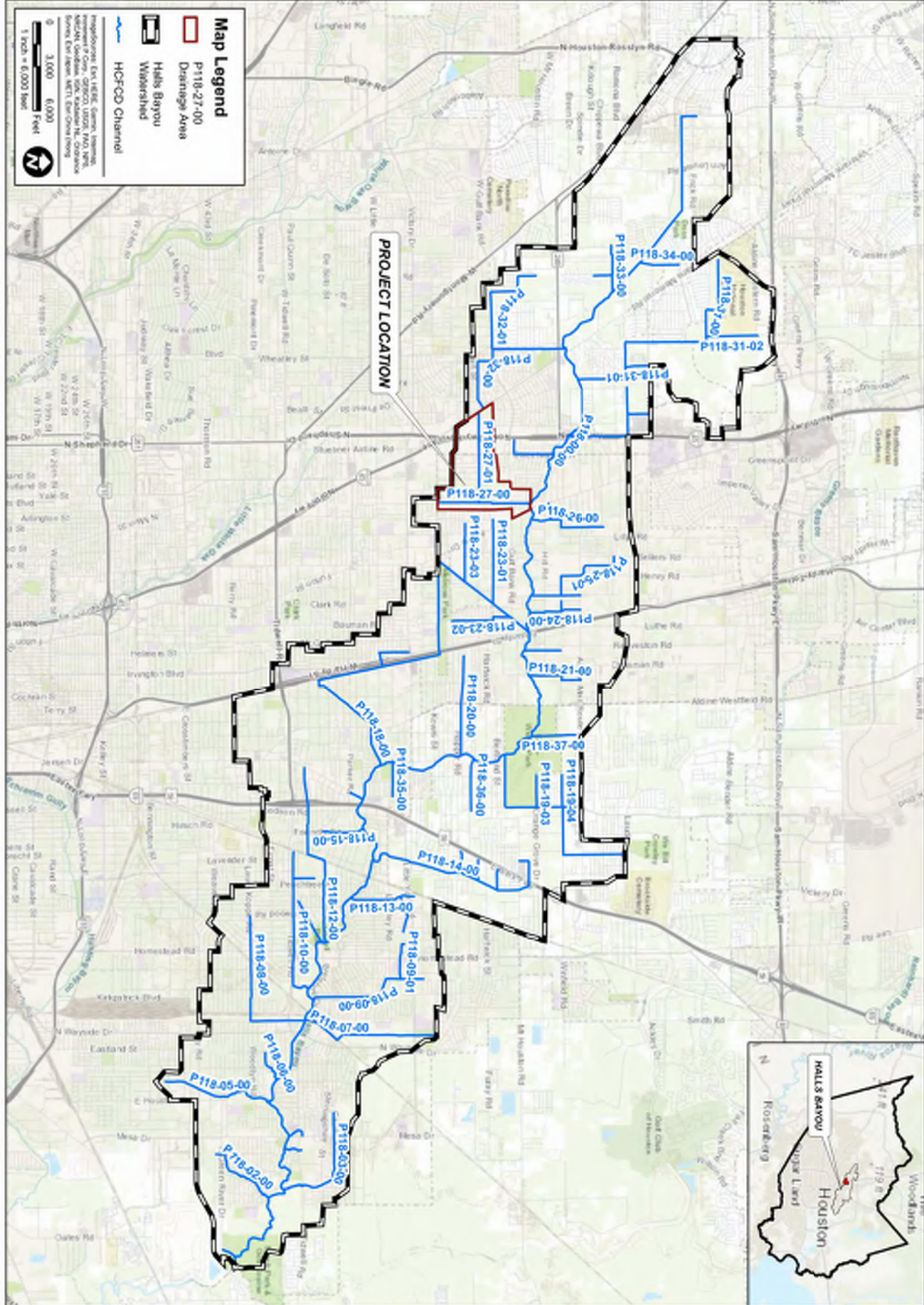


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TBPE Firm No. 2614

EXHIBITS

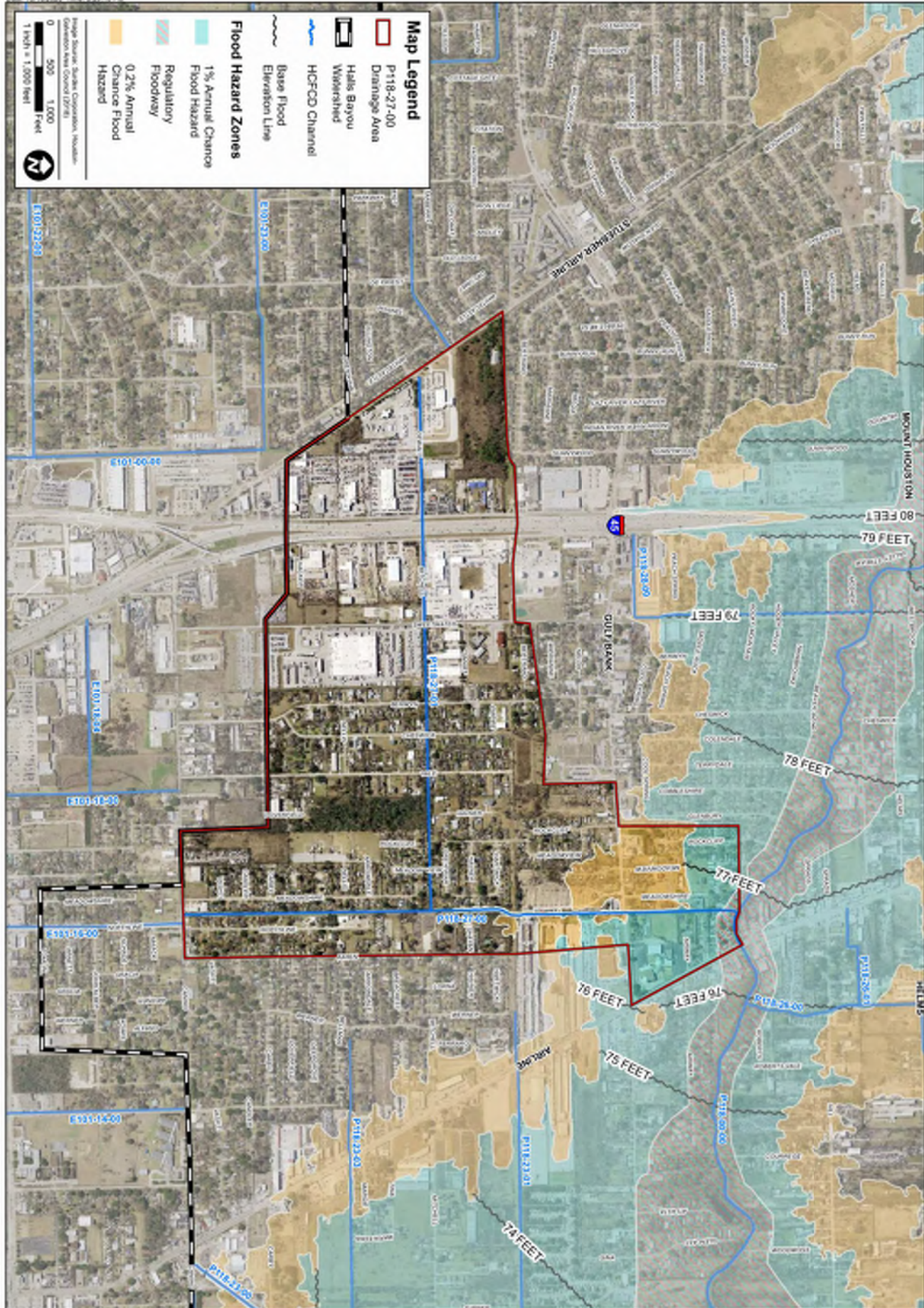



HARRIS COUNTY FLOOD CONTROL DISTRICT
 9900 Northwest Freeway
 Houston, Texas 77028
 DATE: MAY 2010
 SCALE: AS NOTED
 EXHIBIT 1


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CHECKED:	B.JI
APPROVED:	CEE

HCFCD HALLS BAYOU WATERSHED
 P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS
 VICINITY MAP

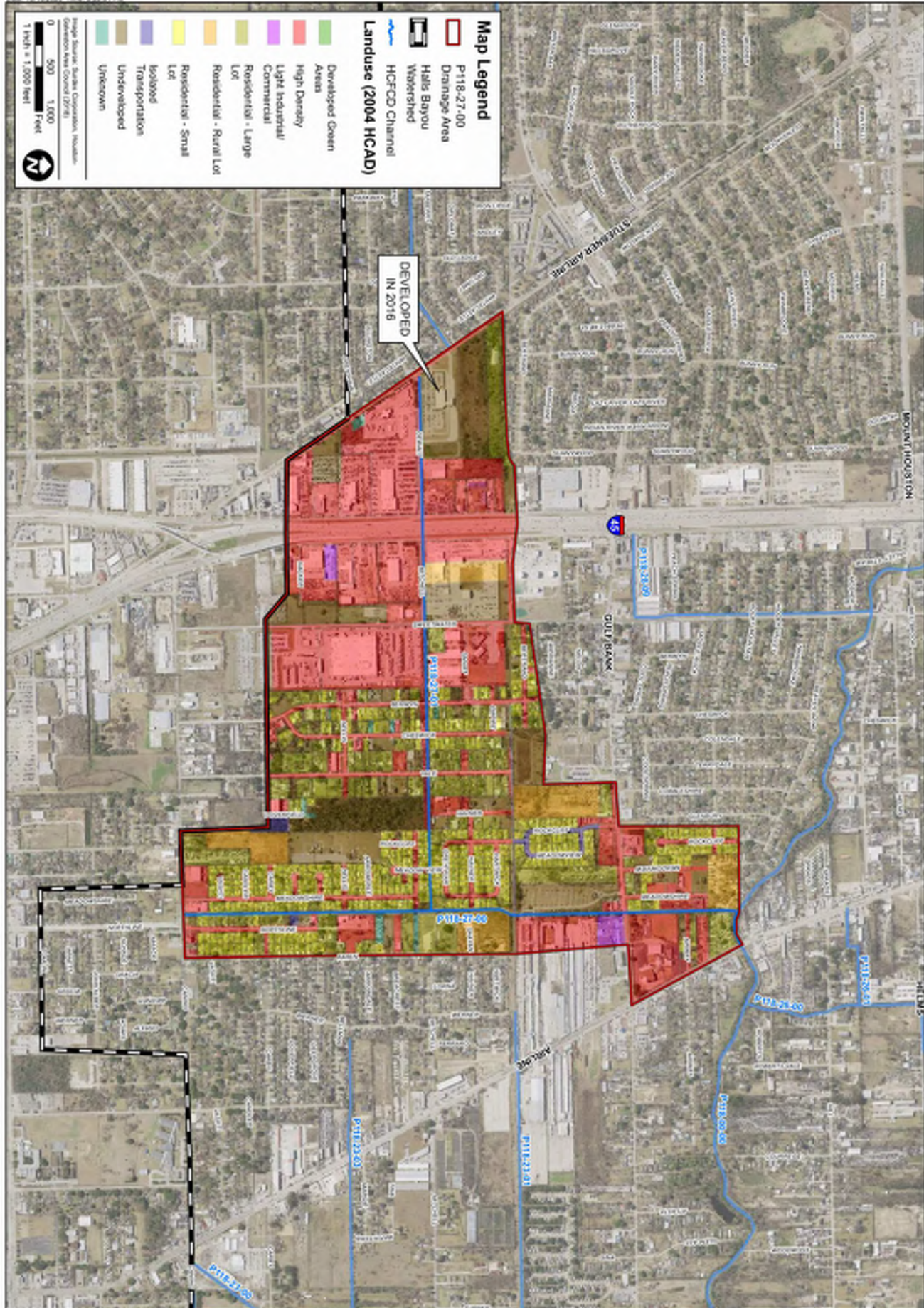


Map Legend

- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Base Flood Elevation Line
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard

Map Source: State Geospatial Information Commission (SGIC) (2018)
 Contour Interval: 2 Feet
 Scale: 1 inch = 1,000 feet

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>9900 Northwest Freeway Houston, Texas 77028</small>	 Lockwood, Andrews & Newnam, Inc. <small>A LEO A DALY COMPANY 2015 Park 100 2016 2001 Bayview Drive - Houston, TX 77058-0775 T 713.866.6900 • F 713.866.6985 www.lan-inc.com • info@lan-inc.com</small>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P-118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS FEMA EFFECTIVE FLOODPLAIN
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: MAY 2020 SCALE: AS NOTED EXHIBIT 2			



Map Legend

- P118-27-00
- Drainage Area
- Halls Bayou Watershed
- HCFCO Channel

Landuse (2004 HCAD)

- Developed Green Areas
- High Density
- Light Industrial/Commercial
- Residential - Large Lot
- Residential - Rural Lot
- Residential - Small Lot
- Isolated Transportation
- Undeveloped
- Unknown

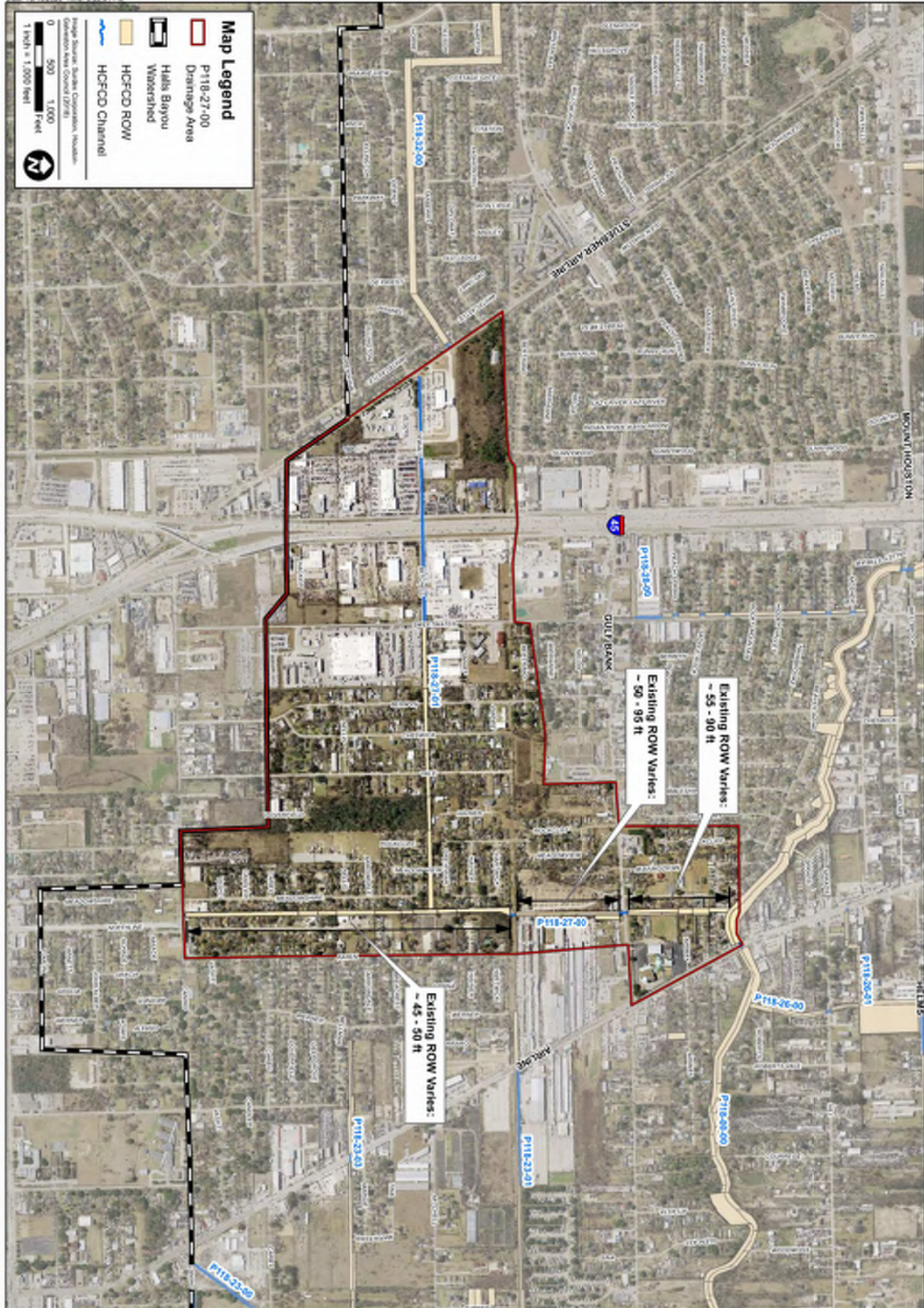
Map Source: State Commission, Houston, Commission Area Council (2011)

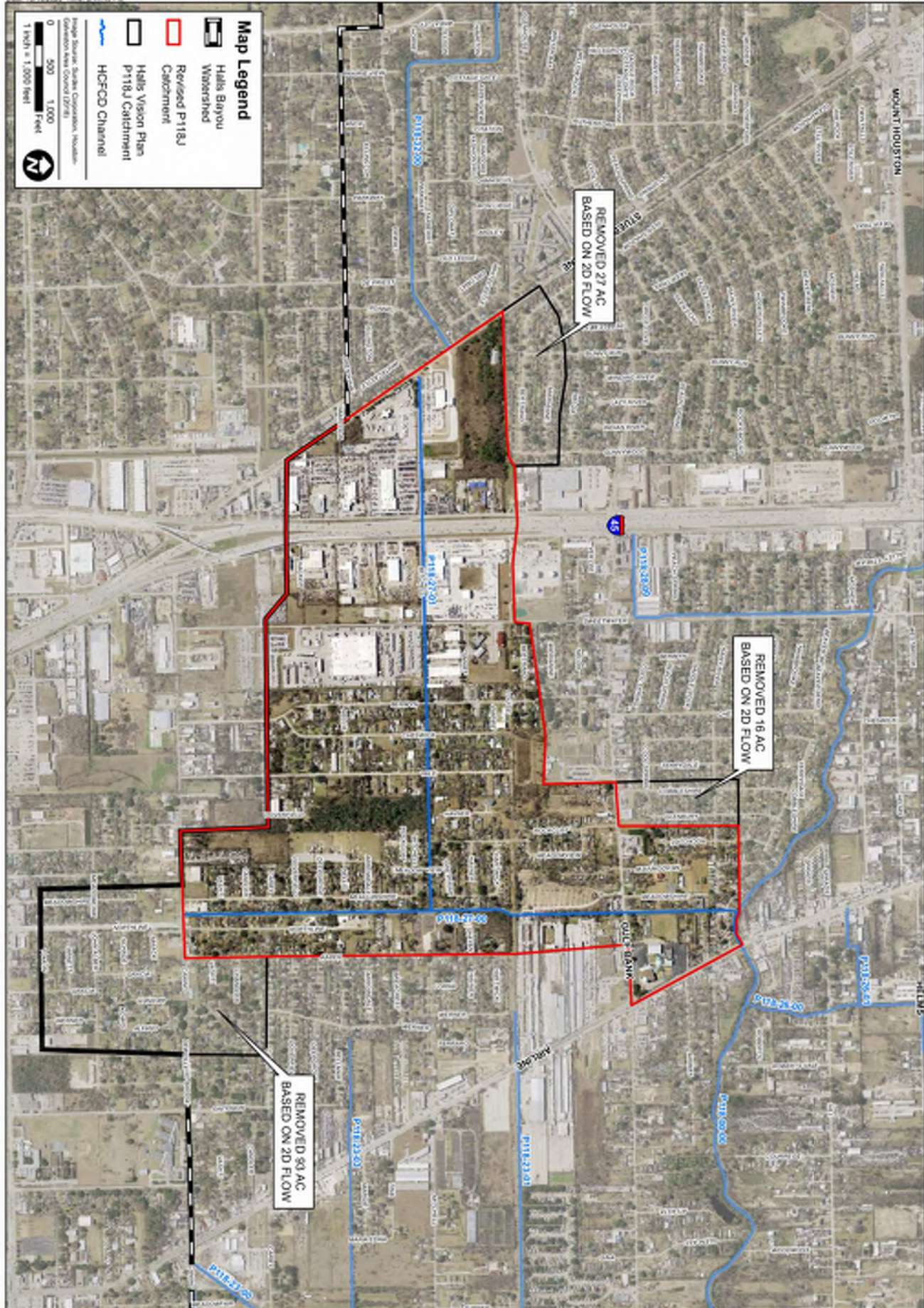
Scale: 1 inch = 1,000 feet

North Arrow

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IN 2016

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		CHECKED: BJH	
		APPROVED: CEE	
EXHIBIT 3	DATE: MAY 2020 SCALE: AS NOTED		





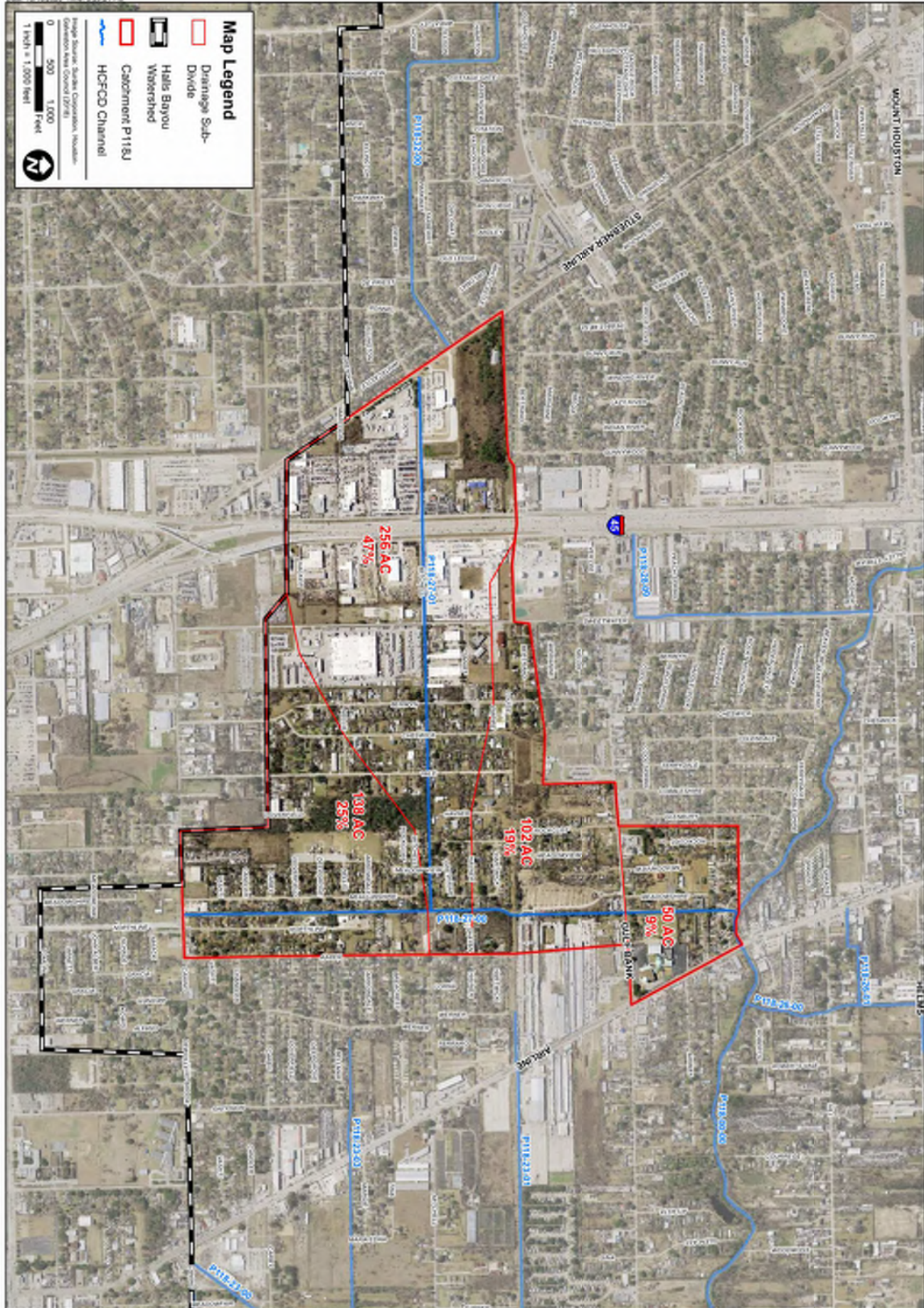
Map Legend

- Halls Bayou Watershed
- Revised P118J Catchment
- Halls Vision Plan P118J Catchment
- HCFCO Channel

Map Source: Sutter Construction, Inc.
 Construction Area Cover (2778)

Scale: 1 inch = 1,000 feet

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		CHECKED: SJJ	
		APPROVED: CEE	
EXHIBIT 5	DATE: MAY 2010 SCALE: AS NOTED		



Map Legend

- Drainage Sub-Divide
- Halls Bayou Watershed
- Catchment P118J
- HCFCO Channel

Map Source: Subarea Construction Model
 Construction Area Cover (27%)
 0 500 1,000 Feet
 1 Inch = 1,000 Feet

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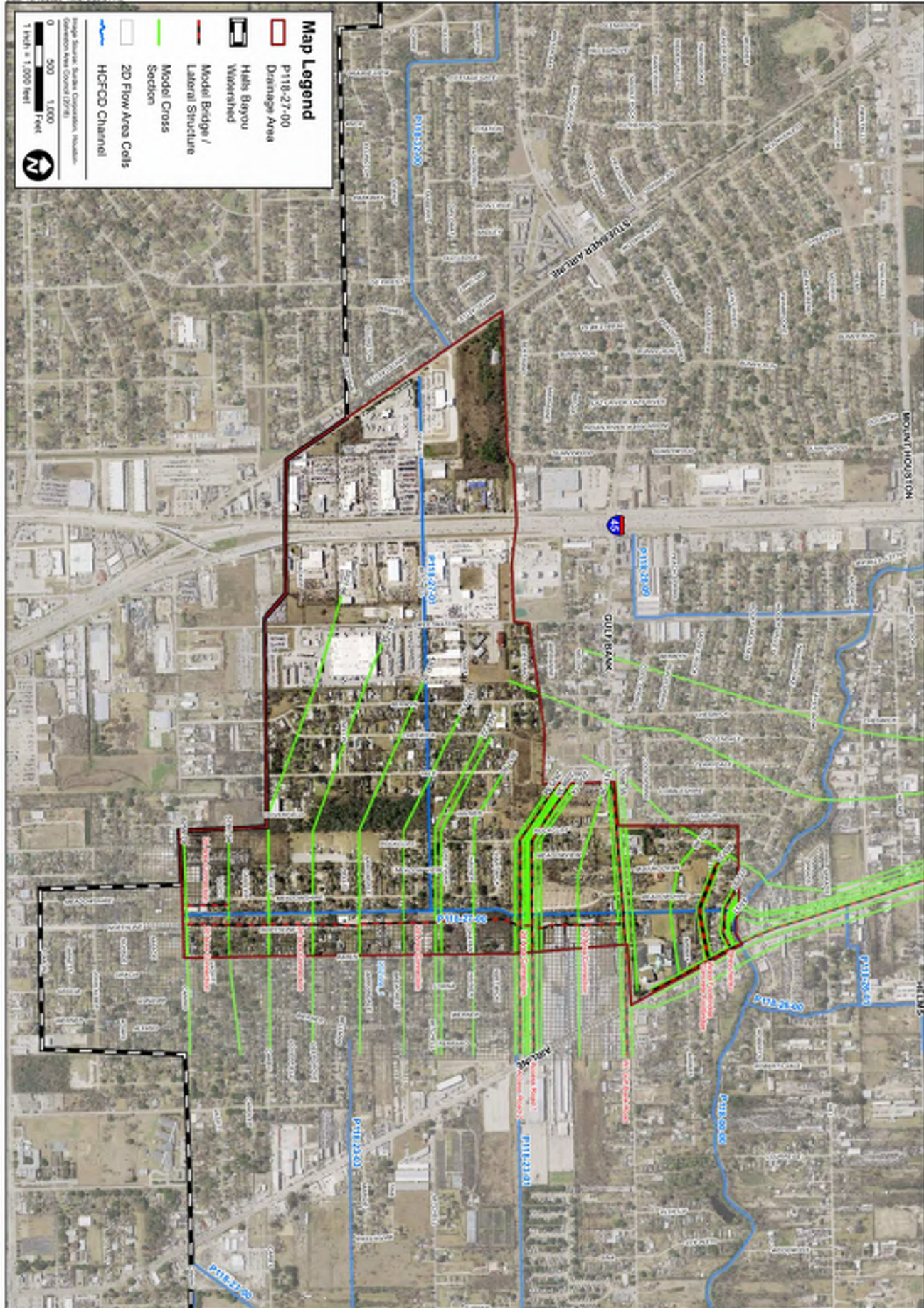
PREPARED:	TMM
CHECKED:	BJI
APPROVED:	CEE

HCFCO HALLS BAYOU WATERSHED
 P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS

DRAINAGE AREA DELINEATION SUBDIVIDES

EXHIBIT
 8

DATE: MAY 2010
 SCALE: AS NOTED



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- Model Bridge / Lateral Structure
- Model Cross Section
- 2D Flow Area Cells
- HCFCD Channel

Map Source: Sutter Construction, Inc. / Construction Area (2787)

Scale: 1 inch = 1,000 feet

North Arrow

HARRIS COUNTY FLOOD CONTROL DISTRICT

9900 Northwest Freeway
Houston, Texas 77036

DATE: MAY 2020
SCALE: AS NOTED

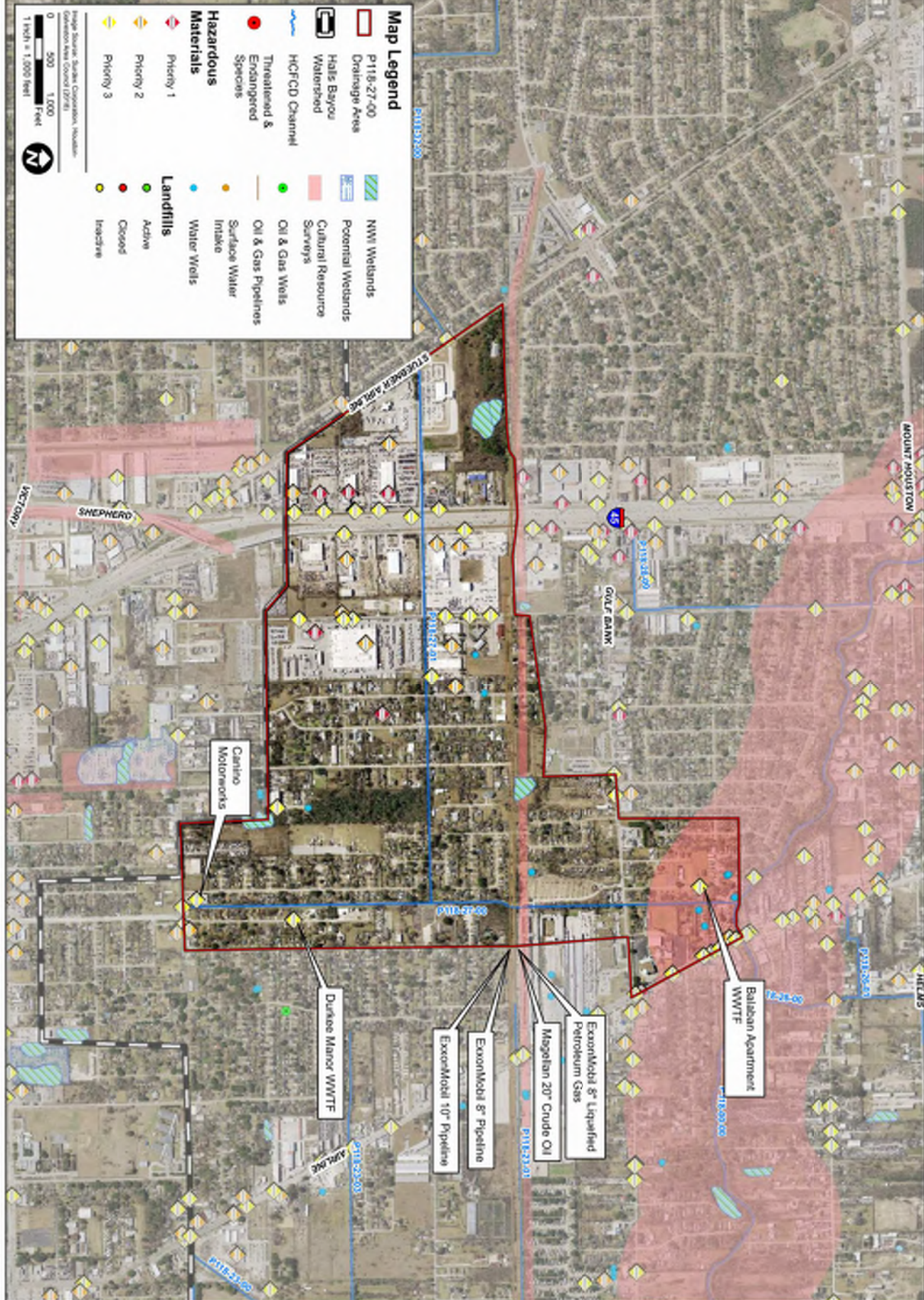
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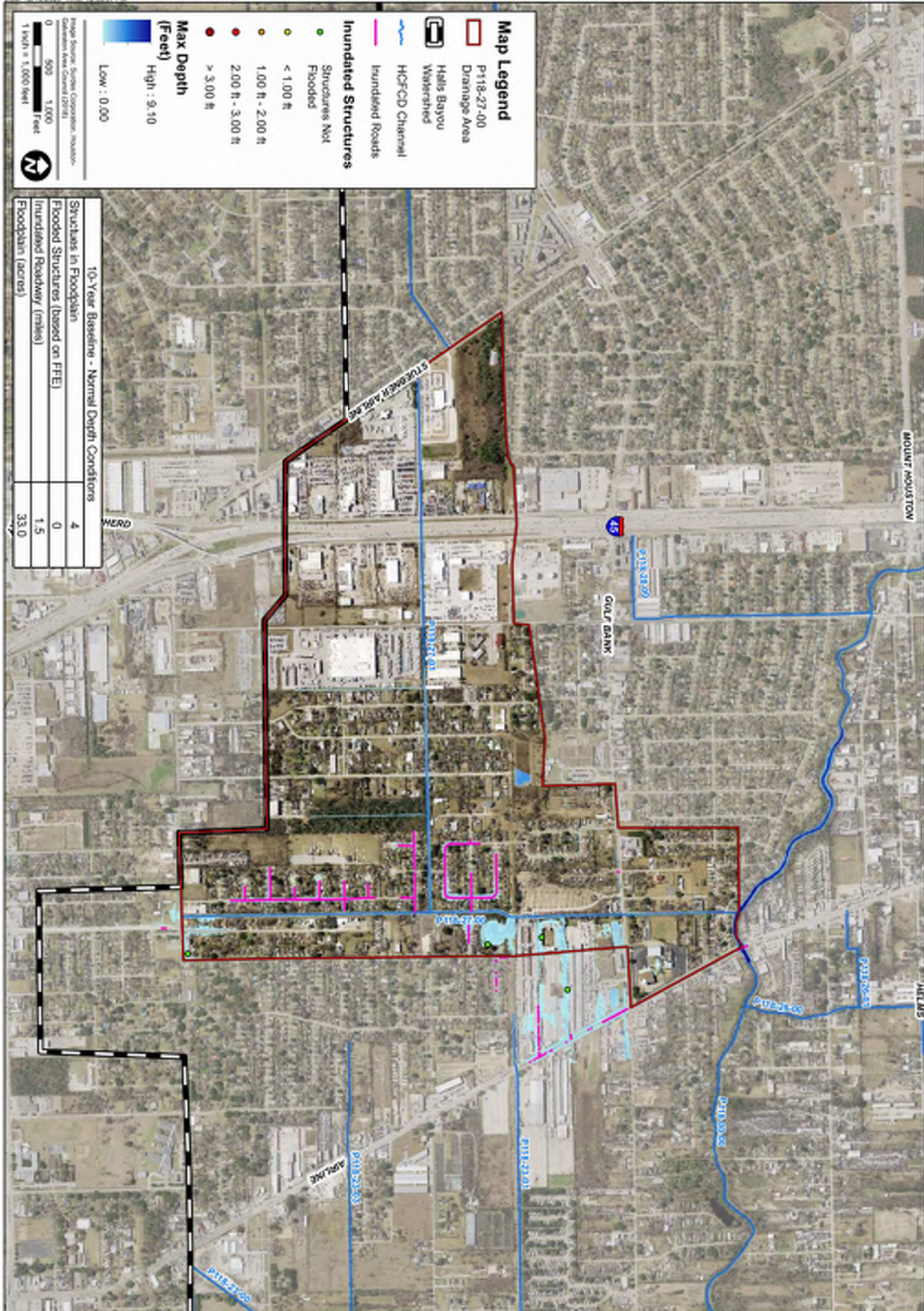
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CHECKED:	BJI
APPROVED:	CEE

HCFCD HALLS BAYOU WATERSHED
 P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS

**HEC-RAS GEOMETRY
 BASELINE CONDITIONS**



 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p> <p>9900 Northwest Freeway Houston, Texas 77028</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LEED & BABY COMPANY</p> <p>2016 Firm No. 2016 1000 West Loop West - Houston, TX 77028 713.866.8800 • F 713.866.8805 www.lan-n.com • info@lan-n.com</p>	PREPARED: BJI	<p>HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS</p> <p>WATERSHED ENVIRONMENTAL BASELINE (WEB) MAP DATA SUMMARY TOOL (DST) DATA</p>
		CHECKED: CEE	
		APPROVED: CEE	
<p>DATE: APRIL 2020 SCALE: AS NOTED</p>	<p>EXHIBIT 8</p>		



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Structures Not Flooded
- Flooded
- > 3.00 ft
- 2.00 ft - 3.00 ft
- 1.00 ft - 2.00 ft
- < 1.00 ft

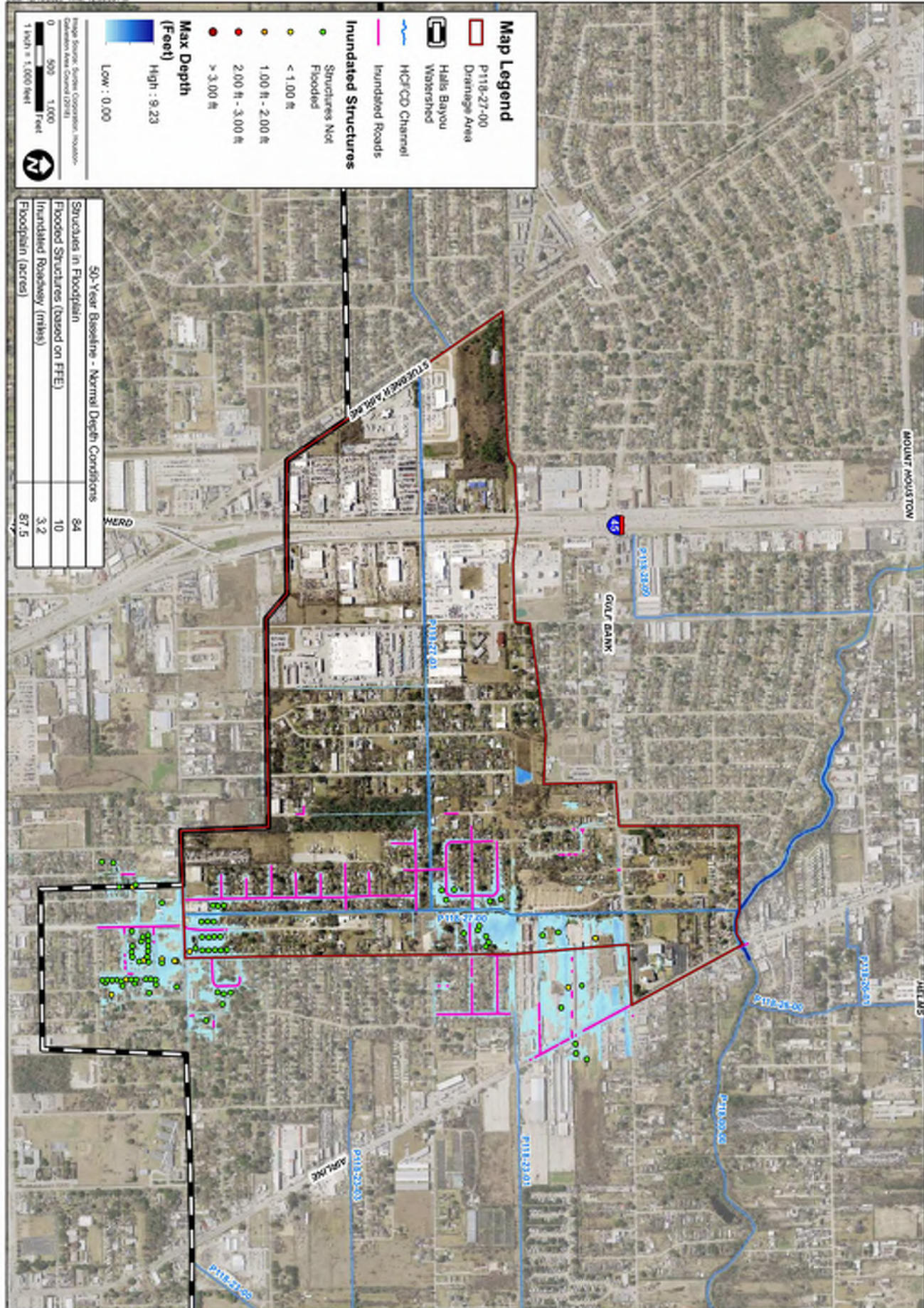
Max Depth (Feet)
 High : 9.10
 Low : 0.00

Map Source: Source: Corporation, Inundation: Corporation, Base: Contour (Feet)
 0 500 1,000 Feet
 1 Inch = 1,000 Feet

10-Year Baseline - Normal Depth Conditions

Structures in Floodplain	4
Flooded Structures (based on FFE)	0
Inundated Roadway (miles)	1.5
Floodplain (acres)	33.0

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		CHECKED: BJJ	
		APPROVED: CEE	
DATE: MAY 2020 SCALE: AS NOTED EXHIBIT 9			



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Structures Not Flooded
- Structures Flooded

Inundated Structures

- Structures Not Flooded
- Structures Flooded

Max Depth (Feet)

High: 9.23
Low: 0.00

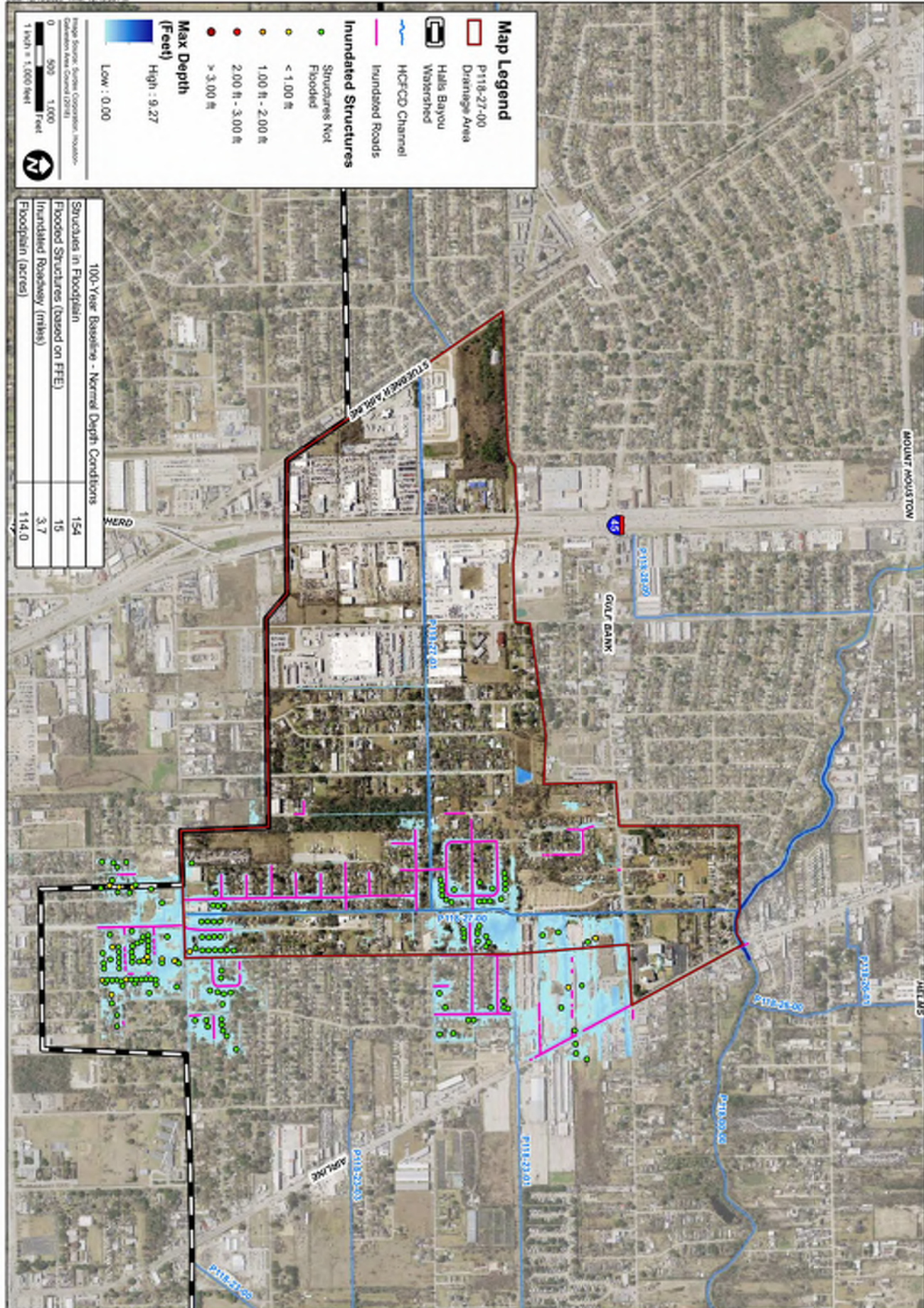
Color scale: 0 (light blue) to 9.23 (dark blue)

Scale: 1 inch = 1,000 feet

50-Year Baseline - Normal Depth Conditions

Structures in Floodplain	84
Flooded Structures (based on FFE)	10
Inundated Roadway (mils)	3.2
Floodplain (acres)	87.5

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		CHECKED: BJL	
		APPROVED: CEE	
DATE: MAY 2020 SCALE: AS NOTED EXHIBIT 10			



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎



Max Depth (Feet)
 High : 9.27
 Low : 0.00

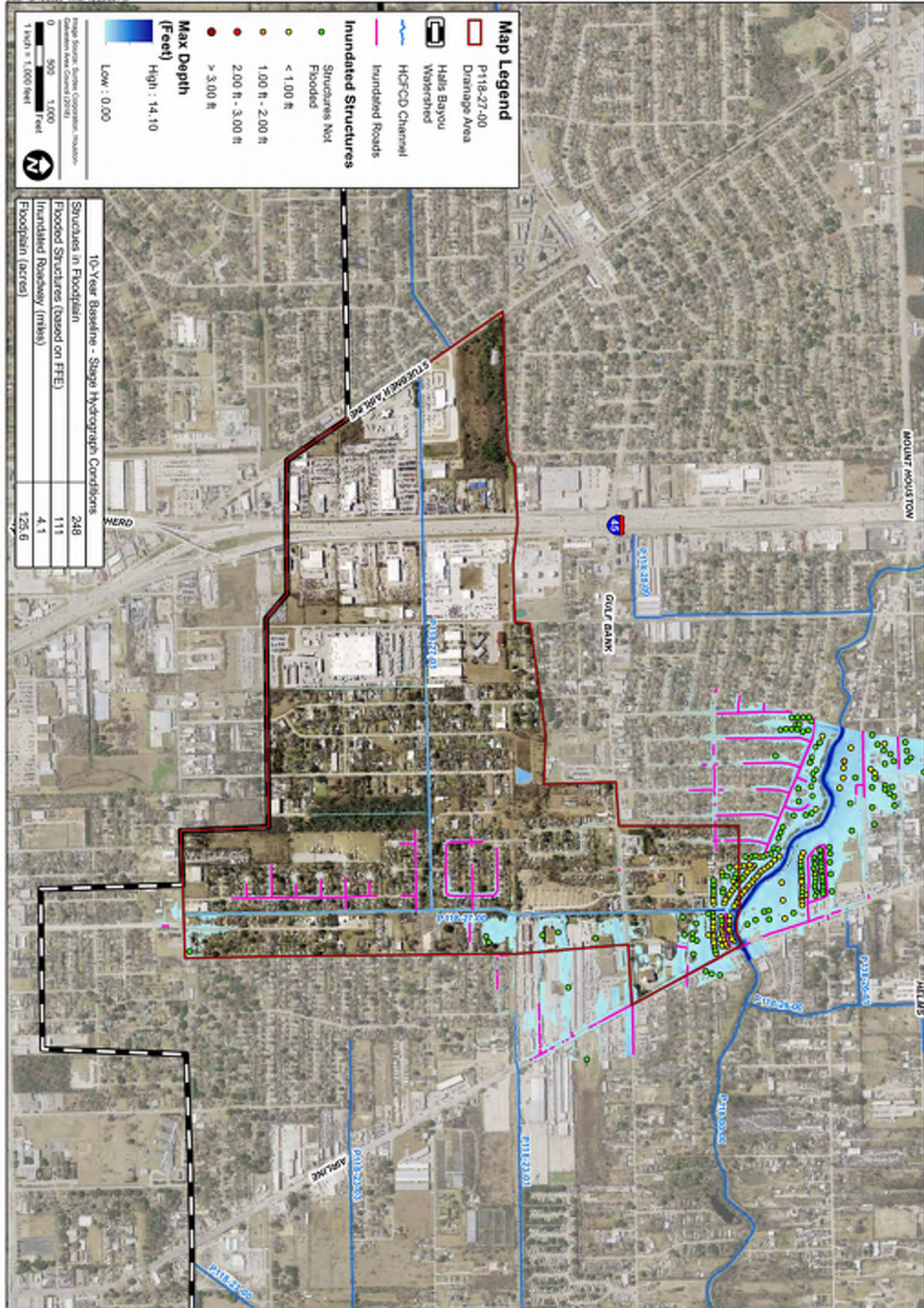
Scale: 1 inch = 1,000 feet

North Arrow

100-Year Baseline - Normal Depth Conditions

Structures in Floodplain	154
Flooded Structures (based on FFE)	15
Inundated Roadway (mils)	3.7
Floodplain (acres)	114.0

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		CHECKED: BJL	
		APPROVED: CEE	
DATE: MAY 2020 SCALE: AS NOTED	EXHIBIT 11		



Map Legend

- P118-27-00
- Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 ft
- 1.00 ft - 2.00 ft
- 2.00 ft - 3.00 ft
- > 3.00 ft



Max Depth (Feet)
 High : 14.10
 Low : 0.00

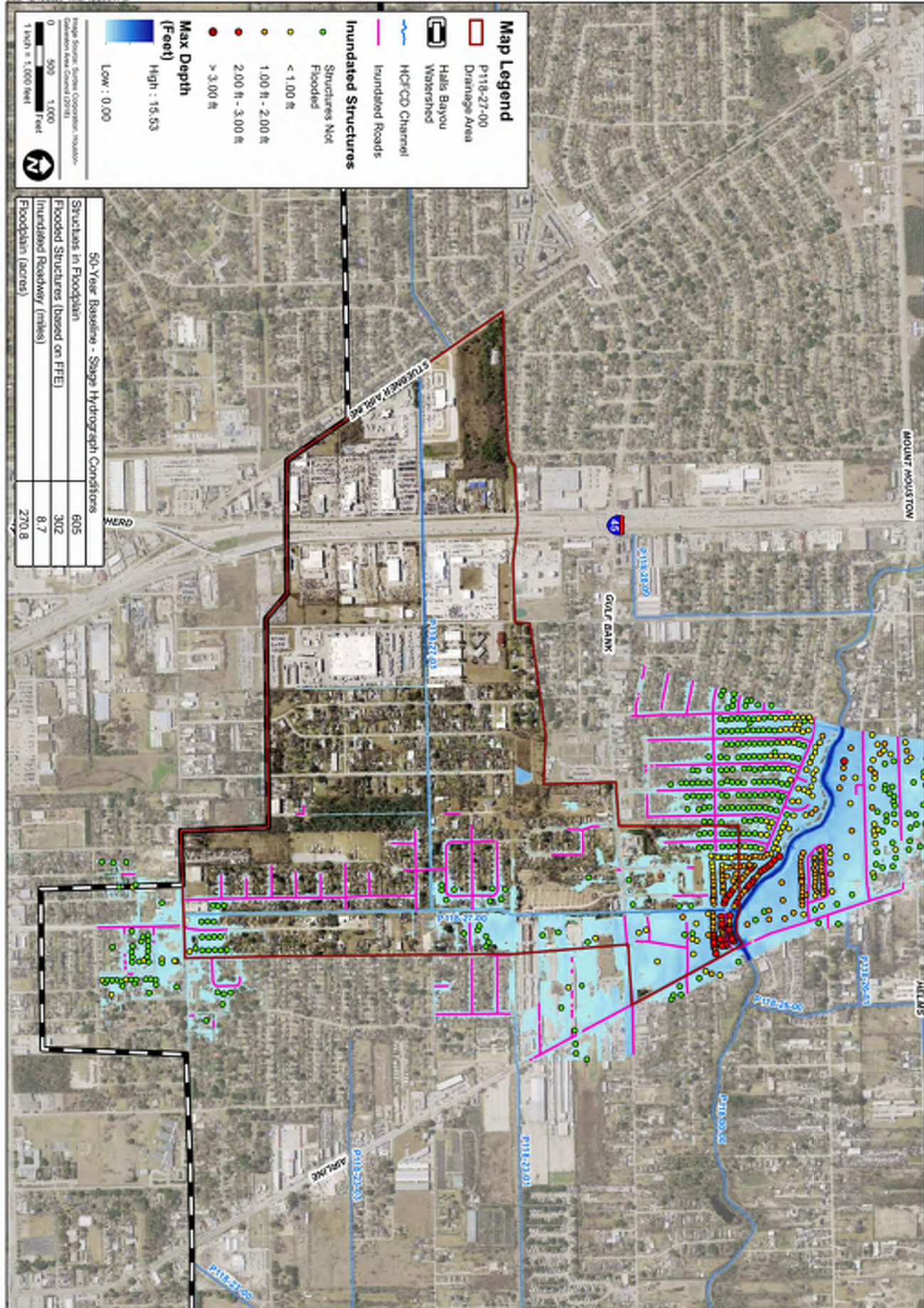
Map Source: Google Corporation, Microsoft Corporation, Esri, DeLorme, GeoEye, IGN, Aerotech, AeroGRID, IGN, Esri, Swire

Scale: 1 inch = 1,000 feet

10-Year Baseline - Stage Hydrograph Conditions

Structures in Floodplain	248
Flooded Structures (based on FFE)	111
Inundated Roadway (mils)	4.1
Floodplain (acres)	125.6

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>9900 Northwest Freeway Houston, Texas 77025</small>	 Lockwood, Andrews & Newnam, Inc. <small>A U.S. & CANADA COMPANY</small> <small>1000 Park St. 20th 2000 Broadway Blvd. • Houston, TX 77002-5700 713.266.4000 • F 713.266.4000 www.laninc.com • info@laninc.com</small>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 10-YEAR BASELINE CONDITIONS PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED	EXHIBIT 13		



Map Legend



- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 ft
- 1.00 ft - 2.00 ft
- 2.00 ft - 3.00 ft
- > 3.00 ft

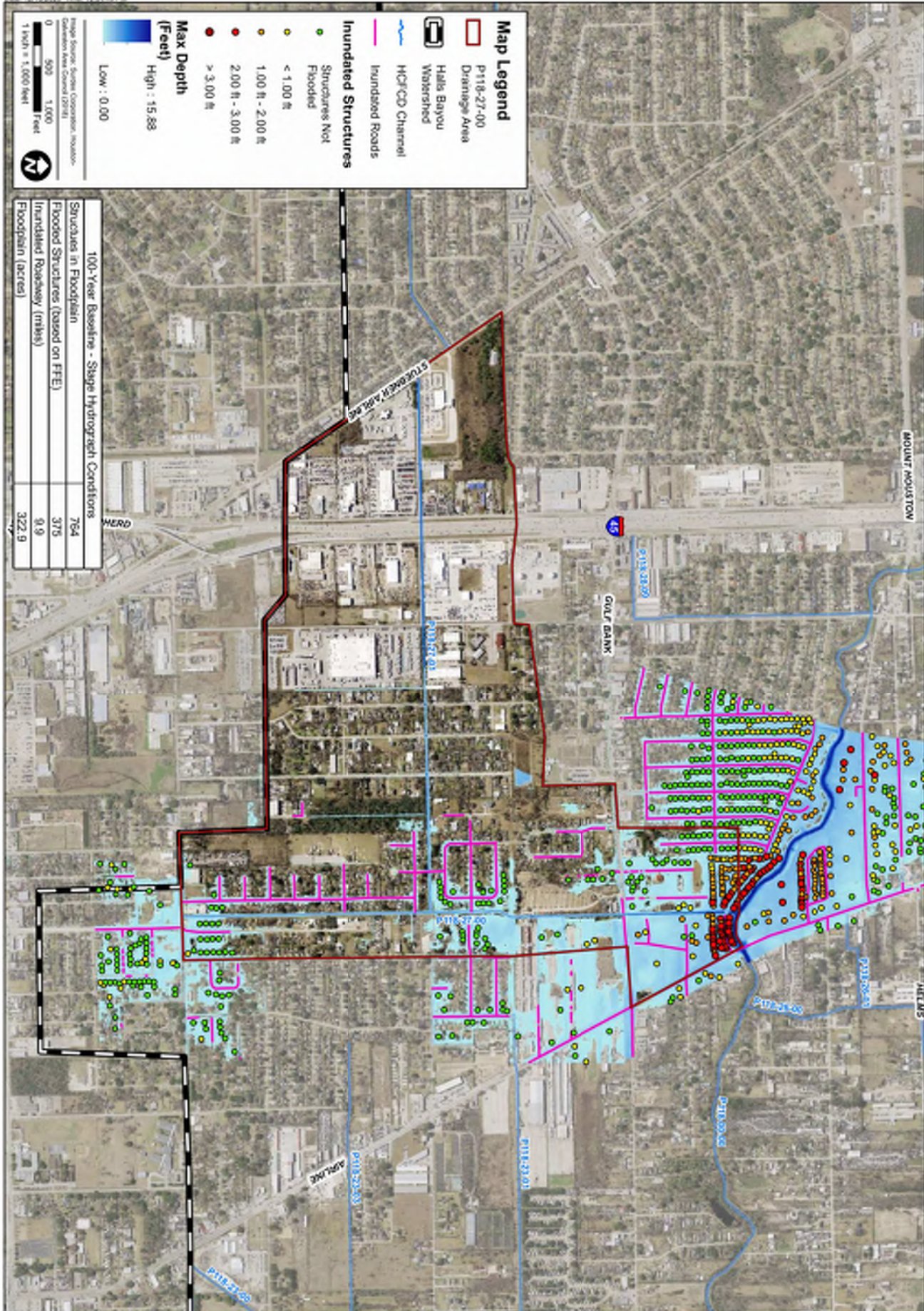
Max Depth (Feet)
 High : 15.53
 Low : 0.00

Scale: 1 inch = 1,000 feet

50-Year Baseline - Stage Hydrograph Conditions

Structures in Floodplain	605
Flooded Structures (based on FFEI)	302
Inundated Roadway (miles)	8.7
Floodplain (acres)	270.8

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>3900 Northwest Freeway Houston, Texas 77026</small>	 Lockwood, Andrews & Newnam, Inc. <small>A 100% W-9 COMPANY</small> <small>1000 Park 300, 3014 6907 Broadway Blvd. • Houston, TX 77043-6700 713.266.6900 • F 713.266.3000 www.laninc.com • info@laninc.com</small>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 50-YEAR BASELINE CONDITIONS PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJL	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED EXHIBIT 14			



Map Legend

- ▭ P118-27-00 Drainage Area
- ▭ Halls Bayou Watershed
- ▭ HCFCO Channel
- ▭ Inundated Roads
- ▭ Inundated Structures
- Structures Not Flooded
- Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

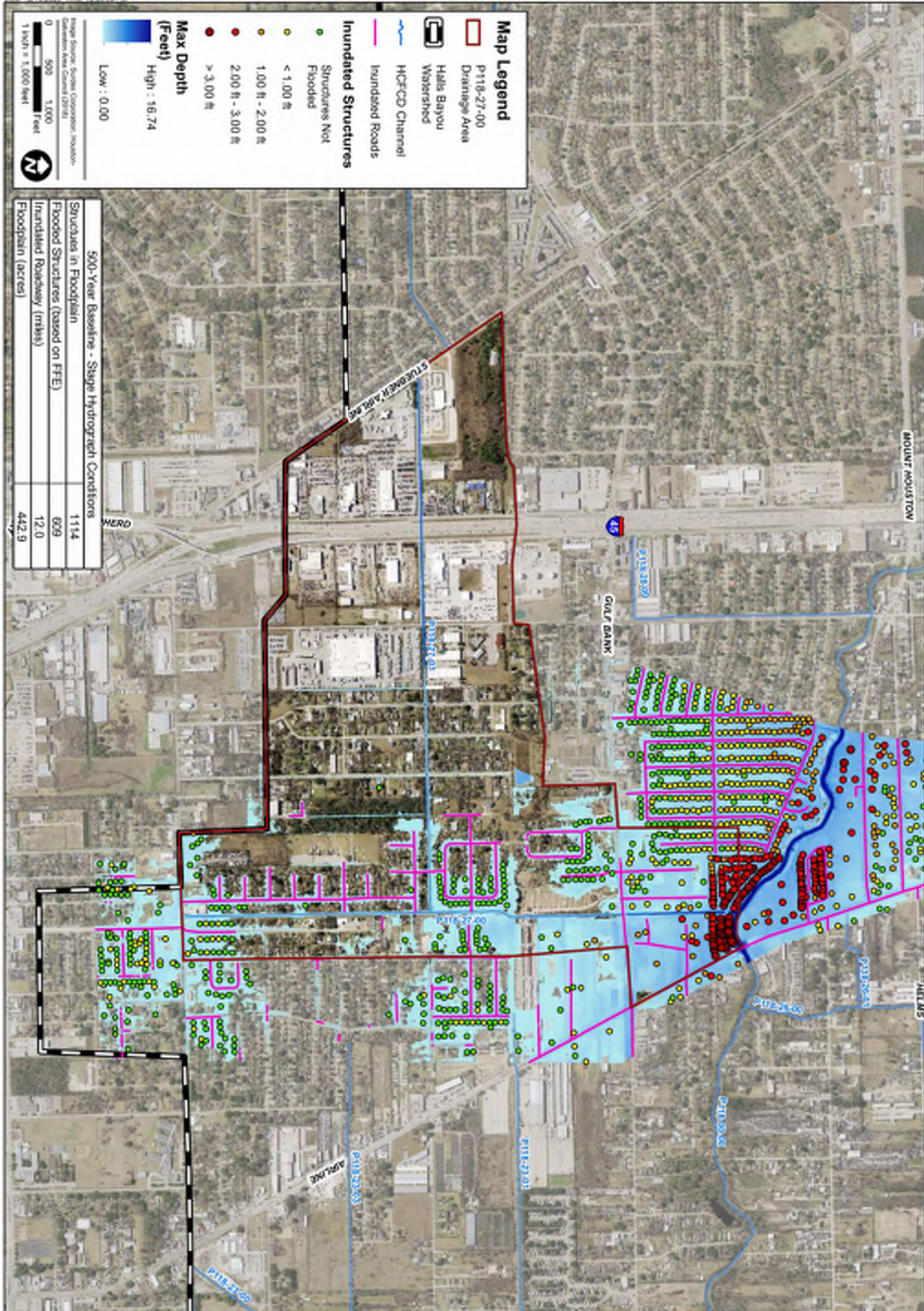
Max Depth (Feet)
 High : 15.88
 Low : 0.00

Range: 0 to 15.88
 Color: 0 to 15.88
 Contour Interval: 0.50
 1 Inch = 1,000 Feet

100-Year Baseline - Stage Hydrograph Conditions

Structures in Floodplain	764
Flooded Structures (based on FFE)	375
Inundated Roadway (mils)	9.9
Floodplain (acres)	322.9

<p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p> <p>3900 Northward Freeway Houston, Texas 77026</p>	<p>Lockwood, Andrews & Newnam, Inc. A U.S. & GUY COMPANY</p> <p>1000 Park St. 20th 2000 Broadway Blvd. • Houston, TX 77002-5700 P: 713.866.8200 • F: 713.866.3200 www.laninc.com • info@laninc.com</p>	PREPARED: TMM	<p>HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS</p> <p>100-YEAR BASELINE CONDITIONS PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)</p>
		CHECKED: BJ	
		APPROVED: CEE	
<p>DATE: OCT 2020 SCALE: AS NOTED</p> <p>EXHIBIT 15</p>			



Map Legend

- P118-27-00
- Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Structures Not Flooded
- Structures Flooded

Max Depth (Feet)



- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

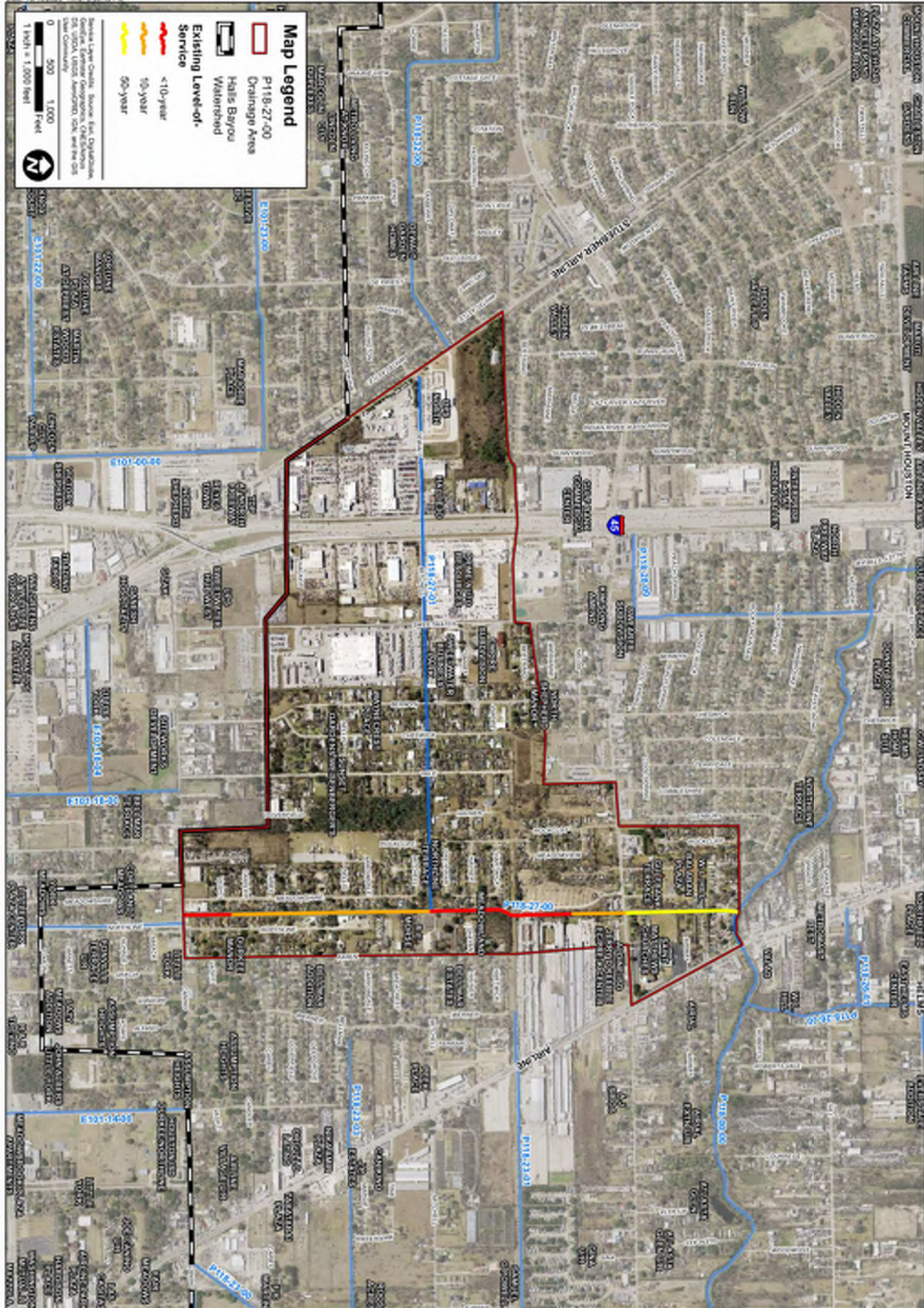
Scale: 1 inch = 1,000 feet



North Arrow

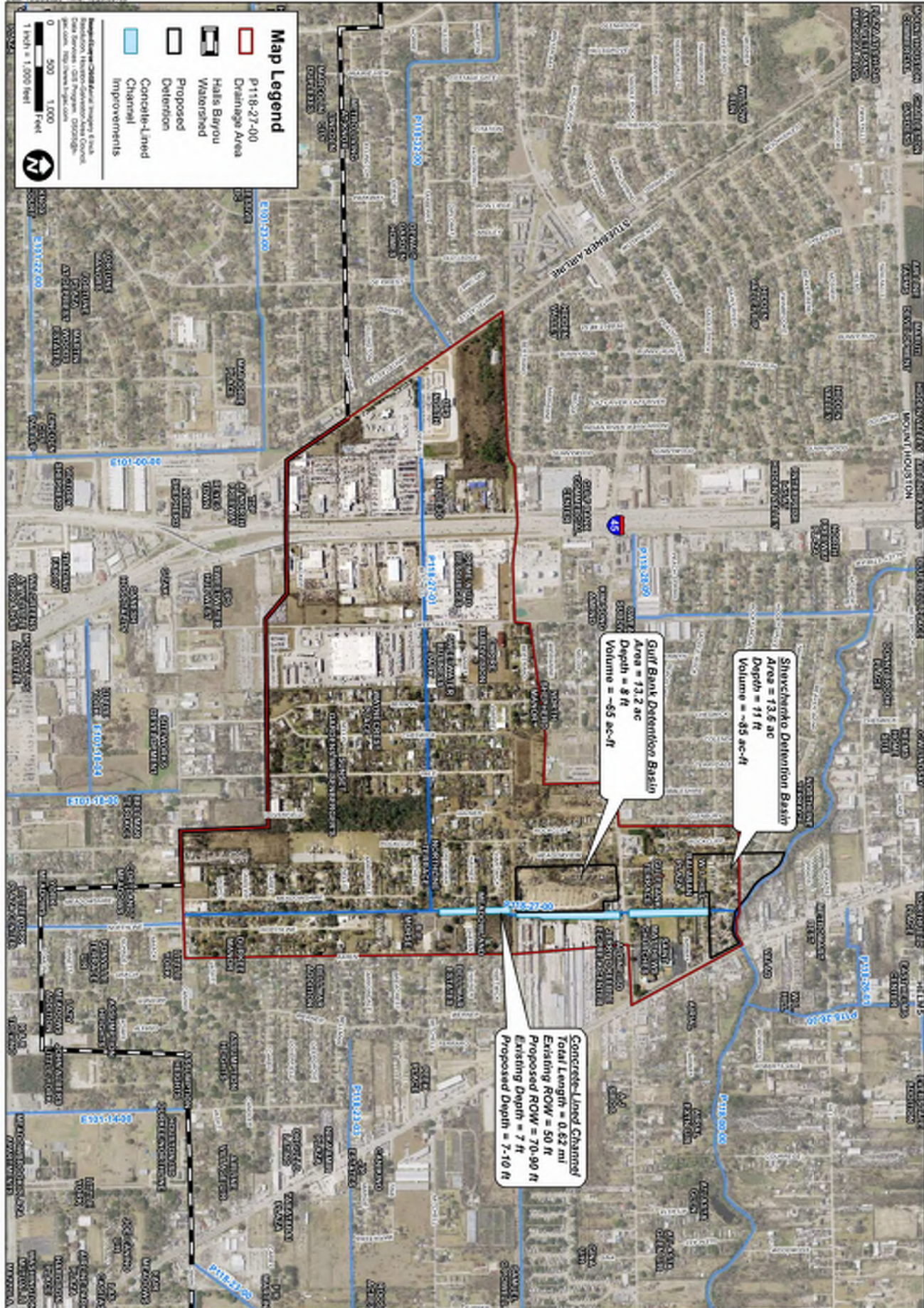
500-Year Baseline - Stage Hydrograph Conditions

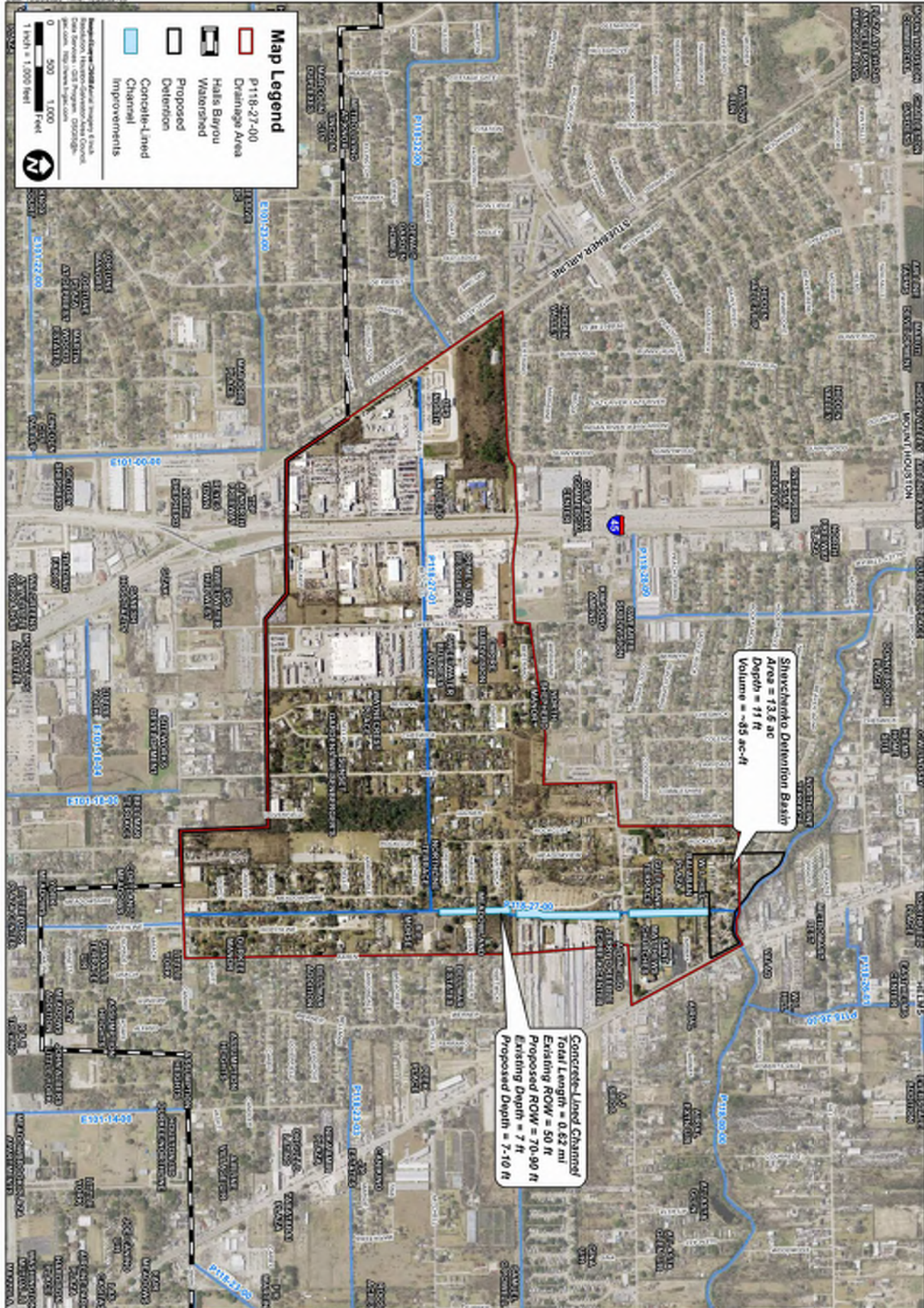
Structures in Floodplain	1114
Flooded Structures (based on FFE)	609
Inundated Roadway (mils)	12.0
Floodplain (acres)	442.9

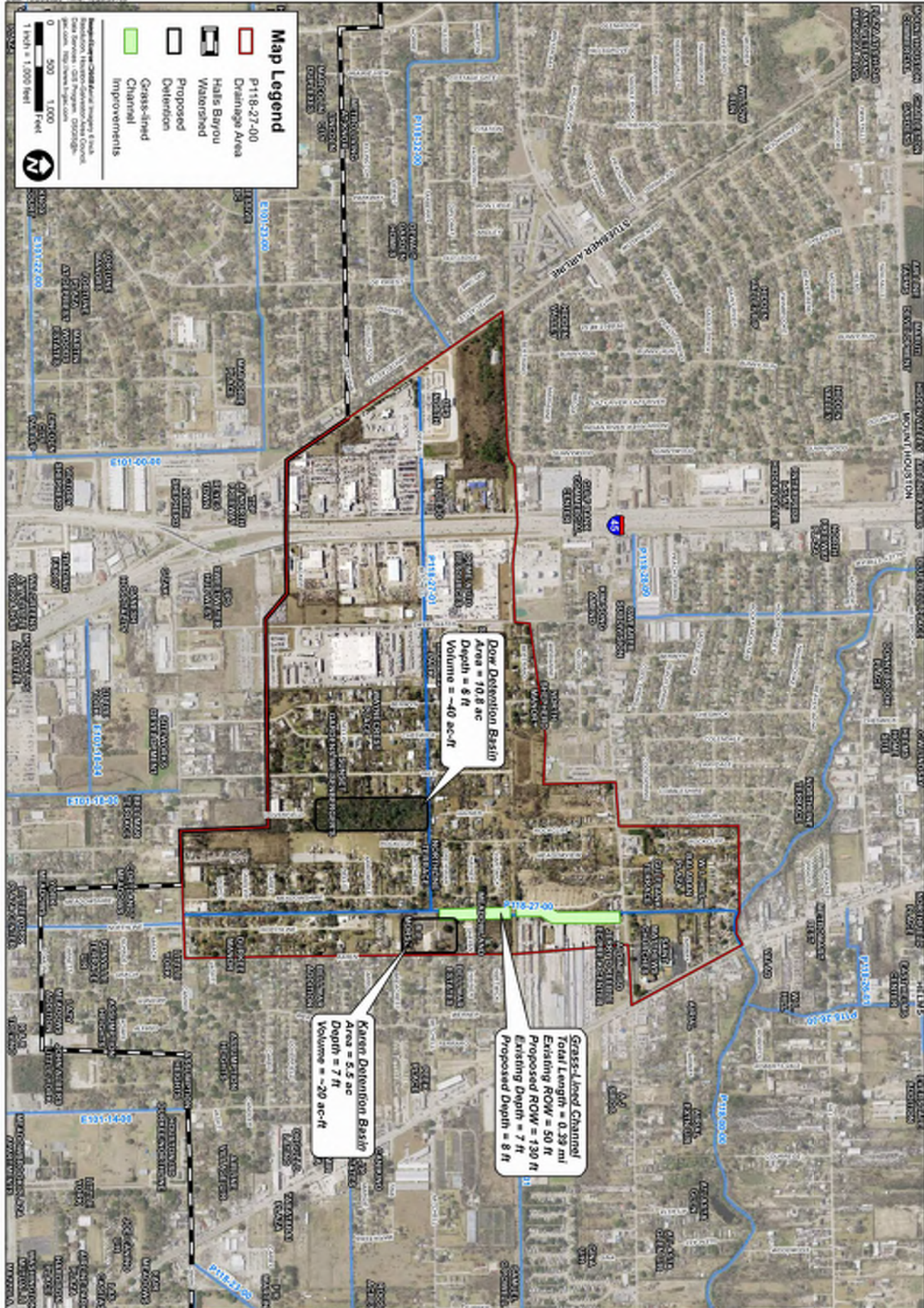
 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A U.S. & GUY COMPANY</p>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 500-YEAR BASELINE CONDITIONS PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJL	
		APPROVED: CEE	
DATE: OCT 2010 SCALE: AS NOTED	5000 Northward Parkway Houston, Texas 77058	2010 Parkway 2010 2010 Parkway Blvd. • Houston, TX 77043-5700 281.481.2000 • # 248.288.2000 www.lannc.com • info@lannc.com	EXHIBIT 16





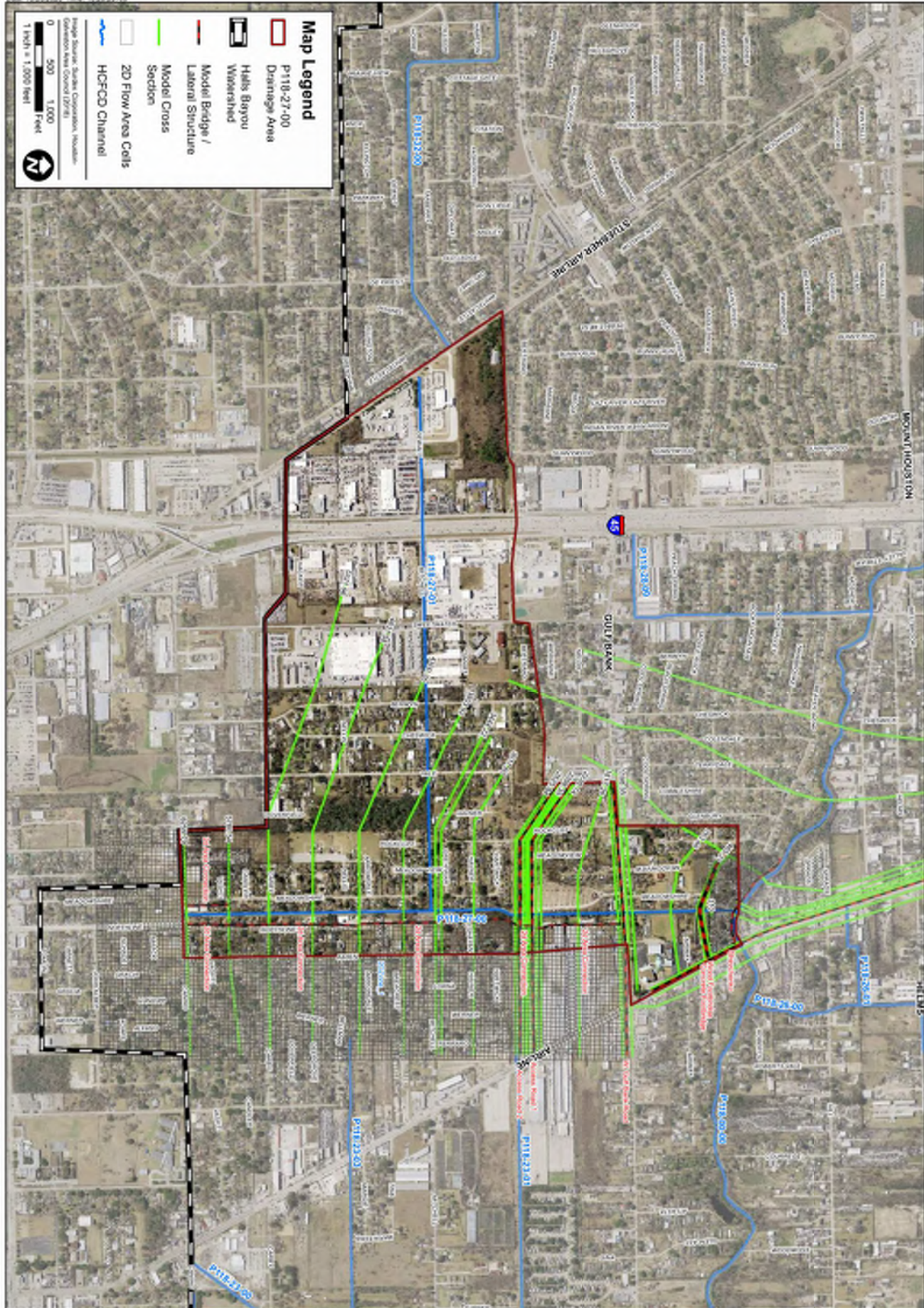
 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Neumann, Inc. A LEED & SAI COMPANY 2017 Park Ave. Suite 200 2017 Springdale - Houston, TX 77059 713.866.8900 • F 713.866.8900 www.lan-inc.com • lan@lan-inc.com</p>	PREPARED: PSK	<p>HCFCF HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS</p> <p>EXISTING LEVEL-OF-SERVICE</p>	
		DATE: MAY 2010		CHECKED: CEE
		SCALE: AS NOTED		APPROVED: CEE
EXHIBIT 17				







 <p>HAIRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Neumann, Inc. A LEED & GREEN COMPANY</p>	PREPARED: ENR	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS ALTERNATIVE 3 LAYOUT
		CHECKED: CEE	
		APPROVED: CEE	
DATE: AUG 2009 SCALE: AS NOTED EXHIBIT 20	9900 Northwest Parkway Houston, Texas 77025	7500 Park 20th Houston, TX 77057 281.466.8000 • 281.466.8000 www.laninc.com • info@laninc.com	



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- Model Bridge / Lateral Structure
- Model Cross Section
- 2D Flow Area Cells
- HCFCD Channel

Map Source: State Construction Module
 Construction Area Color (27781)
 Construction Area Color (27781)

Scale: 1 inch = 1,000 feet

North Arrow

HARRIS COUNTY FLOOD CONTROL DISTRICT

9900 Northwest Freeway
 Houston, Texas 77036

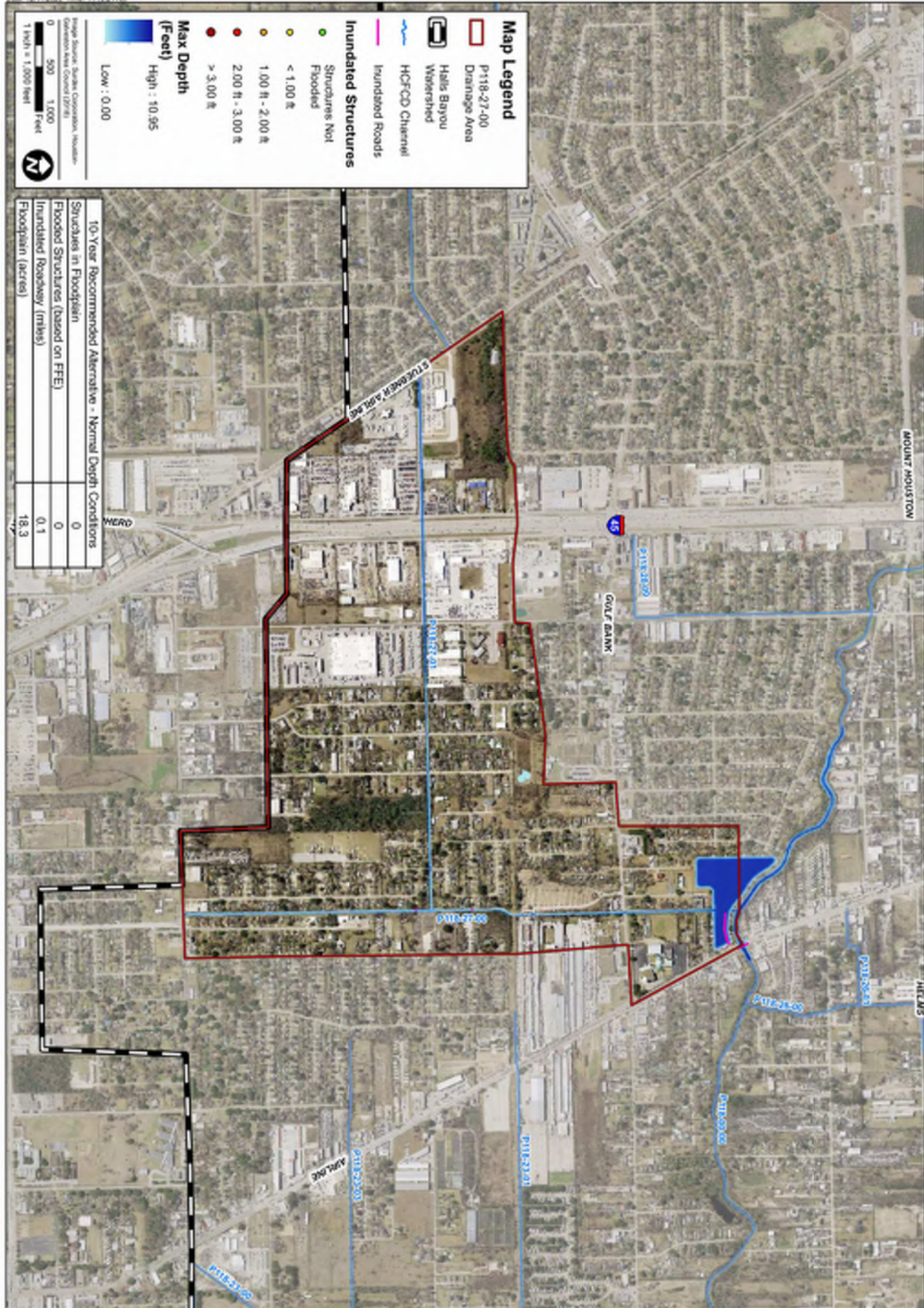
Lockwood, Andrews & Newnam, Inc.
 A LEO A DALY COMPANY

2010 Park Ave. 20th
 2010 Park Ave. - Houston, TX 77002
 P 713.866.8900 • F 713.866.0182
 www.lan-inc.com • info@lan-inc.com

PREPARED:	TMM
CHECKED:	BJI
APPROVED:	CEE

HCFCD HALLS BAYOU WATERSHED
 P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS

**HEC-RAS GEOMETRY
 RECOMMENDED ALTERNATIVE**



Map Legend

- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎


Max Depth (Feet)
 High : 10.95
 Low : 0.00

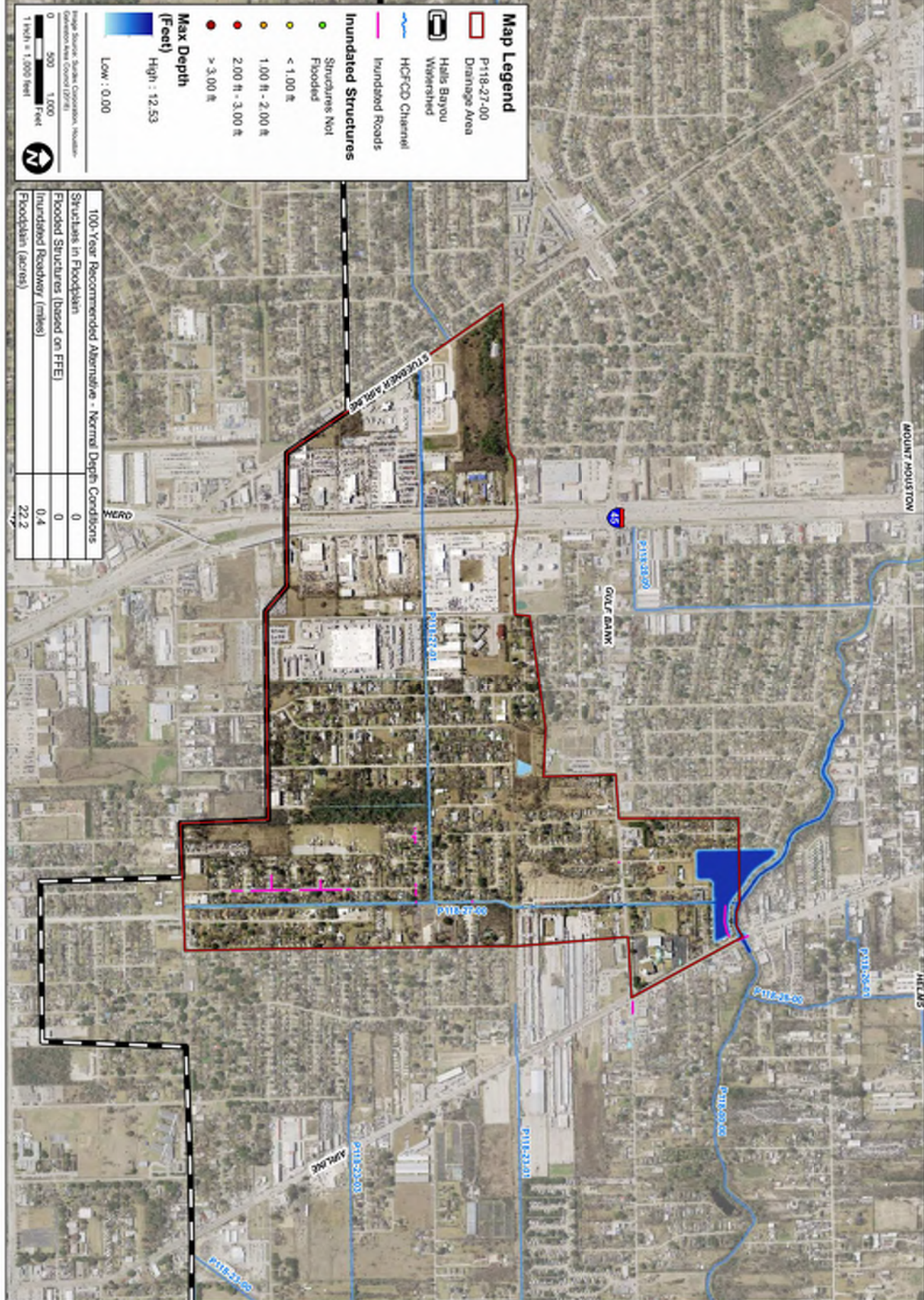
Map Source: Statewide Contour Model
 Contour Interval: 0.25 呎
 Contour Line Color: 12751

Scale: 1 Inch = 1,000 Feet

10-Year Recommended Alternative - Normal Depth Conditions

Structures in Floodplain	0
Flooded Structures (based on FFE)	0
Inundated Roadway (miles)	0.1
Floodplain (acres)	18.3

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LEED & S&P COMPANY</p>	PREPARED: TMM	<p>HCFCD HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS</p> <p>10-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)</p>
		CHECKED: BJJ	
		APPROVED: CEE	
<p>DATE: OCT 2016 SCALE: AS NOTED</p>	<p>9900 Northwest Freeway Houston, Texas 77036</p>	<p>2700 Westpark Drive - Houston, TX 77055-0775 281-486-8800 • F 281-486-2885 www.lan-in.com • info@lan-in.com</p>	<p>EXHIBIT 22</p>



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

Max Depth (Feet)
 High : 12.53
 Low : 0.00

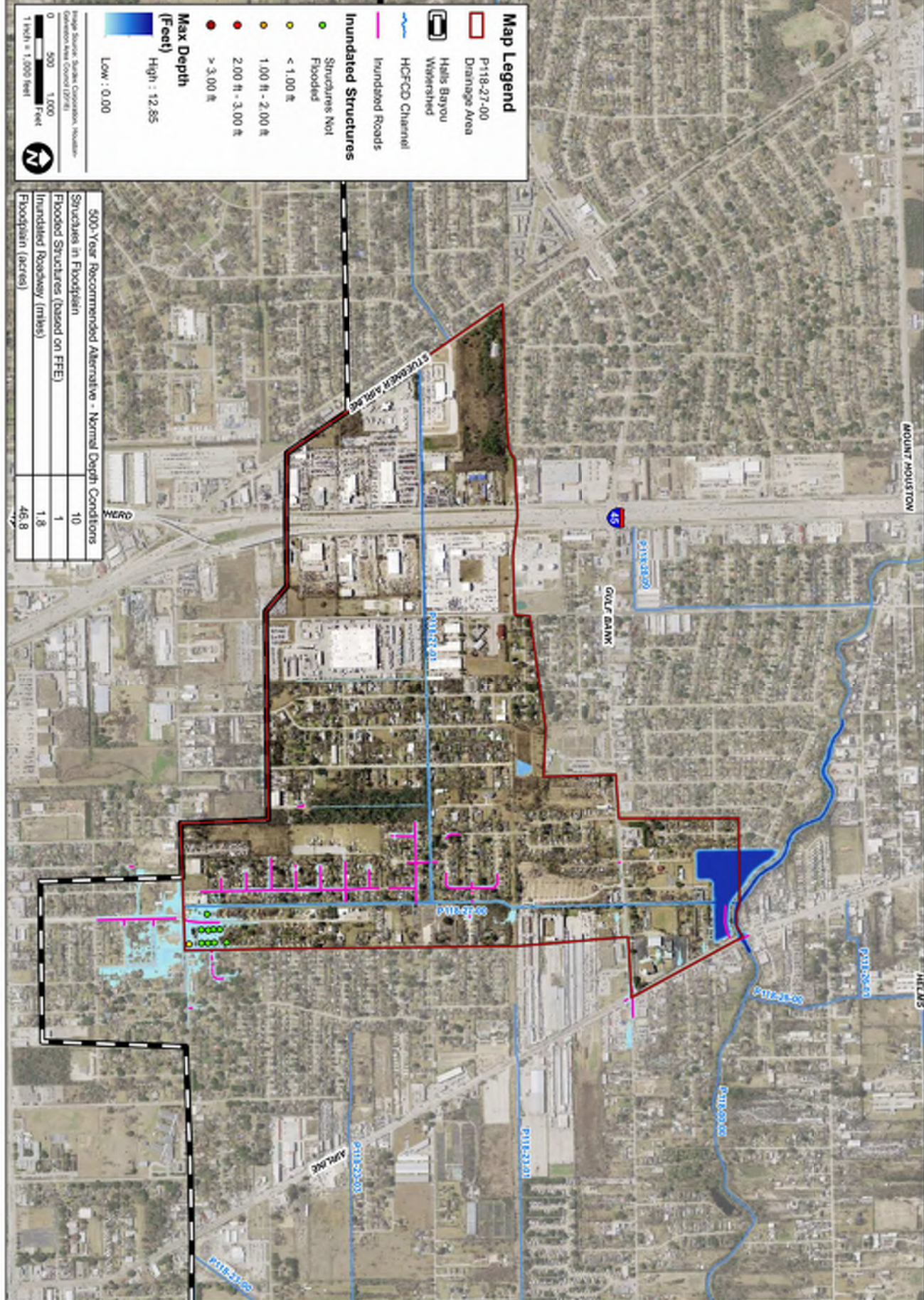
Map Source: Sattler, Cozzolino, Houston
 Contour Interval: 0.25 呎
 Contour Line Color: 127561

Scale: 1 inch = 1,000 feet

100-Year Recommended Alternative - Normal Depth Conditions

Structures in Floodplain	Flooded Structures (based on FFE)	Inundated Roadway (miles)	Floodplain (acres)
0	0	0.4	22.2

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LEED & GBC COMPANY</p>	PREPARED: TMM	HCFCD HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 100-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2010 SCALE: AS NOTED EXHIBIT 24			



Map Legend

- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Inundated Roads
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎



Max Depth (Feet)
 High : 12.85
 Low : 0.00

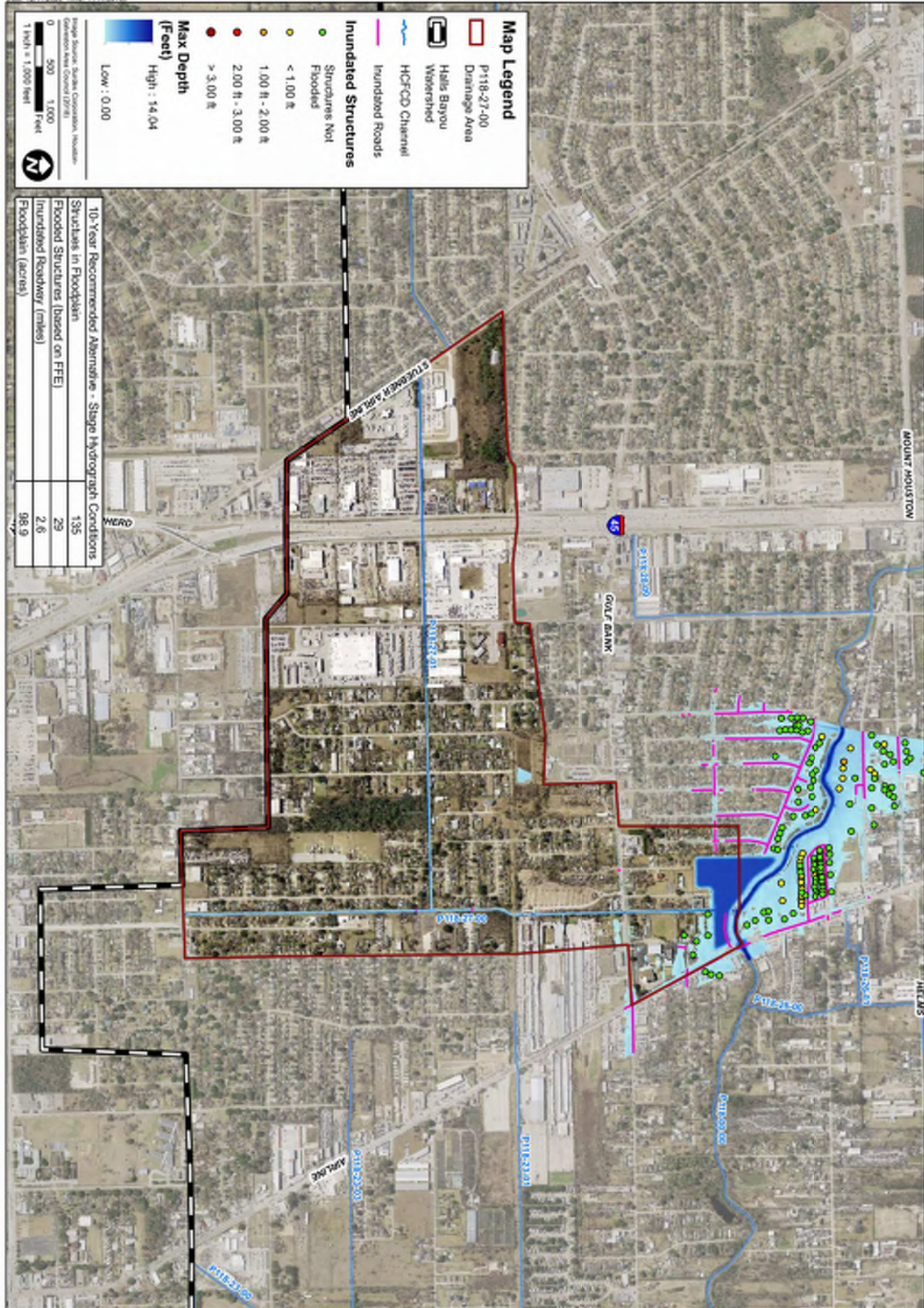
Map Source: Surface Elevation, Houston, Texas
 Contour Interval: 1.00 Feet
 Contour Line Color: Green

Scale: 1 Inch = 1,000 Feet

500-Year Recommended Alternative - Normal Depth Conditions

Structures in Floodplain	10
Flooded Structures (based on FFE)	1
Inundated Roadway (miles)	1.8
Floodplain (acres)	46.8

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LEED & GBCI COMPANY</p>	PREPARED: TMM	HCFCD HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 500-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2010 SCALE: AS NOTED	EXHIBIT 25		



Map Legend


- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Inundated Roads
- Inundated Structures
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

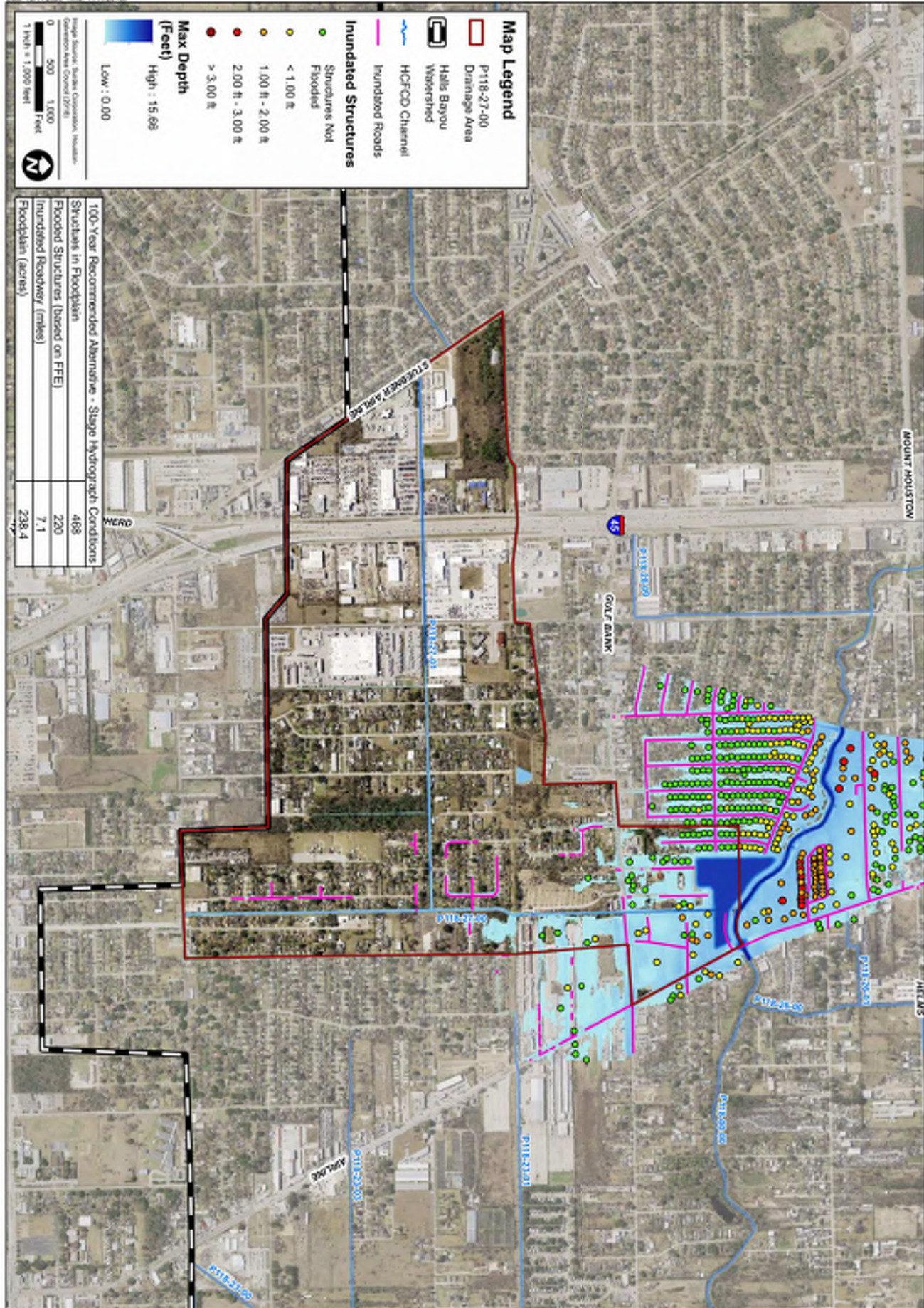
Max Depth (Feet)
 High : 14.04
 Low : 0.00

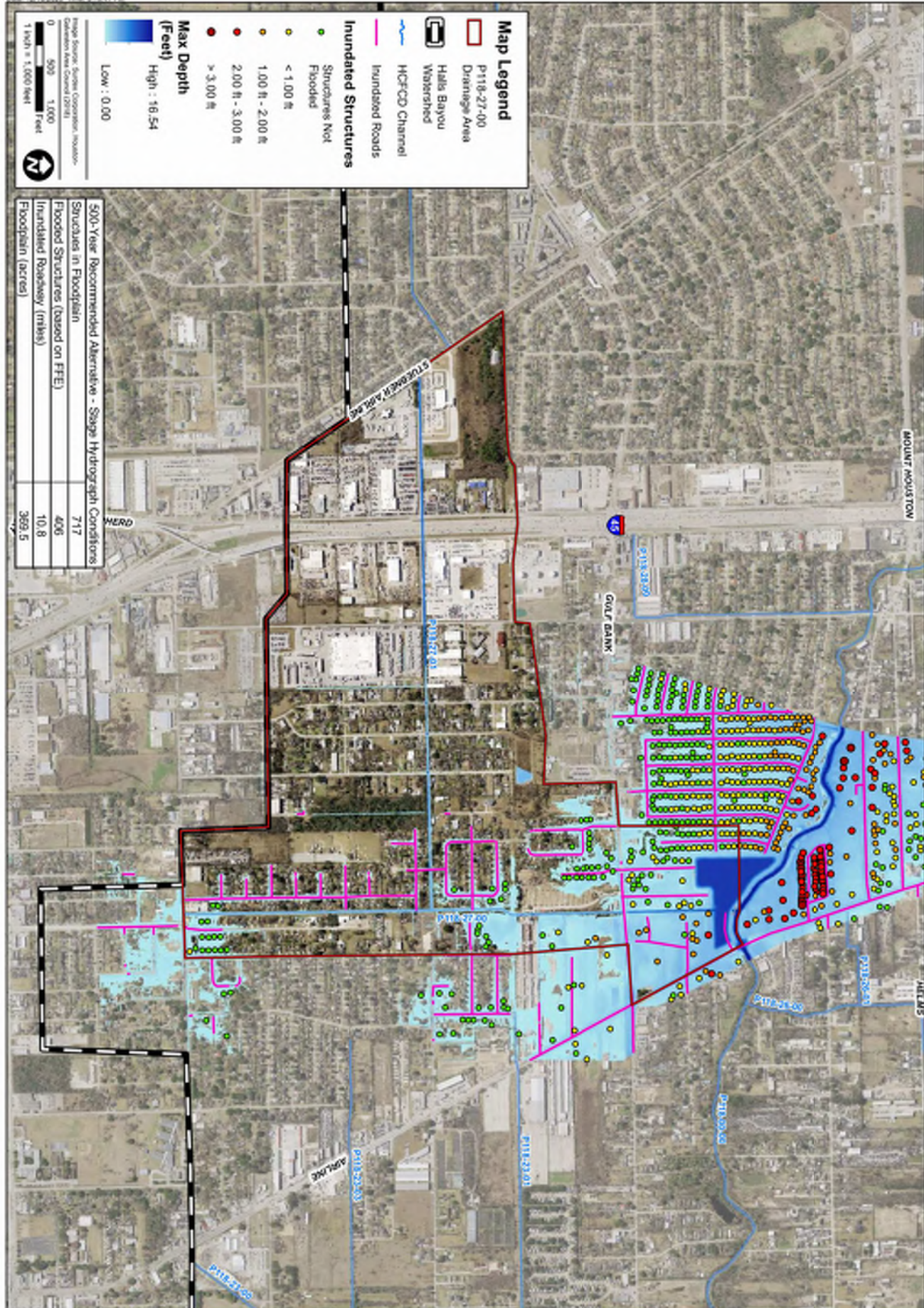
Map Source: Statewide Commission, Houston, Commission Area Council (27761)
 Scale: 1 inch = 1,000 feet

10-Year Recommended Alternative - Stage Hydrograph Conditions

Structure in Floodplain	135
Flooded Structures (based on FFEI)	29
Inundated Roadway (miles)	2.6
Floodplain (acres)	98.9

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>9900 Northwest Freeway Houston, Texas 77028</small>	 Lockwood, Andrews & Newnam, Inc. <small>A LEED & S&P COMPANY</small> 1976 Park Ave. 20th 2707 Shoppack Drive - Houston, TX 77058-0775 P 713.866.8200 • F 713.866.0265 www.lan-in.com • info@lan-in.com	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 10-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2016 SCALE: AS NOTED EXHIBIT 26			





Map Legend



- P118-27-00 Drainage Area
- Gulf Bank
- HCFCO Channel
- Inundated Roads
- Structures Not Flooded
- < 1.00 呎
- 1.00 呎 - 2.00 呎
- 2.00 呎 - 3.00 呎
- > 3.00 呎

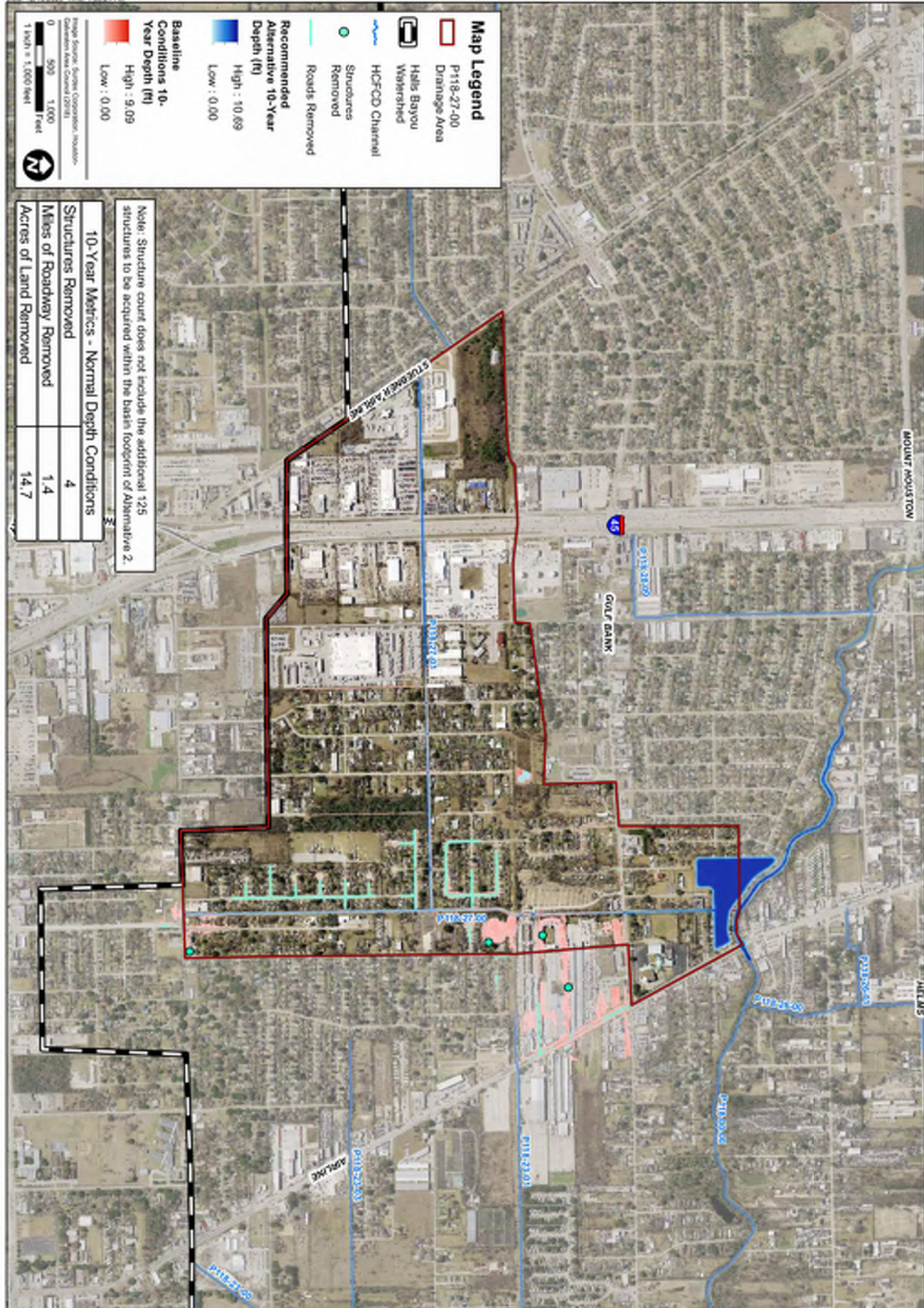
Max Depth (Feet)
High : 16.54
Low : 0.00

Scale: 1 inch = 1,000 feet

500-Year Recommended Alternative - Stage Hydrograph Conditions

Structures in Floodplain	717
Flooded Structures (based on FFE)	406
Inundated Roadway (mils)	10.8
Floodplain (acres)	389.5

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A U.S. & CANADA COMPANY</p>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-03 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 500-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJL	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED EXHIBIT 29			



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed
- Recommended Alternative 10-Year Depth (ft)
- Baseline Conditions 10-Year Depth (ft)



Recommended Alternative 10-Year Depth (ft)
 High : 10.69
 Low : 0.00

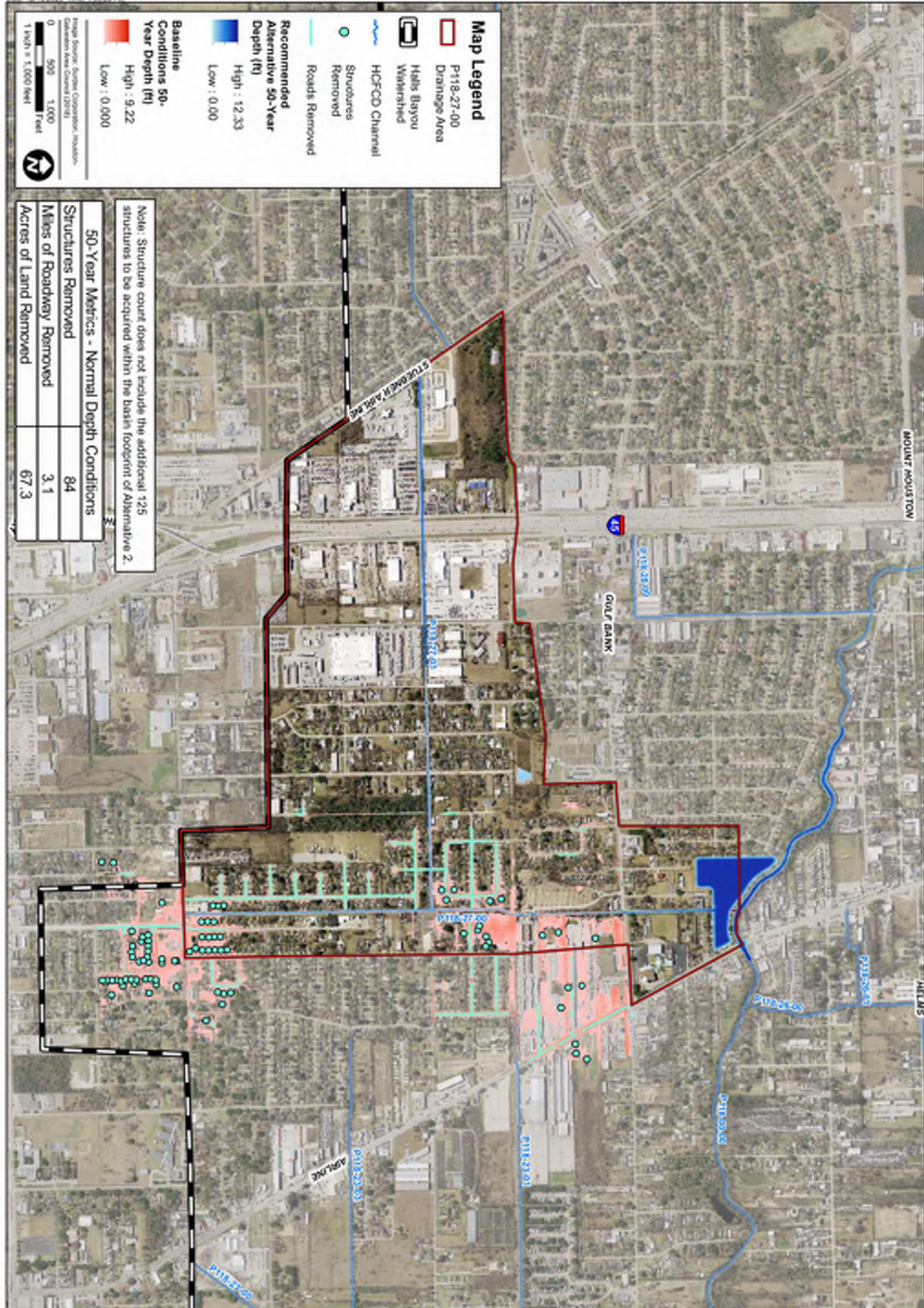
Baseline Conditions 10-Year Depth (ft)
 High : 9.09
 Low : 0.00

Map Source: Survey Coordinates: NAD83
 Coordinate System: GCS (NAD 83)
 Scale: 1 inch = 1,000 feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

10-Year Metrics - Normal Depth Conditions	
Structures Removed	4
Miles of Roadway Removed	1.4
Acres of Land Removed	14.7

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>3900 Northward Freeway Houston, Texas 77058</small>	 Lockwood, Andrews & Newnam, Inc. <small>A LEO & GUY COMPANY</small> <small>1800 Park St. 20th 2000 Broadway Blvd. • Houston, TX 77058-5700 P 713.866.6900 • F 713.866.3000 www.laninc.com • info@laninc.com</small>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 10-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED EXHIBIT 30			





Map Legend

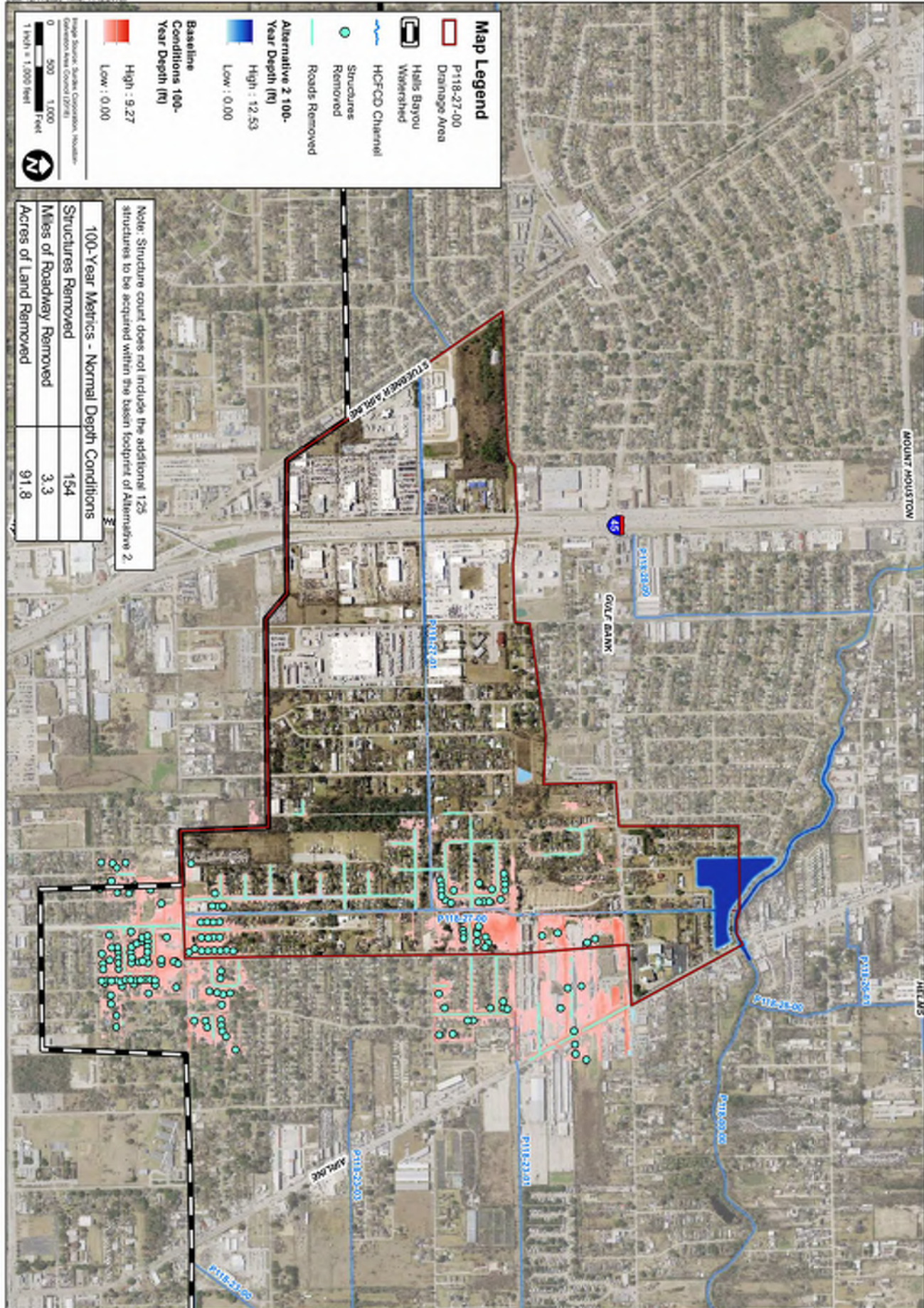
- P118-27-00
- Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed
- Recommended Alternative 50-Year Depth (ft)
- High : 12.33
- Low : 0.00
- Baseline Conditions 50-Year Depth (ft)
- High : 9.22
- Low : 0.00

Map Source: Survey Coordinates: NAD83
 Coordinate System: GCS (NAD 83)
 Scale: 1 inch = 1,000 feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

50-Year Metrics - Normal Depth Conditions	
Structures Removed	84
Miles of Roadway Removed	3.1
Acres of Land Removed	67.3

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A LEO & GUY COMPANY</p>	PREPARED: TMM	<p>HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 50-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)</p>
		CHECKED: BJJ	
		APPROVED: CEE	
<p>DATE: OCT 2020 SCALE: AS NOTED</p>	<p>31</p>		




Map Legend

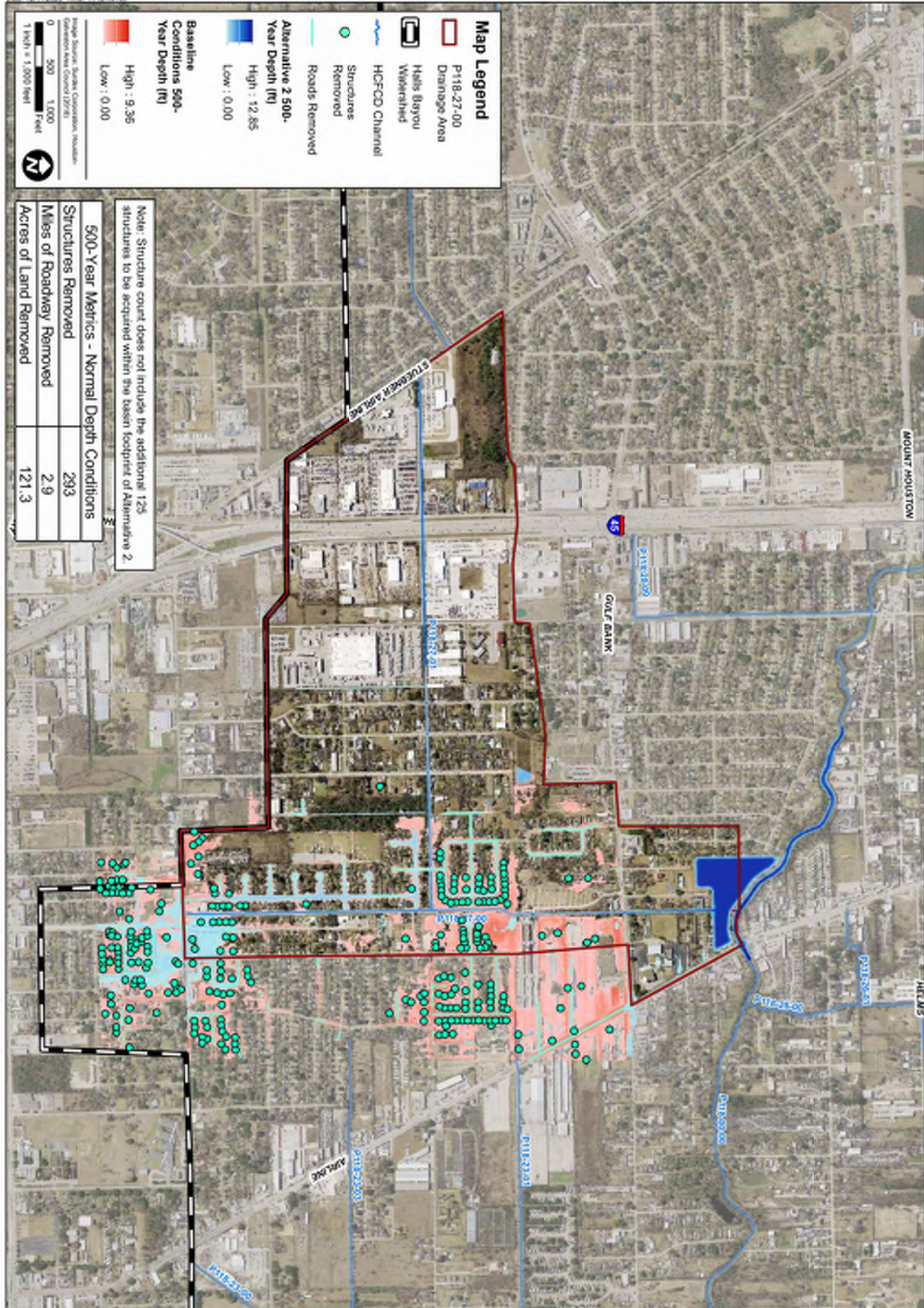
- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCD Channel
- Structures Removed
- Roads Removed
- Alternative 2 100-Year Depth (ft)
High : 12.53
Low : 0.00
- Baseline Conditions 100-Year Depth (ft)
High : 9.27
Low : 0.00

Map Source: Statewide Geospatial Information Commission (www.gis.texas.gov)
 Commission File Count (12/7/11):
 0 500 1,000 Feet
 1 Inch = 1,000 Feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

100-Year Metrics - Normal Depth Conditions	
Structures Removed	154
Miles of Roadway Removed	3.3
Acres of Land Removed	91.8

		PREPARED: TMM	<p>HCFCD HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 100-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)</p>
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2010 SCALE: AS NOTED EXHIBIT 32			



Map Legend

- P-118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed
- Alternative 2 500-Year Depth (ft)
High : 12.85
Low : 0.00
- Baseline Conditions 500-Year Depth (ft)
High : 9.26
Low : 0.00

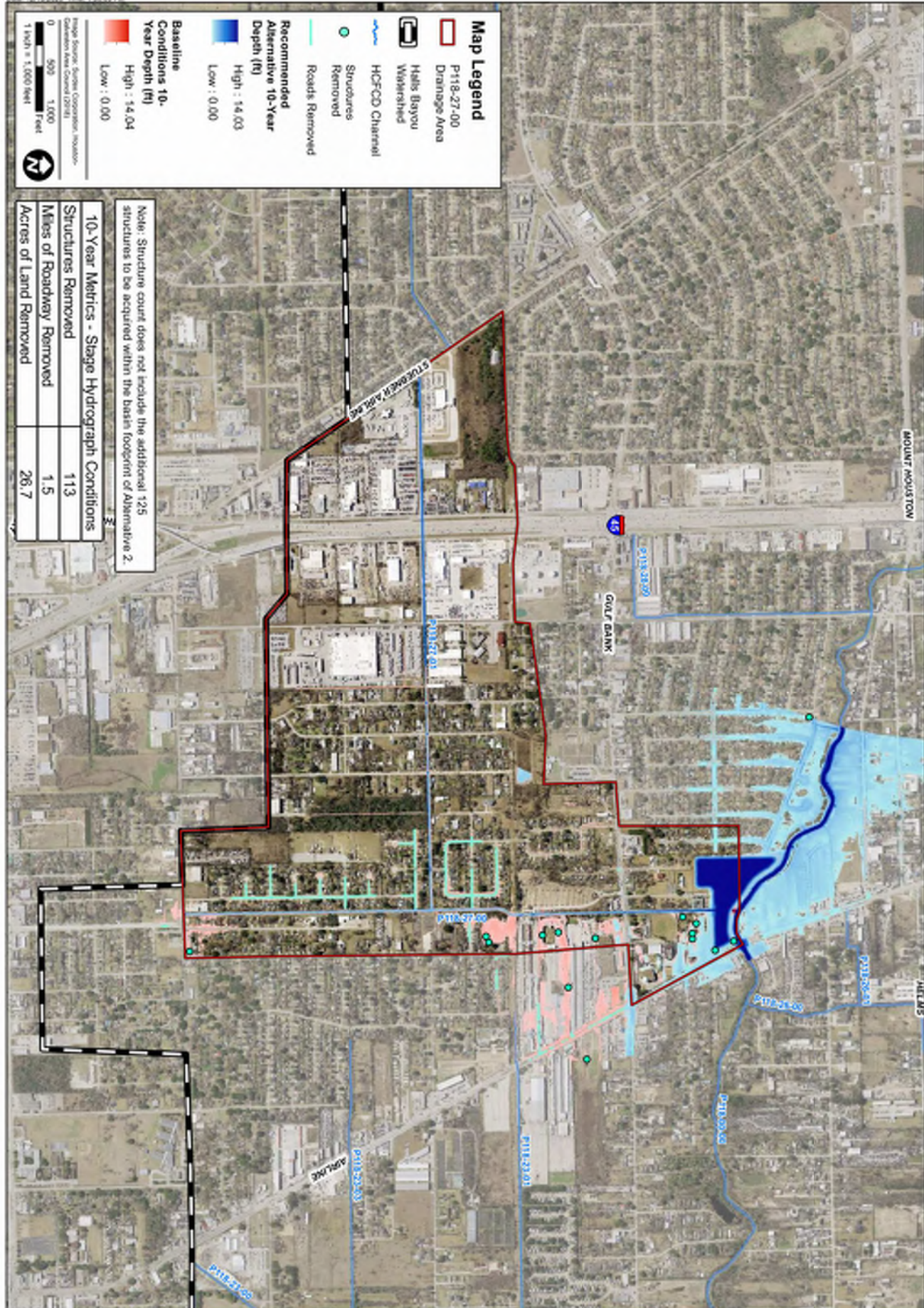
Map Source: Surface Elevation, Houston, Texas
 Contour Interval: 0.25 ft
 Contour Line Color: 17781

Scale: 1 inch = 1,000 feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

500-Year Metrics - Normal Depth Conditions	
Structures Removed	293
Miles of Roadway Removed	2.9
Acres of Land Removed	121.3

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>9600 Northwest Freeway Houston, Texas 77028</small>	 Lockwood, Andrews & Newnam, Inc. <small>A LEO A DALY COMPANY</small> 1376 Park Ave. 20th 2707 Briarcliff Drive - Houston, TX 77005-0775 P 713.866.8200 • F 713.866.0200 www.lan-in.com • info@lan-in.com	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 500-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (NORMAL DEPTH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2010 SCALE: AS NOTED EXHIBIT 33			





Map Legend

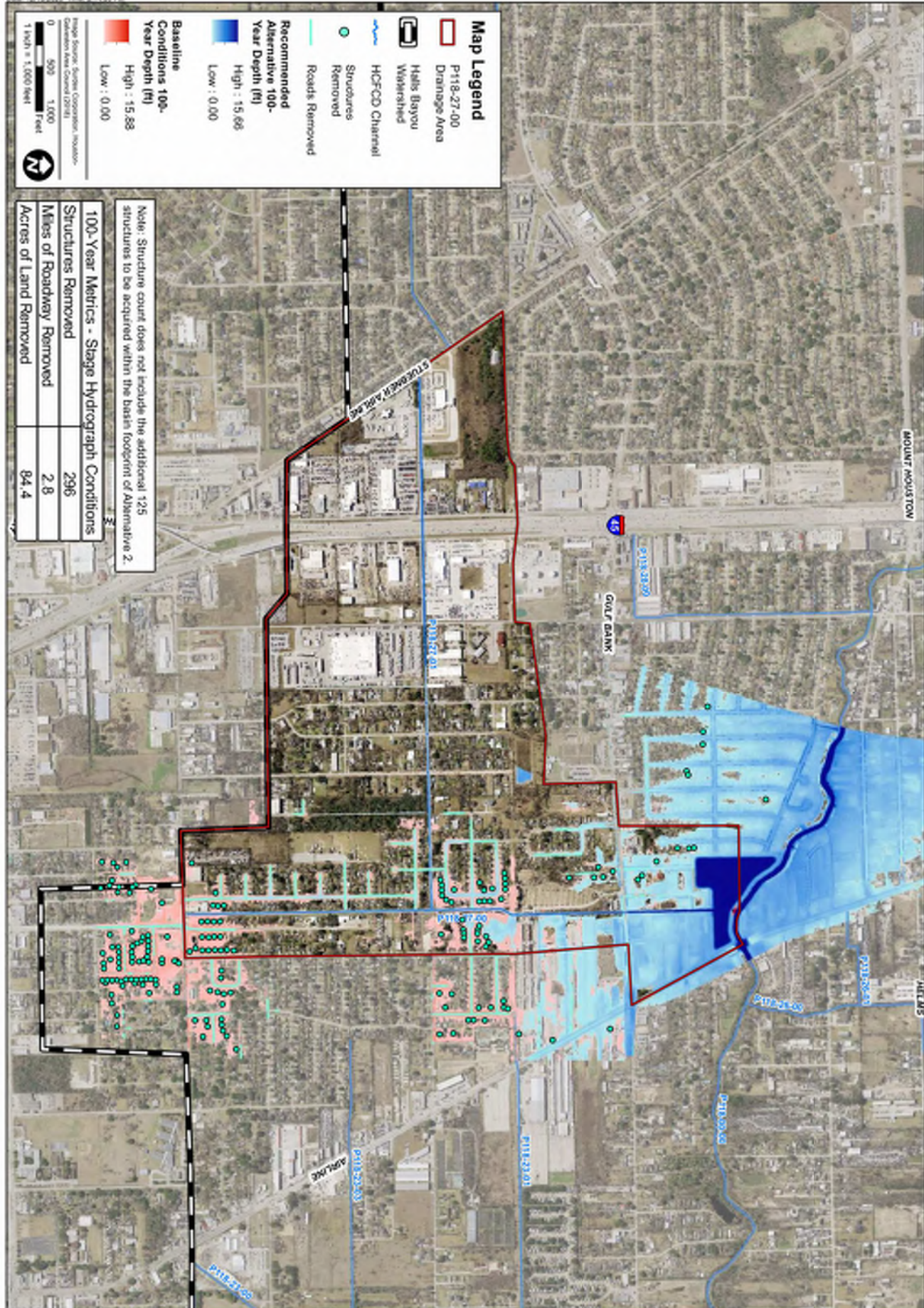
- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed
- Recommended Alternative 10-Year Depth (ft)
High : 14.00
Low : 0.00
- Baseline Conditions 10-Year Depth (ft)
High : 14.04
Low : 0.00

Map Source: Source: Corporation, Houston, Texas
 Projection: NAD 83
 Scale: 1:50,000 Feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

10-Year Metrics - Stage Hydrograph Conditions	
Structures Removed	113
Miles of Roadway Removed	1.5
Acres of Land Removed	26.7

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A L20 & ONLY COMPANY</p>	PREPARED: TMM	<p>HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 10-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)</p>
		CHECKED: BJL	
		APPROVED: CEE	
<p>DATE: OCT 2010 SCALE: AS NOTED</p>	<p>34</p>		



Map Legend

- P118-27-00
- Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed

Recommended Alternative 100-Year Depth (ft)

High : 15.66
Low : 0.00



Baseline Conditions 100-Year Depth (ft)

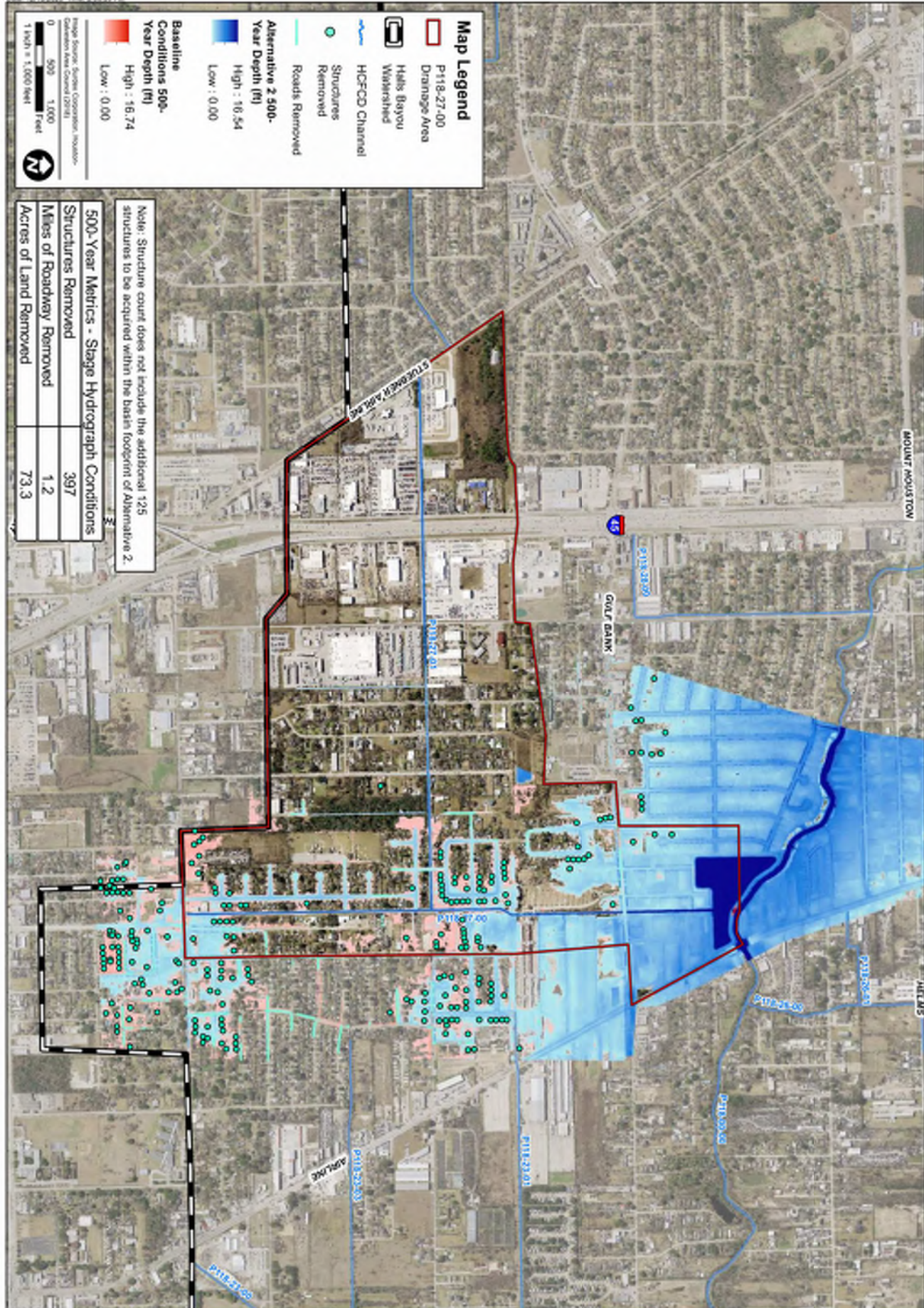
High : 15.88
Low : 0.00

Map Source: Source: Corporation, Houston, Texas
 Copyright Year: 2018
 Projection: NAD 83
 Scale: 1:1000
 1 inch = 1,000 feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

100-Year Metrics - Stage Hydrograph Conditions	
Structures Removed	296
Miles of Roadway Removed	2.8
Acres of Land Removed	84.4

 HARRIS COUNTY FLOOD CONTROL DISTRICT <small>9900 Northwest Freeway Houston, Texas 77024</small>	 Lockwood, Andrews & Newnam, Inc. <small>A LIDAR & CIVIL COMPANY</small> <small>1000 Park No. 2014 2001 Broadway Blvd. • Houston, TX 77058-5700 P: 713.866.8800 • F: 713.866.3800 www.laninc.com • info@laninc.com</small>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 100-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJL	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED EXHIBIT 36			



Map Legend

- P118-27-00 Drainage Area
- Halls Bayou Watershed
- HCFCO Channel
- Structures Removed
- Roads Removed

Alternative 2 500-Year Depth (ft)
 High : 16.54
 Low : 0.00



Baseline Conditions 500-Year Depth (ft)
 High : 16.74
 Low : 0.00

Map Source: Source: Corporation, Inc. / Corporation (see General Credit)

Scale: 1 inch = 1,000 feet

Note: Structure count does not include the additional 125 structures to be acquired within the basin footprint of Alternative 2.

500-Year Metrics - Stage Hydrograph Conditions	
Structures Removed	397
Miles of Roadway Removed	1.2
Acres of Land Removed	73.3

 <p>HARRIS COUNTY FLOOD CONTROL DISTRICT</p>	 <p>Lockwood, Andrews & Newnam, Inc. A L201 & ONLY COMPANY</p> <p>1000 Parkway Blvd. • Houston, TX 77063-5700 281.713.8800 • F 281.713.8800 www.laninc.com • info@laninc.com</p>	PREPARED: TMM	HCFCO HALLS BAYOU WATERSHED P118-27-00 ALTERNATIVES ANALYSIS OF DRAINAGE IMPROVEMENTS 500-YEAR RECOMMENDED ALTERNATIVE (ALT. 2) VS. BASELINE CONDITIONS COMPARISON PERFORMANCE METRICS (STAGE HYDROGRAPH TAILWATER)
		CHECKED: BJJ	
		APPROVED: CEE	
DATE: OCT 2020 SCALE: AS NOTED			

