

## **Appendix A – Ground survey and HEC-RAS model**

The following data summarize cross section and profile data from the ground survey for lower York Creek. Figures A-1, A-2, and A-3 show locations of cross sections. Tables A-1, A-2, and A-3 describe survey control from Napa County Lidar, instrument setups for the PCI survey, and cross section endpoints for the PCI survey. All instrument setups were typically monumented with 1-foot rebar and yellow caps inscribed with “PCI” and the cross section or instrument setup number.

Figure A-4 shows the cross sections from the PCI survey, with estimated water surface elevations from the HEC-RAS model. For water surface elevations estimated above the surveyed banks, the data should be considered provisional, pending additional modeling analysis to account for and describe overbank flows.





**Figure A-1** Cross section locations and survey control, Creek Station -1+90 (Napa River) to 19+74 (Railroad Bridge)





**Figure A-2** Cross section locations and survey control, Creek station 19+74 (Railroad Bridge) to 45+75 (Highway 29 Bridge)





**Figure A-3** Cross section locations and survey control, Creek station 45+75 (Highway 29 Bridge) to 65+30 (upstream of Spring Mountain Road culvert)



**Table A-1** Survey control for 2002 Napa County Orthophoto and LIDAR Project

Point description	Northing (feet)	Easting (feet)	Elevation (feet)
CP4 on Pratt avenue about 230 feet North of Beringer main entrance	1948534	6425374	258.7
CP5 on Pratt avenue about 940 feet South of the Napa River bridge	1950278	6426363	231.8

1. Horizontal datum is NAD 83, California Coordinate System, Zone II, feet
2. Vertical datum is NGVD 1929, U.S. Survey feet.

**Table A-2** Survey control network for PCI survey

Setup	Description	Northing	Easting	Elevation
IS01	Origin of survey on LB in bare lot on Doilney property	1946555	6423771	313.84
IS02	N of Spring Mountain Road near fence on RB	1946642	6423847	310.31
IS03	LB on bench just downstream of SMR bridge on Doilney property	1946677	6423816	302.36
IS04	LB opposite Vasconi property	1946833	6423852	302.84
IS05	Near deer fence on LB on Beringer property	1946920	6423851	303.87
IS06	At edge of Beringer vineyard near gate in LB deer fence and XS 8	1947054	6423897	301.1
IS07	At edge of Beringer vineyard near steep LB on XS 8	1947214	6423955	298.2
IS08	Near corner Beringer vineyard, LB XS 10	1947280	6424099	293.4
IS09	On LB bench between swale and toe of hill	1947429	6424112	291.98
IS10	On South edge of access road on LB, on top of hill slope, turning point	1947510	6424169	306.89
IS11	At edge of parking lot near temporary trailer and XS 14 LHP	1947602	6424376	291.43
IS12	In Oleander hedge on LB, turning point	1947718	6424489	282.43
IS13	On RB bench below Main St, Apartments, near XS 15	1947769	6424573	279.35
IS14	On sidewalk, upstream side of Hwy 29 bridge over corner in concrete crosshairs	1947937	6424697	278.7
IS15	LB in Beringer, at edge of vineyard, downstream of Hwy 29 bridge, near XS 17	1948046	6424748	272.71
IS16	LB at edge Beringer vineyard, near XS 18	1948147	6424758	270.96
IS17	LB at edge Beringer vineyard, near XS 19	1948277	6424774	269.11
IS18	Downstream of admin building on LB, in hedge/trees, near LHP XS 20	1948484	6424771	267.74

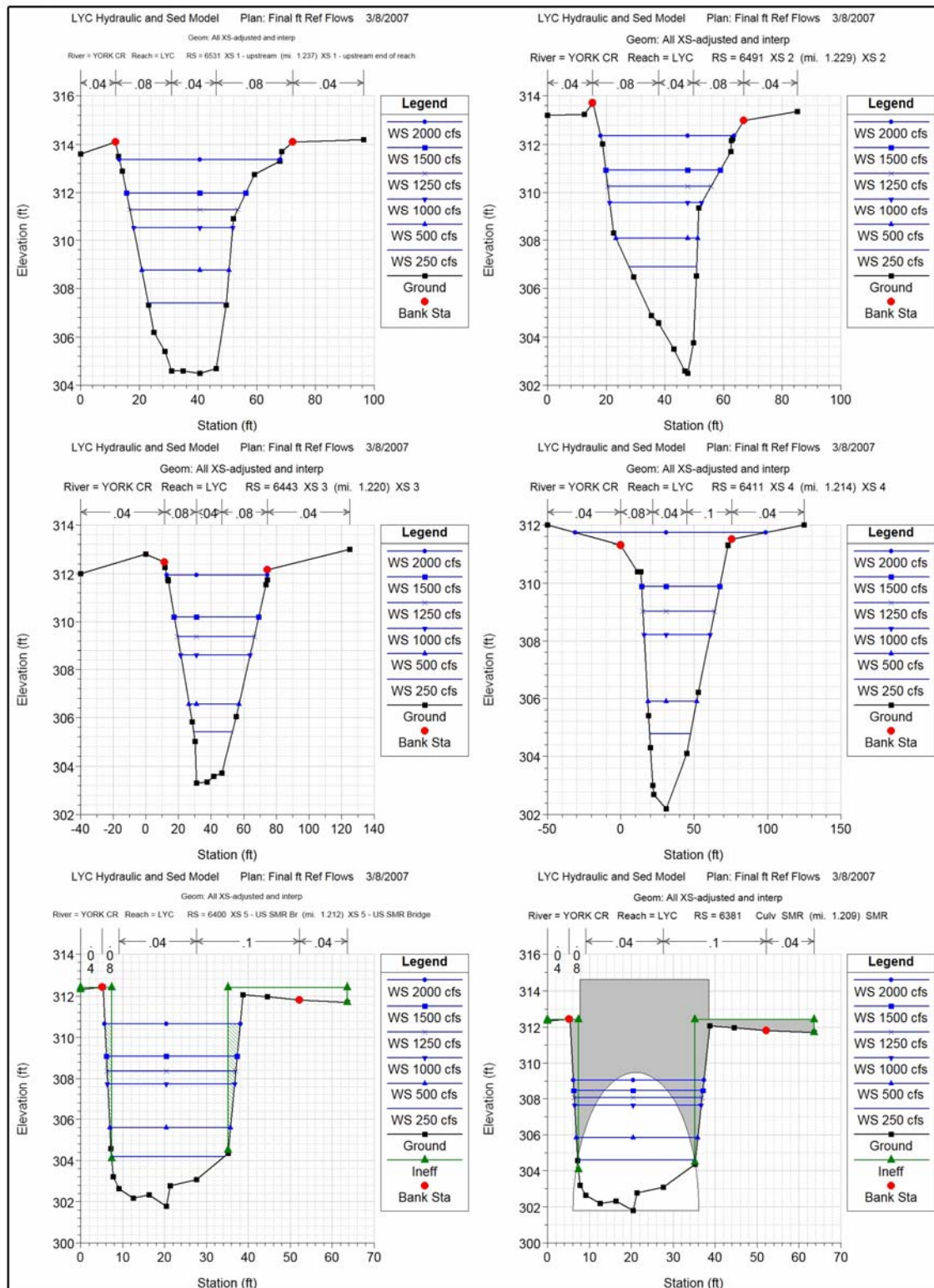
IS19	RB upstream of Beringer main bridge, RHP of XS 20	1948484	6424771	267.76
IS20	RB downstream of Beringer main bridge, in trees and shrubs near RB abutment	1948589	6424842	267.84
IS21	LB near picnic area for grape testing facility, near XS 21	1948736	6424805	261.32
IS22	LB upstream of Beringer foot bridge, near XS 21	1948945	6424820	262.41
IS23	RB downstream of footbridge, across fork lift road near vineyard and XS 23	1949179	6424897	255.83
IS24	Across fork lift road near XS 24 and flare in road	1949418	6424915	253.94
IS25	Downstream of fork lift bridge on RB, near abutment	1949688	6424825	251.31
IS26	On RB between railroad tracks and Beringer pond, about 140 feet from creek, near utility pole	1949952	6424847	249.64
IS27	On RR tracks near Beringer pond and RB of XS 27, pin in RR tie	1950304	6424574	244.9
IS28	On middle of RR bridge, pin in RR tie	1950403	6424476	243.94
IS29	on berm of Beringer pond, at property line with Varozza property on RB	1950452	6424649	244.75
IS30	On berm for Varroza pond, on RB near XS 32	1951065	6424935	239.97
IS31	RB on Storey property, near edge of vineyard and fence near property line	1951464	6425138	228.45
IS32	RB near Storey access road	1951684	6425276	224.28
IS33	RB near berm for Storey pond	1952076	6425516	223.91

**Table A-3** Cross section endpoint coordinates

CROSS SECTION ID	LEFT ENDPOINT			RIGHT ENDPOINT		
	Easting	Northing	Elev.	Easting	Northing	Elev.
XS 1	6,423,748	1,946,532	314.1	6,423,757	1,946,476	313.7
XS 2	6,423,765	1,946,546	313.5	6,423,799	1,946,508	312.2
XS 3	6,423,777	1,946,575	312.5	6,423,835	1,946,551	312.2
XS 4	6,423,791	1,946,599	310.4	6,423,852	1,946,588	311.7
XS 5	6,423,794	1,946,607	312.3	6,423,857	1,946,602	311.7
DS SMR	6,423,793	1,946,636	311.0	6,423,847	1,946,642	310.4
XS 6	6,423,811	1,946,722	304.0	6,423,840	1,946,715	305.9
XS 7	6,423,818	1,946,869	306.5	6,423,882	1,946,799	302.9
XS 8	6,423,929	1,947,041	300.4	6,423,998	1,947,009	301.2
XS 9	6,423,977	1,947,202	298.6	6,424,030	1,947,163	295.3
XS 10	6,424,112	1,947,247	294.6	6,424,131	1,947,195	294.0
XS 11	6,424,149	1,947,270	293.8	6,424,218	1,947,244	298.6
XS 12	6,424,098	1,947,412	292.5	6,424,216	1,947,424	290.1
XS 13	6,424,190	1,947,486	278.8	6,424,223	1,947,442	289.9
XS 14	6,424,366	1,947,604	292.8	6,424,405	1,947,534	288.0
XS 15	6,424,518	1,947,779	282.7	6,424,560	1,947,750	279.3

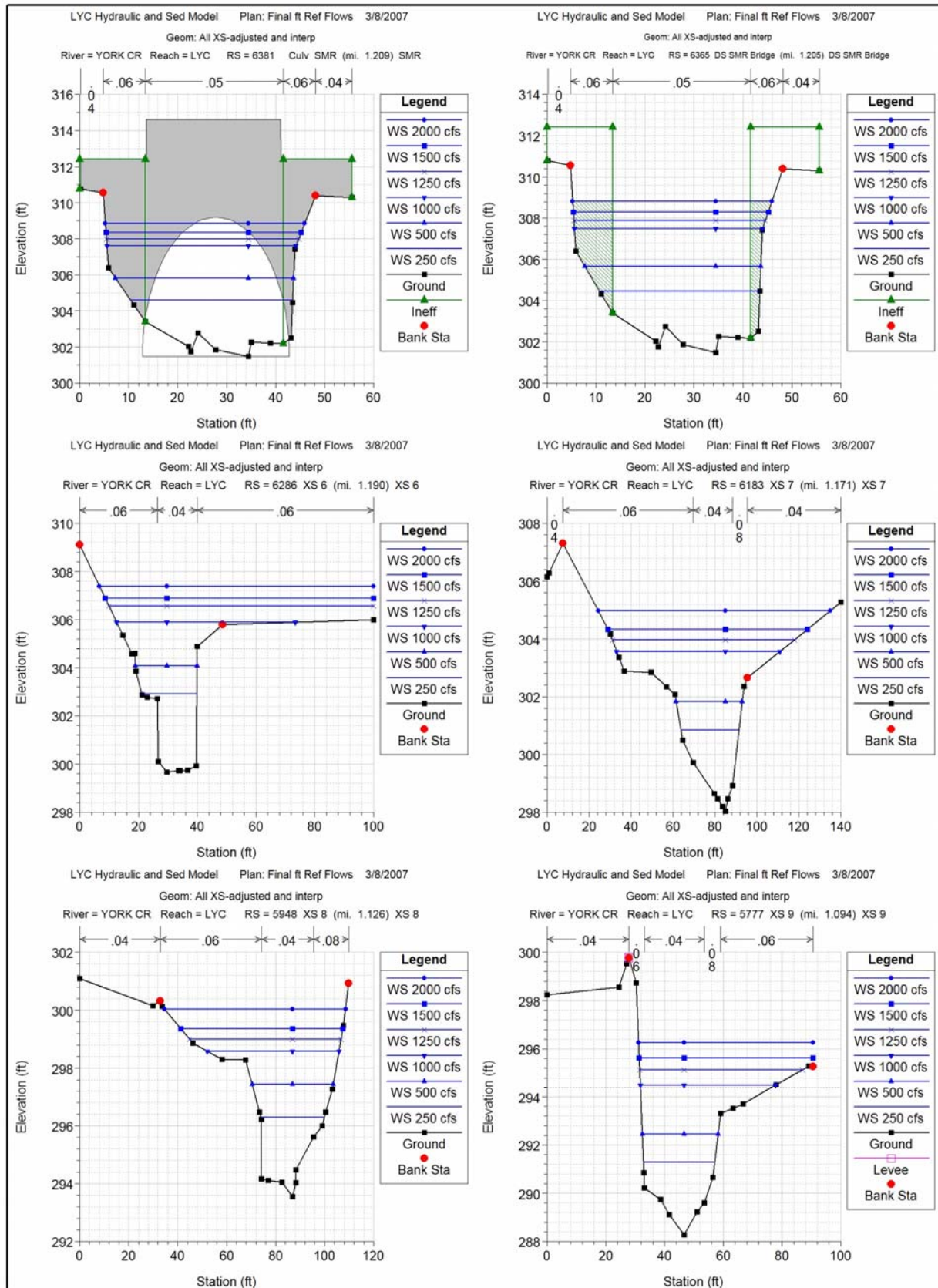
XS 16	6,424,652	1,947,922	277.8	6,424,676	1,947,894	278.1
US HWY29	6,424,684	1,947,944	278.7	6,424,724	1,947,896	277.7
DS HWY29	6,424,723	1,947,974	278.1	6,424,760	1,947,930	278.4
XS 17	6,424,766	1,948,046	272.6	6,424,805	1,948,033	274.9
XS 18	6,424,758	1,948,147	270.9	6,424,826	1,948,142	273.2
XS 19	6,424,774	1,948,277	269.1	6,424,837	1,948,272	271.9
XS 20	6,424,771	1,948,484	267.7	6,424,823	1,948,489	268.0
US BMAIN	6,424,772	1,948,577	268.0	6,424,835	1,948,543	267.5
DS BMAIN	6,424,775	1,948,616	267.6	6,424,829	1,948,586	268.0
XS 21	6,424,804	1,948,719	262.2	6,424,841	1,948,715	263.0
XS 22	6,424,820	1,948,935	262.7	6,424,865	1,948,931	260.2
US FT BR	6,424,801	1,948,987	261.8	6,424,863	1,948,979	260.0
XS 23	6,424,824	1,949,191	258.9	6,424,878	1,949,189	256.4
XS 24	6,424,811	1,949,413	255.1	6,424,915	1,949,418	253.9
XS 24-5	6,424,818	1,949,482	253.7	6,424,896	1,949,449	254.1
US BFLB	6,424,762	1,949,632	253.0	6,424,829	1,949,659	252.0
DS BFLB	6,424,774	1,949,651	252.7	6,424,824	1,949,674	252.1
XS 25	6,424,696	1,949,831	255.8	6,424,769	1,949,863	249.7
XS 26	6,424,643	1,949,987	252.3	6,424,707	1,950,012	248.1
XS 27	6,424,506	1,950,204	244.3	6,424,545	1,950,261	243.9
XS 28	6,424,443	1,950,317	243.0	6,424,493	1,950,319	243.9
US RR	6,424,437	1,950,427	242.0	6,424,508	1,950,357	242.6
DS RR	6,424,445	1,950,450	241.4	6,424,512	1,950,381	242.7
XS 29	6,424,526	1,950,553	240.4	6,424,588	1,950,506	241.0
XS 30	6,424,737	1,950,919	236.1	6,424,805	1,950,886	235.5
XS 31	6,424,985	1,951,293	233.2	6,425,022	1,951,271	231.7
XS 32	6,425,088	1,951,486	228.6	6,425,123	1,951,462	228.8
XS 33	6,425,214	1,951,702	228.9	6,425,261	1,951,680	225.2
XS 34	6,425,433	1,952,121	221.9	6,425,502	1,952,081	225.4

1. Horizontal datum is NAD 83, California Coordinate System, Zone xx, feet
2. Vertical datum is NGVD 1929, feet.
3. Cross section endpoints surveyed in arbitrary coordinate system and shifted to known ground control according to Napa County Lidar / Flood Study [date].

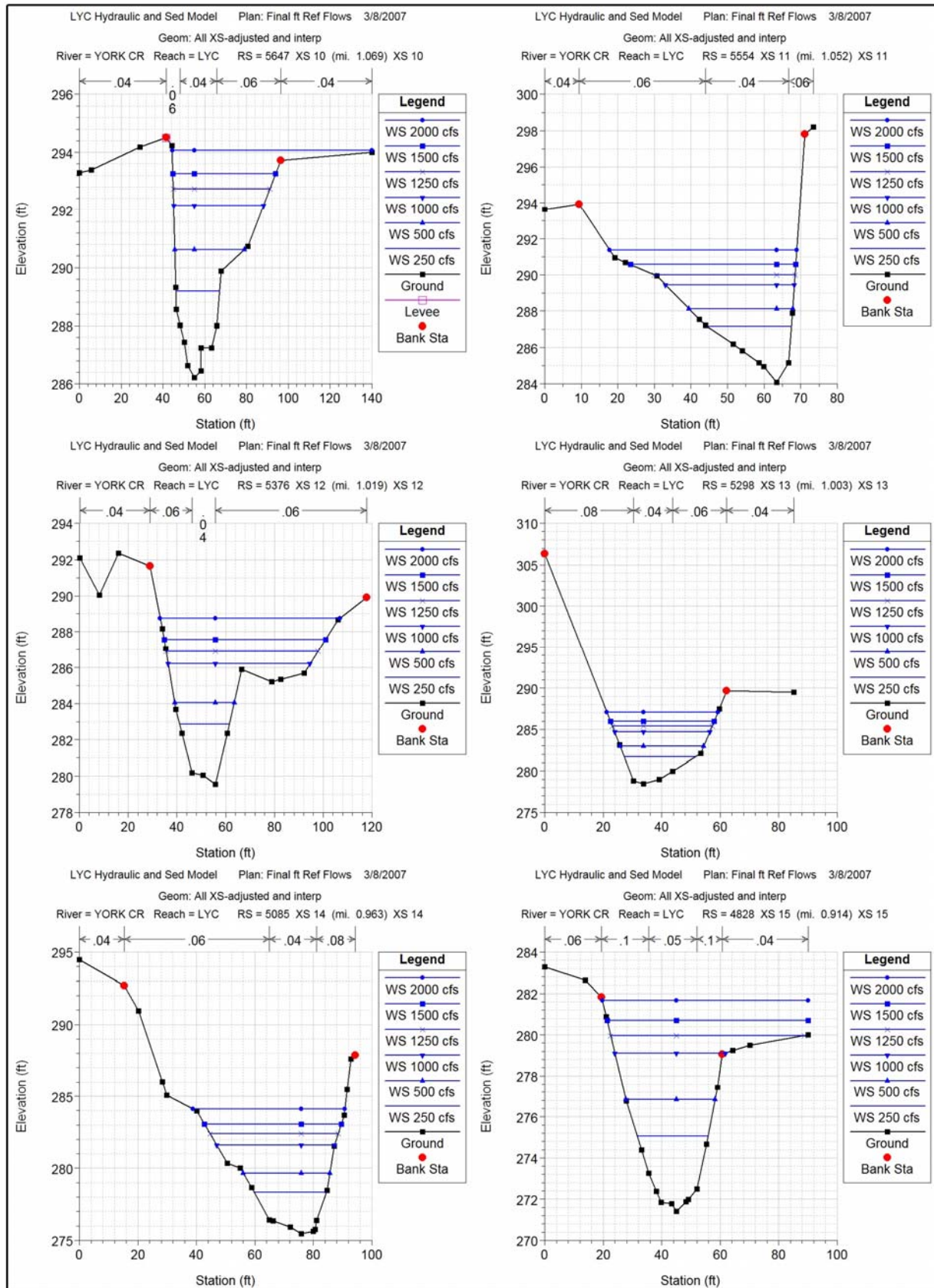


**Figure A-4** Cross sections from PCI ground survey and HEC-RAS data

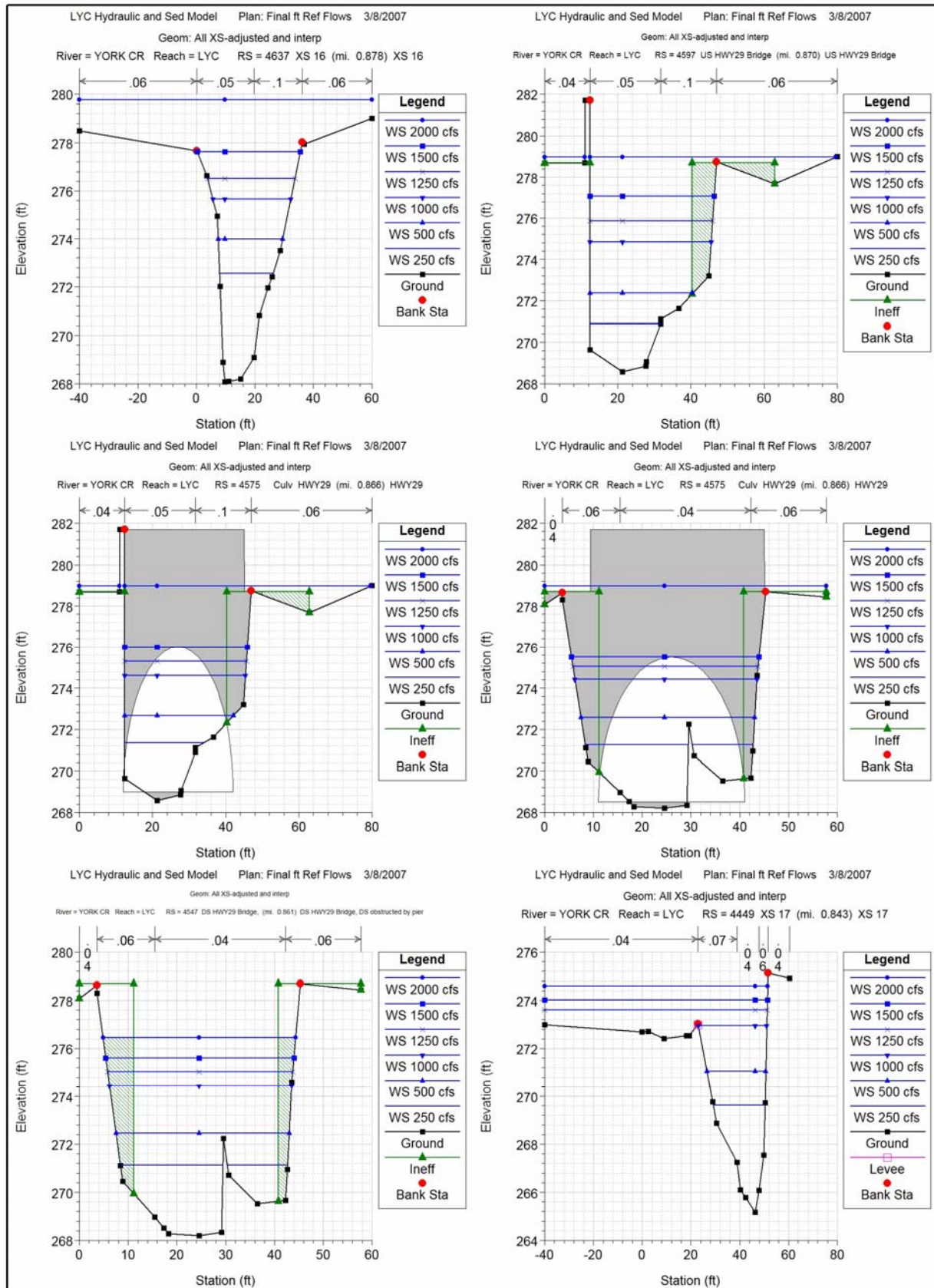




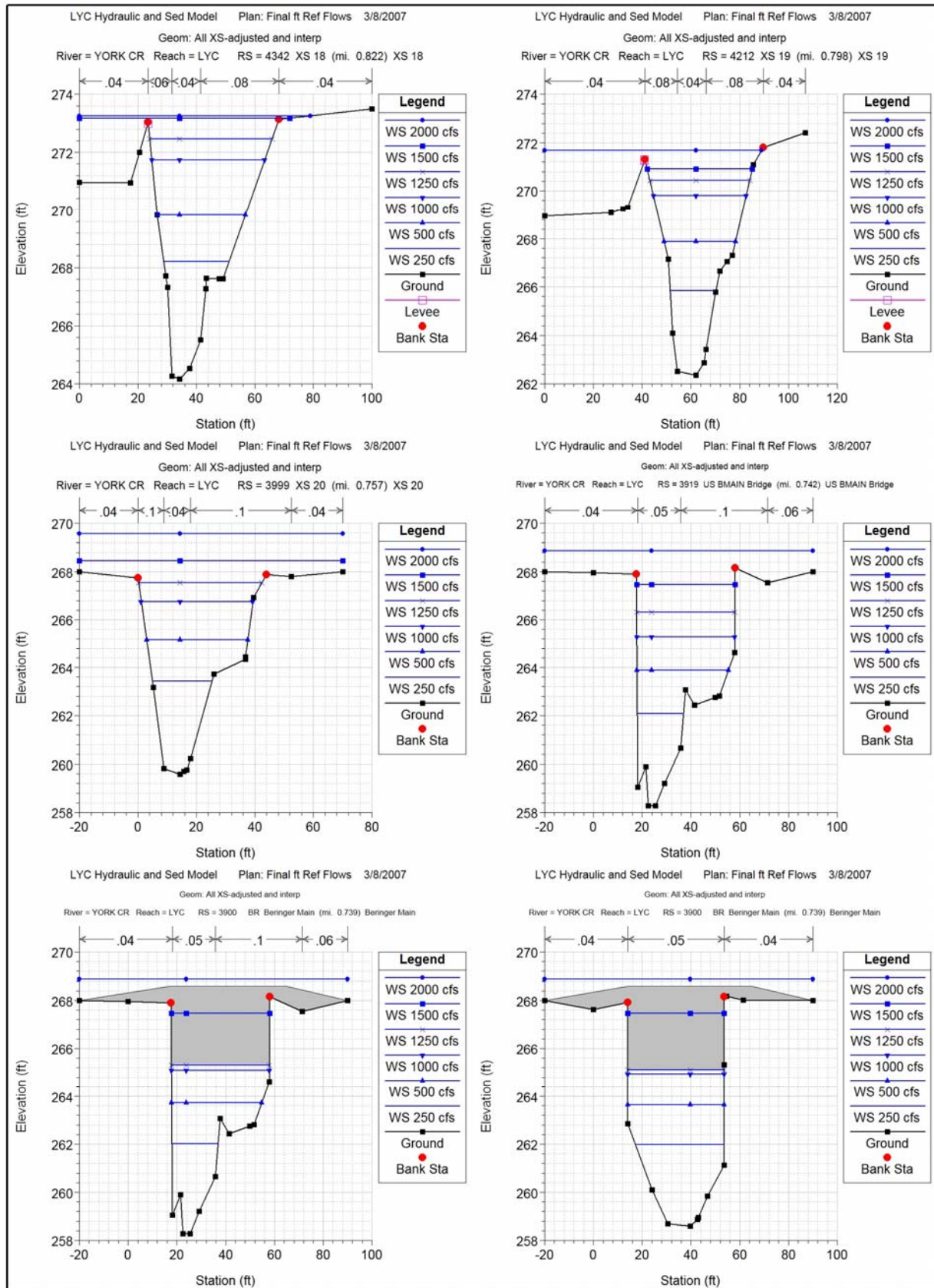


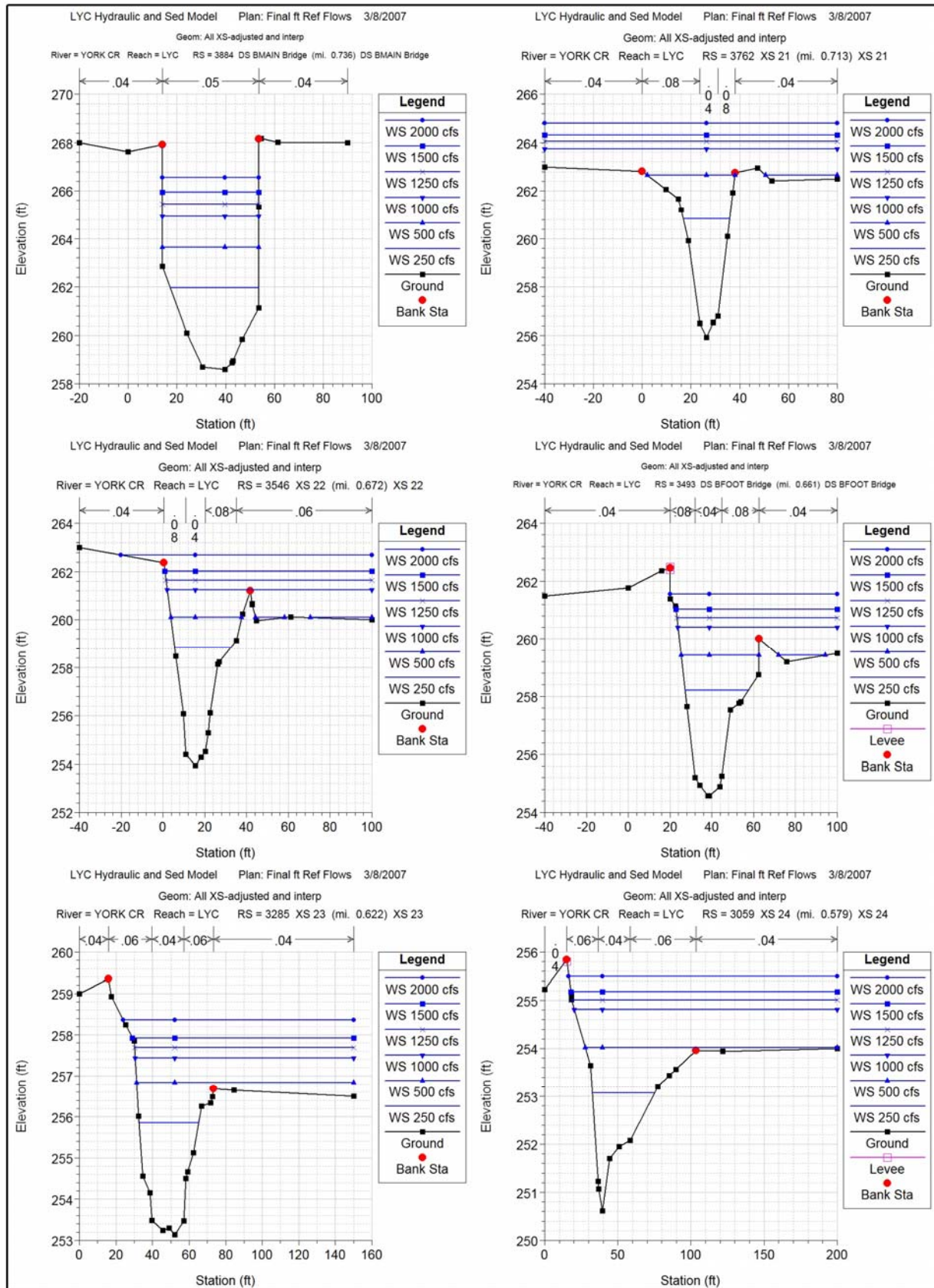




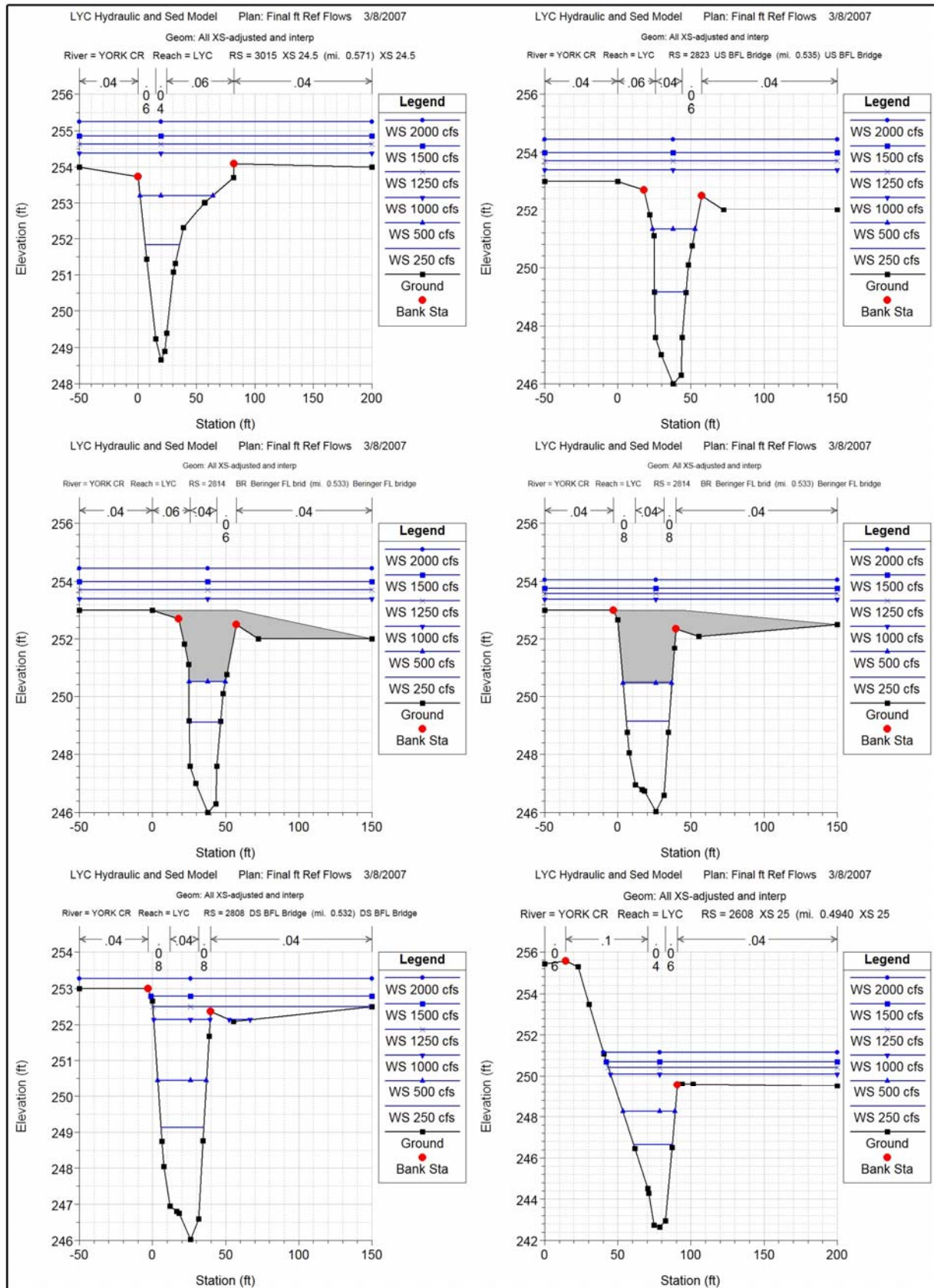


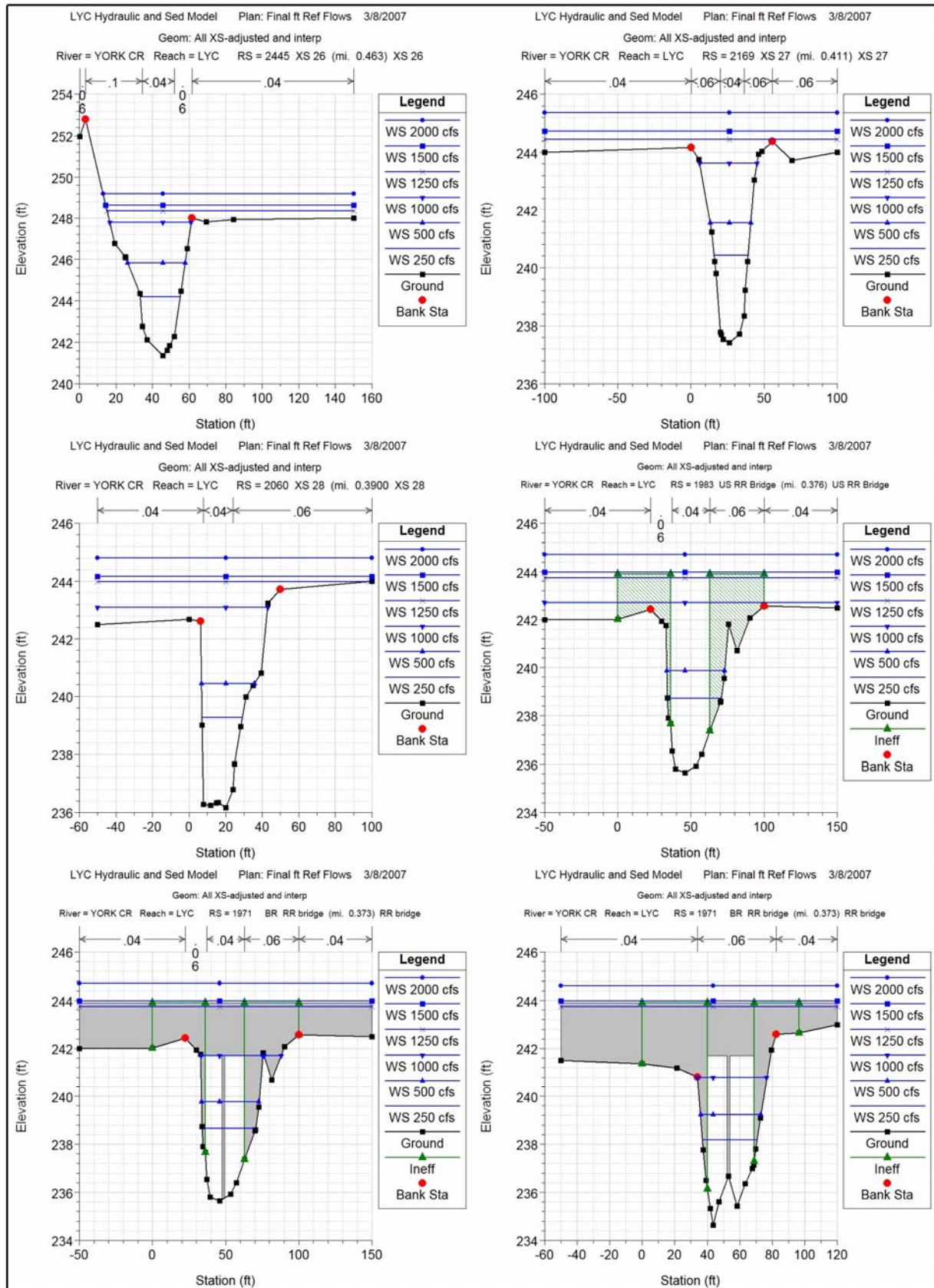




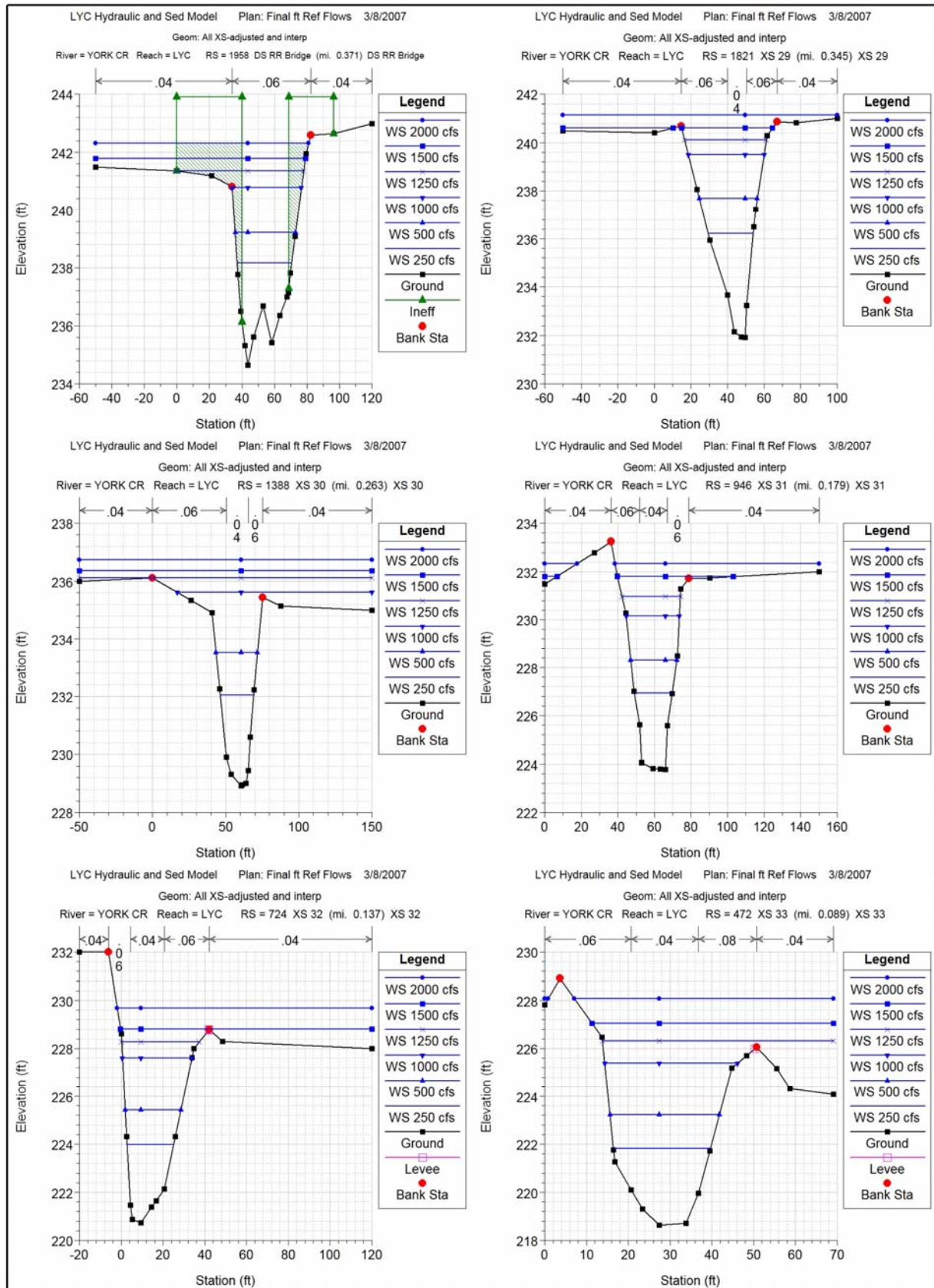


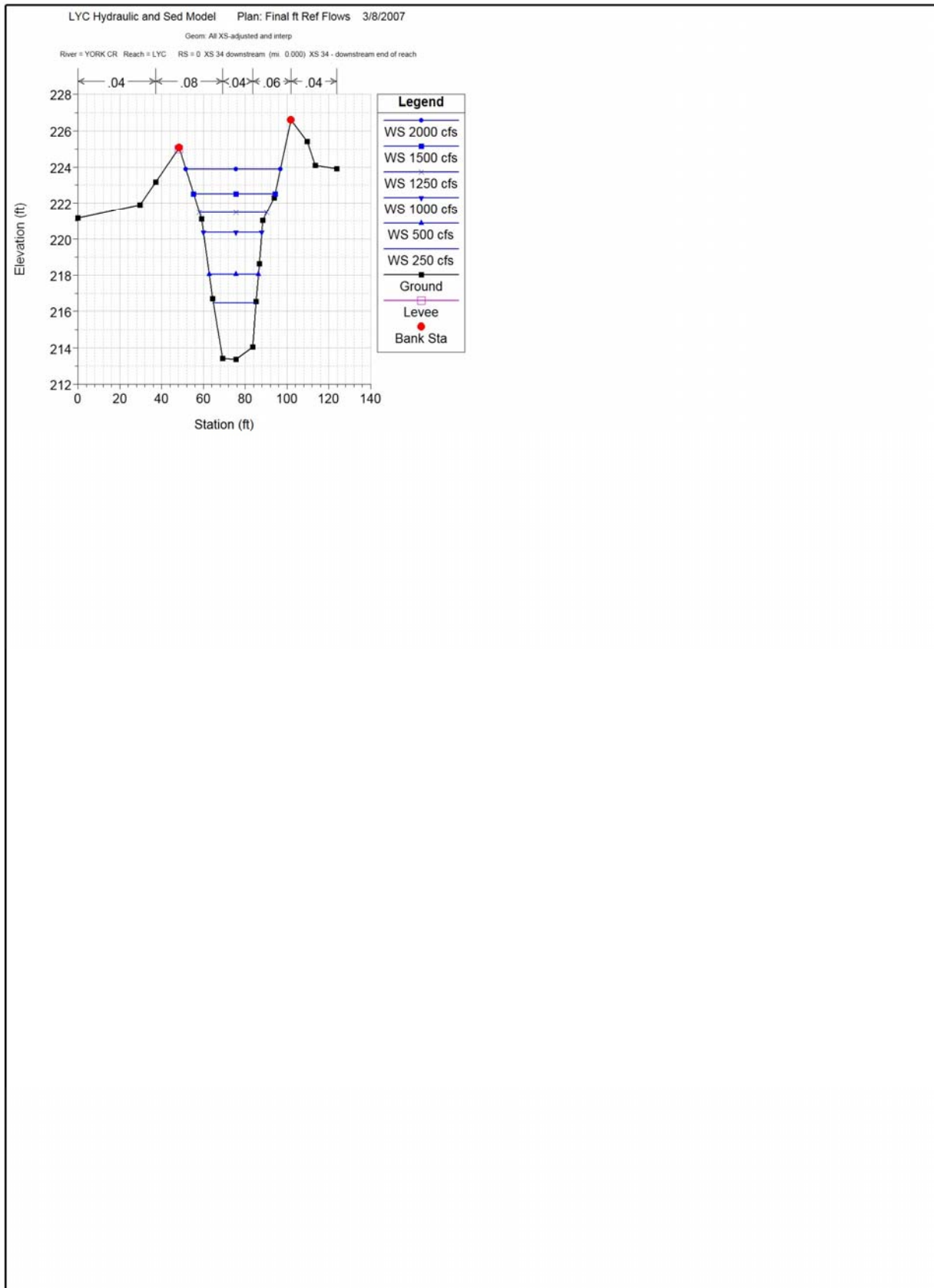














## Appendix B – HEC-RAS data and sediment mobilization potential calculations

The following data summarize HEC-RAS output from the hydraulic model used in the sediment mobilization analysis. The data were selected based on inputs to shear stress equations. The calculations of shear stress and bed mobilization potential are also shown in the following tables.

**Table B-1** Critical shear stress for common particle sizes on lower York Creek

<b>CRITICAL SHEAR STRESS PER SHIELDS (T<sub>c</sub>)</b>			
	<b>Incipient Motion of d<sub>i</sub></b>		
	T <sub>c</sub> (T* <sub>c</sub> = 0.03)	T <sub>c</sub> (T* <sub>c</sub> = 0.045)	T <sub>c</sub> (T* <sub>c</sub> = 0.06)
	Crit. Shear, C	Crit. Shear, C	Crit. Shear, C
d <sub>i</sub> (mm)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
22.6	0.23	0.34	0.46
64.0	0.65	0.97	1.30
90.5	0.92	1.38	1.83
181.0	1.83	2.75	3.67
362.0	3.67	5.50	7.34
	<b>Complete Mobilization of d<sub>i</sub></b>		
	2x T <sub>c</sub> (T* <sub>c</sub> = 0.03)	2X T <sub>c</sub> (T* <sub>c</sub> = 0.045)	2X T <sub>c</sub> (T* <sub>c</sub> = 0.06)
	Crit. Shear, C	Crit. Shear, C	Crit. Shear, C
d <sub>i</sub> (mm)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
22.6	0.46	0.69	0.92
64.0	1.30	1.95	2.60
90.5	1.83	2.75	3.67
181.0	3.67	5.50	7.34
362.0	7.34	11.01	14.68

**Table B-2** Channel competence for incipient motion or partial mobilization

station (mi.)	XS ID	flow (cfs)							
		100	250	500	1000	1250	1500	2000	2500
1.24	XS 1	93	186	250	321	372	343	393	351
1.23	XS 2	119	185	220	276	313	291	391	351
1.22	XS 3	71	127	172	249	301	296	422	435
1.21	XS 4	80	141	191	284	340	332	408	447
1.21	US SMR	65	115	215	366	443	441	646	614
1.21	DS SMR	90	186	271	397	460	436	554	454
1.19	XS 6	110	152	194	203	250	234	276	232
1.17	XS 7	78	135	184	191	232	223	298	260
1.13	XS 8	74	134	176	168	189	181	243	221
1.09	XS 9	82	154	214	218	242	232	313	278
1.07	XS 10	86	154	170	222	265	253	339	306
1.05	XS 11	79	124	160	207	243	219	285	255
1.02	XS 12	104	175	219	189	243	246	351	308
1.00	XS 13	73	93	142	215	229	224	293	242
0.96	XS 14	69	92	141	204	218	214	277	212
0.91	XS 15	83	113	174	261	284	279	360	300
0.88	XS 16	111	122	163	214	222	214	345	308
0.87	US HWY29	56	79	116	234	263	276	303	268
0.86	DS HWY29	57	92	152	263	282	278	366	302
0.84	XS 17	86	111	160	226	241	230	289	233
0.82	XS 18	88	92	140	205	216	213	251	210
0.80	XS 19	84	117	158	220	227	215	266	220
0.76	XS 20	96	116	145	219	227	238	334	281
0.74	US BMAIN	75	106	126	188	218	231	323	272
0.74	DS BMAIN	72	111	183	250	260	249	311	250
0.71	XS 21	106	128	137	198	206	198	255	209
0.67	XS 22	116	117	155	200	209	202	267	225
0.66	DS BFB	88	96	140	194	200	192	237	194
0.62	XS 23	72	91	121	161	166	157	187	145
0.58	XS 24	40	50	69	112	116	112	146	121
0.57	XS 24.5	49	87	91	122	119	105	149	113
0.54	US BFLB	52	109	162	204	192	165	225	164
0.53	DS BFLB	48	110	158	203	189	159	210	154
0.49	XS 25	62	116	156	195	180	152	201	144
0.46	XS 26	43	101	140	178	173	149	203	148
0.41	XS 27	59	112	145	181	145	128	188	144
0.39	XS 28	60	114	134	205	188	159	224	166
0.38	US RRB	55	88	162	330	309	104	133	146
0.37	DS RRB	43	75	141	242	219	226	250	259
0.35	XS 29	53	78	129	191	166	161	175	180
0.26	XS 30	47	75	130	139	106	111	127	133
0.18	XS 31	51	74	126	199	174	165	181	186
0.14	XS 32	46	73	128	204	172	163	190	200
0.09	XS 33	46	74	134	211	180	187	208	210
0.00	XS 34	48	78	139	222	192	187	209	214



**Table B-3** Channel competence for full entrainment or complete mobilization

station (mi.)	XS ID	flow (cfs)							
		100	250	500	1000	1250	1500	2000	2500
1.24	XS 1	47	93	125	161	186	171	197	176
1.23	XS 2	60	93	110	138	156	146	196	175
1.22	XS 3	36	64	86	125	150	148	211	218
1.21	XS 4	40	71	96	142	170	166	204	224
1.21	US SMR	32	58	107	183	222	220	323	307
1.21	DS SMR	45	93	135	198	230	218	277	227
1.19	XS 6	55	76	97	101	125	117	138	116
1.17	XS 7	39	68	92	95	116	112	149	130
1.13	XS 8	37	67	88	84	94	90	121	110
1.09	XS 9	41	77	107	109	121	116	157	139
1.07	XS 10	43	77	85	111	132	127	170	153
1.05	XS 11	39	62	80	103	122	109	143	127
1.02	XS 12	52	87	110	95	122	123	175	154
1.00	XS 13	36	46	71	108	115	112	147	121
0.96	XS 14	34	46	71	102	109	107	138	106
0.91	XS 15	41	57	87	131	142	139	180	150
0.88	XS 16	55	61	82	107	111	107	173	154
0.87	US HWY29	28	39	58	117	131	138	151	134
0.86	DS HWY29	28	46	76	131	141	139	183	151
0.84	XS 17	43	55	80	113	120	115	144	117
0.82	XS 18	44	46	70	102	108	106	126	105
0.80	XS 19	42	58	79	110	113	108	133	110
0.76	XS 20	48	58	73	109	114	119	167	140
0.74	US BMAIN	38	53	63	94	109	115	161	136
0.74	DS BMAIN	36	55	91	125	130	124	155	125
0.71	XS 21	53	64	68	99	103	99	127	104
0.67	XS 22	58	58	78	100	105	101	133	112
0.66	DS BFB	44	48	70	97	100	96	118	97
0.62	XS 23	36	46	60	80	83	79	94	73
0.58	XS 24	20	25	34	56	58	56	73	61
0.57	XS 24.5	24	44	45	61	59	52	74	56
0.54	US BFLB	26	55	81	102	96	83	113	82
0.53	DS BFLB	24	55	79	102	94	79	105	77
0.49	XS 25	31	58	78	98	90	76	101	72
0.46	XS 26	21	50	70	89	86	74	102	74
0.41	XS 27	29	56	72	91	73	64	94	72
0.39	XS 28	30	57	67	103	94	79	112	83
0.38	US RRB	27	44	81	165	155	52	66	73
0.37	DS RRB	22	37	70	121	110	113	125	130
0.35	XS 29	27	39	65	95	83	80	87	90
0.26	XS 30	23	37	65	69	53	55	64	67
0.18	XS 31	25	37	63	99	87	83	91	93
0.14	XS 32	23	36	64	102	86	81	95	100
0.09	XS 33	23	37	67	105	90	93	104	105
0.00	XS 34	24	39	70	111	96	93	105	107

**Table B-4** HEC-RAS data and calculations of shear stress and mobilization potential

HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg	T <sub>0</sub>	Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T <sub>0c</sub> =0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T <sub>0c</sub> =0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)			d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)	
								E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	100	304.5	306.06	1.21	1.18	306.27	0.0192	1.4	1.5	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 2	1.23	100	302.5	305.67	1.69	1.51	305.84	0.019	1.8	1.9	0.9	0.7	0.3	1.4	0.7	0.5	0.2
XS 3	1.22	100	303.3	304.52	0.94	0.9	305	0.019	1.1	1.1	0.6	0.4	0.2	0.8	0.4	0.3	0.1
XS 4	1.21	100	302.2	303.85	1.03	1.01	304.14	0.019	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2
US SMR	1.21	100	301.79	303.43	0.85	0.82	303.87	0.019	1.0	1.0	0.5	0.4	0.2	0.8	0.4	0.3	0.1
DS SMR	1.21	100	301.48	303.42	1.18	1.14	303.56	0.019	1.4	1.4	0.7	0.5	0.2	1.1	0.5	0.4	0.2
XS 6	1.19	100	299.67	301.49	1.68	1.39	301.81	0.019	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
XS 7	1.17	100	298.04	299.96	1.01	0.99	300.28	0.019	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2
XS 8	1.13	100	293.55	295.21	1.02	0.94	295.64	0.019	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 9	1.09	100	288.28	290.39	1.07	1.04	290.65	0.019	1.2	1.3	0.6	0.5	0.2	1.0	0.5	0.3	0.2
XS 10	1.07	100	286.21	286.24	1.16	1.09	288.57	0.019	1.3	1.3	0.7	0.5	0.2	1.0	0.5	0.4	0.2
XS 11	1.05	100	284.07	286.23	1.07	1	286.76	0.019	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2
XS 12	1.02	100	279.57	281.68	1.4	1.32	281.98	0.019	1.6	1.6	0.8	0.6	0.3	1.2	0.6	0.4	0.2
XS 13	1.00	100	278.46	280.52	1.3	1.24	280.81	0.0143	1.1	1.1	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 14	0.96	100	275.45	277.28	1.21	1.17	277.54	0.014	1.0	1.1	0.5	0.4	0.2	0.8	0.4	0.3	0.1
XS 15	0.91	100	271.4	273.67	1.47	1.41	273.86	0.014	1.3	1.3	0.6	0.5	0.2	1.0	0.5	0.3	0.2
XS 16	0.88	100	268.07	271.05	2.28	1.89	271.21	0.014	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
US HWY29	0.87	100	268.57	270.01	1	0.96	270.52	0.014	0.9	0.9	0.4	0.3	0.2	0.7	0.3	0.2	0.1
DS HWY29	0.86	100	268.2	269.88	1.04	0.97	270.13	0.014	0.9	0.9	0.4	0.3	0.2	0.7	0.3	0.2	0.1
XS 17	0.84	100	265.16	268.1	1.63	1.46	268.35	0.014	1.3	1.3	0.7	0.5	0.2	1.0	0.5	0.4	0.2
XS 18	0.82	100	264.16	266.51	1.75	1.5	266.87	0.014	1.3	1.4	0.7	0.5	0.2	1.0	0.5	0.4	0.2
XS 19	0.80	100	262.36	264.33	1.55	1.44	264.6	0.014	1.3	1.3	0.7	0.5	0.2	1.0	0.5	0.4	0.2
XS 20	0.76	100	259.58	262.08	1.77	1.63	262.28	0.014	1.5	1.5	0.7	0.5	0.3	1.1	0.6	0.4	0.2
US BMAIN	0.74	100	258.28	260.77	1.49	1.28	260.99	0.014	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
DS BMAIN	0.74	100	258.59	260.44	1.25	1.23	260.57	0.014	1.1	1.1	0.6	0.4	0.2	0.8	0.4	0.3	0.1
XS 21	0.71	100	255.93	259.09	2.05	1.81	259.28	0.014	1.6	1.7	0.8	0.6	0.3	1.2	0.6	0.4	0.2
XS 22	0.67	100	253.94	257.18	2.24	1.98	257.29	0.014	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
DS BFB	0.66	100	254.57	256.74	1.58	1.5	256.93	0.014	1.3	1.4	0.7	0.5	0.2	1.0	0.5	0.4	0.2
XS 23	0.62	100	253.14	254.94	1.26	1.22	255.08	0.014	1.1	1.1	0.6	0.4	0.2	0.8	0.4	0.3	0.1
XS 24	0.58	100	250.61	252.46	0.69	0.68	252.8	0.014	0.6	0.6	0.3	0.2	0.1	0.5	0.2	0.2	0.1
XS 24.5	0.57	100	248.66	250.78	1.27	1.23	251.03	0.0096	0.7	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
US BFLB	0.54	100	246	248.04	1.41	1.31	248.26	0.010	0.8	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
DS BFLB	0.53	100	246.03	247.96	1.25	1.22	248.11	0.010	0.7	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
XS 25	0.49	100	242.64	245.22	1.68	1.57	245.39	0.010	0.9	1.0	0.5	0.3	0.2	0.7	0.4	0.3	0.1
XS 26	0.46	100	241.36	243.02	1.11	1.08	243.38	0.010	0.6	0.7	0.3	0.2	0.1	0.5	0.3	0.2	0.1
XS 27	0.41	100	237.42	239.38	1.56	1.48	239.55	0.010	0.9	0.9	0.5	0.3	0.2	0.7	0.3	0.2	0.1
XS 28	0.39	100	236.16	238.2	1.7	1.53	238.35	0.010	0.9	0.9	0.5	0.3	0.2	0.7	0.4	0.3	0.1
US RRB	0.38	100	235.65	237.71	1.58	1.54	237.8	0.0087	0.8	0.9	0.4	0.3	0.2	0.6	0.3	0.2	0.1
DS RRB	0.37	100	234.64	237.22	1.25	1.21	237.34	0.009	0.7	0.7	0.3	0.2	0.1	0.5	0.3	0.2	0.1
XS 29	0.35	100	231.92	234.65	1.66	1.5	234.86	0.009	0.8	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
XS 30	0.26	100	228.93	230.75	1.37	1.31	231	0.009	0.7	0.7	0.4	0.3	0.1	0.5	0.3	0.2	0.1
XS 31	0.18	100	223.79	225.59	1.58	1.42	225.86	0.009	0.8	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
XS 32	0.14	100	220.74	222.75	1.35	1.28	223	0.009	0.7	0.7	0.4	0.3	0.1	0.5	0.3	0.2	0.1
XS 33	0.09	100	218.64	220.55	1.34	1.29	220.81	0.009	0.7	0.7	0.4	0.3	0.1	0.5	0.3	0.2	0.1
XS 34	0.00	100	213.38	215.17	1.45	1.36	215.41	0.009	0.7	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1



HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg		Ratio $T_0 / T_{0c}$ SHIELDS $T^*c=0.045$				Ratio $T_0 / T_{0c}$ SHIELDS $T^*c=0.060$			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)	E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)	
										partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	250	304.5	307.38	2.24	2.13	307.65	0.0213	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 2	1.23	250	302.5	306.89	2.4	2.12	307.2	0.021	2.8	2.9	1.4	1.0	0.5	2.2	1.1	0.8	0.4
XS 3	1.22	250	303.3	305.41	1.55	1.46	306.13	0.021	1.9	2.0	1.0	0.7	0.4	1.5	0.7	0.5	0.3
XS 4	1.21	250	302.2	304.77	1.67	1.62	305.22	0.021	2.2	2.2	1.1	0.8	0.4	1.7	0.8	0.6	0.3
US SMR	1.21	250	301.79	304.18	1.39	1.32	304.89	0.021	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
DS SMR	1.21	250	301.48	304.45	2.2	2.13	304.7	0.021	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 6	1.19	250	299.67	302.92	2.22	1.74	303.48	0.021	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3
XS 7	1.17	250	298.04	300.83	1.6	1.55	301.33	0.021	2.1	2.1	1.1	0.7	0.4	1.6	0.8	0.6	0.3
XS 8	1.13	250	293.55	296.3	1.68	1.53	296.81	0.021	2.0	2.1	1.0	0.7	0.4	1.6	0.8	0.6	0.3
XS 9	1.09	250	288.28	291.29	1.87	1.76	291.76	0.021	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3
XS 10	1.07	250	286.21	289.18	1.94	1.76	289.77	0.021	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3
XS 11	1.05	250	284.07	287.16	1.53	1.42	287.94	0.021	1.9	1.9	1.0	0.7	0.3	1.5	0.7	0.5	0.3
XS 12	1.02	250	279.57	282.85	2.15	2	283.35	0.021	2.7	2.7	1.4	1.0	0.5	2.0	1.0	0.7	0.4
XS 13	1.00	250	278.46	281.72	1.98	1.86	282.13	0.0122	1.4	1.5	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 14	0.96	250	275.45	278.34	1.94	1.85	278.76	0.012	1.4	1.4	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 15	0.91	250	271.4	275.06	2.41	2.27	275.35	0.012	1.7	1.8	0.9	0.6	0.3	1.3	0.7	0.5	0.2
XS 16	0.88	250	268.07	272.55	3.02	2.45	272.87	0.012	1.9	1.9	1.0	0.7	0.3	1.4	0.7	0.5	0.3
US HWY29	0.87	250	268.57	270.88	1.73	1.58	271.76	0.012	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2
DS HWY29	0.86	250	268.2	271.13	2.04	1.84	271.41	0.012	1.4	1.4	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 17	0.84	250	265.16	269.63	2.57	2.22	269.96	0.012	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
XS 18	0.82	250	264.16	268.21	2.12	1.84	268.64	0.012	1.4	1.4	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 19	0.80	250	262.36	265.83	2.64	2.34	266.23	0.012	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
XS 20	0.76	250	259.58	263.43	2.57	2.33	263.79	0.012	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
US BMAIN	0.74	250	258.28	262.09	2.67	2.13	262.46	0.012	1.6	1.7	0.8	0.6	0.3	1.2	0.6	0.4	0.2
DS BMAIN	0.74	250	258.59	261.97	2.31	2.22	262.11	0.012	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
XS 21	0.71	250	255.93	260.84	2.95	2.56	261.14	0.012	1.9	2.0	1.0	0.7	0.4	1.5	0.7	0.5	0.3
XS 22	0.67	250	253.94	258.83	2.6	2.34	259.03	0.012	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
DS BFB	0.66	250	254.57	258.2	2.02	1.92	258.46	0.012	1.5	1.5	0.7	0.5	0.3	1.1	0.6	0.4	0.2
XS 23	0.62	250	253.14	255.86	1.89	1.83	256.11	0.012	1.4	1.4	0.7	0.5	0.3	1.1	0.5	0.4	0.2
XS 24	0.58	250	250.61	253.07	1.03	1.01	253.58	0.012	0.8	0.8	0.4	0.3	0.1	0.6	0.3	0.2	0.1
XS 24.5	0.57	250	248.66	251.83	1.7	1.65	252.21	0.0129	1.3	1.4	0.7	0.5	0.2	1.0	0.5	0.4	0.2
US BFLB	0.54	250	246	249.16	2.32	2.07	249.55	0.013	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
DS BFLB	0.53	250	246.03	249.12	2.18	2.08	249.37	0.013	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
XS 25	0.49	250	242.64	246.65	2.35	2.19	246.9	0.013	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2
XS 26	0.46	250	241.36	244.17	2.03	1.91	244.67	0.013	1.5	1.6	0.8	0.6	0.3	1.2	0.6	0.4	0.2
XS 27	0.41	250	237.42	240.43	2.27	2.12	240.77	0.013	1.7	1.7	0.9	0.6	0.3	1.3	0.7	0.5	0.2
XS 28	0.39	250	236.16	239.28	2.46	2.16	239.6	0.013	1.7	1.8	0.9	0.6	0.3	1.3	0.7	0.5	0.2
US RRB	0.38	250	235.65	238.71	2.58	2.5	238.91	0.0086	1.3	1.4	0.7	0.5	0.2	1.0	0.5	0.4	0.2
DS RRB	0.37	250	234.64	238.16	2.18	2.12	238.4	0.009	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 29	0.35	250	231.92	236.22	2.41	2.2	236.49	0.009	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2
XS 30	0.26	250	228.93	232.05	2.25	2.11	232.41	0.009	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 31	0.18	250	223.79	226.93	2.33	2.09	227.35	0.009	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 32	0.14	250	220.74	223.98	2.25	2.06	224.37	0.009	1.1	1.1	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 33	0.09	250	218.64	221.82	2.23	2.1	222.18	0.009	1.1	1.2	0.6	0.4	0.2	0.9	0.4	0.3	0.2
XS 34	0.00	250	213.38	216.46	2.47	2.21	216.85	0.009	1.2	1.2	0.6	0.4	0.2	0.9	0.5	0.3	0.2

HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL											
Plan: Ref flows River: YORK CR Reach: LYC								reach avg		T <sub>0</sub>		Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)	E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)			
										partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.		
XS 1	1.24	500	304.5	308.75	3.31	3.05	309.15	0.0200	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5		
XS 2	1.23	500	302.5	308.08	3.08	2.68	308.61	0.020	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
XS 3	1.22	500	303.3	306.55	2.22	2.1	307.4	0.020	2.6	2.7	1.3	1.0	0.5	2.0	1.0	0.7	0.4		
XS 4	1.21	500	302.2	305.9	2.43	2.33	306.49	0.020	2.9	3.0	1.5	1.1	0.5	2.2	1.1	0.8	0.4		
US SMR	1.21	500	301.79	305.6	2.75	2.62	306.26	0.020	3.3	3.4	1.7	1.2	0.6	2.5	1.3	0.9	0.4		
DS SMR	1.21	500	301.48	305.66	3.41	3.3	306.08	0.020	4.1	4.2	2.1	1.5	0.7	3.2	1.6	1.1	0.6		
XS 6	1.19	500	299.67	304.07	3.09	2.36	305	0.020	2.9	3.0	1.5	1.1	0.5	2.3	1.1	0.8	0.4		
XS 7	1.17	500	298.04	301.83	2.33	2.24	302.54	0.020	2.8	2.9	1.4	1.0	0.5	2.2	1.1	0.8	0.4		
XS 8	1.13	500	293.55	297.44	2.34	2.15	298.09	0.020	2.7	2.8	1.4	1.0	0.5	2.1	1.0	0.7	0.4		
XS 9	1.09	500	288.28	292.46	2.89	2.61	293.16	0.020	3.3	3.3	1.7	1.2	0.6	2.5	1.3	0.9	0.4		
XS 10	1.07	500	286.21	290.62	2.29	2.07	291.29	0.020	2.6	2.7	1.3	0.9	0.5	2.0	1.0	0.7	0.4		
XS 11	1.05	500	284.07	288.13	2.13	1.95	289.2	0.020	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3		
XS 12	1.02	500	279.57	284.05	2.91	2.67	284.82	0.020	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
XS 13	1.00	500	278.46	282.96	2.86	2.65	283.54	0.0130	2.2	2.2	1.1	0.8	0.4	1.7	0.8	0.6	0.3		
XS 14	0.96	500	275.45	279.65	2.82	2.64	280.2	0.013	2.1	2.2	1.1	0.8	0.4	1.7	0.8	0.6	0.3		
XS 15	0.91	500	271.4	276.84	3.52	3.26	277.18	0.013	2.7	2.7	1.4	1.0	0.5	2.0	1.0	0.7	0.4		
XS 16	0.88	500	268.07	273.99	3.82	3.05	274.54	0.013	2.5	2.5	1.3	0.9	0.5	1.9	1.0	0.7	0.3		
US HWY29	0.87	500	268.57	272.36	2.44	2.16	273.2	0.013	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2		
DS HWY29	0.86	500	268.2	272.47	3.3	2.85	272.87	0.013	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3		
XS 17	0.84	500	265.16	271.06	3.59	2.99	271.57	0.013	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3		
XS 18	0.82	500	264.16	269.82	2.98	2.61	270.31	0.013	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3		
XS 19	0.80	500	262.36	267.89	3.33	2.96	268.3	0.013	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3		
XS 20	0.76	500	259.58	265.17	2.97	2.72	265.53	0.013	2.2	2.3	1.1	0.8	0.4	1.7	0.9	0.6	0.3		
US BMAIN	0.74	500	258.28	263.89	2.81	2.36	264.24	0.013	1.9	2.0	1.0	0.7	0.3	1.5	0.7	0.5	0.3		
DS BMAIN	0.74	500	258.59	263.65	3.77	3.42	263.82	0.013	2.8	2.9	1.4	1.0	0.5	2.1	1.1	0.8	0.4		
XS 21	0.71	500	255.93	262.65	2.83	2.56	263.01	0.013	2.1	2.1	1.1	0.8	0.4	1.6	0.8	0.6	0.3		
XS 22	0.67	500	253.94	260.09	3.2	2.9	260.42	0.013	2.4	2.4	1.2	0.9	0.4	1.8	0.9	0.6	0.3		
DS BFB	0.66	500	254.57	259.43	2.81	2.62	259.78	0.013	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3		
XS 23	0.62	500	253.14	256.83	2.34	2.26	257.17	0.013	1.8	1.9	0.9	0.7	0.3	1.4	0.7	0.5	0.3		
XS 24	0.58	500	250.61	254.02	1.3	1.29	254.41	0.013	1.0	1.1	0.5	0.4	0.2	0.8	0.4	0.3	0.1		
XS 24.5	0.57	500	248.66	253.2	1.73	1.7	253.54	0.0130	1.4	1.4	0.7	0.5	0.3	1.1	0.5	0.4	0.2		
US BFLB	0.54	500	246	251.33	3.52	3.04	251.7	0.013	2.5	2.5	1.3	0.9	0.4	1.9	1.0	0.7	0.3		
DS BFLB	0.53	500	246.03	250.45	3.15	2.96	250.81	0.013	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3		
XS 25	0.49	500	242.64	248.27	3.13	2.92	248.57	0.013	2.4	2.4	1.2	0.9	0.4	1.8	0.9	0.6	0.3		
XS 26	0.46	500	241.36	245.83	2.79	2.62	246.33	0.013	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3		
XS 27	0.41	500	237.42	241.54	2.92	2.71	242.13	0.013	2.2	2.3	1.1	0.8	0.4	1.7	0.8	0.6	0.3		
XS 28	0.39	500	236.16	240.44	2.86	2.5	241.01	0.013	2.0	2.1	1.0	0.7	0.4	1.6	0.8	0.6	0.3		
US RRB	0.38	500	235.65	239.85	3.73	3.62	240.25	0.0109	2.5	2.5	1.3	0.9	0.4	1.9	0.9	0.7	0.3		
DS RRB	0.37	500	234.64	239.22	3.24	3.15	239.66	0.011	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3		
XS 29	0.35	500	231.92	237.69	3.18	2.9	238.07	0.011	2.0	2.0	1.0	0.7	0.4	1.5	0.8	0.5	0.3		
XS 30	0.26	500	228.93	233.51	3.14	2.91	234	0.011	2.0	2.0	1.0	0.7	0.4	1.5	0.8	0.5	0.3		
XS 31	0.18	500	223.79	228.3	3.17	2.82	228.91	0.011	1.9	2.0	1.0	0.7	0.3	1.5	0.7	0.5	0.3		
XS 32	0.14	500	220.74	225.43	3.21	2.87	225.96	0.011	1.9	2.0	1.0	0.7	0.4	1.5	0.8	0.5	0.3		
XS 33	0.09	500	218.64	223.23	3.31	3	223.75	0.011	2.0	2.1	1.0	0.7	0.4	1.6	0.8	0.6	0.3		
XS 34	0.00	500	213.38	218.04	3.61	3.12	218.58	0.011	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3		



HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg	T <sub>0</sub>	Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)			d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)	
								E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	1000	304.5	310.52	4.58	4.09	311.17	0.0191	4.9	5.0	2.5	1.8	0.9	3.8	1.9	1.3	0.7
XS 2	1.23	1000	302.5	309.58	4.15	3.51	310.49	0.019	4.2	4.3	2.2	1.5	0.8	3.2	1.6	1.1	0.6
XS 3	1.22	1000	303.3	308.6	3.36	3.17	309.36	0.019	3.8	3.9	1.9	1.4	0.7	2.9	1.5	1.0	0.5
XS 4	1.21	1000	302.2	308.23	3.83	3.61	308.75	0.019	4.3	4.4	2.2	1.6	0.8	3.3	1.7	1.2	0.6
US SMR	1.21	1000	301.79	307.74	4.9	4.66	308.58	0.019	5.6	5.7	2.9	2.0	1.0	4.3	2.1	1.5	0.8
DS SMR	1.21	1000	301.48	307.47	5.23	5.05	308.19	0.019	6.0	6.2	3.1	2.2	1.1	4.6	2.3	1.6	0.8
XS 6	1.19	1000	299.67	305.9	3.13	2.58	307.12	0.019	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 7	1.17	1000	298.04	303.56	2.49	2.43	304.17	0.019	2.9	3.0	1.5	1.1	0.5	2.2	1.1	0.8	0.4
XS 8	1.13	1000	293.55	298.58	2.28	2.14	299.62	0.019	2.6	2.6	1.3	0.9	0.5	2.0	1.0	0.7	0.3
XS 9	1.09	1000	288.28	294.5	3.07	2.78	295.28	0.019	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 10	1.07	1000	286.21	292.15	3.15	2.83	293	0.019	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 11	1.05	1000	284.07	289.45	2.9	2.63	290.93	0.019	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.9	0.4
XS 12	1.02	1000	279.57	286.2	2.56	2.41	286.9	0.019	2.9	3.0	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 13	1.00	1000	278.46	284.68	4.13	3.72	285.54	0.0141	3.3	3.4	1.7	1.2	0.6	2.5	1.3	0.9	0.4
XS 14	0.96	1000	275.45	281.61	3.82	3.53	282.27	0.014	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 15	0.91	1000	271.4	279.11	5.01	4.52	279.57	0.014	4.0	4.1	2.0	1.4	0.7	3.1	1.5	1.1	0.5
XS 16	0.88	1000	268.07	275.66	4.65	3.7	276.67	0.014	3.3	3.3	1.7	1.2	0.6	2.5	1.3	0.9	0.4
US HWY29	0.87	1000	268.57	274.85	4.93	4.04	275.67	0.014	3.6	3.7	1.8	1.3	0.6	2.7	1.4	1.0	0.5
DS HWY29	0.86	1000	268.2	274.43	5.26	4.54	275.07	0.014	4.0	4.1	2.1	1.5	0.7	3.1	1.5	1.1	0.5
XS 17	0.84	1000	265.16	272.94	4.84	3.9	273.78	0.014	3.4	3.5	1.8	1.2	0.6	2.6	1.3	0.9	0.5
XS 18	0.82	1000	264.16	271.74	4.03	3.54	272.38	0.014	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 19	0.80	1000	262.36	269.81	4.26	3.81	270.4	0.014	3.4	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 20	0.76	1000	259.58	266.76	4.22	3.78	267.36	0.014	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5
US BMAIN	0.74	1000	258.28	265.28	4	3.25	265.89	0.014	2.9	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
DS BMAIN	0.74	1000	258.59	264.93	5.05	4.33	265.32	0.014	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5
XS 21	0.71	1000	255.93	263.74	3.76	3.42	264.06	0.014	3.0	3.1	1.5	1.1	0.5	2.3	1.2	0.8	0.4
XS 22	0.67	1000	253.94	261.24	3.8	3.45	261.62	0.014	3.0	3.1	1.6	1.1	0.6	2.3	1.2	0.8	0.4
DS BFB	0.66	1000	254.57	260.4	3.65	3.35	260.91	0.014	2.9	3.0	1.5	1.1	0.5	2.3	1.1	0.8	0.4
XS 23	0.62	1000	253.14	257.44	2.9	2.78	257.94	0.014	2.4	2.5	1.3	0.9	0.4	1.9	0.9	0.7	0.3
XS 24	0.58	1000	250.61	254.81	1.95	1.93	255.08	0.014	1.7	1.7	0.9	0.6	0.3	1.3	0.7	0.5	0.2
XS 24.5	0.57	1000	248.66	254.38	2.43	2.39	254.65	0.0125	1.9	1.9	1.0	0.7	0.3	1.4	0.7	0.5	0.3
US BFLB	0.54	1000	246	253.39	4.48	3.98	253.57	0.012	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
DS BFLB	0.53	1000	246.03	252.14	4.29	3.97	252.71	0.012	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 25	0.49	1000	242.64	250.09	4.08	3.81	250.38	0.012	3.0	3.0	1.5	1.1	0.5	2.3	1.1	0.8	0.4
XS 26	0.46	1000	241.36	247.79	3.69	3.47	248.37	0.012	2.7	2.8	1.4	1.0	0.5	2.1	1.0	0.7	0.4
XS 27	0.41	1000	237.42	243.62	3.82	3.54	244.31	0.012	2.8	2.8	1.4	1.0	0.5	2.1	1.1	0.8	0.4
XS 28	0.39	1000	236.16	243.09	4.73	4.01	243.54	0.012	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.9	0.4
US RRB	0.38	1000	235.65	242.72	6.58	6.39	243.15	0.0126	5.0	5.2	2.6	1.8	0.9	3.9	1.9	1.4	0.7
DS RRB	0.37	1000	234.64	240.79	4.81	4.68	241.6	0.013	3.7	3.8	1.9	1.3	0.7	2.8	1.4	1.0	0.5
XS 29	0.35	1000	231.92	239.51	4.04	3.7	240.06	0.013	2.9	3.0	1.5	1.1	0.5	2.2	1.1	0.8	0.4
XS 30	0.26	1000	228.93	235.62	2.83	2.69	236.05	0.013	2.1	2.2	1.1	0.8	0.4	1.6	0.8	0.6	0.3
XS 31	0.18	1000	223.79	230.15	4.47	3.85	231.07	0.013	3.0	3.1	1.6	1.1	0.5	2.3	1.2	0.8	0.4
XS 32	0.14	1000	220.74	227.6	4.53	3.96	228.28	0.013	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 33	0.09	1000	218.64	225.38	4.66	4.08	226.09	0.013	3.2	3.3	1.6	1.2	0.6	2.5	1.2	0.9	0.4
XS 34	0.00	1000	213.38	220.37	5.19	4.3	221.11	0.013	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5

HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL											
Plan: Ref flows River: YORK CR Reach: LYC								reach avg		T <sub>0</sub>		Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T*c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)	E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)			
										partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.		
XS 1	1.24	1250	304.5	311.28	4.94	4.4	312.02	0.0206	5.7	5.8	2.9	2.1	1.0	4.4	2.2	1.5	0.8		
XS 2	1.23	1250	302.5	310.26	4.34	3.7	311.3	0.021	4.8	4.9	2.4	1.7	0.9	3.7	1.8	1.3	0.6		
XS 3	1.22	1250	303.3	309.38	3.78	3.56	310.15	0.021	4.6	4.7	2.4	1.7	0.8	3.5	1.8	1.2	0.6		
XS 4	1.21	1250	302.2	309.03	4.28	4.02	309.58	0.021	5.2	5.3	2.7	1.9	0.9	4.0	2.0	1.4	0.7		
US SMR	1.21	1250	301.79	308.36	5.51	5.24	309.39	0.021	6.7	6.9	3.5	2.4	1.2	5.2	2.6	1.8	0.9		
DS SMR	1.21	1250	301.48	307.87	5.63	5.44	308.84	0.021	7.0	7.2	3.6	2.5	1.3	5.4	2.7	1.9	1.0		
XS 6	1.19	1250	299.67	306.57	3.57	2.96	307.6	0.021	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5		
XS 7	1.17	1250	298.04	303.97	2.81	2.74	304.63	0.021	3.5	3.6	1.8	1.3	0.6	2.7	1.4	1.0	0.5		
XS 8	1.13	1250	293.55	298.99	2.36	2.23	300.13	0.021	2.9	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4		
XS 9	1.09	1250	288.28	295.14	3.13	2.86	295.94	0.021	3.7	3.8	1.9	1.3	0.7	2.8	1.4	1.0	0.5		
XS 10	1.07	1250	286.21	292.74	3.49	3.13	293.67	0.021	4.0	4.1	2.1	1.5	0.7	3.1	1.6	1.1	0.5		
XS 11	1.05	1250	284.07	290.01	3.19	2.88	291.62	0.021	3.7	3.8	1.9	1.3	0.7	2.9	1.4	1.0	0.5		
XS 12	1.02	1250	279.57	286.9	3.07	2.88	287.57	0.021	3.7	3.8	1.9	1.3	0.7	2.9	1.4	1.0	0.5		
XS 13	1.00	1250	278.46	285.37	4.62	4.12	288.35	0.0135	3.5	3.6	1.8	1.3	0.6	2.7	1.3	0.9	0.5		
XS 14	0.96	1250	275.45	282.39	4.26	3.93	283.09	0.014	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
XS 15	0.91	1250	271.4	279.97	5.66	5.1	280.46	0.014	4.3	4.4	2.2	1.6	0.8	3.3	1.7	1.2	0.6		
XS 16	0.88	1250	268.07	276.52	4.96	3.99	277.62	0.014	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
US HWY29	0.87	1250	268.57	275.86	5.94	4.73	276.75	0.014	4.0	4.1	2.1	1.5	0.7	3.1	1.5	1.1	0.5		
DS HWY29	0.86	1250	268.2	275.04	5.87	5.07	275.84	0.014	4.3	4.4	2.2	1.6	0.8	3.3	1.7	1.2	0.6		
XS 17	0.84	1250	265.16	273.61	5.45	4.33	274.26	0.014	3.7	3.8	1.9	1.3	0.7	2.8	1.4	1.0	0.5		
XS 18	0.82	1250	264.16	272.46	4.41	3.89	273.17	0.014	3.3	3.4	1.7	1.2	0.6	2.5	1.3	0.9	0.4		
XS 19	0.80	1250	262.36	270.43	4.56	4.08	271.13	0.014	3.4	3.5	1.8	1.3	0.6	2.7	1.3	0.9	0.5		
XS 20	0.76	1250	259.58	267.54	4.57	4.09	268.2	0.014	3.5	3.6	1.8	1.3	0.6	2.7	1.3	0.9	0.5		
US BMAIN	0.74	1250	258.28	266.32	5.01	3.92	266.91	0.014	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
DS BMAIN	0.74	1250	258.59	265.45	5.56	4.67	265.95	0.014	3.9	4.1	2.0	1.4	0.7	3.0	1.5	1.1	0.5		
XS 21	0.71	1250	255.93	264.06	4.07	3.7	264.41	0.014	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.9	0.4		
XS 22	0.67	1250	253.94	261.65	4.14	3.76	262.05	0.014	3.2	3.3	1.6	1.2	0.6	2.4	1.2	0.9	0.4		
DS BFB	0.66	1250	254.57	260.73	3.93	3.6	261.33	0.014	3.0	3.1	1.6	1.1	0.6	2.3	1.2	0.8	0.4		
XS 23	0.62	1250	253.14	257.69	3.12	2.99	258.24	0.014	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3		
XS 24	0.58	1250	250.61	255.01	2.1	2.08	255.32	0.014	1.8	1.8	0.9	0.6	0.3	1.4	0.7	0.5	0.2		
XS 24.5	0.57	1250	248.66	254.62	2.68	2.63	254.89	0.0110	1.8	1.9	0.9	0.7	0.3	1.4	0.7	0.5	0.2		
US BFLB	0.54	1250	246	253.71	4.8	4.27	253.9	0.011	2.9	3.0	1.5	1.1	0.5	2.3	1.1	0.8	0.4		
DS BFLB	0.53	1250	246.03	252.5	4.54	4.19	253.19	0.011	2.9	3.0	1.5	1.0	0.5	2.2	1.1	0.8	0.4		
XS 25	0.49	1250	242.64	250.4	4.27	3.99	250.7	0.011	2.7	2.8	1.4	1.0	0.5	2.1	1.1	0.7	0.4		
XS 26	0.46	1250	241.36	248.34	4.08	3.83	248.9	0.011	2.6	2.7	1.3	1.0	0.5	2.0	1.0	0.7	0.4		
XS 27	0.41	1250	237.42	244.45	3.4	3.22	244.97	0.011	2.2	2.3	1.1	0.8	0.4	1.7	0.9	0.6	0.3		
XS 28	0.39	1250	236.16	243.99	4.81	4.18	244.31	0.011	2.9	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4		
US RRB	0.38	1250	235.65	243.75	7.61	7.39	244.06	0.0102	4.7	4.8	2.4	1.7	0.9	3.6	1.8	1.3	0.6		
DS RRB	0.37	1250	234.64	241.36	5.39	5.23	242.37	0.010	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5		
XS 29	0.35	1250	231.92	240.11	4.33	3.97	240.76	0.010	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3		
XS 30	0.26	1250	228.93	236.12	2.64	2.54	236.45	0.010	1.6	1.7	0.8	0.6	0.3	1.2	0.6	0.4	0.2		
XS 31	0.18	1250	223.79	230.96	4.85	4.16	231.98	0.010	2.6	2.7	1.4	1.0	0.5	2.0	1.0	0.7	0.4		
XS 32	0.14	1250	220.74	228.28	4.68	4.1	229.08	0.010	2.6	2.7	1.3	0.9	0.5	2.0	1.0	0.7	0.4		
XS 33	0.09	1250	218.64	226.32	4.9	4.31	226.88	0.010	2.7	2.8	1.4	1.0	0.5	2.1	1.1	0.7	0.4		
XS 34	0.00	1250	213.38	221.47	5.5	4.58	222.25	0.010	2.9	3.0	1.5	1.1	0.5	2.2	1.1	0.8	0.4		



HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg	T <sub>0</sub>	Ratio T <sub>0</sub> / T <sub>0c</sub> SHIELDS T*c=0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> SHIELDS T*c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)			d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)	
								E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	1500	304.5	311.98	5.15	4.6	312.79	0.0181	5.2	5.4	2.7	1.9	0.9	4.0	2.0	1.4	0.7
XS 2	1.23	1500	302.5	310.93	4.55	3.91	312.04	0.018	4.4	4.5	2.3	1.6	0.8	3.4	1.7	1.2	0.6
XS 3	1.22	1500	303.3	310.2	4.21	3.97	310.94	0.018	4.5	4.6	2.3	1.6	0.8	3.5	1.7	1.2	0.6
XS 4	1.21	1500	302.2	309.89	4.76	4.46	310.43	0.018	5.1	5.2	2.6	1.8	0.9	3.9	1.9	1.4	0.7
US SMR	1.21	1500	301.79	309.07	6.22	5.92	310.24	0.018	6.7	6.9	3.4	2.4	1.2	5.2	2.6	1.8	0.9
DS SMR	1.21	1500	301.48	308.3	6.06	5.85	309.5	0.018	6.6	6.8	3.4	2.4	1.2	5.1	2.6	1.8	0.9
XS 6	1.19	1500	299.67	306.89	3.77	3.14	307.97	0.018	3.6	3.7	1.8	1.3	0.6	2.7	1.4	1.0	0.5
XS 7	1.17	1500	298.04	304.34	3.08	3	305.03	0.018	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 8	1.13	1500	293.55	299.36	2.56	2.43	300.58	0.018	2.8	2.8	1.4	1.0	0.5	2.1	1.1	0.7	0.4
XS 9	1.09	1500	288.28	295.63	3.42	3.11	296.48	0.018	3.5	3.6	1.8	1.3	0.6	2.7	1.4	1.0	0.5
XS 10	1.07	1500	286.21	293.26	3.79	3.4	294.27	0.018	3.8	4.0	2.0	1.4	0.7	3.0	1.5	1.0	0.5
XS 11	1.05	1500	284.07	290.57	3.24	2.94	292.2	0.018	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 12	1.02	1500	279.57	287.56	3.52	3.31	288.2	0.018	3.7	3.9	1.9	1.4	0.7	2.9	1.4	1.0	0.5
XS 13	1.00	1500	278.46	285.99	5.05	4.47	287.08	0.0122	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 14	0.96	1500	275.45	283.05	4.63	4.27	283.8	0.012	3.3	3.3	1.7	1.2	0.6	2.5	1.3	0.9	0.4
XS 15	0.91	1500	271.4	280.69	6.2	5.57	281.16	0.012	4.2	4.4	2.2	1.5	0.8	3.3	1.6	1.2	0.6
XS 16	0.88	1500	268.07	277.63	5.23	4.28	278.66	0.012	3.3	3.3	1.7	1.2	0.6	2.5	1.3	0.9	0.4
US HWY29	0.87	1500	268.57	277.07	7.16	5.51	277.95	0.012	4.2	4.3	2.2	1.5	0.8	3.2	1.6	1.1	0.6
DS HWY29	0.86	1500	268.2	275.61	6.44	5.56	276.57	0.012	4.2	4.4	2.2	1.5	0.8	3.3	1.6	1.2	0.6
XS 17	0.84	1500	265.16	274.01	5.83	4.6	274.65	0.012	3.5	3.6	1.8	1.3	0.6	2.7	1.3	1.0	0.5
XS 18	0.82	1500	264.16	273.18	4.82	4.25	273.89	0.012	3.2	3.3	1.7	1.2	0.6	2.5	1.2	0.9	0.4
XS 19	0.80	1500	262.36	270.91	4.8	4.3	271.73	0.012	3.3	3.4	1.7	1.2	0.6	2.5	1.3	0.9	0.4
XS 20	0.76	1500	259.58	268.46	5.29	4.75	269.02	0.012	3.6	3.7	1.9	1.3	0.7	2.8	1.4	1.0	0.5
US BMAIN	0.74	1500	258.28	267.46	6.14	4.61	268.03	0.012	3.5	3.6	1.8	1.3	0.6	2.7	1.4	1.0	0.5
DS BMAIN	0.74	1500	258.59	265.93	6.04	4.97	266.55	0.012	3.8	3.9	1.9	1.4	0.7	2.9	1.5	1.0	0.5
XS 21	0.71	1500	255.93	264.33	4.34	3.95	264.73	0.012	3.0	3.1	1.5	1.1	0.5	2.3	1.2	0.8	0.4
XS 22	0.67	1500	253.94	262.02	4.45	4.03	262.45	0.012	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
DS BFB	0.66	1500	254.57	261.02	4.18	3.83	261.71	0.012	2.9	3.0	1.5	1.1	0.5	2.2	1.1	0.8	0.4
XS 23	0.62	1500	253.14	257.92	3.28	3.14	258.53	0.012	2.4	2.5	1.2	0.9	0.4	1.8	0.9	0.7	0.3
XS 24	0.58	1500	250.61	255.18	2.26	2.23	255.54	0.012	1.7	1.7	0.9	0.6	0.3	1.3	0.7	0.5	0.2
XS 24.5	0.57	1500	248.66	254.85	2.9	2.85	255.11	0.0089	1.6	1.6	0.8	0.6	0.3	1.2	0.6	0.4	0.2
US BFLB	0.54	1500	246	253.99	5.07	4.51	254.19	0.009	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3
DS BFLB	0.53	1500	246.03	252.79	4.67	4.32	253.5	0.009	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3
XS 25	0.49	1500	242.64	250.68	4.43	4.14	250.99	0.009	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3
XS 26	0.46	1500	241.36	248.64	4.32	4.05	249.2	0.009	2.3	2.3	1.2	0.8	0.4	1.7	0.9	0.6	0.3
XS 27	0.41	1500	237.42	244.74	3.69	3.5	245.23	0.009	2.0	2.0	1.0	0.7	0.4	1.5	0.8	0.5	0.3
XS 28	0.39	1500	236.16	244.17	4.99	4.33	244.57	0.009	2.4	2.5	1.2	0.9	0.4	1.9	0.9	0.7	0.3
US RRB	0.38	1500	235.65	243.98	2.75	2.59	244.24	0.0097	1.6	1.6	0.8	0.6	0.3	1.2	0.6	0.4	0.2
DS RRB	0.37	1500	234.64	241.79	5.82	5.65	242.95	0.010	3.4	3.5	1.8	1.2	0.6	2.6	1.3	0.9	0.5
XS 29	0.35	1500	231.92	240.61	4.35	4.02	241.34	0.010	2.4	2.5	1.3	0.9	0.4	1.9	0.9	0.7	0.3
XS 30	0.26	1500	228.93	236.36	2.89	2.77	236.72	0.010	1.7	1.7	0.9	0.6	0.3	1.3	0.6	0.5	0.2
XS 31	0.18	1500	223.79	231.8	4.72	4.13	232.83	0.010	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3
XS 32	0.14	1500	220.74	228.82	4.6	4.07	229.52	0.010	2.5	2.5	1.3	0.9	0.4	1.9	1.0	0.7	0.3
XS 33	0.09	1500	218.64	227.06	5.3	4.67	227.61	0.010	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 34	0.00	1500	213.38	222.51	5.48	4.67	223.27	0.010	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4

HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg	T <sub>0</sub>	Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T <sup>*</sup> c=0.045				Ratio T <sub>0</sub> / T <sub>0c</sub> , SHIELDS T <sup>*</sup> c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)			d50 (45mm)		d84 (181 mm)		d50 (45mm)		d84 (181 mm)	
								E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	2000	304.5	313.36	4.96	4.52	314.2	0.0212	6.0	6.1	3.1	2.2	1.1	4.6	2.3	1.6	0.8
XS 2	1.23	2000	302.5	312.35	5.23	4.5	313.44	0.021	6.0	6.1	3.1	2.2	1.1	4.6	2.3	1.6	0.8
XS 3	1.22	2000	303.3	311.95	5.15	4.85	312.56	0.021	6.4	6.6	3.3	2.3	1.2	4.9	2.5	1.7	0.9
XS 4	1.21	2000	302.2	311.74	4.94	4.69	312.17	0.021	6.2	6.4	3.2	2.3	1.1	4.8	2.4	1.7	0.8
US SMR	1.21	2000	301.79	310.65	7.8	7.43	311.97	0.021	9.8	10.1	5.0	3.6	1.8	7.6	3.8	2.7	1.3
DS SMR	1.21	2000	301.48	308.83	6.59	6.37	310.63	0.021	8.4	8.7	4.3	3.1	1.5	6.5	3.2	2.3	1.1
XS 6	1.19	2000	299.67	306.93	3.8	3.17	308.63	0.021	4.2	4.3	2.2	1.5	0.8	3.2	1.6	1.1	0.6
XS 7	1.17	2000	296.04	304.98	3.5	3.42	305.72	0.021	4.5	4.6	2.3	1.6	0.8	3.5	1.7	1.2	0.6
XS 8	1.13	2000	293.55	300.03	2.93	2.79	301.36	0.021	3.7	3.8	1.9	1.3	0.7	2.8	1.4	1.0	0.5
XS 9	1.09	2000	288.28	296.25	4.03	3.6	297.34	0.021	4.8	4.9	2.4	1.7	0.9	3.7	1.8	1.3	0.6
XS 10	1.07	2000	286.21	294.06	4.38	3.9	295.24	0.021	5.2	5.3	2.7	1.9	0.9	4.0	2.0	1.4	0.7
XS 11	1.05	2000	284.07	291.36	3.61	3.28	293.17	0.021	4.3	4.5	2.2	1.6	0.8	3.3	1.7	1.2	0.6
XS 12	1.02	2000	279.57	288.75	4.29	4.03	289.37	0.021	5.3	5.5	2.7	1.9	1.0	4.1	2.1	1.5	0.7
XS 13	1.00	2000	278.46	287.08	5.77	5.05	288.38	0.0142	4.5	4.6	2.3	1.6	0.8	3.4	1.7	1.2	0.6
XS 14	0.96	2000	275.45	284.11	5.17	4.76	284.97	0.014	4.2	4.3	2.2	1.5	0.8	3.2	1.6	1.1	0.6
XS 15	0.91	2000	271.4	281.68	6.92	6.2	282.2	0.014	5.5	5.6	2.8	2.0	1.0	4.2	2.1	1.5	0.7
XS 16	0.88	2000	268.07	279.76	7.24	5.94	280.33	0.014	5.2	5.4	2.7	1.9	1.0	4.0	2.0	1.4	0.7
US HWY29	0.87	2000	268.57	278.97	7.34	5.21	279.89	0.014	4.6	4.7	2.4	1.7	0.8	3.5	1.8	1.3	0.6
DS HWY29	0.86	2000	268.2	276.45	7.28	6.29	277.79	0.014	5.6	5.7	2.9	2.0	1.0	4.3	2.1	1.5	0.8
XS 17	0.84	2000	265.16	274.59	6.38	4.97	275.32	0.014	4.4	4.5	2.3	1.6	0.8	3.4	1.7	1.2	0.6
XS 18	0.82	2000	264.16	273.26	4.9	4.32	274.13	0.014	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5
XS 19	0.80	2000	262.36	271.69	5.07	4.58	272.23	0.014	4.0	4.2	2.1	1.5	0.7	3.1	1.6	1.1	0.6
XS 20	0.76	2000	259.58	269.57	6.39	5.74	270.06	0.014	5.1	5.2	2.6	1.8	0.9	3.9	2.0	1.4	0.7
US BMAIN	0.74	2000	258.28	268.86	7.52	5.55	269.38	0.014	4.9	5.0	2.5	1.8	0.9	3.8	1.9	1.3	0.7
DS BMAIN	0.74	2000	258.59	266.56	6.66	5.35	267.45	0.014	4.7	4.9	2.4	1.7	0.9	3.6	1.8	1.3	0.6
XS 21	0.71	2000	255.93	264.81	4.82	4.38	265.31	0.014	3.9	4.0	2.0	1.4	0.7	3.0	1.5	1.1	0.5
XS 22	0.67	2000	253.94	262.69	5.07	4.59	263.19	0.014	4.1	4.2	2.1	1.5	0.7	3.1	1.6	1.1	0.6
DS BFB	0.66	2000	254.57	261.56	4.44	4.07	262.43	0.014	3.6	3.7	1.8	1.3	0.7	2.8	1.4	1.0	0.5
XS 23	0.62	2000	253.14	258.36	3.36	3.22	259.05	0.014	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 24	0.58	2000	250.61	255.5	2.54	2.51	255.96	0.014	2.2	2.3	1.1	0.8	0.4	1.7	0.9	0.6	0.3
XS 24.5	0.57	2000	248.66	255.25	3.31	3.25	255.53	0.0112	2.3	2.3	1.2	0.8	0.4	1.7	0.9	0.6	0.3
US BFLB	0.54	2000	246	254.45	5.53	4.92	254.68	0.011	3.4	3.5	1.8	1.2	0.6	2.6	1.3	0.9	0.5
DS BFLB	0.53	2000	246.03	253.26	4.94	4.58	253.95	0.011	3.2	3.3	1.6	1.2	0.6	2.5	1.2	0.9	0.4
XS 25	0.49	2000	242.64	251.14	4.69	4.4	251.5	0.011	3.1	3.1	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 26	0.46	2000	241.36	249.2	4.73	4.44	249.75	0.011	3.1	3.2	1.6	1.1	0.6	2.4	1.2	0.8	0.4
XS 27	0.41	2000	237.42	245.38	4.33	4.1	245.78	0.011	2.9	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 28	0.39	2000	236.16	244.82	5.63	4.89	245.24	0.011	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5
US RRB	0.38	2000	235.65	244.71	3.48	3.27	244.94	0.0099	2.0	2.1	1.0	0.7	0.4	1.6	0.8	0.5	0.3
DS RRB	0.37	2000	234.64	242.32	6.34	6.16	243.74	0.010	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5
XS 29	0.35	2000	231.92	241.15	4.65	4.31	241.98	0.010	2.7	2.7	1.4	1.0	0.5	2.0	1.0	0.7	0.4
XS 30	0.26	2000	228.93	236.75	3.27	3.14	237.15	0.010	1.9	2.0	1.0	0.7	0.4	1.5	0.7	0.5	0.3
XS 31	0.18	2000	223.79	232.34	5.1	4.47	233.58	0.010	2.8	2.8	1.4	1.0	0.5	2.1	1.1	0.8	0.4
XS 32	0.14	2000	220.74	229.68	5.3	4.68	230.25	0.010	2.9	3.0	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 33	0.09	2000	218.64	228.08	5.76	5.13	228.71	0.010	3.2	3.3	1.6	1.1	0.6	2.4	1.2	0.9	0.4
XS 34	0.00	2000	213.38	223.89	6	5.16	224.73	0.010	3.2	3.3	1.6	1.2	0.6	2.5	1.2	0.9	0.4



HEC-RAS OUTPUT								CALCULATED SHEAR STRESS AND MOBILIZATION POTENTIAL									
Plan: Ref flows River: YORK CR Reach: LYC								reach avg	T <sub>0</sub>	Ratio T <sub>0</sub> / T <sub>c</sub> , SHIELDS T*c=0.045				Ratio T <sub>0</sub> / T <sub>c</sub> , SHIELDS T*c=0.060			
XS ID	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Depth C (ft)	Hydr Radius C (ft)	EGL elev (ft)			d50 (45mm)	d84 (181 mm)	d50 (45mm)	d84 (181 mm)				
								E.G. Slope (ft/ft)	Shear Chan (lb/sq ft)	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.	partial mob.	complete mob.
XS 1	1.24	2500	304.5	314.44	5.54	5.07	315.28	0.0169	5.3	5.5	2.7	1.9	1.0	4.1	2.1	1.5	0.7
XS 2	1.23	2500	302.5	313.57	5.83	5.06	314.62	0.017	5.3	5.5	2.7	1.9	1.0	4.1	2.1	1.5	0.7
XS 3	1.22	2500	303.3	313.6	6.7	6.28	313.98	0.017	6.6	6.8	3.4	2.4	1.2	5.1	2.5	1.8	0.9
XS 4	1.21	2500	302.2	313.6	6.8	6.46	313.8	0.017	6.8	7.0	3.5	2.5	1.2	5.2	2.6	1.9	0.9
US SMR	1.21	2500	301.79	312.17	9.32	8.87	313.61	0.017	9.3	9.6	4.8	3.4	1.7	7.2	3.6	2.5	1.3
DS SMR	1.21	2500	301.48	309.03	6.78	6.55	311.68	0.017	6.9	7.1	3.5	2.5	1.3	5.3	2.7	1.9	0.9
XS 6	1.19	2500	299.67	307.25	4	3.35	309.2	0.017	3.5	3.6	1.8	1.3	0.6	2.7	1.4	1.0	0.5
XS 7	1.17	2500	298.04	305.52	3.84	3.75	306.29	0.017	3.9	4.1	2.0	1.4	0.7	3.0	1.5	1.1	0.5
XS 8	1.13	2500	293.55	300.57	3.36	3.19	302.02	0.017	3.4	3.5	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 9	1.09	2500	288.28	296.78	4.54	4.01	298.11	0.017	4.2	4.3	2.2	1.5	0.8	3.3	1.6	1.2	0.6
XS 10	1.07	2500	286.21	294.87	4.94	4.42	295.77	0.017	4.7	4.8	2.4	1.7	0.8	3.6	1.8	1.3	0.6
XS 11	1.05	2500	284.07	291.98	4.08	3.68	294.03	0.017	3.9	4.0	2.0	1.4	0.7	3.0	1.5	1.1	0.5
XS 12	1.02	2500	279.57	289.86	4.72	4.45	290.45	0.017	4.7	4.8	2.4	1.7	0.9	3.6	1.8	1.3	0.6
XS 13	1.00	2500	278.46	288.01	6.37	5.53	289.5	0.0107	3.7	3.8	1.9	1.3	0.7	2.8	1.4	1.0	0.5
XS 14	0.96	2500	275.45	285.01	5.26	4.85	285.96	0.011	3.2	3.3	1.7	1.2	0.6	2.5	1.2	0.9	0.4
XS 15	0.91	2500	271.4	282.46	7.65	6.86	283.07	0.011	4.6	4.7	2.3	1.7	0.8	3.5	1.8	1.2	0.6
XS 16	0.88	2500	268.07	281.1	8.58	7.04	281.55	0.011	4.7	4.8	2.4	1.7	0.8	3.6	1.8	1.3	0.6
US HWY29	0.87	2500	268.57	280.54	8.92	6.13	281.25	0.011	4.1	4.2	2.1	1.5	0.7	3.1	1.6	1.1	0.6
DS HWY29	0.86	2500	268.2	277.18	8.02	6.92	278.91	0.011	4.6	4.7	2.4	1.7	0.8	3.5	1.8	1.3	0.6
XS 17	0.84	2500	265.16	275.16	6.92	5.34	275.96	0.011	3.5	3.6	1.8	1.3	0.6	2.7	1.4	1.0	0.5
XS 18	0.82	2500	264.16	273.8	5.44	4.8	274.8	0.011	3.2	3.3	1.6	1.2	0.6	2.5	1.2	0.9	0.4
XS 19	0.80	2500	262.36	272.26	5.57	5.03	272.9	0.011	3.3	3.4	1.7	1.2	0.6	2.6	1.3	0.9	0.5
XS 20	0.76	2500	259.58	270.32	7.14	6.42	270.86	0.011	4.3	4.4	2.2	1.6	0.8	3.3	1.6	1.2	0.6
US BMAIN	0.74	2500	258.28	269.77	8.43	6.22	270.25	0.011	4.1	4.2	2.1	1.5	0.8	3.2	1.6	1.1	0.6
DS BMAIN	0.74	2500	258.59	267.23	7.33	5.73	268.38	0.011	3.8	3.9	2.0	1.4	0.7	2.9	1.5	1.0	0.5
XS 21	0.71	2500	255.93	265.24	5.25	4.78	265.84	0.011	3.2	3.3	1.6	1.2	0.6	2.4	1.2	0.9	0.4
XS 22	0.67	2500	253.94	263.3	5.68	5.14	263.82	0.011	3.4	3.5	1.8	1.2	0.6	2.6	1.3	0.9	0.5
DS BFB	0.66	2500	254.57	262	4.87	4.43	263.08	0.011	2.9	3.0	1.5	1.1	0.5	2.3	1.1	0.8	0.4
XS 23	0.62	2500	253.14	258.72	3.44	3.32	259.52	0.011	2.2	2.3	1.1	0.8	0.4	1.7	0.9	0.6	0.3
XS 24	0.58	2500	250.61	255.8	2.8	2.77	256.34	0.011	1.8	1.9	0.9	0.7	0.3	1.4	0.7	0.5	0.3
XS 24.5	0.57	2500	248.66	255.62	3.68	3.62	255.92	0.0076	1.7	1.8	0.9	0.6	0.3	1.3	0.7	0.5	0.2
US BFLB	0.54	2500	246	254.84	5.93	5.27	255.12	0.008	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3
DS BFLB	0.53	2500	246.03	253.65	5.32	4.94	254.32	0.008	2.3	2.4	1.2	0.8	0.4	1.8	0.9	0.6	0.3
XS 25	0.49	2500	242.64	251.54	4.94	4.64	251.97	0.008	2.2	2.3	1.1	0.8	0.4	1.7	0.8	0.6	0.3
XS 26	0.46	2500	241.36	249.66	5.07	4.76	250.26	0.008	2.3	2.3	1.2	0.8	0.4	1.7	0.9	0.6	0.3
XS 27	0.41	2500	237.42	245.92	4.88	4.62	246.3	0.008	2.2	2.2	1.1	0.8	0.4	1.7	0.8	0.6	0.3
XS 28	0.39	2500	236.16	245.34	6.16	5.35	245.81	0.008	2.5	2.6	1.3	0.9	0.5	1.9	1.0	0.7	0.3
US RRB	0.38	2500	235.65	245.26	4.03	3.79	245.51	0.0094	2.2	2.3	1.1	0.8	0.4	1.7	0.9	0.6	0.3
DS RRB	0.37	2500	234.64	242.9	6.93	6.73	244.4	0.009	3.9	4.0	2.0	1.4	0.7	3.0	1.5	1.1	0.5
XS 29	0.35	2500	231.92	241.54	5.05	4.67	242.45	0.009	2.7	2.8	1.4	1.0	0.5	2.1	1.1	0.7	0.4
XS 30	0.26	2500	228.93	237.08	3.6	3.46	237.54	0.009	2.0	2.1	1.0	0.7	0.4	1.6	0.8	0.6	0.3
XS 31	0.18	2500	223.79	232.94	5.51	4.84	234.05	0.009	2.8	2.9	1.5	1.0	0.5	2.2	1.1	0.8	0.4
XS 32	0.14	2500	220.74	230.43	5.88	5.2	230.95	0.009	3.0	3.1	1.6	1.1	0.6	2.3	1.2	0.8	0.4
XS 33	0.09	2500	218.64	228.8	6.1	5.45	229.55	0.009	3.2	3.3	1.6	1.2	0.6	2.5	1.2	0.9	0.4
XS 34	0.00	2500	213.38	224.95	6.43	5.56	225.84	0.009	3.3	3.3	1.7	1.2	0.6	2.5	1.3	0.9	0.4