APPENDIX 9-A

BERA 2010 Selected Information

DRAFT

Baseline Ecological Risk Assessment:

Former ASARCO East Helena Facility
East Helena, Montana

Prepared for
Montana Environmental Trust Group, LLC
Trustee of the Montana Environmental Custodial Trust
P.O. Box 1230
East Helena, MT 59635

December 31, 2010

Gradient

Gradient

Sediment and Sediment Toxicity Sampling Locations

East Helena, Montana

MAP 5b

Date: 12/17/2010

Project No.: xxxxxx; PM: xxx; Drawn By: mkovach; Checked By: xxx; Coordinate System: NAD 1983 StatePlane Montana FIPS 2500 Feet; Path: G:\Projects\210017_Montana_Env\Graphics\CADGIS\100\210017_100-25_5b_sed.mxd

Table B-8. Acid-Volatile Sulfide (AVS) and Simultaneously-Extracted Metal (SEM) Concentrations in Sediments

			Conventionals			SEM Metals (umol/g dry-weight)									
	Sample	Location	TOC	Acid Volatile Sulfide		Cd		Cu		Pb		Ni		Zn	
CSM Unit	Date	Sample ID	%	umol/g dry-weight	Q [b]	umol/g	Q	umol/g	Q	umol/g	Q	umol/g	Q	umol/g	Q
Lower Lake	8/3/2010	LL-25	2.71	25.8		0.525		0.08	U	7.44		0.09	U	16.1	
Lower Lake	8/3/2010	LL-22	2.67	19.3		0.874		0.08	U	3.06		0.09	U	11.8	
Lower Lake	8/3/2010	LL-21	1.12	14.2		0.576		0.08	U	5.79		0.12		12.5	
Lower Lake	8/3/2010	LL-24	1.56	17.5		0.081		0.08	U	1.08		0.09	U	5.09	
Lower Lake	8/3/2010	LL-23	1.96	29.6		0.486		0.08	U	1.2		0.09	U	12.3	
Prickly Pear Creek	7/28/2010	PPC-24	0.42	0.4	U	0.009		0.33		0.64		0.09	U	9.45	J
Prickly Pear Creek	7/28/2010	PPC-7	0.73	0.4	U	0.025		0.38		0.76		0.09	U	5.65	J
Prickly Pear Creek	7/28/2010	PPC-5	0.27	0.4	U	0.013		0.24		0.41		0.09	U	3.09	J
Prickly Pear Creek	7/28/2010	PPC-103	0.31	1.8	J	0.013		0.16		0.29		0.09	U	2.98	J
Prickly Pear Creek	7/28/2010	PPC-102	1.56	9.57	J	0.021		0.15		0.48		0.09	U	4.36	J
Prickly Pear Creek	7/29/2010	PPC-22	0.51	3.98	J	0.017		0.31		0.73		0.09	U	6.07	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-4	0.78	0.4	U	0.009		0.2		0.44		0.09	U	4.2	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-6	0.6	0.4	U	0.009		0.2		0.4		0.09	U	3.68	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-8	0.63	0.921	J	0.017		0.37		0.79		0.09	U	6.85	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-2	0.22	0.4	U	0.009	U	0.1		0.23		0.09	U	2.48	J
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-1	0.31	0.4	U	0.016		0.39		0.64		0.09	U	5.48	J
Upper Lake/Marsh	8/3/2010	UL-21	3.2	5.3		0.316		1.02		11		0.09		16.9	
Upper Lake/Marsh	8/5/2010	UL-24	2.34	2.42	J	1.42		4.98	J	31.4		0.13		36.9	
Upper Lake/Marsh	8/5/2010	UL-23	3.02	1.13	J	1.92		7.15	J	121		0.13		59.8	
Upper Lake/Marsh	8/5/2010	UL-22	3.31	92.4		0.645		0.08	U	4.51		0.15		35.7	
Upper Lake/Marsh	8/5/2010	UL-25	2.52	116		0.294		0.08	U	3.47		0.12		33	
Upper Lake/Marsh	8/5/2010	ULM-2	3.11	6.9		0.046		0.5		1.08		0.09	U	13.7	
Upper Lake/Marsh	8/5/2010	ULM-3	4.04	56.5		0.249		0.08	U	2.61		0.1		31.5	
Upper Lake/Marsh	8/5/2010	ULM-4	3.39	83.5		0.564		0.08	U	5.03		0.14		33.9	
Upper Lake/Marsh	8/5/2010	ULM-5	5.02	94.4		0.668		0.08	U	7.56		0.2		61.9	
Upper Lake/Marsh	8/5/2010	ULM-1	2.58	0.667	J	0.134		2.61		5.49		0.09	U	11.6	
Walker Creek (Marsh)	8/11/2010	WPM-1	0.59	2.48		0.009	U	0.25		0.02	U	0.09	U	0.11	
Walker Creek (Marsh)	8/12/2010	WPM-2	1.0	0.507		0.009	U	0.22		0.02	U	0.09	U	0.08	
Walker Creek (Marsh)	8/12/2010	WPM-3	2.26	0.812		0.009	U	0.41		0.03		0.09	U	0.18	
Walker Creek (Marsh)	8/12/2010	WPM-4	0.9	0.4	U	0.009	U	0.19		0.02	U	0.09	U	0.13	
Walker Creek (Marsh)	8/12/2010	WPM-5	0.73	0.4	U	0.009	U	0.29		0.02	U	0.09	U	0.09	
Walker Creek (Pond)	8/11/2010	WP-3	1.24	0.598		0.009	U	0.1		0.02	U	0.09	U	0.13	
Walker Creek (Pond)	8/11/2010	WP-4	0.61	1.44		0.009	U	0.08	U	0.02	U	0.09	U	0.12	
Walker Creek (Pond)	8/11/2010	WP-5	0.44	0.856		0.009	U	0.13		0.02	U	0.09	U	0.11	
Walker Creek (Pond)	8/11/2010	WP-1	1.08	1.95		0.009	U	0.14		0.03		0.09	U	0.16	
Walker Creek (Pond)	8/11/2010	WP-2	0.86	2.65		0.009	U	0.27		0.02	U	0.09	U	0.08	
Wilson Ditch	8/10/2010	WD-2	3.03	0.4	U	0.408		4.72		23.6		0.1		19.2	

Notes:

J - estimated

U - not detected

Table B-7. Sediment Chemistry Data (Conventional Parameters and Total Metals)

			Conventionals							Total Metals (mg/kg dry-weight)																			
	Sample	Location	Field pH	TOC	Moisture	Grain Size Fraction (%)				Al		Sb		As		Ba		Be		Cd		Cr		Co		Cu		Fe	
CSM Unit	Date	Sample ID	s.u.	%	%	Sand	Silt	Clay	Fine Sand	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
Canyon Ferry (Ref)	10/1/2003	CFR_1	nm	nm	nm	nm	nm	nm	nm	13200		23.2	U	12.4		166		1.5		0.97		21.2		8.4		28.1		16100	
Canyon Ferry (Ref)	10/1/2003	CFR_2	nm	nm	nm	nm	nm	nm	nm	17600		24.2	U	15.6		175		1.8		1.2		23.6		9.3		33.6		19500	
Lower Lake	9/30/2003	LL_1	nm	nm	nm	nm	nm	nm	nm	4440		990		1660		173		0.56		1230		10.4		25.6		1920		17500	
Lower Lake	9/30/2003	LL_2	nm	nm	nm	nm	nm	nm	nm	13000		353		2730		245		1.8		1150		22.1		35.1		1900		35200	
Lower Lake	9/30/2003	LL_3	nm	nm	nm	nm	nm	nm	nm	11500		530		3030		205		1.3		2680		21.9		34.6		2600		30300	
Lower Lake	8/3/2010	LL-21	8.81	1.12	31.3	57	14	26	3	5010		111		901	J	229		10	U	228		9		15		932	J	22800	
Lower Lake	8/3/2010	LL-22	8.1	2.67	27.5	73	14	10	3	4620		121		223	J	100	U	10	U	92		6		6		220	J	9000	
Lower Lake	8/3/2010	LL-23	8.0 (lab)	1.96	32.8	59	20	10	11	6180		11		133	J	100	U	10	U	30		8		5		239	J	12100	
Lower Lake	8/3/2010	LL-24	9.49	1.56	17.2	78	8	14	0 U	4480		55		94	J	130		10	U	19		17		8		168	J	17300	
Lower Lake	8/3/2010	LL-25	7.7	2.71	29.2	76	12	12	0 U	4410		14		138	J	100	U	10	U	40		6		4		223	J	11100	
Prickly Pear Creek	10/1/2003	PPC_2	nm	nm	nm	nm	nm	nm	nm	7750		15.5	U	52.1		135		1.1		6		10.3		12.3		93.9		18600	
Prickly Pear Creek	10/1/2003	PPC_3	nm	nm	nm	nm	nm	nm	nm	9500		4.1		122		250		1.3		22.8		15.9		15.5		221		24800	
Prickly Pear Creek	10/1/2003	PPC_4	nm	nm	nm	nm	nm	nm	nm	10100		4.5		250		352		1.4		36.8		21.2		21.2		480		38100	
Prickly Pear Creek	10/1/2003	PPC_5	nm	nm	nm	nm	nm	nm	nm	4880		1.9		32.1		85.3		0.63		4.1		8.2		7		44.1		11800	
Prickly Pear Creek	7/28/2010	PPC-102	7.43	1.56	34.7	65	4	18	13	3630		1.1		44		100	U	10	U	4.7		6		4		41		9390	
Prickly Pear Creek	7/28/2010	PPC-103	7.48	0.31	22.3	92	6	2	0 U	1640		0.5		36		100	U	10	U	0.7		5	U	2		11		4990	
Prickly Pear Creek	7/30/2010	PPC-22	7.06	0.51	nm	80	8	4	8	2690		0.5		12		100	U	10	U	1.1		7		3		20		9090	
Prickly Pear Creek	7/28/2010	PPC-23	7.63	0.59	22	77	12	6	5	4500		1.5	J	24		100	U	10	U	2.1		10		5		42		13900	
Prickly Pear Creek	7/28/2010	PPC-24	7.43	0.42	28.3	84	6	4	6	2890		0.8	J	19		100	U	10	U	1.2		8		4		25		10100	
Prickly Pear Creek	7/28/2010	PPC-5	7.33	0.27	21.5	92	6	2	0 U	1770		0.5	U	23		100	U	10	U	0.7		7		3		13		8740	
Prickly Pear Creek	7/28/2010	PPC-7	7.46	0.73	32.4	82	10	4	4	3810		1	J	26		100	U	10	U	1.8		9		5		40		13400	
Prickly Pear Creek	7/28/2010	PPC-8	7.4	0.28	24.4	92	6	2	0 U	2090		0.5	U	16		100	U	10	U	0.8		5	U	3		17		7210	
Prickly Pear Creek (Ref)	10/1/2003	PPC_1	nm	nm	nm	nm	nm	nm	nm	8590		-	R	11.5		106		0.91		3.5		18		9.9		59.7		20700	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-1	7.1	0.31	23.1	83	10	4	3	3270		0.6	J	20		100	U	10	U	1.1		5	U	4		24		10500	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-2	7.69	0.22	21	90	8	2	0 U	2110		0.5	U	12		100	U	10	U	0.7		5	U	3		14		7320	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-3	7.7	0.55	21.2	84	8	4	4	3890		0.8	J	19		100	U	10	U	1.1		11		4		27		14100	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-4	7.4 (lab)	0.78	28.4	79	14	4	3	3900		0.6	J	20		100	U	10	U	1.3		7		5		29		12100	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-5	7.56	0.42	27.1	85	6	4	5	3700		0.6	J	18		100	U	10	U	0.9		5	U	4		23		10300	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-6	7.21	0.6	27.3	82	10	4	4	3780		0.8	J	18		100	U	10	U	1.2		10		5		22		13100	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-7	7.53	1.29	30.1	73	14	6	7	4030		1	J	21		100	U	10	U	2.4		6		4		38		10200	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-8	7.5	0.63	26.1	85	10	4	1	4250		0.6	J	20		100	U	10	U	1.2		9		5		25		12100	
Upper Lake/Marsh	8/3/2010	UL-21	7.63	3.2	37.5	58	22	18	2	9340		14		251	J	218		10	U	56		9		5		308	J	13300	
Upper Lake/Marsh	8/5/2010	UL-22	7.08	3.31	51	35	34	22	9	5830		17.8		115		100	U	10	U	31.3		10		6		316		10700	
Upper Lake/Marsh	8/5/2010	UL-23	6.96	3.02	42.1	28	40	26	6	6380		40.7		531		103		10	U	105		10		8		720		13900	
Upper Lake/Marsh	8/5/2010	UL-24	7.08	2.34	31.4	71	14	14	1	4560		57.2		353		184		10	U	74.7		8		7		511		12900	
Upper Lake/Marsh	8/5/2010	UL-25	7.28	2.52	44.1	52	24	20	4	5240		4.1	J	57		100	U	10	U	25.5		10		4		105		10300	
Upper Lake/Marsh	8/5/2010	ULM-1	7.69	2.58	25.6	78	12	10	0 U	4430		7.8		75		100	U	10	U	9.6		7		4		189		12200	
Upper Lake/Marsh	8/5/2010	ULM-2	6.97	3.11	45.2	45	30	14	11	6330		1.1	J	37		100	U	10	U	4.4		10		6		74		11100	
Upper Lake/Marsh	8/5/2010	ULM-3	6.96	4.04	53.7	6	60	22	12	8730		4.3	J	98		114		10	U	14.1		12		8		155		15800	
Upper Lake/Marsh	8/5/2010	ULM-4	6.86	3.39	51.9	1 U	66	30	4	9950		2.5	J	108		120		10	U	11.4		14		9		125		19600	
Upper Lake/Marsh	8/5/2010	ULM-5	6.9	5.02	58.5	1	60	30	9	8830		5.4	J	119		101		10	U	26		13		7		217		12900	
Upper Lake/Marsh	8/5/2010	ULM-6	6.78	3.93	54	13	48	24	15	8680		8.5	J	78		105		10	U	39.8		13		8		280		11900	
Upper Lake/Marsh	8/5/2010	ULM-7	7.55	2.09	47	38	36	12	14	6010		1.5	J	38		104		10	U	2.9		8		5		71		11800	
Upper Lake/Marsh	8/5/2010	ULM-8	6.93	4.44	66.2	4	68	18	10	6140		1.9	J	51		100	U	10	U	4.2		8		4		91		11000	
Upper Lake/Marsh	8/5/2010	ULM-9	7.67	1.01	35	73	14	8	5	5560		0.9	J	21		100	U	10	U	1.6		10		5		41		12400	
Upper Lake/Marsh	9/30/2003	ULM_1	nm	nm	nm	nm	nm	nm	nm	15700		19.5		229		150		1.5		112		19.5		12.2		686		23500	
Upper Lake/Marsh	9/30/2003	ULM_10	nm	nm	nm	nm	nm	nm	nm	14200		60		337		179		1.6		238		20.1		18		1310		25600	
Upper Lake/Marsh	9/30/2003	ULM_3	nm	nm	nm	nm	nm	nm	nm	15700		5.6		162		282		2.1		66.9		22.3		19.2		430		29200	
Upper Lake/Marsh	9/30/2003	ULM_4	nm	nm	nm	nm	nm	nm	nm	11900		16.8		116		143		1.2		42.5		15.6		11.5		404		18400	
Upper Lake/Marsh	9/30/2003	ULM_7	nm	nm	nm	nm	nm	nm	nm	9650		1.2		54.6		120		1		15		12.4		8.6		158		16300	
Upper Lake/Marsh	9/30/2003	ULM_11	nm	nm	nm	nm	nm	nm	nm	17500		112		581		201		2		338		27.3		24.1		2290		30200	
Upper Lake/Marsh	9/30/2003	ULM_12	nm	nm	nm	nm	nm	nm	nm	15900		64.9		452		228		2		316		24.7		21.5		1970		29300	
Upper Lake/Marsh	9/30/2003	ULM_2	nm	nm	nm	nm	nm	nm	nm	14500		1.7		121		213		1.9		12.2		20.5		17.5		191		32600	
Upper Lake/Marsh	9/30/2003	ULM_5	nm	nm	nm	nm	nm	nm	nm	9490		10.9		124		111		1		46.6		13.1		9.1		332		16000	
Upper Lake/Marsh	9/30/2003	ULM_6	nm	nm	nm	nm	nm	nm	nm	20000		68.6		326		228		1.9		199		26.7		18.8		1270		34400	
Upper Lake/Marsh	9/30/2003	ULM_8	nm	nm	nm	nm	nm	nm	nm	12200		6.5		297		149		1.3		38.3		15.8		13.6		391		19300	

Table B-7. Sediment Chemistry Data (Conventional Parameters and Total Metals)

			Conventionals								Total Metals (mg/kg dry-weight)																	
	Sample	Location	Field pH	TOC	Moisture	Grain Size Fraction (%)				Al	Pb		Mn		Hg		Ni		Se		Ag		Tl		V		Zn	
CSM Unit	Date	Sample ID	s.u.	%	%	Sand	Silt	Clay	Fine Sand	mg/kg	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
Canyon Ferry (Ref)	10/1/2003	CFR_1	nm	nm	nm	nm	nm	nm	nm	13200	17.2		198		0.22	U	16.8		13.5	U	3.9	U	9.7	U	24.1		81.4	
Canyon Ferry (Ref)	10/1/2003	CFR_2	nm	nm	nm	nm	nm	nm	nm	17600	23.5		258		0.29	U	18.8		14.1	U	4	U	10.1	U	27.8		102	
Lower Lake	9/30/2003	LL_1	nm	nm	nm	nm	nm	nm	nm	4440	9470		851		53.3		24.7		432		101		1980		20.4		4490	
Lower Lake	9/30/2003	LL_2	nm	nm	nm	nm	nm	nm	nm	13000	9420		1230		38		36.4		221		93.7		700		57.7		6080	
Lower Lake	9/30/2003	LL_3	nm	nm	nm	nm	nm	nm	nm	11500	14400		1370		48.4		34		316		141		884		44.4		6930	
Lower Lake	8/3/2010	LL-21	8.81	1.12	31.3	57	14	26	3	5010	3900	J	726	J	28		13		13.9		38.6		57		22		2280	
Lower Lake	8/3/2010	LL-22	8.1	2.67	27.5	73	14	10	3	4620	846	J	192	J	14		7		24.9		10		87		19		1220	
Lower Lake	8/3/2010	LL-23	8.0 (lab)	1.96	32.8	59	20	10	11	6180	506	J	562	J	3.5		6		2.5		3.7		7		25		1070	
Lower Lake	8/3/2010	LL-24	9.49	1.56	17.2	78	8	14	0 U	4480	600	J	465	J	4.1		8		11.9		5.1		23		56		1620	
Lower Lake	8/3/2010	LL-25	7.7	2.71	29.2	76	12	12	0 U	4410	1070	J	471	J	8		5	U	3.3		4.9		6		19		864	
Prickly Pear Creek	10/1/2003	PPC_2	nm	nm	nm	nm	nm	nm	nm	7750	370		672		0.43		9.9		1.3		2.6	U	6.5	U	34		925	
Prickly Pear Creek	10/1/2003	PPC_3	nm	nm	nm	nm	nm	nm	nm	9500	878		3920		2.5		12.7		2.8		0.85		-	R	44.1		1860	
Prickly Pear Creek	10/1/2003	PPC_4	nm	nm	nm	nm	nm	nm	nm	10100	1090		9030		3.1		16.1		5.3		2.5		-	R	55.2		3930	
Prickly Pear Creek	10/1/2003	PPC_5	nm	nm	nm	nm	nm	nm	nm	4880	203		558		0.27		6.2		1.1		2.4	U	6	U	24.8		444	
Prickly Pear Creek	7/28/2010	PPC-102	7.43	1.56	34.7	65	4	18	13	3630	118		322		0.19		5	U	0.5	U	1.1		1	U	20		420	
Prickly Pear Creek	7/28/2010	PPC-103	7.48	0.31	22.3	92	6	2	0 U	1640	43		168		0.05	U	5	U	0.5	U	0.3		1	U	10	U	125	
Prickly Pear Creek	7/30/2010	PPC-22	7.06	0.51	nm	80	8	4	8	2690	61		329		0.5	U	5	U	0.5	U	0.3		1	U	21		259	
Prickly Pear Creek	7/28/2010	PPC-23	7.63	0.59	22	77	12	6	5	4500	165		389	J	0.33		5		0.5	U	1.1		1	U	32		386	
Prickly Pear Creek	7/28/2010	PPC-24	7.43	0.42	28.3	84	6	4	6	2890	116		419	J	0.28		5	U	0.5	U	0.7		1	U	25		328	
Prickly Pear Creek	7/28/2010	PPC-5	7.33	0.27	21.5	92	6	2	0 U	1770	57		253	J	0.058		5	U	0.5	U	0.5		1	U	24		172	
Prickly Pear Creek	7/28/2010	PPC-7	7.46	0.73	32.4	82	10	4	4	3810	173		452	J	0.28		6		0.5	U	1.1		1	U	30		448	
Prickly Pear Creek	7/28/2010	PPC-8	7.4	0.28	24.4	92	6	2	0 U	2090	92		369	J	0.05	U	5	U	0.5	U	0.4		1	U	17		241	
Prickly Pear Creek (Ref)	10/1/2003	PPC_1	nm	nm	nm	nm	nm	nm	nm	8590	104		720		-	R	10.4		-	R	-	R	-	R	39.7		454	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-1	7.1	0.31	23.1	83	10	4	3	3270	95		522	J	0.051		5	U	0.5	U	0.7		1	U	24		308	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-2	7.69	0.22	21	90	8	2	0 U	2110	45		459	J	0.05	U	5	U	0.5	U	0.3		1	U	16		197	
Prickly Pear Creek (Ref)	7/28/2010	Ref-PPC-3	7.7	0.55	21.2	84	8	4	4	3890	96		611	J	0.05	U	5	U	0.5	U	0.8		1	U	41		276	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-4	7.4 (lab)	0.78	28.4	79	14	4	3	3900	111		490	J	0.055		6		0.5	U	0.9		1	U	30		395	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-5	7.56	0.42	27.1	85	6	4	5	3700	110		524	J	0.05	U	5	U	0.5	U	0.7		1	U	24		308	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-6	7.21	0.6	27.3	82	10	4	4	3780	106		506	J	0.05	U	5		0.5	U	0.7		1	U	32		310	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-7	7.53	1.29	30.1	73	14	6	7	4030	174		414	J	0.12		5	U	0.5	U	1.3		1	U	23		366	
Prickly Pear Creek (Ref)	7/27/2010	Ref-PPC-8	7.5	0.63	26.1	85	10	4	1	4250	113		513	J	0.053		6		0.5	U	0.8		1	U	30		363	
Upper Lake/Marsh	8/3/2010	UL-21	7.63	3.2	37.5	58	22	18	2	9340	2550	J	310	J	230		9		1.3		6.7		5	U	31		817	
Upper Lake/Marsh	8/5/2010	UL-22	7.08	3.31	51	35	34	22	9	5830	1270		299		22	J	9		2.9		13.7		1	U	26		1220	
Upper Lake/Marsh	8/5/2010	UL-23	6.96	3.02	42.1	28	40	26	6	6380	10800		409		79	J	11		21.8		61.4		5		24		3190	
Upper Lake/Marsh	8/5/2010	UL-24	7.08	2.34	31.4	71	14	14	1	4560	3890		295		15	J	9		2.5		30.7		2		22		1410	
Upper Lake/Marsh	8/5/2010	UL-25	7.28	2.52	44.1	52	24	20	4	5240	557		221		130	J	6		0.9		3.6		1	U	27		1010	
Upper Lake/Marsh	8/5/2010	ULM-1	7.69	2.58	25.6	78	12	10	0 U	4430	863		510		28	J	5	U	1.6		12.7		1	U	21		601	
Upper Lake/Marsh	8/5/2010	ULM-2	6.97	3.11	45.2	45	30	14	11	6330	188		420		14	J	7		0.5	U	1.9		1	U	29		670	
Upper Lake/Marsh	8/5/2010	ULM-3	6.96	4.04	53.7	6	60	22	12	8730	573		680		150	J	10		1		5.6		1	U	34		909	
Upper Lake/Marsh	8/5/2010	ULM-4	6.86	3.39	51.9	1 U	66	30	4	9950	492		660		160	J	10		0.8		3.5		1	U	42		656	
Upper Lake/Marsh	8/5/2010	ULM-5	6.9	5.02	58.5	1	60	30	9	8830	991		532		27	J	10		1.5		6.9		1	U	35		1230	
Upper Lake/Marsh	8/5/2010	ULM-6	6.78	3.93	54	13	48	24	15	8680	1420		381		11	J	11		2.5		10.6		1		37		1140	
Upper Lake/Marsh	8/5/2010	ULM-7	7.55	2.09	47	38	36	12	14	6010	253		619		0.74	J	6		0.5	U	1.5		1	U	25		682	
Upper Lake/Marsh	8/5/2010	ULM-8	6.93	4.44	66.2	4	68	18	10	6140	267		519		0.5	U	6		0.5	U	1.9		1	U	23		754	
Upper Lake/Marsh	8/5/2010	ULM-9	7.67	1.01	35	73	14	8	5	5560	151		519		0.5	U	6		0.5	U	0.8		1	U	30		470	
Upper Lake/Marsh	9/30/2003	ULM_1	nm	nm	nm	nm	nm	nm	nm	15700	4270		720		14.2		17.9		14		29.1		1.9		41.9		1810	
Upper Lake/Marsh	9/30/2003	ULM_10	nm	nm	nm	nm	nm	nm	nm	14200	5140		911		28.3		19.6		11.5		64.1		-	R	43.6		4260	
Upper Lake/Marsh	9/30/2003	ULM_3	nm	nm	nm	nm	nm	nm	nm	15700	1470		955		4.7		20.1		4.3		10.2		-	R	50.4		3540	
Upper Lake/Marsh	9/30/2003	ULM_4	nm	nm	nm	nm	nm	nm	nm	11900	1170		576		5.9		12.1		4.5		14		10.5	U	34		2100	
Upper Lake/Marsh	9/30/2003	ULM_7	nm	nm	nm	nm	nm	nm	nm	9650	486		472		1.2		9.3		3.2		2.7		8.5	U	27.1		1360	
Upper Lake/Marsh	9/30/2003	ULM_11	nm	nm	nm	nm	nm	nm	nm	17500	10400		1300		50.6		24.8		19.9		127		-	R	59.4		6550	
Upper Lake/Marsh	9/30/2003	ULM_12	nm	nm	nm	nm	nm	nm	nm	15900	8990		1190		59.1		23		20.4		107		-	R	52.4		6420	
Upper Lake/Marsh	9/30/2003	ULM_2	nm	nm	nm	nm	nm	nm	nm	14500	594		2520		0.59		16.2		2.8		0.65		-	R	56.2		1680	
Upper Lake/Marsh	9/30/2003	ULM_5	nm	nm	nm	nm	nm	nm	nm	9490	1610		484		14.5		10.1		3.8		11.9		8.3	U	34.3		1680	
Upper Lake/Marsh	9/30/2003	ULM_6	nm	nm	nm	nm	nm	nm	nm	20000	5360		747		27.3		22.5		14		59.3		4.8		58.9		4200	
Upper Lake/Marsh	9/30/2003	ULM_8	nm	nm	nm	nm	nm	nm	nm	12200	1850		890		10.1		13.4		5.2		14.2		6.6	U	46.2		2120	

Table B-7. Sediment Chemistry Data (Conventional Parameters and Total Metals)

			Conventionals							Total Metals (mg/kg dry-weight)																			
	Sample	Location	Field pH	TOC	Moisture	Grain Size Fraction (%)				Al		Sb		As		Ba		Be		Cd		Cr		Co		Cu		Fe	
CSM Unit	Date	Sample ID	s.u.	%	%	Sand	Silt	Clay	Fine Sand	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
Upper Lake/Marsh	9/30/2003	ULM_9	nm	nm	nm	nm	nm	nm	nm	15600		0.43		146		214		1.7		17.7		20.9		17.4		180		26200	
Walker Creek (Marsh)	8/11/2010	WPM-1	6.48	0.59	21.9	76	13	9	2	7120		0.5	U	2		100	U	10	U	0.5	U	7		5		40		16700	
Walker Creek (Marsh)	8/12/2010	WPM-2	6.76	1	22.7	71	15	7	7	7840		0.5	U	3		100	U	10	U	0.5	U	9		11		36		15000	
Walker Creek (Marsh)	8/12/2010	WPM-3	7.13	2.26	36.7	47	33	17	3	10800		0.5	U	4		124		10	U	0.5	U	8		7		42		14600	
Walker Creek (Marsh)	8/12/2010	WPM-4	6.47	0.9	26.2	62	23	11	4	6410		0.5	U	2		100	U	10	U	0.5	U	10		5		32		16300	
Walker Creek (Marsh)	8/12/2010	WPM-5	6.56	0.73	22.8	63	21	11	5	8400		0.5	U	2		100	U	10	U	0.5	U	12		6		36		20100	
Walker Creek (Pond)	8/11/2010	WP-1	6.7	1.08	22.2	79	13	7	1	6740		0.5	U	2		102		10	U	0.5	U	7		4		32		11800	
Walker Creek (Pond)	8/11/2010	WP-2	7.01	0.86	19.6	72	15	9	4	8360		0.5	U	3		118		10	U	0.5	U	7		7		43		15800	
Walker Creek (Pond)	8/11/2010	WP-3	6.9	1.24	28.1	64	21	11	4	6800		0.6		3		100	U	10	U	0.5	U	6		5		25		10600	
Walker Creek (Pond)	8/11/2010	WP-4	6.8	0.61	18.3	68	20	10	2	8420		0.5	U	3		105		10	U	0.5	U	9		7		33		19800	
Walker Creek (Pond)	8/11/2010	WP-5	6.89	0.44	18.1	71	15	9	5	8270		0.5	U	2		122		10	U	0.5	U	9		7		35		17000	
Wilson Ditch	8/10/2010	WD-2	7.75	3.03	52	55	22	16	7	4430		5.9	J	79		100	U	10	U	20.8		5	U	5		154		8950	
Wilson Ditch	8/10/2010	WD-25	7.49	3.73	48.7	45	24	24	7	5980		1.2	J	23		100	U	10	U	10.1		5	U	4		41		9270	
Wilson Ditch	8/10/2010	WD-26	7.57	3.25	39.1	41	24	24	11	7070		2.4	J	44		100	U	10	U	27.7		7		6		68		11700	
Wilson Ditch	8/10/2010	WD-3	7.51	3.55	49	37	36	22	5	6650		1.9	J	34		100	U	10	U	19.6		8		5		78		12200	
Wilson Ditch	8/10/2010	WD-4	7.59	5.12	64.1	24	42	24	10	5820		2.9	J	28		100	U	10	U	17.1		6		5		93		10300	

Notes:
nr = not reported
nm = not measured
U = not detected
J = estimated value
R = rejected

Table B-7. Sediment Chemistry Data (Conventional Parameters and Total Metals)

			Conventionals								Total Metals (mg/kg dry-weight)																	
	Sample	Location	Field pH	TOC	Moisture	Grain Size Fraction (%)				Al	Pb		Mn		Hg		Ni		Se		Ag		Tl		V		Zn	
CSM Unit	Date	Sample ID	s.u.	%	%	Sand	Silt	Clay	Fine Sand	mg/kg	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
Upper Lake/Marsh	9/30/2003	ULM_9	nm	nm	nm	nm	nm	nm	nm	15600	529		755		2.1		17.9		2.9		2.6	U	6.4	U	57.5		1670	
Walker Creek (Marsh)	8/11/2010	WPM-1	6.48	0.59	21.9	76	13	9	2	7120	3		230	J	0.05	U	5	U	0.5	U	0.1	U	1	U	32		21	
Walker Creek (Marsh)	8/12/2010	WPM-2	6.76	1	22.7	71	15	7	7	7840	4		203		0.05	U	5	U	0.5	U	0.1	U	1	U	35		28	
Walker Creek (Marsh)	8/12/2010	WPM-3	7.13	2.26	36.7	47	33	17	3	10800	5		238		0.05	U	5	U	0.5	U	0.1	U	1	U	36		28	
Walker Creek (Marsh)	8/12/2010	WPM-4	6.47	0.9	26.2	62	23	11	4	6410	5		154		0.05	U	5	U	0.5	U	0.1	U	1	U	45		24	
Walker Creek (Marsh)	8/12/2010	WPM-5	6.56	0.73	22.8	63	21	11	5	8400	5		180		0.05	U	5	U	0.5	U	0.1	U	1	U	54		29	
Walker Creek (Pond)	8/11/2010	WP-1	6.7	1.08	22.2	79	13	7	1	6740	6		183	J	0.05	U	5	U	0.5	U	0.1	U	1	U	32		28	
Walker Creek (Pond)	8/11/2010	WP-2	7.01	0.86	19.6	72	15	9	4	8360	5		343	J	0.05	U	5	U	0.5	U	0.1	U	1	U	36		29	
Walker Creek (Pond)	8/11/2010	WP-3	6.9	1.24	28.1	64	21	11	4	6800	6		129	J	0.05	U	5	U	0.5	U	0.1	U	1	U	27		31	
Walker Creek (Pond)	8/11/2010	WP-4	6.8	0.61	18.3	68	20	10	2	8420	6		301	J	0.05	U	5	U	0.5	U	0.1	U	1	U	45		33	
Walker Creek (Pond)	8/11/2010	WP-5	6.89	0.44	18.1	71	15	9	5	8270	5		303	J	0.05	U	5	U	0.5	U	0.1	U	1	U	43		29	
Wilson Ditch	8/10/2010	WD-2	7.75	3.03	52	55	22	16	7	4430	1610		1010		20		5	U	1.6		11.1		2		18		678	
Wilson Ditch	8/10/2010	WD-25	7.49	3.73	48.7	45	24	24	7	5980	320		790		1.4		5	U	0.5	U	2.2		1	U	17		421	
Wilson Ditch	8/10/2010	WD-26	7.57	3.25	39.1	41	24	24	11	7070	536		839		120		5		0.7		3.6		1		25		583	
Wilson Ditch	8/10/2010	WD-3	7.51	3.55	49	37	36	22	5	6650	625		919		4.7		6		0.6		4.7		1	U	27		586	
Wilson Ditch	8/10/2010	WD-4	7.59	5.12	64.1	24	42	24	10	5820	680		1120		5		5	U	1		6.8		1	U	17		720	

Notes:

nr = not reported

nm = not measured

U = not detected

J = estimated value

R = rejected

Table B-6. Sediment Porewater Chemistry Data (Conventional Parameters and Dissolved Metals)

			Conventionals					Dissolved Metals																																									
	Sample	Location	Hardness	Ca	K	Mg	Na	Al		Sb		As		Ba		Be		Cd		Cr		Co		Cu		Fe		Pb		Mn		Hg		Ni		Se		Ag		Tl		V		Zn	
CSM Unit	Date	Sample ID	mg/L as $CaCO_3$	ug/L	ug/L	ug/L	ug/L	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q	ug/L	Q
Canyon Ferry (ref)	10/1/03	CFR_1	227	54,600	4,590	22,000	31,900	200	U	60	U	31.5		107		5	U	5	U	0.99		50	U	3.2		83.8		10	U	237		-		40	U	35	U	0.85		25	U	50	U	60	U
Canyon Ferry (ref)	10/1/03	CFR_2	232	55,700	4,920	22,500	30,200	200	U	60	U	13.6		110		5	U	5	U	1.5		50	U	4		100	U	10	U	358		-		40	U	6.9		0.95		25	U	50	U	60	U
Lower Lake	9/30/03	LL_1	193	66,300	22,800	6,660	399,000	145		483		2530		42.9		5	U	3.2		4.6		50	U	7.6		323		17.7		773		-		6.1		7.2		1.5		25	U	4.6		40.9	
Prickly Pear Creek	10/1/2003	PPC_2	118	34,900	2,740	7,480	16,200	200	U	60	U	15	U	200	U	5	U	1		0.75		50	U	4.3		89.4		10	U	547		0.2	U	40	U	35	U	1.2		25	U	2.9		194	
Prickly Pear Creek	10/1/2003	PPC_3	116	33,300	3,320	8,020	18,800	200	U	60	U	8		27.2		5	U	0.27		10	U	50	U	6.4		82.6		10	U	15	U	0.2	U	40	U	8.1		0.7		25	U	2.9		187	
Prickly Pear Creek	10/1/2003	PPC_4	118	34,100	3,260	8,050	18,700	200	U	12.1		10.3		30.3		5	U	0.31		10	U	50	U	6		82.2		10	U	15	U	0.2	U	40	U	10.5		0.99		25	U	3.8		140	
Prickly Pear Creek	10/1/2003	PPC_5	212	61,300	3,000	14,200	16,000	200	U	60	U	15	U	108		5	U	2.2		1.2		3.8		3.9		55.2		10	U	1260		0.2	U	40	U	14.1		1		25	U	5.4		170	
Prickly Pear Creek (piezometer)	8/5/2010	PPC-102	107	33,000	3,000	6,000	33,000	50	U	3	U	144		100	U	1	U	0.1	U	1	U	0.5	U	1	U	430		0.5	U	1210		0.005	U	10	U	1	U	0.5	U	0.2	U	100	U	1360	
Prickly Pear Creek (piezometer)	8/5/2010	PPC-103	115	36,000	6,000	6,000	60,000	50	U	24		2430		100	U	1	U	0.1	U	1	U	0.5	U	1	U	20	U	0.5	U	640		0.0101		10	U	1	U	0.5	U	3.4		100	U	970	
Prickly Pear Creek (Reference)	10/1/2003	PPC_1	51.4	16,000	1,460	2,770	3,950	200	U	60	U	15	U	200	U	5	U	0.38		1		50	U	3.2		47.6		10	U	939		0.2	U	40	U	35	U	-	R	25	U	2.6		95.7	
Upper Lake/Marsh	9/30/2003	ULM_3	182	52,800	3,580	12,200	19,900	200	U	60	U	15	U	142		5	U	5	U	1.6		50	U	3.5		825		10	U	916		0.2	U	3.1		35	U	0.94		25	U	50	U	60	U
Upper Lake/Marsh	9/30/2003	ULM_4	154	45,600	3,860	9,760	18,900	200	U	60	U	15	U	113		5	U	5	U	2		50	U	25	U	2200		10	U	1990		0.2	U	40	U	35	U	10	U	25	U	50	U	60	U
Upper Lake/Marsh	9/30/2003	ULM_7	290	85,300	4,580	18,600	20,400	200	U	60	U	15	U	112		5	U	0.35		2.7		1.2		25	U	19900		10	U	2700		0.2	U	40	U	35	U	1.2		25	U	50	U	60	U
Upper Lake/Marsh	9/30/2003	ULM_10	196	58,100	4,520	12,400	19,400	200	U	60	U	15	U	126		5	U	5	U	3.1		50	U	3.3		2390		7.5		3010		0.2	U	40	U	35	U	1.4		25	U	50	U	30	
Upper Lake/Marsh	9/30/2003	ULM_6	229	68,300	5,780	14,200	20,700	200	U	60	U	15	U	180		5	U	5	U	2.3		50	U	3.8		260		4.7		1840		0.2	U	40	U	35	U	1.1		25	U	50	U	60	U
Upper Lake/Marsh	9/30/2003	ULM_12	222	65,900	5,070	13,900	19,200	200	U	60	U	15	U	183		5	U	5	U	2.7		50	U	3.1		5080		10.5		2460		0.2	U	40	U	35	U	0.78		25	U	50	U	60	U

Notes:

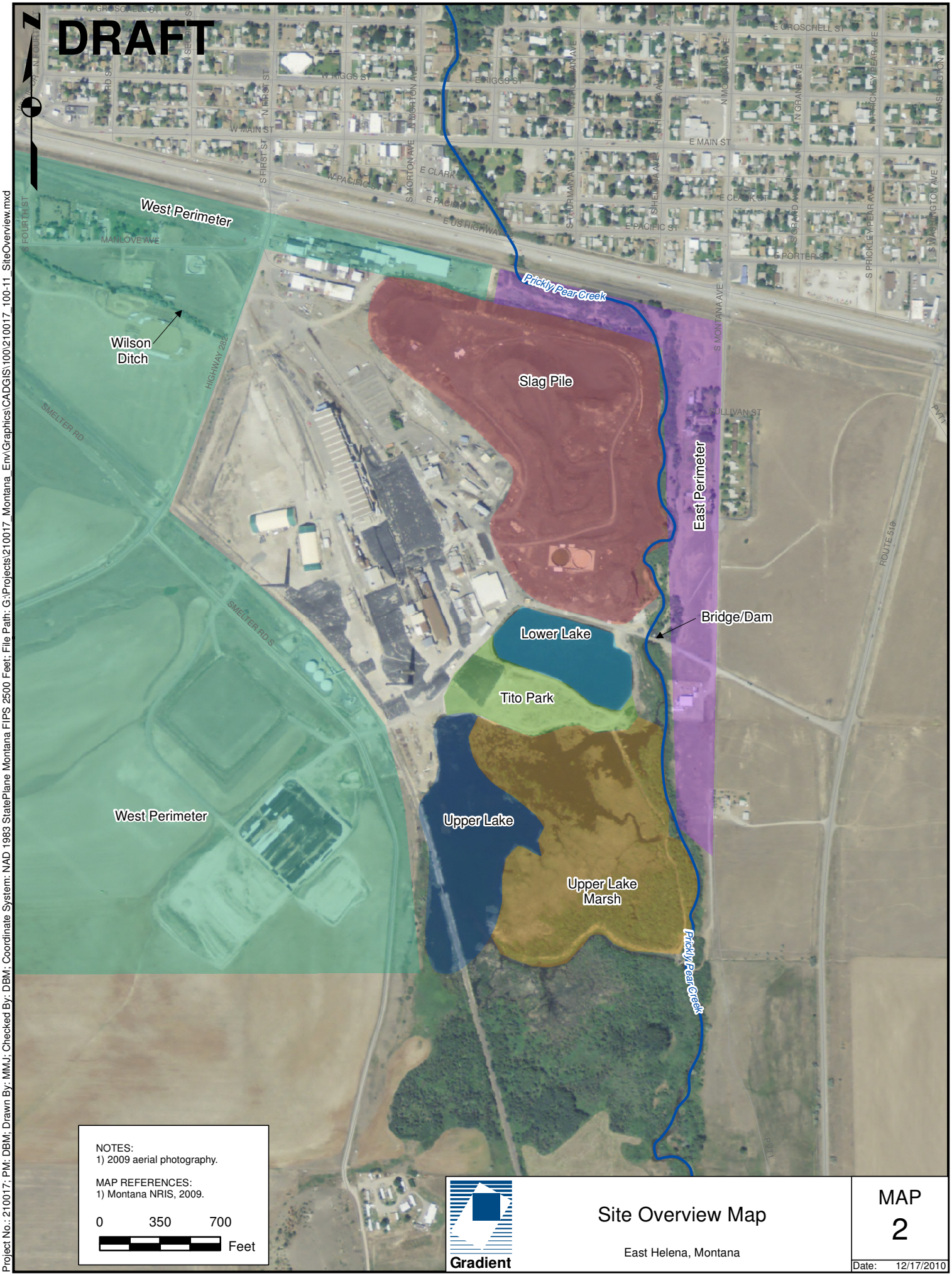
nr = not reported

nm = not measured

U = not detected

J = estimated value

R = rejected



Project No.: 210017; PM: DBM; Drawn By: MMJ; Checked By: DBM; Coordinate System: NAD 1983 StatePlane Montana FIPS 2500 Feet; File Path: G:\Projects\210017_Montana_Env\Graphics\CADGIS\100\210017_100-11_SiteOverview.mxd

Table B-1. BERA Sample Locations

		Coordinates (NAD83 State Plant Feet)		Coordinates (UTM Zone 12N Meters)		Environmental Media Collected at Station															
CSM Unit	**Sample/Location ID**	**X**	**Y**	**X**	**Y**	**SW**	**PW**	**PZ**	**SD**	**SDTOX**	**BI**	**OI**	**AM**	**FF**	**GF**	**PF**	**AP**	**SL**	**EW**	**SI**	**AFI**
Canyon Ferry Reservor (reference)	CFR_1	8777657.113	4690050.61	2767350.9	30815884.46	X	X		X	X				X			X				
Canyon Ferry Reservor (reference)	CFR_2	7318217.635	3922300.187	2307111.989	25684168.41	X	X		X	X	X										
Lower Lake	LL_1	5442686.827	3437775.48	1718385.897	20636342.54	X	X		X	X											
Lower Lake	LL_2	2721799.442	1718717.161	859332.9541	10318121.95	X			X												
Lower Lake	LL_3	2722317.771	1718466.406	859492.42	10318048.55	X			X												
Lower Lake	LL-21	5444828.972	3437614.504	1719039.804	20636306.03	X			X		X			X							
Lower Lake	LL-22	9528328.16	6012995.69	3008298.896	36112672.29	X			X		X	X		X							
Lower Lake	LL-23	2721796.826	1718673.16	859332.4147	10318108.52	X			X												
Lower Lake	LL-24	5443072.061	3438368.915	1718499.844	20636525.68	X			X		X			X							
Lower Lake	LL-25	6803321.895	4296244.974	2147976.916	25795130.95	X			X		X	X		X							
Lower Lake	LL-BK-1	4081679.338	2578577.184	1288685.631	15477329.79													X		X	
Lower Lake	LL-BK-2	2722645.15	1718296.891	859593.205	10317998.8													X		X	
Lower Lake	LL-BK-3	4082962.491	2578603.191	1289076.606	15477345.24													X		X	
Lower Lake	LL-BK-4	2721805.897	1718315.505	859337.2767	10317999.55													X		X	
Lower Lake	Lower Lake	1360892.449	859253.6711	429664.8755	5159028.952	X															
Lower Ore Storage Area	LOS-SS1	1359193.911	859798.8948	429143.9346	5159185.187													X			
Lower Ore Storage Area	LOS-SS10	2718631.657	1720770.989	858355.3155	10318729.42													X			
Lower Ore Storage Area	LOS-SS11	1359512.454	860346.8484	429237.8193	5159354.081													X			
Lower Ore Storage Area	LOS-SS12	1359356.989	860585.1464	429189.0336	5159425.807													X			
Lower Ore Storage Area	LOS-SS13	1358979.348	860869.1959	429072.2566	5159510.176													X			
Lower Ore Storage Area	LOS-SS14	1359396.726	860784.2973	429199.9786	5159486.745													X			
Lower Ore Storage Area	LOS-SS15	5436162.224	3444254.351	1716359.096	20638279.16													X		X	X
Lower Ore Storage Area	LOS-SS16	6796326.799	4305106.531	2145792.73	25797791.09													X			
Lower Ore Storage Area	LOS-SS2	1359390.453	859759.532	429204.0748	5159174.341													X			
Lower Ore Storage Area	LOS-SS3	2717680.361	1720156.929	858068.9439	10318536.66													X			
Lower Ore Storage Area	LOS-SS5	2718861.353	1719909.967	858430.3793	10318468.31													X			
Lower Ore Storage Area	LOS-SS6	2718549.207	1720390.535	858332.414	10318612.96													X			
Lower Ore Storage Area	LOS-SS7	2718946.364	1720305.612	858453.9723	10318589.41													X			
Lower Ore Storage Area	LOS-SS8	4076489.138	2581429.681	1287086.841	15478168.85													X			
Lower Ore Storage Area	LOS-SS9	2718304.663	1720887.884	858254.9564	10318763.13													X			
Lower Ore Storage Area	SS-19	1359535.578	861222.2155	429239.7356	5159621.044													X			
Lower Ore Storage Area	SS-22	1359343.384	859664.5023	429190.2846	5159145.098													X			
Misc. Unpaved Area	UPS-SS1	1359781.887	859208.7972	429326.62	5159008.762													X			
Misc. Unpaved Area	UPS-SS10	1359655.873	861120.0491	429277.0026	5159590.607													X			
Misc. Unpaved Area	UPS-SS11	2720256.042	1721344.978	858847.0916	10318913.9													X			
Misc. Unpaved Area	UPS-SS12	2720974.927	1721158.024	859067.3164	10318861.13													X			
Misc. Unpaved Area	UPS-SS13	1360102.872	860258.6726	429418.306	5159330.665													X			
Misc. Unpaved Area	UPS-SS14	1360501.814	859957.813	429541.6746	5159241.297													X			
Misc. Unpaved Area	UPS-SS2	1359560.751	859437.7764	429257.8711	5159077.263													X			
Misc. Unpaved Area	UPS-SS3	1359998.816	859240.0202	429392.5607	5159019.552													X			
Misc. Unpaved Area	UPS-SS4	1359894.083	859680.3104	429358.0546	5159153.146													X			
Misc. Unpaved Area	UPS-SS5	1359727.414	859893.108	429306.0032	5159217.033													X			
Misc. Unpaved Area	UPS-SS7	1359728.607	860616.5745	429302.1251	5159437.565													X			
Misc. Unpaved Area	UPS-SS8	1359270.089	861170.8695	429159.1108	5159603.836													X			
Misc. Unpaved Area	UPS-SS9	2719075.637	1722734.219	858479.1377	10319330.45													X			
Misc. Unpaved Area	SS-21	1359851.662	860494.0603	429340.3527	5159400.942													X			
Misc. Unpaved Area	SS-28	1360156.739	859337.9202	429440.1244	5159050.319													X			
Misc. Unpaved Area	SS-29	1360113.883	859623.8485	429425.3846	5159137.224													X			
Misc. Unpaved Area	SS-30	1360562.682	860025.8225	429559.8295	5159262.384													X			
Misc. Unpaved Area	SS-31	1360244.117	860742.2316	429458.525	5159478.89													X			
Prickly Pear Creek	PPC_2	4084936.432	2573206.093	1289709.942	15475711.68	X	X		X												
Prickly Pear Creek	PPC_3	4080983.53	2586535.141	1288426.878	15479751.44	X	X		X												
Prickly Pear Creek	PPC_4	4080476.114	2589412.362	1288255.34	15480625.49	X	X		X												
Prickly Pear Creek	PPC_5	4080524.637	2589410.861	1288270.14	15480625.32	X	X		X												
Prickly Pear Creek	PPC-101	1361540.95	858889.5691	429864.6847	5158921.77	X															
Prickly Pear Creek	PPC-102	10892400.03	6872344.615	3438932.355	41271748.92	X		X	X	X	X	X			X	X					
Prickly Pear Creek	PPC-102 (SG-06)	1361474.912	859114.5716	429843.236	5158989.968	X															
Prickly Pear Creek	PPC-103	12252498.41	7734028.181	3868340.939	46431513.89	X		X	X	X	X	X			X	X					
Prickly Pear Creek	PPC-22	13615409.5	8582667.578	4298683.364	51587319.26				X	X	X	X		X		X					
Prickly Pear Creek	PPC-22 (SG-03A)	1361633.477	857815.1081	429899.1886	5158594.798	X															

Table B-1. BERA Sample Locations

		Coordinates (NAD83 State Plant Feet)		Coordinates (UTM Zone 12N Meters)		Environmental Media Collected at Station															
CSM Unit	**Sample/Location ID**	**X**	**Y**	**X**	**Y**	**SW**	**PW**	**PZ**	**SD**	**SDTOX**	**BI**	**OI**	**AM**	**FF**	**GF**	**PF**	**AP**	**SL**	**EW**	**SI**	**AFI**
Prickly Pear Creek	PPC-23	1361505.961	860842.6277	429842.5687	5159516.891				X												
Prickly Pear Creek	PPC-23 (SG-08)	1361510.38	860834.7123	429843.9621	5159514.504	X															
Prickly Pear Creek	PPC-24	10870039.21	6916562.124	3431857.134	41285096.11				X	X	X	X			X	X					
Prickly Pear Creek	PPC-3A	1361602.872	854620.4104	429908.592	5157620.821	X															
Prickly Pear Creek	PPC-5	6807299.403	4298177.923	2149177.997	25795743.47	X			X	X	X	X									
Prickly Pear Creek	PPC-5 (SG-07)	1361489.372	859664.7748	429844.4177	5159157.764	X															
Prickly Pear Creek	PPC-6	1361390.734	861313.7011	429804.6834	5159659.807	X															
Prickly Pear Creek	PPC-7	5442615.969	3446243.327	1718314.651	20638923.27	X			X	X	X										
Prickly Pear Creek	PPC-7 (SG-09)	1360742.968	861467.4005	429606.3318	5159702.86	X															
Prickly Pear Creek	PPC-8	2720465.377	1726473.424	858880.8331	10320478.37	X			X												
Prickly Pear Creek	PPC-8 (SG-10)	1360205.955	863289.1102	429431.9605	5160255.001	X															
Prickly Pear Creek	PPC-9A	1357939.92	865480.4472	428728.3846	5160909.675	X															
Prickly Pear Creek	PPC-RZ-1	1361511.47	860707.0447	429845.0428	5159475.595													X			
Prickly Pear Creek	PPC-RZ-2	5445479.976	3439155.195	1719229.208	20636779.47													X	X	X	
Prickly Pear Creek	PPC-RZ-3	1361642.7	857869.524	429901.6806	5158611.439													X			
Prickly Pear Creek	PPC-RZ-4	4084590.374	2574888.034	1289594.595	15476222.34													X		X	
Prickly Pear Creek	PPC-RZ-5	2722813.204	1717875.983	859646.8986	10317871.48													X		X	
Prickly Pear Creek	SG-11	1359372.182	864146.6879	429172.7836	5160511.518	X															
Prickly Pear Creek (reference)	PPC_1	3990330.943	2357938.504	1262136.67	15409539.47	X	X		X												
Prickly Pear Creek (reference)	REF-PPC-1	4059821.195	2517072.655	1282383.642	15458453.97	X			X		X										
Prickly Pear Creek (reference)	REF-PPC-2	5423683.349	3369580.566	1712993.27	20615444.13	X			X	X	X										
Prickly Pear Creek (reference)	REF-PPC-3	2716088.31	1688640.603	857768.4913	10308920.61	X			X												
Prickly Pear Creek (reference)	REF-PPC-4	13588562.92	8456808.827	4291238.171	51548797.98	X			X	X	X				X						
Prickly Pear Creek (reference)	REF-PPC-5	4087238.871	2547467.272	1290562.696	15467879.57	X			X	X											
Prickly Pear Creek (reference)	REF-PPC-6	5450379.806	3401312.12	1720944.661	20625273	X			X	X	X										
Prickly Pear Creek (reference)	REF-PPC-7	2722833.872	1704360.743	859732.4485	10313751.93	X			X												
Prickly Pear Creek (reference)	REF-PPC-8	4084755.308	2559687.227	1289734.003	15471589.84	X			X		X										
Prickly Pear Creek/Upper Lake Marsh	AP-01	1361521.035	858247.1287	429862.381	5158725.826								X								
Prickly Pear Creek/Upper Lake Marsh	AP-02	1361533.737	858257.4494	429866.1924	5158729.047								X								
Prickly Pear Creek/Upper Lake Marsh	AP-03	1361532.149	858247.9226	429865.7642	5158726.134								X								
Prickly Pear Creek/Upper Lake Marsh	AP-04	1361521.432	858258.6403	429862.4345	5158729.338								X								
Railcar Staging Area	RCSA-1	6794918.928	4308142.999	2145345.783	25798708.41													X			
Railcar Staging Area	RCSA-2	8155129.301	5171428.959	2574779.108	30958962.48													X			
Railcar Staging Area	RCSA-3	1358758.016	862009.8892	428998.1024	5159856.582													X			
Railcar Staging Area	RCSA-4	1358880.479	861749.4651	429036.9583	5159777.918													X			
Railcar Staging Area	RCSA-5	8150243.033	5172605.76	2573282.786	30959292.54													X			
Railcar Staging Area	RCSA-6	1357981.004	862196.9896	428760.1581	5159909.058													X			
Railcar Staging Area	RCSA-7	1357655.986	862269.9377	428660.6589	5159929.388													X			
Railcar Staging Area	RCSA-8	6786856.215	4311692.91	2142867.308	25799743.21													X			
Site Perimeter	UOP-SS1	1359182.056	861547.1445	429130.0705	5159718.015													X			
Site Perimeter	UOP-SS10	1359785.457	858949.5013	429329.2285	5158929.745													X			
Site Perimeter	UOP-SS11	1359924.607	858418.6899	429374.7564	5158768.761													X			
Site Perimeter	UOP-SS12	5438810.595	3447261.237	1717148.737	20639211.24													X		X	X
Site Perimeter	UOP-SS13	1360177.128	861718.522	429432.3814	5159776.088													X			
Site Perimeter	UOP-SS14	1360504.171	861640.7905	429532.5257	5159754.312													X			
Site Perimeter	UOP-SS15	2721823.611	1722768.165	859316.57	10319356.91													X			
Site Perimeter	UOP-SS16	2722177.999	1723082.903	859422.7485	10319454.92													X			
Site Perimeter	UOP-SS17	2722738.318	1722677.919	859595.918	10319334.76													X			
Site Perimeter	UOP-SS17 (east)	2722871.083	1722676.297	859636.3966	10319335.04															X	X
Site Perimeter	UOP-SS18	1361339.29	861468.6675	429788.094	5159706.742													X			
Site Perimeter	UOP-SS19	1361655.67	860622.0187	429889.4958	5159450.523													X			
Site Perimeter	UOP-SS2	2718193.178	1722508.894	858211.4696	10319256.59													X			
Site Perimeter	UOP-SS20	5446547.527	3437118.642	1719566.557	20636164.96													X		X	X
Site Perimeter	UOP-SS21	1361669.112	858821.4501	429904.1502	5158901.758													X			
Site Perimeter	UOP-SS3	1358961.747	860938.6902	429066.4839	5159531.256													X			
Site Perimeter	UOP-SS4	2717702.433	1721168.336	858069.7417	10318845.09													X			
Site Perimeter	UOP-SS5	1358700.323	860275.1961	428990.6875	5159327.478													X			
Site Perimeter	UOP-SS6	1358708.043	860065.4356	428994.2705	5159263.585													X			
Site Perimeter	UOP-SS7	1358838.759	859759.3816	429035.9095	5159171.06													X			
Site Perimeter	UOP-SS8	1359188.714	859632.6276	429143.3251	5159134.475													X			

Table B-1. BERA Sample Locations

		Coordinates (NAD83 State Plant Feet)		Coordinates (UTM Zone 12N Meters)		Environmental Media Collected at Station															
CSM Unit	**Sample/Location ID**	**X**	**Y**	**X**	**Y**	**SW**	**PW**	**PZ**	**SD**	**SDTOX**	**BI**	**OI**	**AM**	**FF**	**GF**	**PF**	**AP**	**SL**	**EW**	**SI**	**AFI**
Site Perimeter	UOP-SS9	5437462.214	3437032.228	1716797.701	20636085.35													X		X	X
Site Perimeter	SS-23	1359611.537	859067.8469	429275.5208	5158964.8													X			
Tito Park	UOS-SS1	2720066.968	1717595.692	858811.4415	10317769.95													X			
Tito Park	UOS-SS10	5442418.562	3436241.686	1718313.118	20635873.44													X		X	X
Tito Park	UOS-SS11	1360761.86	859196.1932	429625.4068	5159010.666													X			
Tito Park	UOS-SS12	2721195.72	1717878.251	859153.8481	10317862.69													X		X	
Tito Park	UOS-SS13	1360745.674	858898.0893	429622.2208	5158919.704													X			
Tito Park	UOS-SS14	5443587.561	3435673.59	1718672.781	20635707.12													X		X	X
Tito Park	UOS-SS15	1360902.657	859046.9405	429669.1992	5158965.997													X			
Tito Park	UOS-SS16	1361052.841	859041.1504	429715.0118	5158965.113													X			
Tito Park	UOS-SS17	4083609.67	2576925.769	1289283.712	15476837.73													X		X	X
Tito Park	UOS-SS18	1361051.509	858912.0004	429715.363	5158925.738													X			
Tito Park	UOS-SS19	1361196.626	858895.3714	429759.6949	5158921.52													X			
Tito Park	UOS-SS2	5440014.341	3435750.511	1717583.15	20635709.62													X		X	X
Tito Park	UOS-SS20	2722566.889	1717890.686	859571.7312	10317874.52													X		X	
Tito Park	UOS-SS21	4082292.6	2577524.432	1288878.736	15477012.49													X		X	X
Tito Park	UOS-SS22	5442680.518	3435687.174	1718396.218	20635705.95													X		X	X
Tito Park	UOS-SS3	2720321.05	1718162.53	858885.5665	10317944.22													X			
Tito Park	UOS-SS4	2720615.465	1718138.398	858975.4507	10317938.59													X			
Tito Park	UOS-SS5	1360313.778	859214.4563	429488.7164	5159013.606													X			
Tito Park	UOS-SS6	1360467.512	859209.4848	429535.6065	5159012.992													X			
Tito Park	UOS-SS7	1360476.594	859362.2089	429537.4795	5159059.598													X			
Tito Park	UOS-SS8	5442441.055	3436833.527	1718316.504	20636053.97													X		X	X
Tito Park	UOS-SS9	4081382.707	2577191.573	1288603.337	15476905.69													X		X	X
Tito Park	SS-24	1360693.08	859041.2843	429605.3498	5158963.044													X			
Upper Lake/Marsh	UL_comp	1360714.772	858685.399	429614.0484	5158854.691												X				
Upper Lake/Marsh	UL-21	25855018.21	16317471.55	8163090.75	98018994.05	X			X		X	X		X	X	X					
Upper Lake/Marsh	UL-22	2720196.308	1716840.925	858855.2921	10317540.64	X			X												
Upper Lake/Marsh	UL-23	13602442.48	8585428.559	4294714.603	51588084.83	X			X		X	X			X	X					
Upper Lake/Marsh	UL-24	5441649.964	3435962.278	1718080.474	20635783.76	X			X		X	X									
Upper Lake/Marsh	UL-25	5440855.542	3432062.994	1717861.184	20634590.53	X			X		X	X									
Upper Lake/Marsh	UL-BK-1	2719992.493	1715454.192	858801.2969	10317116.74													X		X	
Upper Lake/Marsh	UL-BK-2	2720314.073	1717559.329	858886.9765	10317760.31													X		X	
Upper Lake/Marsh	UL-BK-3	2720809.684	1717974.318	859035.6142	10317889.71													X		X	
Upper Lake/Marsh	UL-BK-4	2722182.258	1717800.642	859455.017	10317844.82													X		X	
Upper Lake/Marsh	ULM_1	5440514.584	3431387.039	1717761.218	20634382.49	X			X		X						X				
Upper Lake/Marsh	ULM_10	6801830.543	4293823.597	2147536.524	25794384.13	X	X		X	X	X										
Upper Lake/Marsh	ULM_11	4082153.489	2576261.556	1288843.737	15476626.72	X			X								X				
Upper Lake/Marsh	ULM_12	5444279.168	3435003.222	1718887.525	20635506.84	X	X		X	X											
Upper Lake/Marsh	ULM_2	4081566.482	2573110.583	1288683.283	15475662.81	X			X								X				
Upper Lake/Marsh	ULM_3	5440730.663	3433665.243	1717813.724	20635078.19	X	X		X	X											
Upper Lake/Marsh	ULM_4	5442143.481	3433637.229	1718244.54	20635077.94	X	X		X	X											
Upper Lake/Marsh	ULM_5	4083291.731	2574594.906	1289200.465	15476125.38	X			X								X				
Upper Lake/Marsh	ULM_6	5444805.646	3433531.535	1719056.633	20635061.33	X	X		X	X											
Upper Lake/Marsh	ULM_7	5441409.569	3432235.76	1718029.048	20634646.44	X	X		X	X											
Upper Lake/Marsh	ULM_8	4082112.559	2574150.086	1288843.642	15475982.87	X			X								X				
Upper Lake/Marsh	ULM_9	4083204.436	2574257.212	1289175.836	15476021.93	X			X								X				
Upper Lake/Marsh	ULM-1	9530682.521	6007734.997	3009047.391	36111082.55	X			X		X			X	X						
Upper Lake/Marsh	ULM-2	8163084.181	5145828.941	2577353.996	30951205.78	X			X		X	X		X							
Upper Lake/Marsh	ULM-3	6802688.472	4289171.734	2147825.311	25792971.19	X			X		X	X		X							
Upper Lake/Marsh	ULM-4	5442471.909	3432290.192	1718352.549	20634669.26	X			X		X	X									
Upper Lake/Marsh	ULM-5	6804030.1	4291901.774	2148218.255	25793811.22	X			X		X	X		X							
Upper Lake/Marsh	ULM-6	2722165.879	1716633.198	859456.8693	10317488.87	X			X												
Upper Lake/Marsh	ULM-7	5445242.701	3430327.73	1719208.64	20634087.32	X			X									X	X		
Upper Lake/Marsh	ULM-8	2721088.402	1715039.246	859137.782	10316996.68	X			X												
Upper Lake/Marsh	ULM-9	2721569.26	1714932.388	859284.9822	10316966.93	X			X												
Upper Lake/Marsh	Upper Lake	1360714.434	858703.8439	429613.8373	5158860.312	X															
Walker Creek (reference)	Walker Pond	1273152.305	854684.7255	402946.3147	5157121.295								X								
Walker Creek (reference)	WP-1	10185091.83	6840402.753	3223514.74	41257861.24	X			X		X				X						
Walker Creek (reference)	WP-2	3819238.586	2565014.828	1208766.747	15471655.44	X			X		X										

Table B-1. BERA Sample Locations

		Coordinates (NAD83 State Plant Feet)		Coordinates (UTM Zone 12N Meters)		Environmental Media Collected at Station															
CSM Unit	**Sample/Location ID**	**X**	**Y**	**X**	**Y**	**SW**	**PW**	**PZ**	**SD**	**SDTOX**	**BI**	**OI**	**AM**	**FF**	**GF**	**PF**	**AP**	**SL**	**EW**	**SI**	**AFI**
Walker Creek (reference)	WP-3	3820033.752	2564450.594	1209012.454	15471488.12	X			X		X										
Walker Creek (reference)	WP-4	3819998.947	2564747.248	1209000.102	15471578.34	X			X		X										
Walker Creek (reference)	WP-5	3819905.202	2564870.918	1208970.799	15471615.49	X			X		X										
Walker Creek (reference)	WPM-1	3819207.276	2564983.109	1208757.389	15471645.59	X			X		X										
Walker Creek (reference)	WPM-2	3819138.278	2564952.722	1208736.534	15471635.92	X			X		X										
Walker Creek (reference)	WPM-3	3819295.059	2564049.966	1208789.63	15471361.65	X			X		X										
Walker Creek (reference)	WPM-4	3819721.428	2564155.26	1208918.983	15471396.25	X			X		X										
Walker Creek (reference)	WPM-5	3819795.995	2564984.192	1208936.844	15471649.38	X			X		X										
Walker Creek (reference)	WPS-1	3818794.256	2564614.747	1208633.65	15471530.87													X	X		
Walker Creek (reference)	WPS-2	3818961.647	2564225.873	1208686.961	15471413.31													X	X		
Walker Creek (reference)	WPS-3	3819058.481	2564189.626	1208716.692	15471402.83													X	X		
Walker Creek (reference)	WPS-4	1273202.836	855077.1774	402959.4127	5157241.224													X			
Walker Creek (reference)	WPS-5	1272983.54	854851.5041	402893.8897	5157171.143													X			
Walker Creek (reference)	WPS-6	1273378.724	854928.7225	403013.9013	5157197.004													X			
Walker Creek (reference)	GF-18	1273097.858	854995.8504	402927.8898	5157215.816										X						
Walker Creek (reference)	GF-19	1273117.304	854997.4061	402933.8082	5157216.405										X						
Walker Creek (reference)	GF-20	1273118.081	855015.2958	402933.9402	5157221.863										X						
Walker Creek (reference)	GF-21	1273135.971	855007.5176	402939.4393	5157219.597										X						
Walker Creek (reference)	GF-22	1273135.971	854991.1836	402939.5353	5157214.618										X						
Wilson Ditch	WD-1	1360131.61	858899.8835	429435.0331	5158916.651	X															
Wilson Ditch	WD-2	6794541.259	4305815.704	2145244.308	25797996.79	X			X		X	X		X							
Wilson Ditch	WD-25	2710547.089	1729801.877	855838.0415	10321434.8	X			X												
Wilson Ditch	WD-26	2706662.367	1732745.749	854636.6439	10322309.37	X			X												
Wilson Ditch	WD-3	2711643.692	1725785.488	856195.8553	10320216.95	X			X												
Wilson Ditch	WD-4	2715469.245	1723493.093	857375.3951	10319540.62	X			X												

Abbreviations:
SW = Surface Water
PW = Porewater
PZ = Piezometer
SD = Sediment
SDTOX = Sediment Toxicity Test
BI = Benthic Invertebrate
OI = Other Aquatic Invertebrates (e.g., snails, crustaceans, leaches)
AM = Amphibian
FF = Forage Fish
GF = Game Fish
PF = Piscivorous Fish
AP = Aquatic Plant
SL = Soil
EW = Earthworm
SI = Soil Invertebrates
AFI = Aerial/Foliar Invertebrates

Table 2.9
Sediment Concentrations Measured in Prickly Pear Creek and Reference Sites

	Geometric Mean Sediment Concentrations (mg/kg dry weight)							
	Prickly Pear Creek				Reference Sites			
Metal	**Upper Prickly Pear Creek (1991-1992) (n = 3)**	**Lower Prickly Pear Creek (1991-1992) (n = 5)**	**Mouth/ Delta of Prickly Pear Creek (1987) (n = 3)**	**Mouth/ Delta of Prickly Pear Creek (1991) (n = 2)**	**Canyon Ferry (1987) (n = 3)**	**Canyon Ferry (1992) (n = 1)**	**Lake Helena (1987) (n = 4)**	**Lake Helena (1992) (n = 2)**
Al	5,993	2,910	19,100	1,290	23,400	7,080	6,590	5,590
As	11.71	18.19	66.1	11.7	5.1	4.93	6.0	5.48
Be	0.22	--	1.43	--	1.1	0.22	0.47	--
Boron	--	--	5.3	3.74	8.4	<5.05	2.2	--
Ca	0.73	1.97	9.2	--	0.3	<0.20	0.7	0.26
Cr	12.4	7.4	19	6.03	18.7	10.80	8.2	20.8
Cu	30.7	32.7	95	5.55	15	5.68	12.7	10.27
Fe	10,240	7,580	23,500	2,930	18,740	8,140	9,030	4,560
Pb	77.2	127	221	30.4	14	6.81	13	24.7
Magnesium	3,063	1,899	10,790	920	11,840	4,730	3,160	1,530
Mn	526	490	697	149	223	161	161	123
Hg	--	--	0.43	--	0.02	<0.10	0.03	--
Ni	5.76	--	12.5	--	12.2	7.99	4.5	--
Se	--	--	0.57	--	0.41	<0.50	0.16	--
Zn	268	370	854	73	57	58.3	65	226

Source: US FWS (1997)

Whole-body fish and benthic invertebrate samples were collected and analyzed, and concentrations of As, Cu, Pb, and Zn were found to be significantly higher downstream of the site in stonefly larvae (Table 2.10). Significant differences were not observed in miscellaneous benthic invertebrates, rainbow trout, brook trout, and sculpin, although concentrations from animals taken below the site were elevated compared to above the site. (It is important to note that, throughout the US FWS report, differences between upstream and downstream datasets that were determined to not be statistically significant were still described as "elevated.")

July
7/27/10

BERA visit to Prickly Pear Creek upstream sites w/ Gradient/

Mark Walker, Julianne Clum, Hydrometrics at Prickly Pear Site near walking bridge across from Ashgrove Cement Plant

Bob Anderson Hydro + Tim V, Gradient arrive. Tim leaves later. (Verstyke)

Ref-PPC-4 1445 pH = 7.52
AEH-1007-300-SED

Collected sediment from depositional zones (near bank, above boulders) at six locations from ~ 50' dwnstrm to 50' upstrm of walking bridge.

Composited samples for metals, particle size, moisture, TOC, ~~pH~~ in 1 liter glass jar. (Sediment analyses)

Composited samples for Sediment/Toxicity; ½ gal/2L plastic bucket (will give to Gradient for analyses)

Collected sample from each location & put it directly in glass soil jar for AVS/SEM. Sealed w/no head space.

Photos upstream + Downstream.

Put all samples on ice in cooler.

pH was taken in-field on sediment by placing 10 ml DI water in vial & adding sediment to ~20 ml. Using pH probe sediment pH = 7.52

Samples Collected w/piston corer. for composite.
Used trowel to collect AVS/SEM.

Ref-PPC-5 1600 pH = 7.56

1 L jar - Sed Chemistry

AEH-1007-301-SED 7/27/10

Collected as above.

Ref-PPC-6- 7/27/10

AEH-1007-302-SED 1630 pH = 7.28
AEH-1007-303-SED 1640 Duplicate (chem + ~~Sed/Tox~~) AVS/SEM

Each:
1 Liter - Chemistry
2 Liter - Sed/Tox - 302 only
1 soil jar - AVS/SEM ~~302 only~~

All equipment was rinsed with DI water between sample sites.

Ref-PPC-7 7/27/10

AEH-1007-304-SED 1810

1 Liter - Chemistry pH = 7.53

Ref-PPC-8 7/27/10

AEH-1007-305-SED 1830
1 Liter - Chem
~~2 Liter - Sed/Tox~~ pH = 7.50
1 soil jar - AVS/SEM

Rinsate Blank 7/27/10

AEH-1007-306-RB 1900

1 250 ml / HNO_3 | uF
TRC Metals

Rinsed trowel & corer w/ DI water into bucket three times. Rinsed bucket ~~5~~ 3 times. Filled corer w/ DI water poured into bucket across trowel. Poured water from bucket into sample jar & preserved & put on ice.

Returned to Office

Delivered samples for Chemistry & AVS/SEM to Energy Labs 7/28/10.
Held Sed/Tox samples in refrigerator for Gradient.

7/28/10 Sunny, Partly Cloudy 65°F, slight breeze

Mark Walker, Juliana Chum, Hydrometrics

Ref-PPC-3 0945 7/28/10

AEH-1007-307-SED 1 Liter-Chemistry Composited

pH = 7.70

Ref-PPC-~~3~~2 7/28/10

AEH-1007-308-SED 1030

1 L-Chemistry pH = 7.69
1 4oz-AVS/SEM
2 L-Sed/Tox

Ref-PPC-1 7/28/10

AEH-1007-309-SED 1120

1-L Chemistry pH = 7.10
1 4oz - AVS/SEM

PPC-24 7/28/10
at piezometers in pasture off
Wiley Rd next to Storage area

AEH-1007-310-SED 1315

1 L - Chemistry pH = 7.43
1 4oz - AVS/SEM
2 L - Sed/Tox

PPC-8 7/28/10

AEH-1007-311-SED 1345

1 L - Chemistry pH = 7.40

PPC-7 7/28/10

AEH-1007-313-SED 1430

1 L - Chemistry pH = 7.46
2 L - Sed Tox
4 oz - AVS/SEM

PPC-23 7/28/10

AEH-1007-312-SED 1510

1 L - Chemistry pH = 7.63

PPC-RZ-1 7/28/10
Riparian soil sample. pH = 7.52

AEH-1007-314-SL 1520
AEH-1007-315-SL 1530 Duplicate

2-4oz soil containers - each

Sampled w/ trowel.

PPC-5 7/28/10

AEH-1007-316-SED 1600
AEH-1007-317-SED 1610 Duplicate
1 L-Chem
2 L-Sed/Tox -316 only pH = 7.33
~~2~~ 4 oz - AVS/SEM

Staff Gage = 1.07' just upstream of site.

PPC-RZ-2 7/28/10

AEH-1007-318-SL 1620

2-4 oz soil - Chemistry
pH = 7.35

PPC-103 7/28/10

AEH-1007-319-SED 1715

1 L-Chem pH = 7.48
2 L-Sed/Tox
1-4 oz soil jar - AVS/SEM

PPC-102 7/28/10

AEH-1007-320-SED 1740

1 L-Chem
2 L-Sed/Tox pH = 7.43
4 oz - AVS/SEM

Thunder, lightning sends us back to truck wind increasing rapidly with rain as we call it a day & head home. 1800 hours

7/29/10

WTW pH 315 calibration
2-Point
56.9 mV/pH 9 mV

Head to Northern Pacific Reservoir (owned by Ashgrove) to collect reference samples for marsh sediment and upland soil.

Used piston corer to collect 5 or more samples for composite at each of 5 sediment sites.

Ref-Msh-1 7/29/10

AEH-1007-321-SED 1145

1 L-Metals Short List pH=6.79

7/29/10

Ref-Msh-2 pH=7.12

AEH-1007-322-SED 1200

Ref-Msh-3 pH=6.90

AEH-1007-323-SED 1215

Ref-Msh-4 pH=7.57

AEH-1007-324-SED 1230

Ref-Msh-5 pH=7.13

AEH-1007-325-SED 1245

All above collected composite sample

1-L-Metals short list

7/29/10

7/29/10

Upland soil reference or cross reference sites along banks of Northern Pacific Reservoir above high water mark. Composite samples using auger for short list of metals.
1 Ziplock for each

Ref-NPS-1
AEH-1007-326-SL 1345

Ref-NPS-2
AEH-1007-327-SL 1400

Ref-NPS-3
AEH-1007-328-SL 1415

Ref-NPS-4
AEH-1007-329-SL 1430

Ref-NPS-5
AEH-1007-330-SL 1445

7/29/10

Marked ~~AH~~ Sediment Locations w/ Stake + flagging. Bob Anderson joined us.

Traveled to McClellan CK Rd crossing of Prickly Pear CK.

Collected 1 composite soil upland sample.

Ref-US-1 pH=7.94 7/29/10
AEH-1007-331-SL 1545

1 ziplock for Metals Chemistry/Physical

Ref-US-2 pH=8.02 7/29/10
AEH-1007-332-SL 1615

Ref-US-3 pH=7.86
AEH-1007-333-SL 1630

Ref-US-2 + -3 are on SE side of PPC across Bompart Property (past motorcross monument

Traveled Across Keffler Ranch & up onto RR track & down at S curve on Prickley Pear Creek to gather two more upland soil samples near Ref-PPC-7.

Ref-US-4 pH = 7.88

AEH-1007-334-SL 1730
AEH-1007-335-SL 1745 Duplicate

Ref-US-5 7/29/10
pH = 8.04

AEH-1007-336-SL 1800

Marked locations w/ Yellow flagging & GPS.

All ~~US~~ ref-US samples submitted for Metals Chemistry & Physical (TOC, Moisture, Grain Size, pH)

Mark Walker & Juliann Chum travel up PPC along E bndry of Lead Smelter to collect 3 riparian soil samples & 1 sediment sample.

PPC-RZ-5 pH = 6.79

AEH-1007-337-SL 1245

PPC-RZ-4 pH = 6.76

AEH-1007-338-SL 1310

PPC-RZ-3 pH = 6.87

AEH-1007-339-SL 1430

PPC-ZZ Sediment pH = 7.06

AEH-1007-340-SED 1445

7/30/10

Soil Rinsate Blank -
washed Auger, bucket & trowel. Decon equipment then poured DI water over auger & trowel into bucket & into bottle.

AEH-1007-341-RB 1550

Sediment Rinsate Blank -
Decon & rinse corer, bucket as above.

AEH-1007-342-RB 1600

8/3/10

Walter Crane, Juliann Clum
Lower Lake Sediment & Water Sampling

LL-25 1000 8/3/10

AEH-1008-343-SW
AEH-1008-343-SED

fld parameters (see below
pH = 7.70

Water -
1-250 TRC Metals preserved
1-500 Diss Metals unfiltered/unpres. (filter in lab)
1-8 oz glass Hg - preserved

pH - 8.58 DO - 6.17
SC - 499 Temp - 21.6

1-Liter - Chem/Physical
1 4oz - AVS/SEM

8/3/10

LL-22 1115

AEH-1008-344-SED pH=8.16
AEH-1008-344-SW

Same bottles as previous.

pH=8.70 DO=6.06
SC=4,99 Temp=21.9

LL-21 1145

AEH-1008-345-SED pH=8.81
AEH-1008-345-SW

pH-8.76 DO=6.06
SC-500 Temp=21.8

Same bottles as previous.

LL-24 1220 8/3/10

AEH-1008-346-SED pH=9.49
AEH-1008-346-SW

Bottles as above.

pH=8.64 DO=6.60
SC=500 Temp.=21.7

LL-23 1330 8/3/10

AEH-1008-347-SED pH=
AEH-1008-347-SW

Bottles as above.

pH=8.88 DO=6.60
SC=500 Temp=22.09

Took break to run for anchor. Too windy + deep to sample otherwise.
Actual sample time ~ 1515
~ 10.75' Deep

UL-21 1645 8/3/10

AEH-1008-348-SED pH = 7.63
AEH-1008-348-SW

pH = 8.12 DO = 7.69
SC = ~~20~~ 230 Temp = 18.6

Bottles as above.

8/5/10

Walker Crane & Julianne Chun @
Upper Lake & Upper Lake Marsh
Sediments & Water Samples

UL-24

AEH-1008-349-SED 1005 pH=7.08
AEH-1008-349-SW 1005

pH = 7.54 DO = 8.41
SC = 208 Temp = 17.08°C

sed 1 L-Chemistry 4 oz-ArS/SEM
wat 1 500-Diss Metals 1 250-TRC 1 8oz-Tot Hg

UL-23

Bottles as for UL-24

AEH-1008-350-SED 1050 pH=6.96
AEH-1008-350-SW 1050
AEH-1008-351-SED 1100 Duplicate
AEH-1008-351-SW 1100 Duplicate

pH = 7.01 DO = 6.61
SC = 222 Temp = 16.07

Rinsate Blank

AEH-1008-352-RB 1115
1-250 TRC Metals

8/5/10

WL-22 8/5/10 Sed pH = 7.08

AEH-1008-353-SED 1200
AEH-1008-353-SW 1200

Water

pH = 6.29 DO = 9.62
SC = 220 Temp = 15.9

Bottles as for WL-24

WL-25 8/5/10 Sed pH = 7.28

AEH-1008-354-SED 1245
AEH-1008-354-SW 1245

pH = 7.41 DO = 11.70
SC = 228 Temp = 16.7

WLM-2 8/5/10 1315

AEH-1008-355-SED pH = 6.97
AEH-1008-355-SW

pH = 7.06 DO = 9.01
SC = 219 Temp = 16.5

Bottles as for WL-24

WLM-3 8/5/10 1345

AEH-1008-356-SED pH = 6.96 (6.96)
AEH-1008-356-SW

Same Bottles as WL-24

pH = 6.75 DO = 7.66
SC = 222 Temp = 15.0

WLM-4 8/5/10 1545

AEH-1008-357-SED pH = 6.86
AEH-1008-357-SW

Same Bottles as WL-24

pH = 8.35 DO = 11.22
SC = 217 Temp = 18.5

WLM-5 8/5/10 1610

AEH-1008-358-SED pH=6.90
AEH-1008-358-SW

pH = 8.04 DO = 13.54
SC = 216 Temp = 18.7

Same bottles as WL-24.
1620 AEH-1008-359-SED Duplicate
AEH-1008-359-SW Duplicate
~~WLM-6 8/5/10~~

~~AEH-~~

WLM-6 8/5/10 1700

AEH-1008-360-SED pH=6.78
AEH-1008-360-SW

Same bottles as WL-24 except
No ARS/SEM 4 oz.

pH = 6.05 DO = 2.50
SC = 218 Temp = 16.7

Took two samples from a
little further from bank.

pH = 6.70 DO = 5.5 variable
SC = 218 Temp = 16.9

DO very unstable from pt to pt.

Rinsate Blank 8/5/10

AEH-1008-361-RB 1730

250 - TRC Metals

8/6/10 Sunny 80° Partly Cloudy

Juliann Clum to Plant Site to meet Jamie Poell who will be conducting Lower & upper bank soil sampling.

Shot in all bank sample locations w/ Trimble.

Photos:

WL-BK-1 SE & NE across nest box (sampling site)
WL-BK-2 N - blue flag across from nest box marks sample site
WL-BK-3 ESE - blue flag marks site
WL-BK-4 " " "
LL-BK-4 NW " "
LL-BK-2 NNW " "
LL-BK-3 SW " "
LL-BK-1 ESE " "

8/10/10

Juliann Clum collecting flow, sediment & water samples on Wilson Ditch, Mark Walker joins up.

WD-26 1120 8/10/10

AEH-1008-417-SED pH = 7.57
AEH-1008-417-SW

pH = 7.84 DO = 6.70
SC = 216 Temp = 21.07

1 - Liter - Chemistry
500 ml - Diss Metals
250 ml - TRC Metals
8 oz - Hg Total

Flow measured on field notes for sample.
0.2' wide, 0.1" deep, 0.13 ft/sec

WD-25 1200 8/10/10

AEH-1008-418-SED pH= 7.49
AEH-1008-418-SW

Same bottles as WD-26.

pH: 7.33 DO-8.47
SC= 216 Temp= 19.64

WD-3 1300 8/10/10 G. Larsen S. Clum

AEH-1008-419-SED pH= 7.51
AEH-1008-419-SW
Same bottles as WD-26

pH 6.98 DO 8.94 mg/L
SC 212 Temp 16.17°C

Measured Flow out of 3' concrete culvert
Depth 0.8'
Diameter 36"
Vel. 1.96 ft/sec

8/11/10

John Dayton & Juliana Clum at Walker Lake/Marsh for Soil, Sed, & wat.

WPS-3 1045 8/11/10

AEH-1008-

WD-4 13:40 8/10/10

AEH-1008-420-SED pH=7.59
AEH-1008-420-SW
SAME BOTTLES AS WD-26

pH 6.97 DO 10.02 mg/L
SC 211 Temp 16.13°C

Depth 1.55'
Vel ~~0.89 ft/sec~~ 0.85 ft/sec
Diameter 3 feet - 36"

WD-2 14:00 8/10/10

AEH-1008-421-SED pH-7.75
AEH-1008-421-SW
SAME bottles as WD-26 plus
ABS/SEM 4oz Amber soil Bottle
with zero head space.

pH 7.76 DO 10.85
SC 210 Temp 15.68

Flow: 18" Parshall Flume 0.74 ft

Rinsate Blank 8/10/10
1445

AEH-1008-422-~~SW~~ RB Sediment

Put all on ice & delivered
to Energy labs.

8/10/10
Left message for Darlene Kechely 449-2552 Owner of Walker Pond to say we'd be sampling pond + marsh on 8/11.

8/11/10 John Dayton + Juliann Clum at Walker Lake/Marsh for Soil, Sed, + Water Samples

WPS-3 1045 8/11/10

AEH-1008-423-SL pH = 5.95

1 ziplock bag Metals + Physical

AEH-1008-424-SL Duplicate 1050

WPS-2 1110 8/11/10

AEH-1008-425-SL pH = 6.04

Same bag + parameters as before.

WPS-5 1120 8/11/10

AEH-1008-426-SL pH = 6.62

ziplock - Metals, Physical

AEH-1008-427-SL 1130 Duplicate

WPS-1 1145 8/11/10

AEH-1008-428-SL pH = 6.61

Ziplocks as above.

Rinsate Blank for Soil

AEH-1008-428-RB 1200

250 ml - metals (TRC)

WPS-4 1215 8/11/10

AEH-1008-429-SL pH= 4.98

Ziplock - Metals, Physical

WPS-6 1240 8/11/10

AEH-1008-430-SL pH= 6.19

Same ziplock as above

Rinsate Blank for Soil

AEH-1008-431-RB 1250 8/11/10

250 ml - TRC metals

WP-3 1310 8/11/10

AEH-1008-432-SED pH=6.90
AEH-1008-432-SW

1-2L Chemistry / Physical
1-4oz AVS / SEM
1-500 Diss Metals (UF/Raw) Cannon
1-250 TRC Metals
1-8 oz TOT Hg

pH= 6.53 DO= 8.82
SC= 118 Temp= 13.94

WP-4 1335 8/11/10

AEH-1008-433-SED pH= 6.86
AEH-1008-433-SW

pH= 6.13 DO= 8.27
SC= 113 Temp= 13.79

Same Containers as WP-3.

WP-5 1400 8/11/10

AEH-1008-434-SED pH=6.89
AEH-1008-434-SW
AEH-1008-435-SED 1410 Dupli.
AEH-1008-435-SW 1410 Dup

pH= 6.59 DO= 8.16
SC= 118 Temp= 14.56

Same Containers as WP-3

WP-1 1430 8/11/10

AEH-1008-436-SED pH=6.70
AEH-1008-436-SW

pH= 6.27 DO= 6.87
SC= 113 Temp= 12.98

AEH-1008-437-SED 1445 Dup
AEH-1008-437-SW 1445 Dup

Same Containers as WP-3.

Rinsate Blank for Sediment 8/11/10

AEH-1008-439-RB 1500

WP-2 1515 8/11/10

AEH-1008-438-SED pH=7.01
AEH-1008-438-SW

pH=6.67 DO= 9.17
SC=110 Temp=14.18

WPM-1 1540 8/11/10

AEH-1008-440-SED pH=6.48
AEH-1008-440-SW

pH=7.19 DO=5.36
SC=118 Temp= 19.17

WPM-2 0910 8/12/10

AEH-1008-441-SED pH = 6.76
AEH-1008-441-SW

pH = 6.38 DO = 7.48
SC = 117 Temp = 13.14
Same bottles as WP-3.

WC-1 0925 8/12/10

AEH-1008-442-SW

pH = 6.19 DO = 8.87
SC = 117 Temp = 10.90

Inlet to Pond (Walker Creek)

Photos: 1 - W; upstream
2 - E; Downstream

GPS point taken at mouth to pond.
Sample ~ 10' upstream
Flow steady - ~7' wide
~3' Deep

WC-1 (cont.)
Collected 500 - UF/Raw-Diss
250 - UF/HNO3 TRC
8z - Tot Hg

WPM-3 0940 8/12/10

AEH-1008-443-SED pH = 7.13
AEH-1008-443-SW

pH = 5.99 DO = 6.52
SC = 278 Temp = 8.55

Same containers collected as WP-3.

WPM-4 1010 8/12/10

AEH-1008-444-SED pH = 6.47
AEH-1008-444-SW

pH = 6.34 DO = 5.73
SC = 117 Temp = 12.90

Same Containers as WP-3

WPM-5 1030 8/12/10

AEH-1008-445-SED pH=6.56
AEH-1008-445-SW

pH=6.21 DO=8.15
SC=117 Temp=13.93
Same bottles as WP-3.

1020
Recalibrated SC (prior to WPM-5)
reading 1402 prior to calibration,
but in SC std.

Std.	Reading	Temp	Time
1413	1413	14.50	1020

Rinsate Blank for Sediment

AEH-1008-446-RB 1058
8/12/10

1-250 TRC Metals w/1HNO3

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

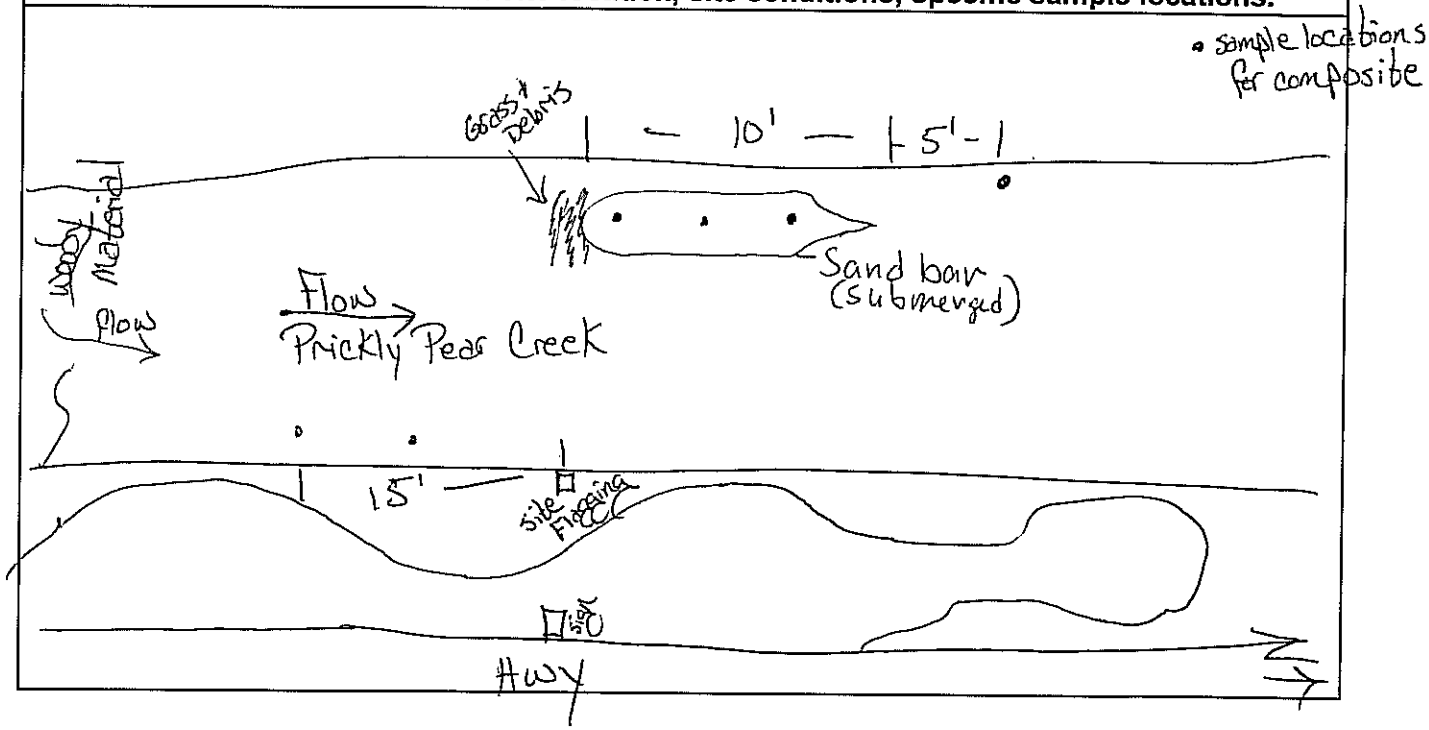
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/27/10	
Weather: Overcast ~60°F	
Site Designation:	Ref-PPC-5
Descriptive Location: Reference Site on Prickly Pear Creek adj. to Ashgrove Cement Sign Pullout "Wildlife Habitat Project" sign.	
GPS Coordinates	
Photo Log (photo #, orientation) 1- Upstream, 2- Downstrm	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1007-301-SED	1600	1 Liter
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Mostly sandy with cobble; woody debris in stream. Heavy vegetation along banks, 1/5 overhang of stream. Bank on left side undisturbed, right side entries from park.

Other Comments: Core is almost all sand. - Collected 6 cores w/ piston core sampler. Recovery 2" to 6". All fine to med. Sand. pH = 7.56

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

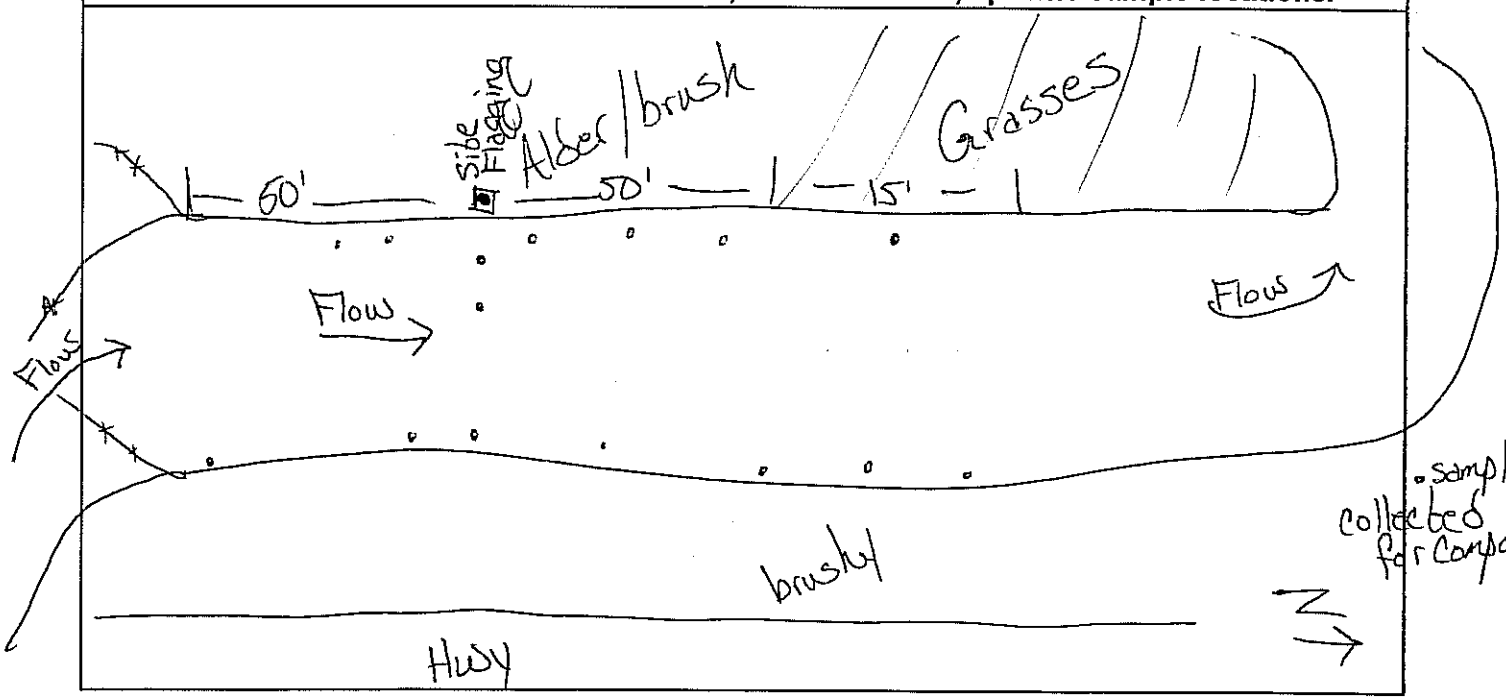
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/27/10	
Weather: Overcast, 60s°F	pH = 7.28
Site Designation:	Ref-PPC-6
Descriptive Location: Reference Site on Prickly Pear Creek just ~~N~~ S of McClellan Rd. turnoff. (Star Lane) Site below Hwy & RR on relatively straight stretch before a large meander.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-Downstrm from Hwy (Overview) 2-upstream (flag in lower right) 3-Downstream toward bend Duplicate AEH-1007-303-SED 1640 Chem + AVS/SEM	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1007-302-SED	1630	1L-Sed Chemistry
Riparian Soil	NA		2L-Sed/Tox
Upland Soil	NA		1 soil jar AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Wide (~40'-30'), stream width. Good vegetation along banks. Sand + ~~grave~~ cobble substrate. Ripple mostly between meanders. 50% 50%
Used trowel in addition to piston corer to collect samples.

Other Comments: ~~50%~~
Cores: Medium sand to silt. Required a lot of cores to make up required sample volume. Removed minor amounts of gravel + wood chips from composite prior to jarring.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

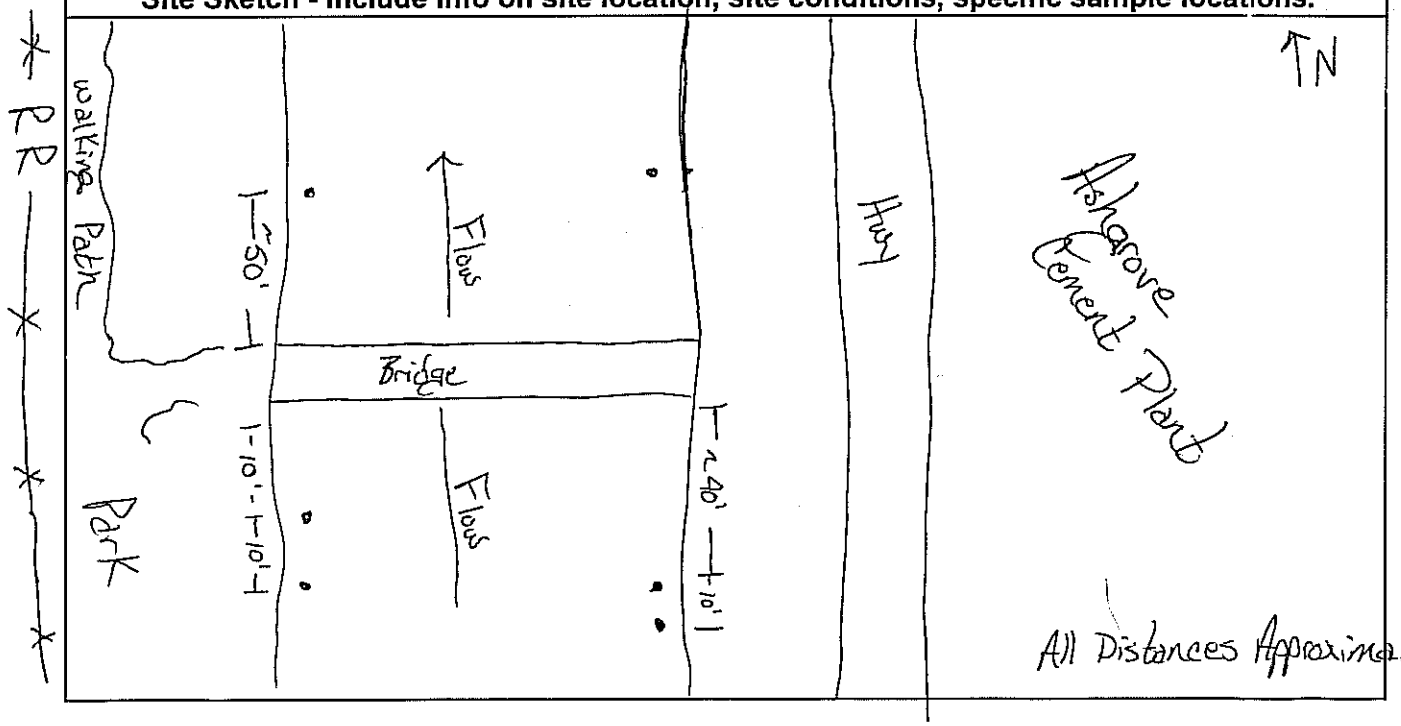
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/27/10	
Weather: Sprinkling rain - 60°F Overcast	
Site Designation:	Ref-PPC-4
Descriptive Location: Across from Ashgrove Cement plant on upstream side of walking bridge (flagged). Reference location on Prickly Pear Creek.	
GPS Coordinates	
Photo Log (photo #, orientation) 1 - upstream 2 - Downstream w/bridge	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1007-300-SED	1445	1 L (sed); 2 L (sed/box)
Riparian Soil	N/A		1 soil jar (SEM/AVS)
Upland Soil	N/A		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Rapid water flow, sandy cobble substrate, fairly straight stretch, riffle no pool. Fairly heavy vegetation except directly under bridge. Alder overhanging 1/3 - 1/2 stream width. pH = 7.52

Other Comments: Cores: mostly orange tan sand, silt with 1/2" layer of organic material on top. Some shiny grains (pyrite). Collected 6 cores w/piston corer. Recovery variable but close to 6".

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/27/10	
Weather: Overcast, breezy	
Site Designation:	Ref-PPC-7
Descriptive Location: Reference Site Prickly Pear. In-stream at bottom of bend with split around a gravel bar. Across from N end of subdivision just above S meander.	
GPS Coordinates	
Photo Log (photo #, orientation) 1 upstrm, 2 Downstrm	

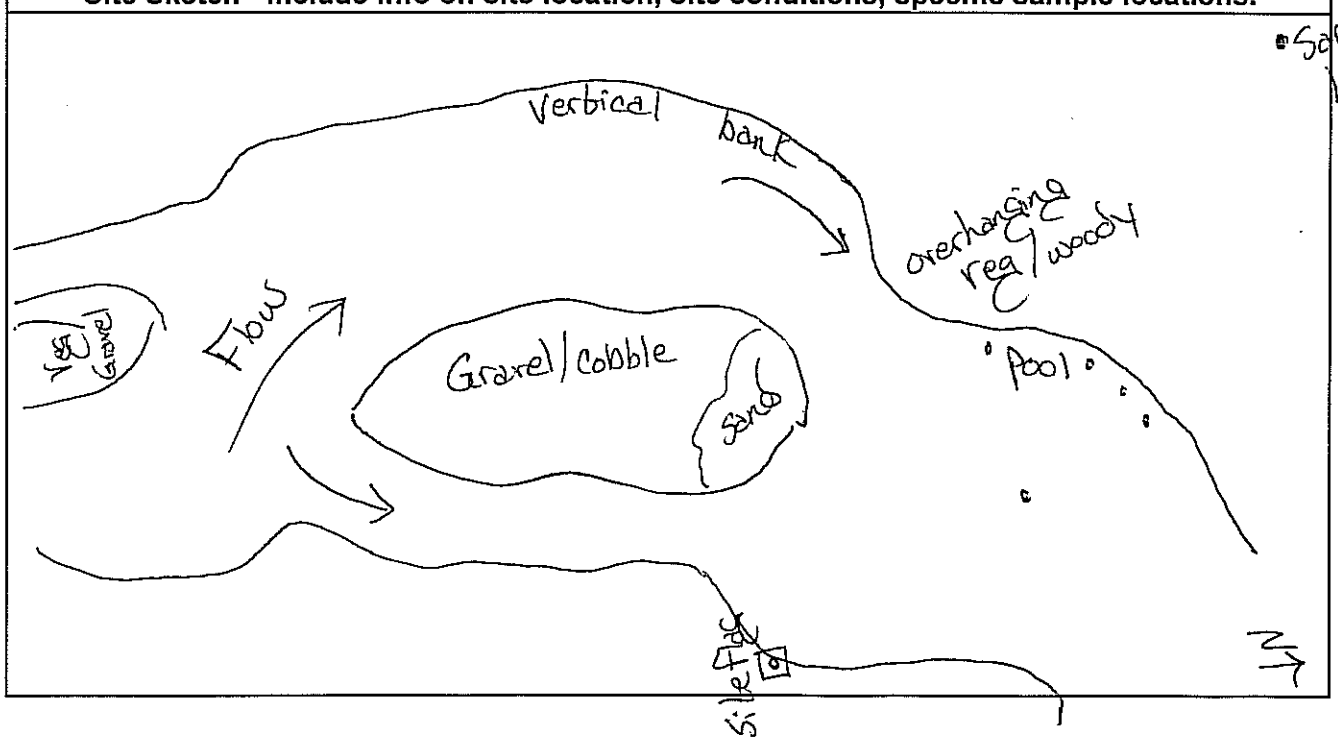
Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1007-304-SED	1810	1 L Sed Chemistry
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Main Channel gravel + cobble. Silt/Sandy along fringes. Pool just downstream of gravel bar in meander. Vertical banks on left bank of meander. Good vegetation except on vertical banks.

Other Comments: Core: Organic Rich silt + medium sand

PH = 7.53

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

BERA 2010

Project Name: East Helena ~~Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): MW, JLC
Laboratory Used: Energy Labs

Site Designation: AEH-1007-306-RB
Sample Code Number: ~~AEH-1006-~~ Rinsate Blank
Sample Date: 7/27/10
Sample Time: 1900 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes No
Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring– other:

Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast

Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						

Rinsate Blank for SED

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	common	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/27/10	
Weather: Partly Cloudy	
Site Designation:	Ref-PPC-8
Descriptive Location: Reference location for Prickly Pear. Just S of Kleffner Ranch + immed. N (downstrm) of RR bridge over Creek.	
GPS Coordinates	

Photo Log (photo #, orientation)

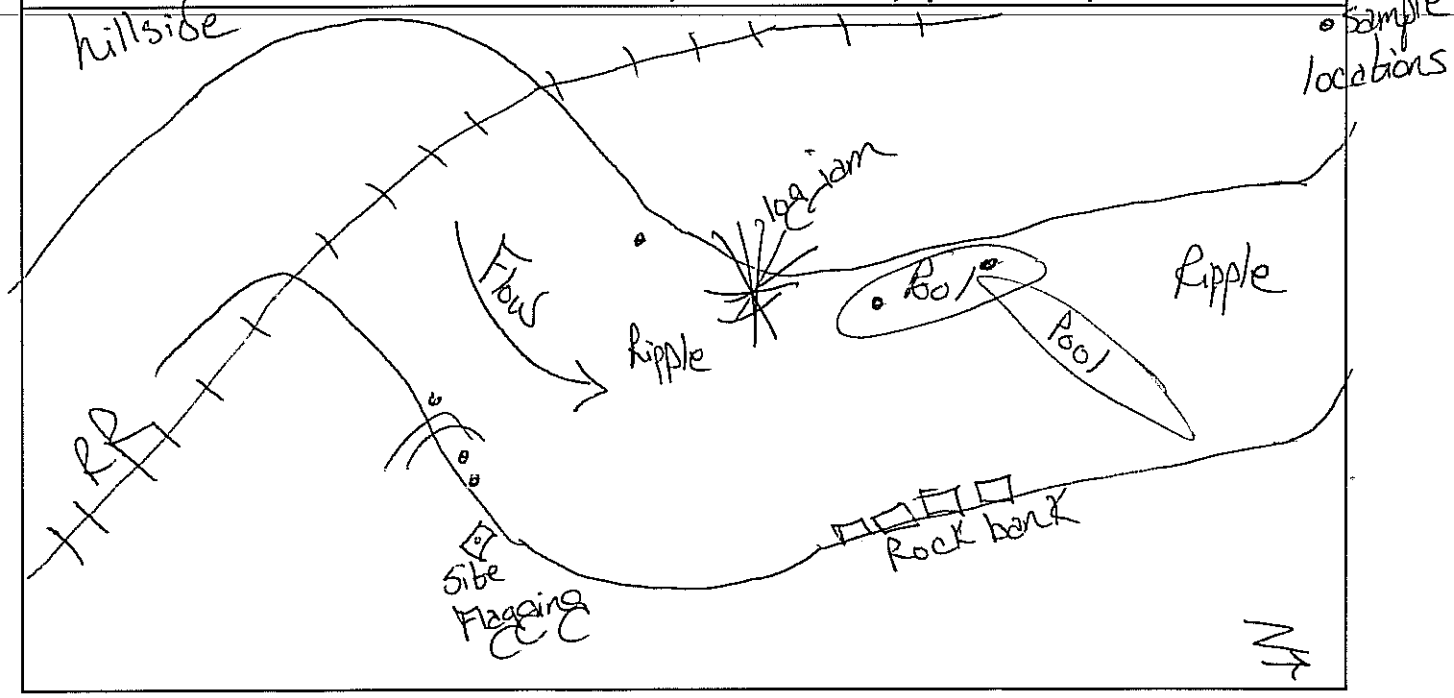
1-Downstrm 2-Downstrm w/ rocky bank 3-upstrm toward RR Crossing

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1007-305-SED	1830	1L - Sed Chem
Riparian Soil	NA		1 soil sample AVS/SEM
Upland Soil	NA		~~2L bucket - Sed tox~~

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Pools + Ripples; Vegetation overhanging banks; Good veg coverage. Fill/abutments near RR crossing. pH = 7.50

Other Comments: Mostly cobble, some gravel + sand, little silt. ~~Threw~~ Threw out few ~~little~~ medium gravel from composite. Cores: Mostly fine to Med Sand, little silt, no organics.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

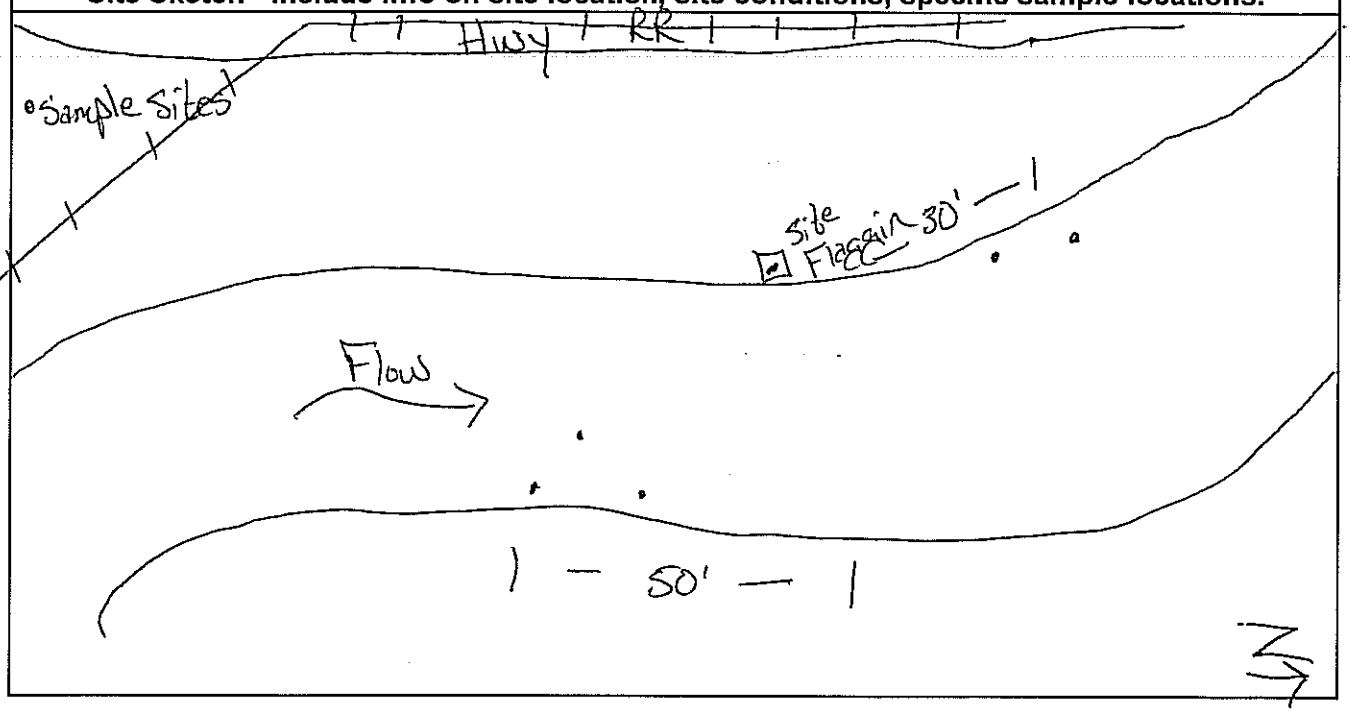
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/28/10	
Weather: Partly Cloudy 65°F	
Site Designation:	Ref-PPC-3
Descriptive Location: Reference site on Prickly Pear Creek just S (upstream) of culvert under Hwy. Ashgrove Cement plant is downstream.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-Upstream 2-Downstream	

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.70 Sediment	AEH-1007-307-SED	0945	1L-Chemistry Composite
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Likely dredged (piles on floodplain), some room for movement prior to road & RR.
Substrate: Cobble, sand, minor gravel. Vegetation good, few rocky trails up bank. Woody materials in stream toward banks.

Other Comments:
Cores: Primarily fine to coarse sand. Some silt toward banks. No organics
Recovery: 3-6" for each core

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

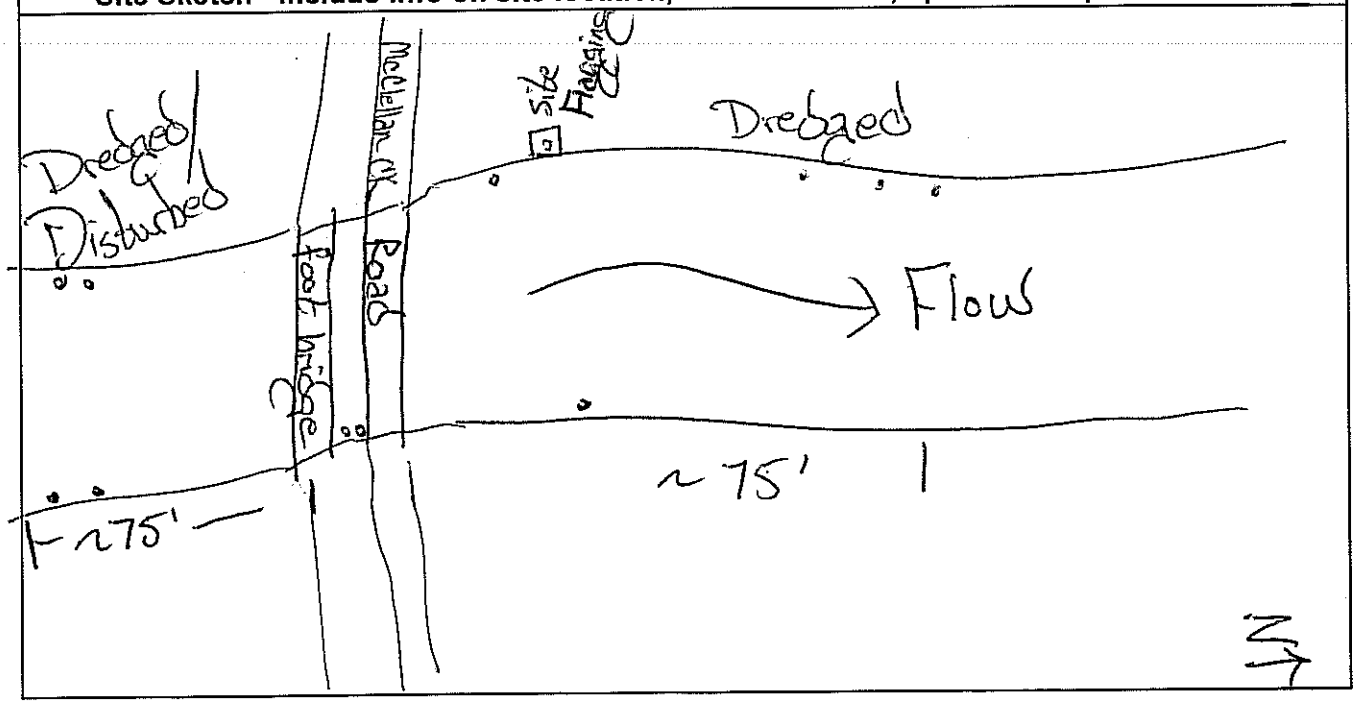
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather:	Partly Cloudy, 70°F
Site Designation:	Ref-PPC-2
Descriptive Location:	Reference location on Prickly Pearch immediately downstream of auto & foot bridges on McClellan Creek Rd.
GPS Coordinates	
Photo Log (photo #, orientation)	1-upstream 2-downstream

Sample Info:		**Number**	**Time**	**Containers**
pH= 7.69	Sediment	AEH-1007-308-SED	1030	1 L-Chemistry
	Riparian Soil	NA		2L-Sed/Tox
	Upland Soil	NA		1 4oz Soil - AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Strong flow, mostly riffle through bridge & downstream. Difficult to locate depositional zones. Substrate is cobble & sand. Veg good, overhanging entire streams in some areas.

Other Comments: Only 2" deep max sand on floor of creek. Used trowel to recover sample. Upstream of bridges & disturbance from bridges silty material was located along banks. Used trowel for sampling.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

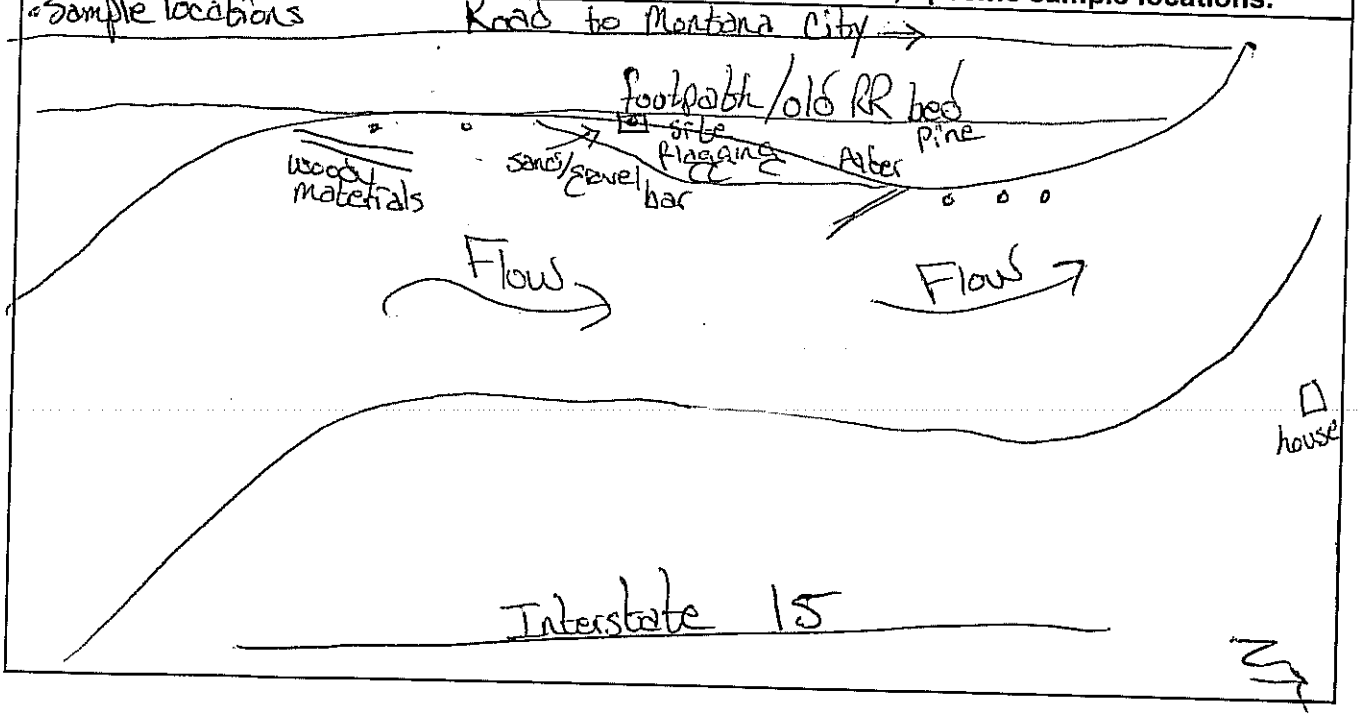
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather: Mostly Sunny 75°F	
Site Designation:	Ref-PPC-1
Descriptive Location: Reference site on Prickly Pear (furthest S). Immediately S of Subdivision between Rd + ~~Enter~~ Hwy 15. Meandering stream. Site on riffle between two meanders.	
GPS Coordinates (Hwy 282)	Interst. Access via footpath - Dr from top of hill down to footpath
Photo Log (photo #, orientation) 1-upstream, 2-Downstream	

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.10	Sediment	AEH-1007-309-SED	1120	1L - Chemistry
	Riparian Soil	NA		4oz - AVS/SEM
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Mostly cobble, + coarse sand to fine gravel bars. Some shiny micaceous material floating. Good veg cover on banks. Some overhanging. Woody materials in stream.

Other Comments: Cores: Silty material ~~(50%)~~ 30%, fine-coarse sand ~~(80%)~~ 80%, some organics

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather: Mostly Sunny / Hazy 75°F	
Site Designation:	PPC-24
Descriptive Location: ~~Mos~~ Along Prickly Pear CK at NE side of pasture. E of Wiley Rd, N of Storage Units. Next to established well + piezometers + gage.	
GPS Coordinates	
Photo Log (photo #, orientation)	

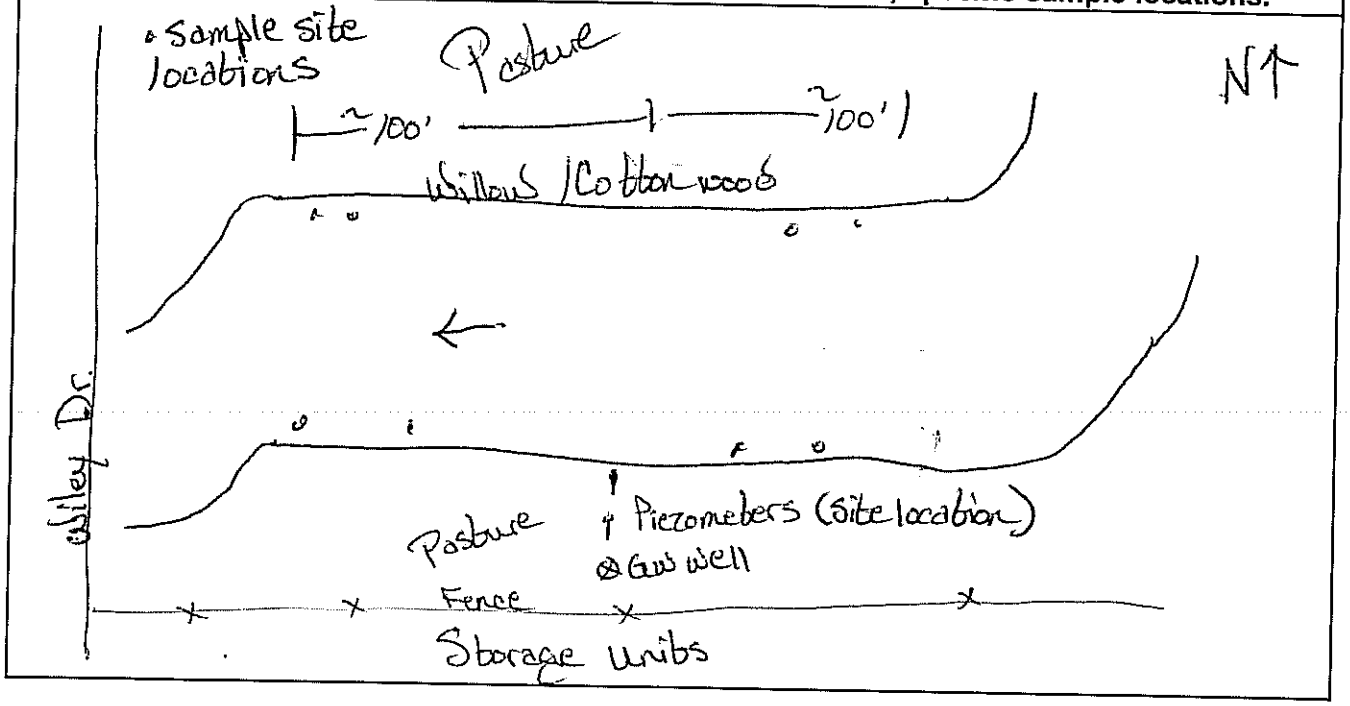
1-Downstream w/staff gage 2-upstream from LEB w/staff gage 3-Downstream w/trash Buildup behind tree

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.43 Sediment	AEH-1007-310-SED	1315	1L - Chemistry
Riparian Soil	NA		14oz - AVS/SEM
Upland Soil	NA		2L - Sed/Tox

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Good vegetation coverage on banks. N side has fairly consistant Cottonwood + willow cover; 3 more grasses. Substrate Mostly cobble with sand. Fine sand along bank w/ lots of shiny micaceous flakes.

Other Comments: Cores: Only 2" Recovery; switch to trowel. Difficult to find depositional zones. Threw 1-2 gravel + few woody pieces. Mostly fine sand, some/little silt.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/28/10	
Weather: Sunny 85°F	
Site Designation:	PPC-8
Descriptive Location: Prickly Pear CK adj. to JFK Park (near established monitoring location) Access from N End of Morton Ave.	
GPS Coordinates	
Photo Log (photo #, orientation)	

1-upstream, 2-Dwnstrm main channel 3-Dwnstrm side channel + Park (REW)

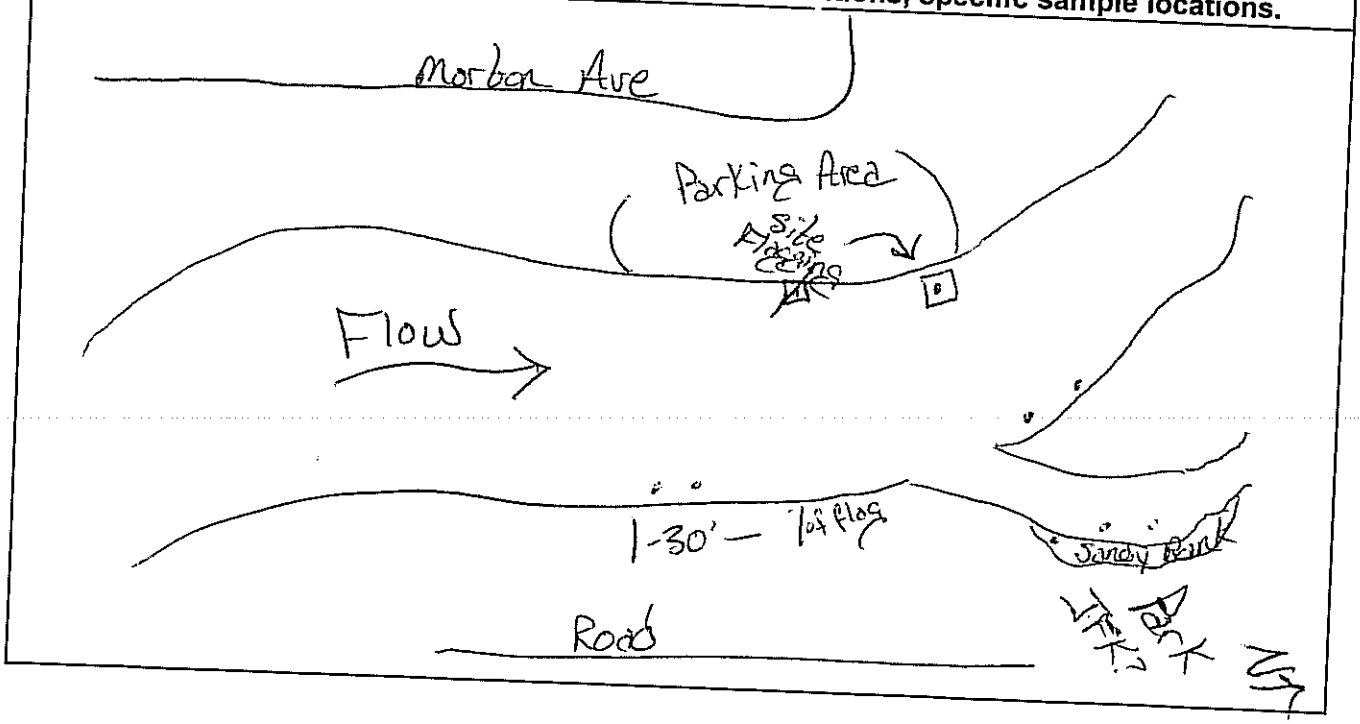
Sample Info:

	Number	Time	Containers
pH= 7.40 Sediment	AEH-1007-311-SED	1345	1k-Chemistry
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Heavy veg except trails leading from Morton Ave. Mostly cobble + gravel substrate, some sand. Used trowel for sampling. Limited depositional zones for sampling.

Other Comments: Sample ranged from fine sand + silt to medium sand. Pulled wood debris out of composite sample.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

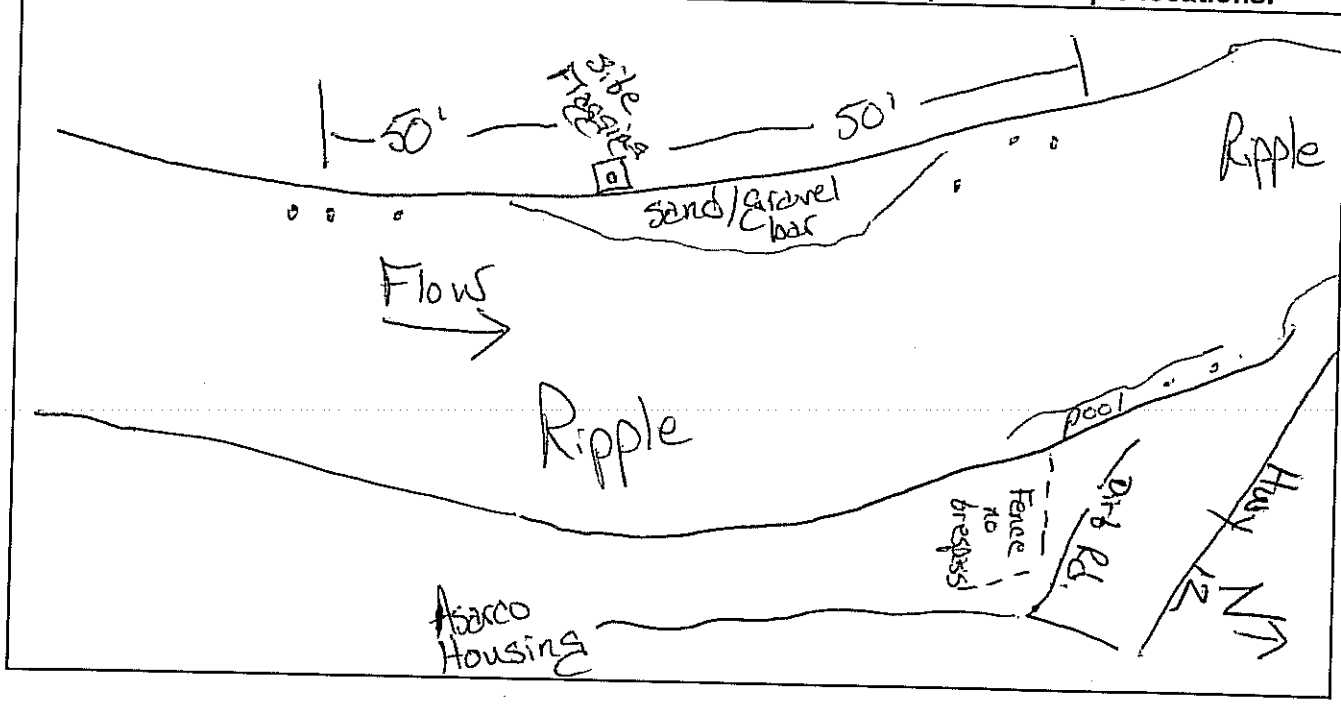
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7/28/10	
Weather: Sunny, Clear, No Breeze 85°F+	
Site Designation:	PPC-23
Descriptive Location: Prickly Pear Creek. couple hundred yards upstrm of no trespass fence off end of E-W road N of Asarco Housing. Site adjacent to Asarco Housing.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-Upstrm, 2-Dwnstrm	

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.63	Sediment	AEH-1007-312-SED	1510	1 L-Chemistry
	Riparian Soil	NA		
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Substrate Cobble, medium-coase gravel. Sand along bank in slower edges.

Other Comments: Core: Beneath 2-3" sand, silty gray somewhat mucky. Mostly difficult to get recovery w/ corer. Switched to trowel. Mostly samples fine-coarse sand.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

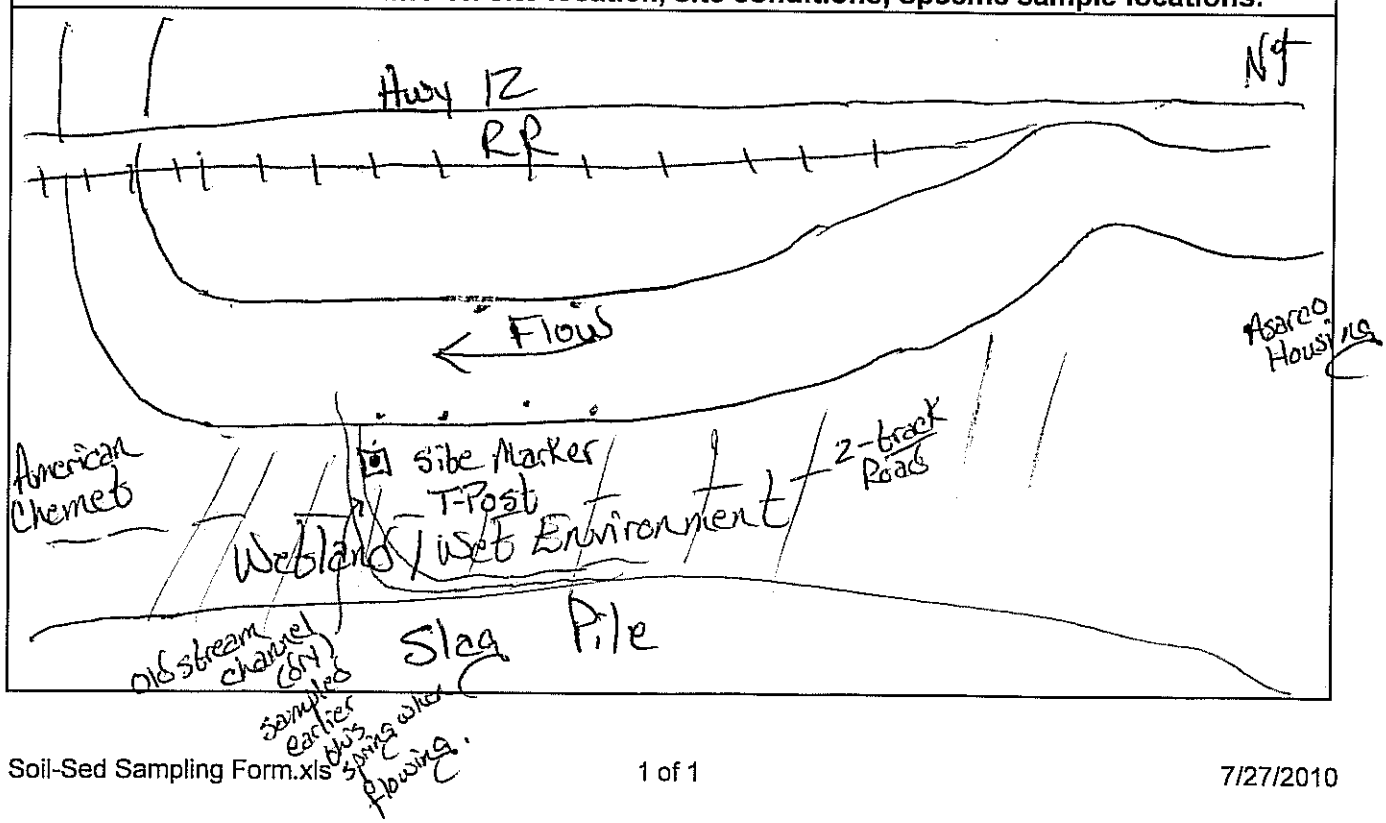
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather: Sunny 85°, Breezy	
Site Designation:	PPC-7
Descriptive Location: Prickley Pear CK just E of American Chemet & crossing under Hwy 12.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-Upstrm, 2-Dwnstrm	

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.46	Sediment	AEH-1007-313-SED	1430	1L-Chemistry
	Riparian Soil	NA		2L-Sed/Tox
	Upland Soil	NA		4oz-AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Substrate mostly cobble, few boulders, Med-Fine sand along banks, very little silt. Veg good.
Staff gage at bridge 1.20'

Other Comments: Samples Med-Fine Sand, very little silt
0-6" Recovery w/ trowel; Many hard 2 2" fine-med sand then below was an organic rich silty material.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

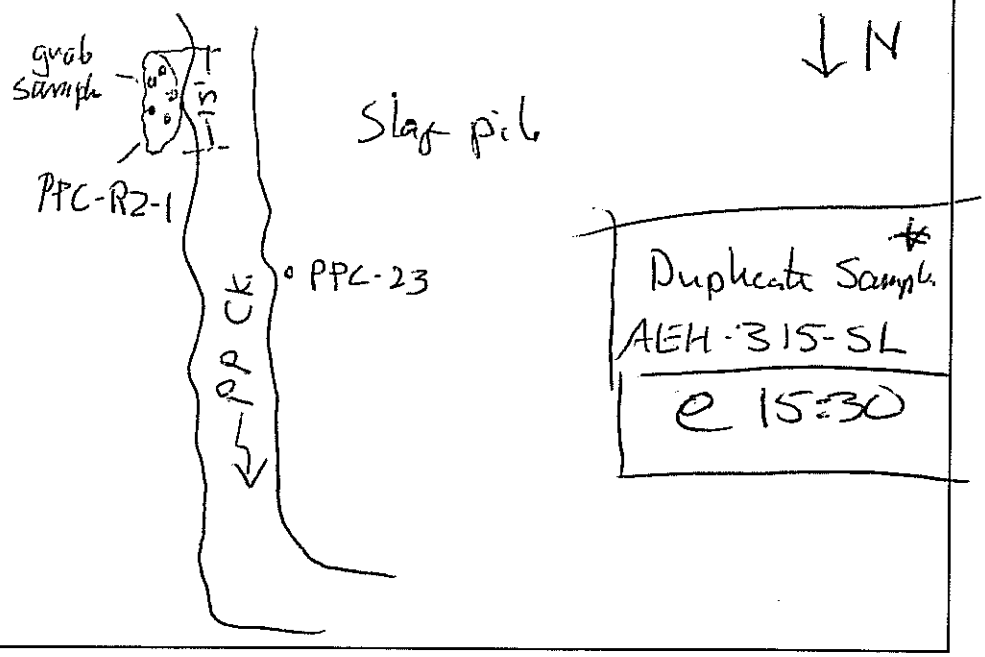
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 7-28-10	
Weather: Right (east) bank ppc about midway between dam and sharp bend in ck above H'way 12.	
Site Designation:	PPC-RZ-1
Descriptive Location: Clear, calm, warm. T ≈ 85°F	
GPS Coordinates	
Photo Log (photo #, orientation) ~~1-upstrm, 2-Downstrm~~	Bob Anderson sampling soil. 1-Looking downstrm on right bank (E. Bank)

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
pH = 7.52 Riparian Soil	AEH-1007-314-SL	1520	2-4 oz soil (Metals/Physical)
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Site is flat bench about 3 ft above creek stage. Dense grass cover, surrounded by riparian shrubs

Other Comments: Collected samples with hand auger; 5 grabs. 0-6". 0-4" topsoil. 4-6" gravelly loam. Composited 5 samples into one composite sample. Collected dup.*

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather:	Sunny 85° Breezy
Site Designation:	PPC-5
Descriptive Location:	Prickly Pear CK ~100 yds downstream from Dam @ Plant Site E Entrance.
GPS Coordinates	
Photo Log (photo #, orientation)	1 - upstream 2 - Downstream, slag pile on horizon

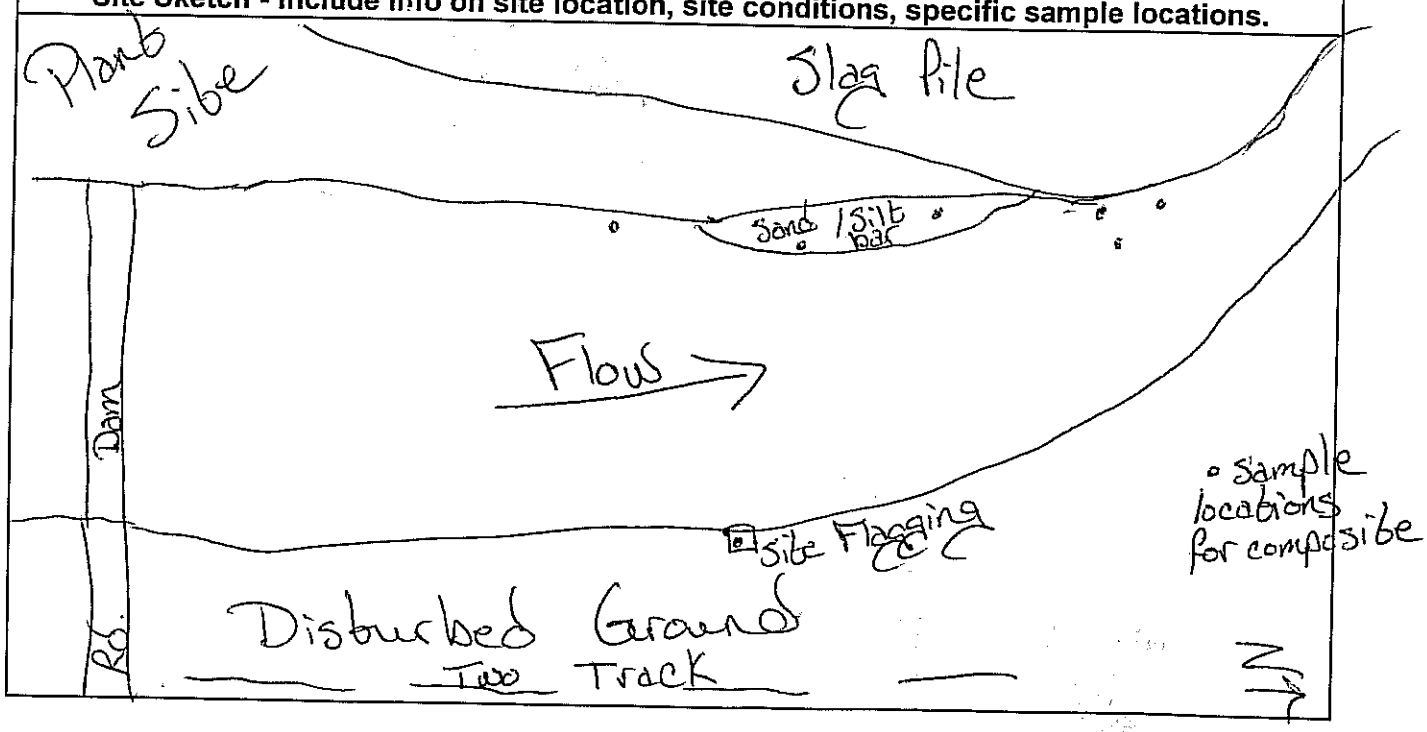
Staff Gage = 1.07' AEH-1007-317-SED 1610 Duplicate 1L - Chemistry 4oz - AVS/SEM

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.33	Sediment	AEH-1007-316-SED	1600	1L - Chemistry
	Riparian Soil	NA		4oz - AVS/SEM
	Upland Soil	NA		2L - Sed/Tox

Site Conditions (stream channel/bed/bank conditions; riparian/upland/slope/veg conditions; signs of fill/disturbance): Substrate: mostly cobble, some sand
Good veg on banks. Stream undercutting some banks on turns. Just Downstream CK directly adjacent to slag pile. Strong Flow

Other Comments: Samples: Fine to Coarse Sandy, some silty sand
Lots of shiny, gold, micaceous material of surface on sand bar & bank edges

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather:	Sunny, Clear 85°F, Breezy
Site Designation:	PPC-RZ-2
Descriptive Location:	Left (west) bank of stream along Prickly Pear CK, ~200 yds Downstream of Dam at E entrance of Plant Site. Approx. 20' up bank from CK.
GPS Coordinates	

Photo Log (photo #, orientation)

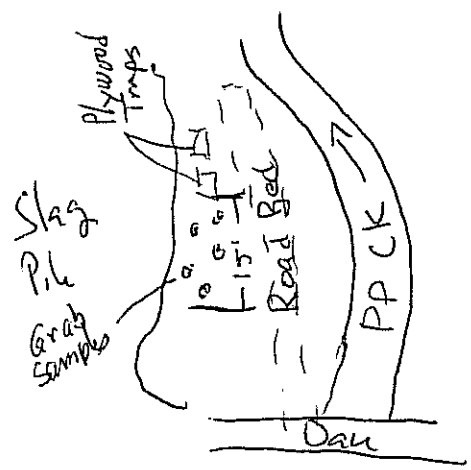
1 - Looking downstream direction (N, NW) at riparian sampling area on left bank (W bank).

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.35 Sediment	NA		
Riparian Soil	AEH-1007-318-SL	1620	2-4oz soil jars
Upland Soil	NA		(Metals, Physical)

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Flat ground w/ good grass cover; surrounded by willows.

Other Comments: Sampled near plywood insect traps. 5 grabs 0-6".
0-2" organic rich sandy loam w/ roots & earthworms.
2-4" Brown sandy loam. Minor gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

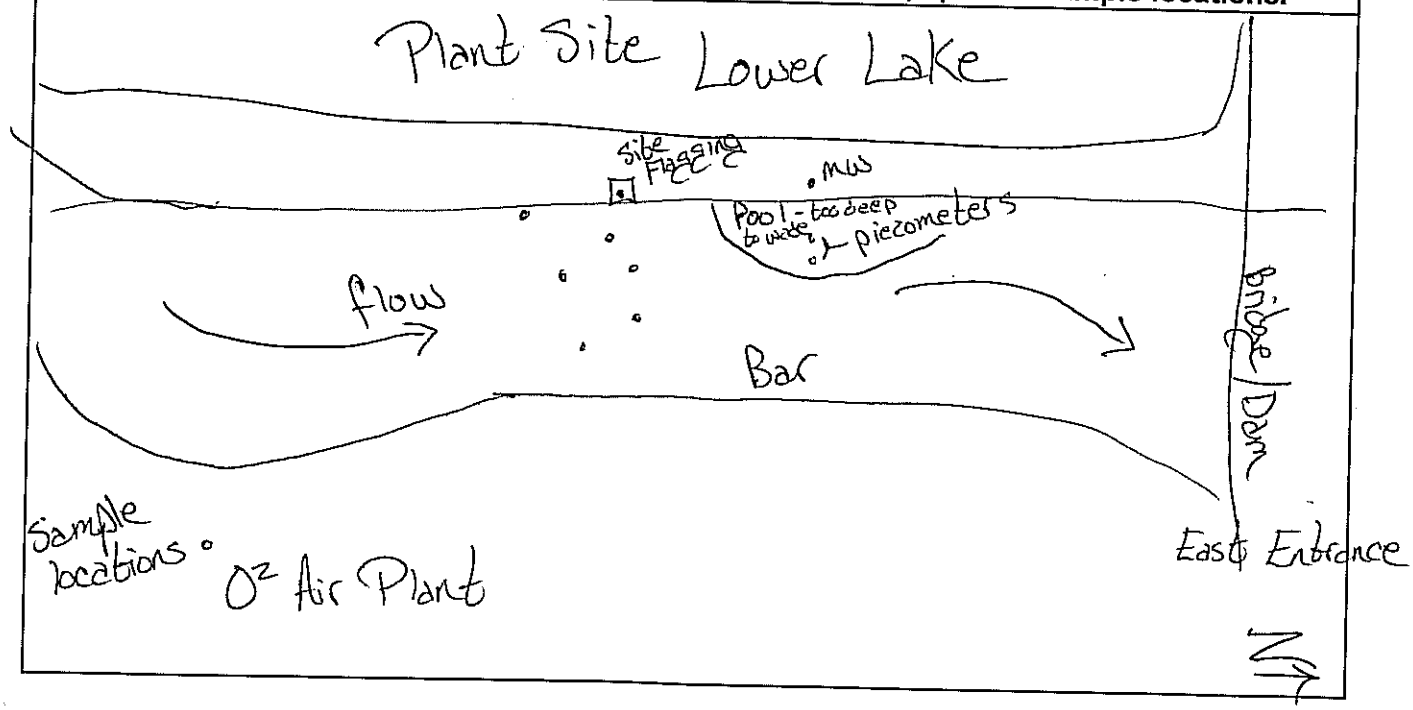
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather:	Sunny, Clear, Slight Breeze 85°F
Site Designation:	PPC-103
Descriptive Location:	Just S (~100') of dam at E Entrance to Lead Smelter Site
GPS Coordinates	
Photo Log (photo #, orientation)	1 - upstream twd Air Plant 2 - Downstrm 3 - Upstrm

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.48 Sediment	AEH-1007-319-SED	1715	1L - Chemistry
Riparian Soil	NA		2L - Sed/Tox
Upland Soil	NA		4oz - AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Heavy Willow/Riparian Veg; Strong flow into dam
Substrate: Mostly Sand, minor silt: Few undercut bank patches.
Horsetail

Other Comments: Cores: Full recovery Mostly sand.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

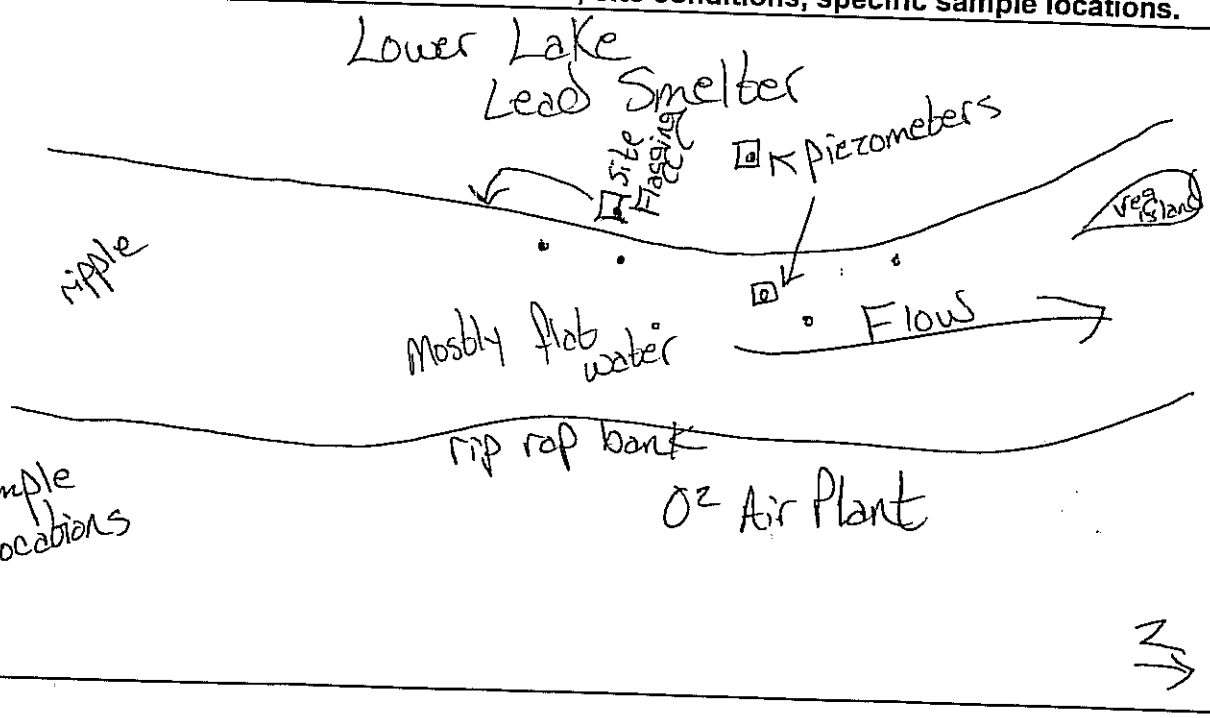
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/28/10
Weather:	Sunny, Clear, Breeze 85°F; Clouds building on horizon. Thunder & Lightning as we finish in distance.
Site Designation:	PPC-~~103~~ 102
Descriptive Location:	Between O2 Plant & old Lead Smelter on Prickly Pear CK
GPS Coordinates	
Photo Log (photo #, orientation)	1-upstream 2 Dwn Strm

Sample Info:		**Number**	**Time**	**Containers**
pH= 7.43	Sediment	AEA-1007-320-SED	1740	1-L Chem
	Riparian Soil	—		2 L - Sed/Tox
	Upland Soil			4 oz - AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Substrate primarily sand w/ organic silt in slack current. Good veg cover.

Other Comments: Lots of organic muck w/ sand in Cores. 100% Recovery

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

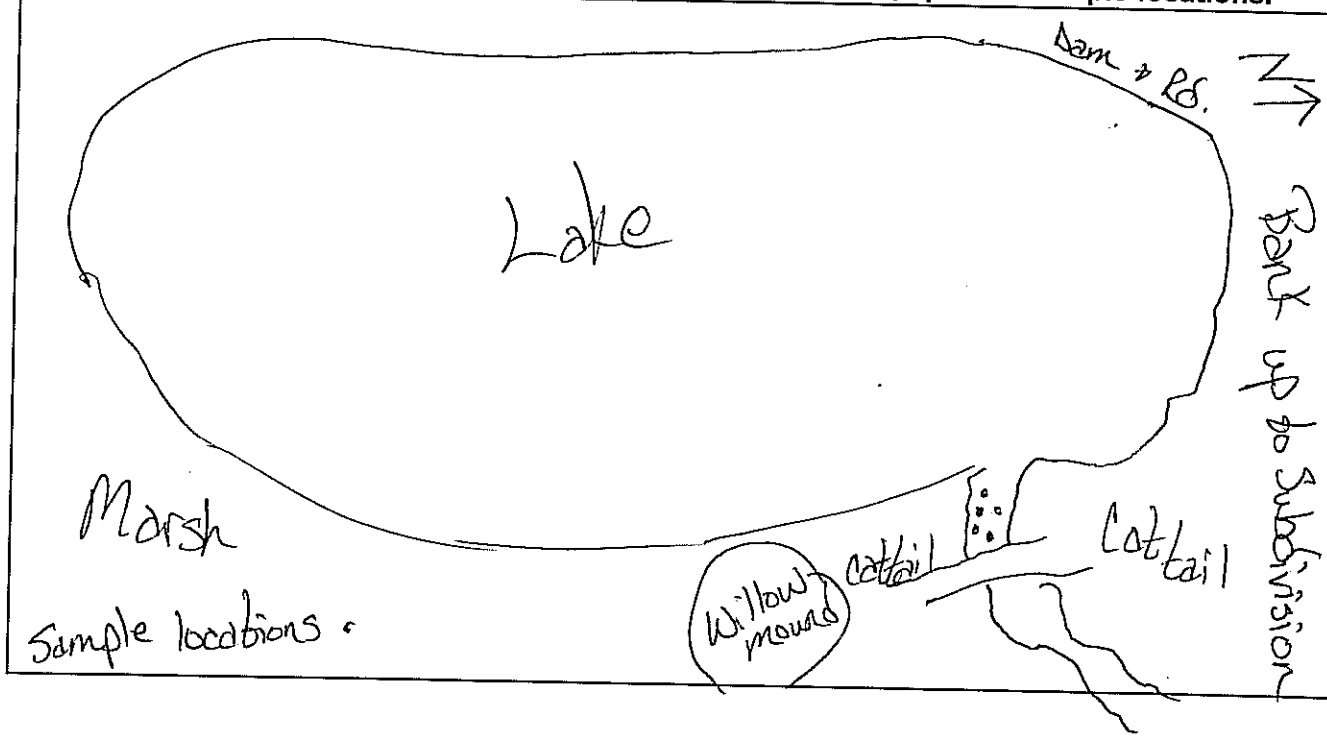
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather:	70°F + Breezy Mostly Sunny
Site Designation:	Ref - Msh - 1
Descriptive Location:	McClellan / Northern Pacific Reservoir Marsh area to SE.
GPS Coordinates	
Photo Log (photo #, orientation)	Looking toward dam (NW) 1 - M. Walker collecting core 2 - Sample site in channel next to Walker

Sample Info:		**Number**	**Time**	**Containers**
pH = 6.79	Sediment	AEH-1007-321-SED	1145	1 L - Chemistry (Metals Short List)
	Riparian Soil	NA		
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Cattails w/ Willow nearby in channel w/ black organic silt w/ little sand. Canadian Geese, Red Winged Blackbirds, etc.

Other Comments: 100% (6+") recovery w/ corer.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather:	Mostly Sunny 70+°F, Breezy
Site Designation:	Ref-Msh-2
Descriptive Location:	Northern Pacific Reservoir Reference Site in Marsh area along NE edge
GPS Coordinates	
Photo Log (photo #, orientation)	2- W Across sample Area & Lake 1- NW toward Dam across Sample Area

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.12	Sediment	AEH-1007-322-SED	1200	1 L - Metals (short list)
	Riparian Soil	NA		
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Edge of Lake ~~mostly~~ w/i grass/cattail areas underlain by silty black organic muck w/some sand to areas with more sand beneath. (med-coarse)

Other Comments:
100% recovery w/ corer.

Site Sketch - Include info on site location, site conditions, specific sample locations.

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

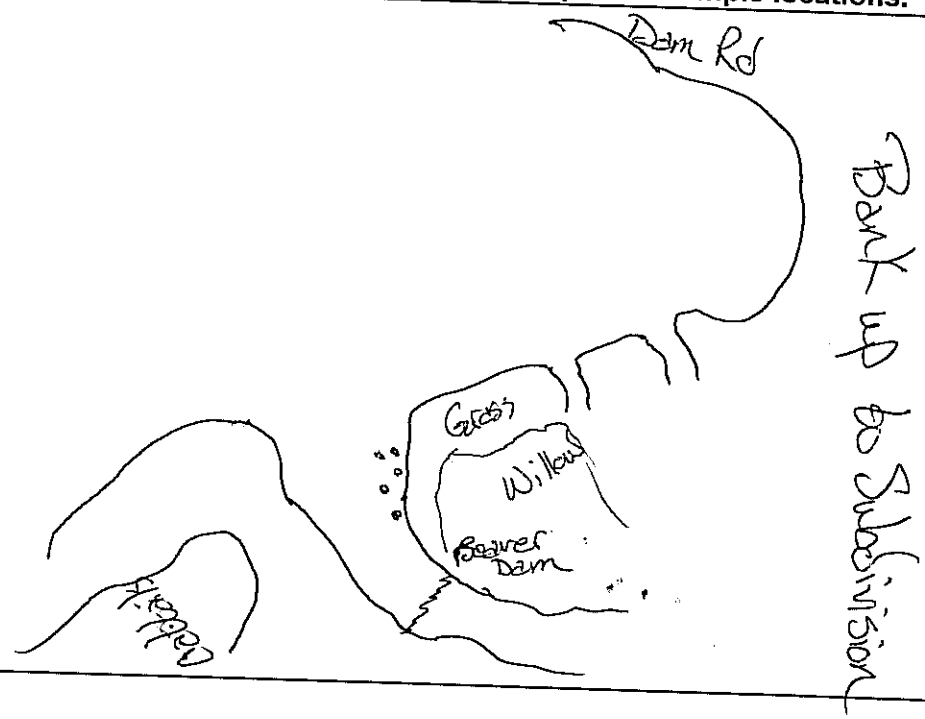
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather:	Mostly Sunny 70+°F, Breezy
Site Designation:	Ref-Msh-3
Descriptive Location:	Northern Pacific Reservoir Marsh on SE Edge Reference Site
GPS Coordinates	
Photo Log (photo #, orientation)	3 - SE From Site across dammed area 1, 2 - Looking SE at Sample Site (Mark Walker Coring) from edge of Lake

Sample Info:	**Number**	**Time**	**Containers**
pH = 6.90 Sediment	AEH-1007-323-SED	1215	1L - Metals (Short List)
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Channel off Lake ~ 75'.
Core 100% recovery layer of black organic silt w/ lots of roots (1/2"-6") underlain by med-fine brown/red sand.

Other Comments:
Easy Coring. Strong Marshy Smell

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

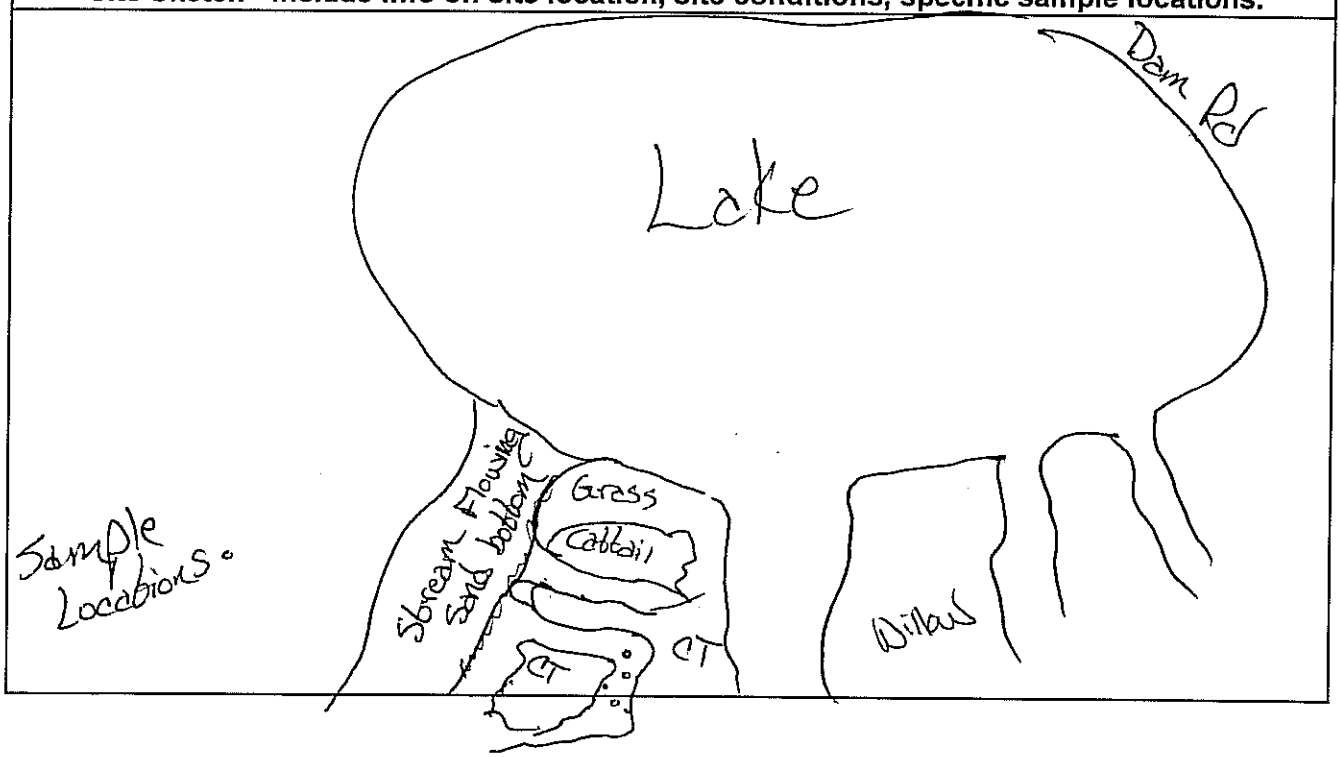
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10 JLC, MWS
Weather:	Mostly Sunny 70°F, Breezy
Site Designation:	Ref-Msh-4
Descriptive Location:	Northern Pacific Reservoir Marsh on SE Edge Reference Site.
GPS Coordinates	
Photo Log (photo #, orientation)	3 - E towards site (M. Walker) 1-Sampling in Muck 2- N towards site from stream

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.57 Sediment	AEH-1007-324-SED	1230	1 L - Short List metals
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Black silty organic material mostly, few cores had few inches of fine-med sand on bottom

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

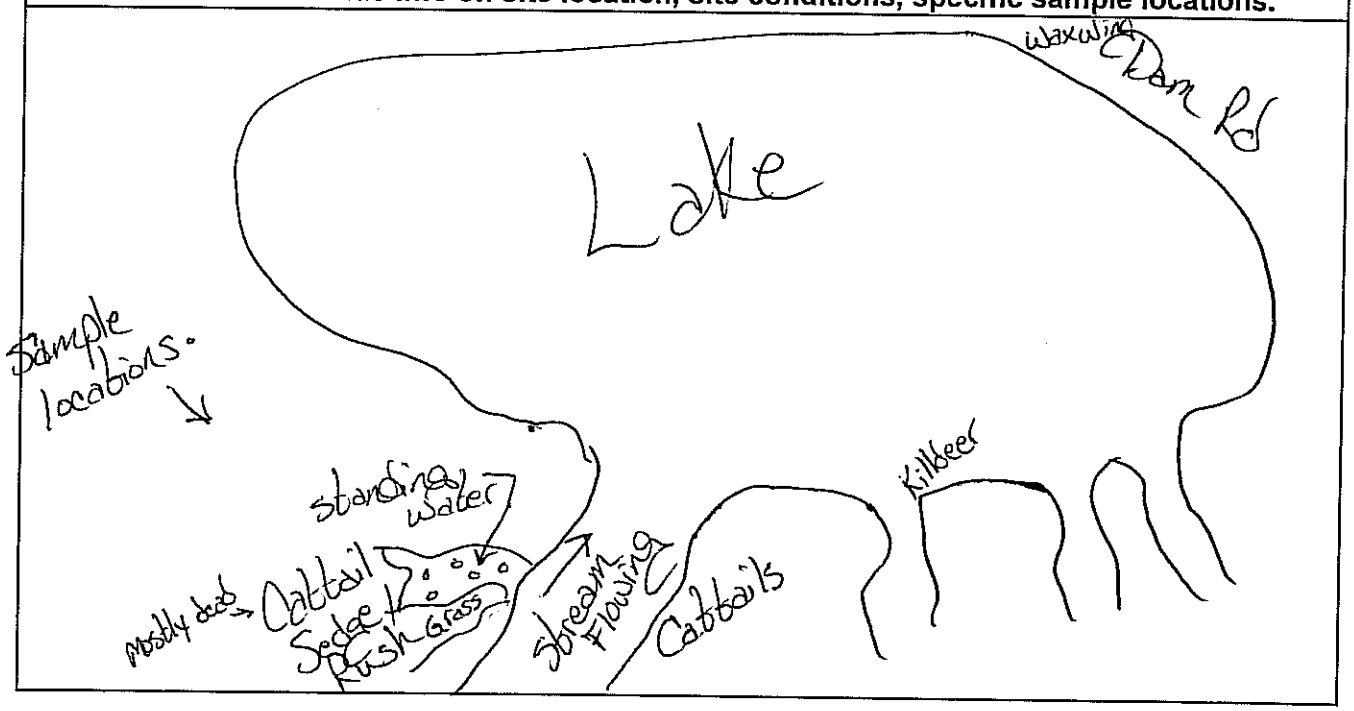
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10 ILC, MW
Weather: Sunny, Breezy 75°F	
Site Designation:	Ref-Msh-5
Descriptive Location: Northern Pacific Reservoir Marsh on SE Edge of Lake	
GPS Coordinates	
Photo Log (photo #, orientation) 1-5 from opp. bank across Site (Same as Panoramic-5) Panoramic Shot begin + end looking upstream (SE)	

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.13 Sediment	AEH-1007-325-SED	1245	1 L - Short List Metals
Riparian Soil	NA		
Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Backwater area just off flowing channel w/ marsh like sediment under standing water

Other Comments: Recovery 100% Black silty muck

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather: Partly Cloudy, 85°F, Breeze	
Site Designation:	Ref-NPS-1
Descriptive Location: Northern Pacific Reservoir Reference Upland Soils	
GPS Coordinates	

Photo Log (photo #, orientation)

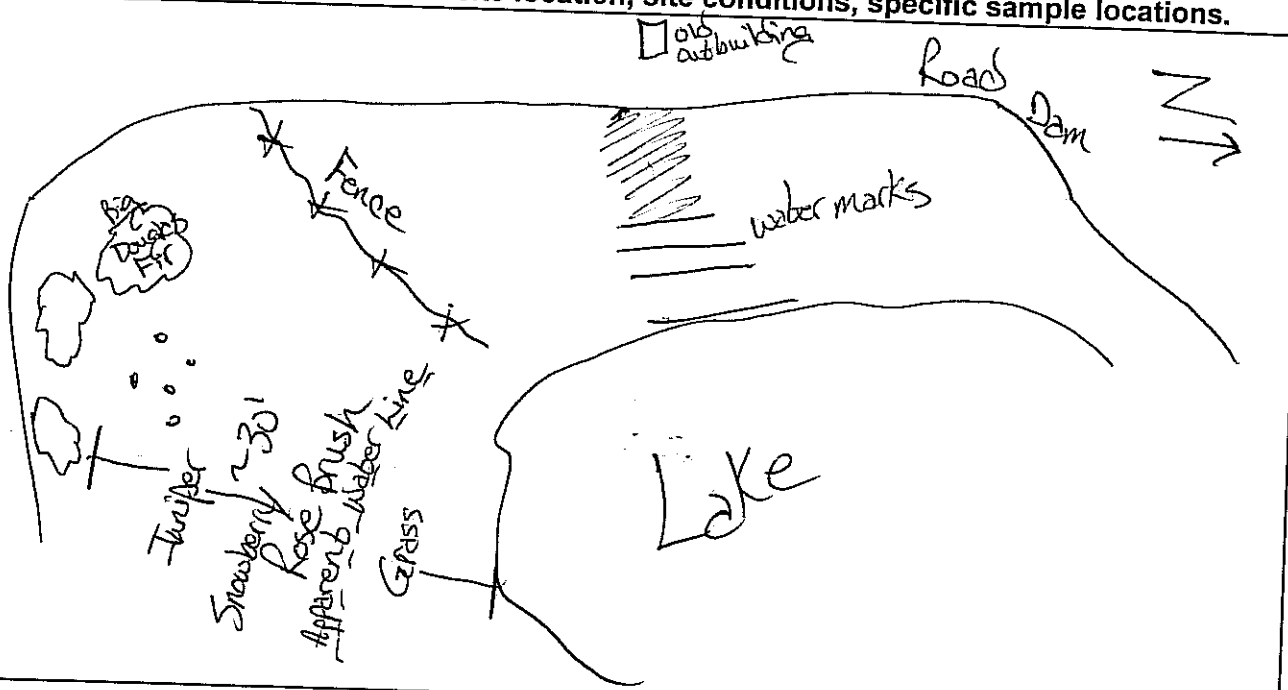
1 - standing at lake edge looking ~S at site 2 - S at site

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA	~~1345~~	
Riparian Soil	NA		
Upland Soil	AEH-1007-326-~~SED~~ SL	1345	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Silty fine Sand / Sandy f silt brown

Other Comments:
Dragonflys (many today)

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

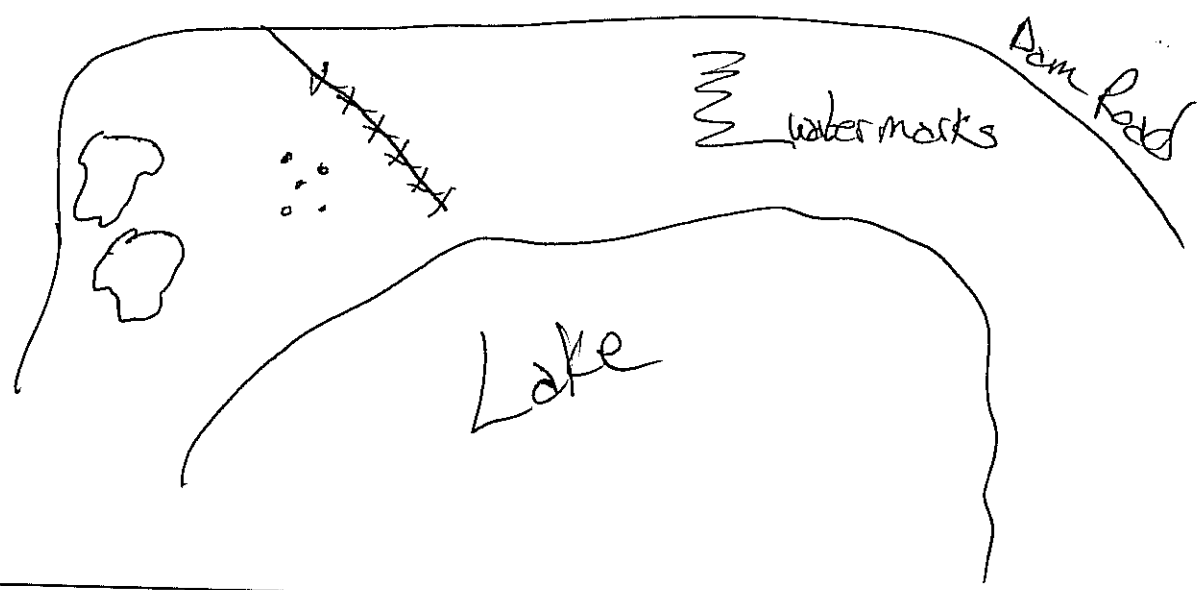
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather: Partly Cloudy, 85°, Breeze	
Site Designation:	Ref-NPS-2
Descriptive Location:	Northern Pacific Reservoir Reference uplands Soils
GPS Coordinates	
Photo Log (photo #, orientation)	
1 - S from edge of water; Walker at site, Fence on Right	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-327-~~SED~~ SL	1400	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance):

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10 MW, JZC
Weather:	85°F Partly Cloudy, Breeze
Site Designation:	Ref-NPS-3
Descriptive Location:	Northern Pacific Reservoir Reference Upland Soils
GPS Coordinates	

Photo Log (photo #, orientation)

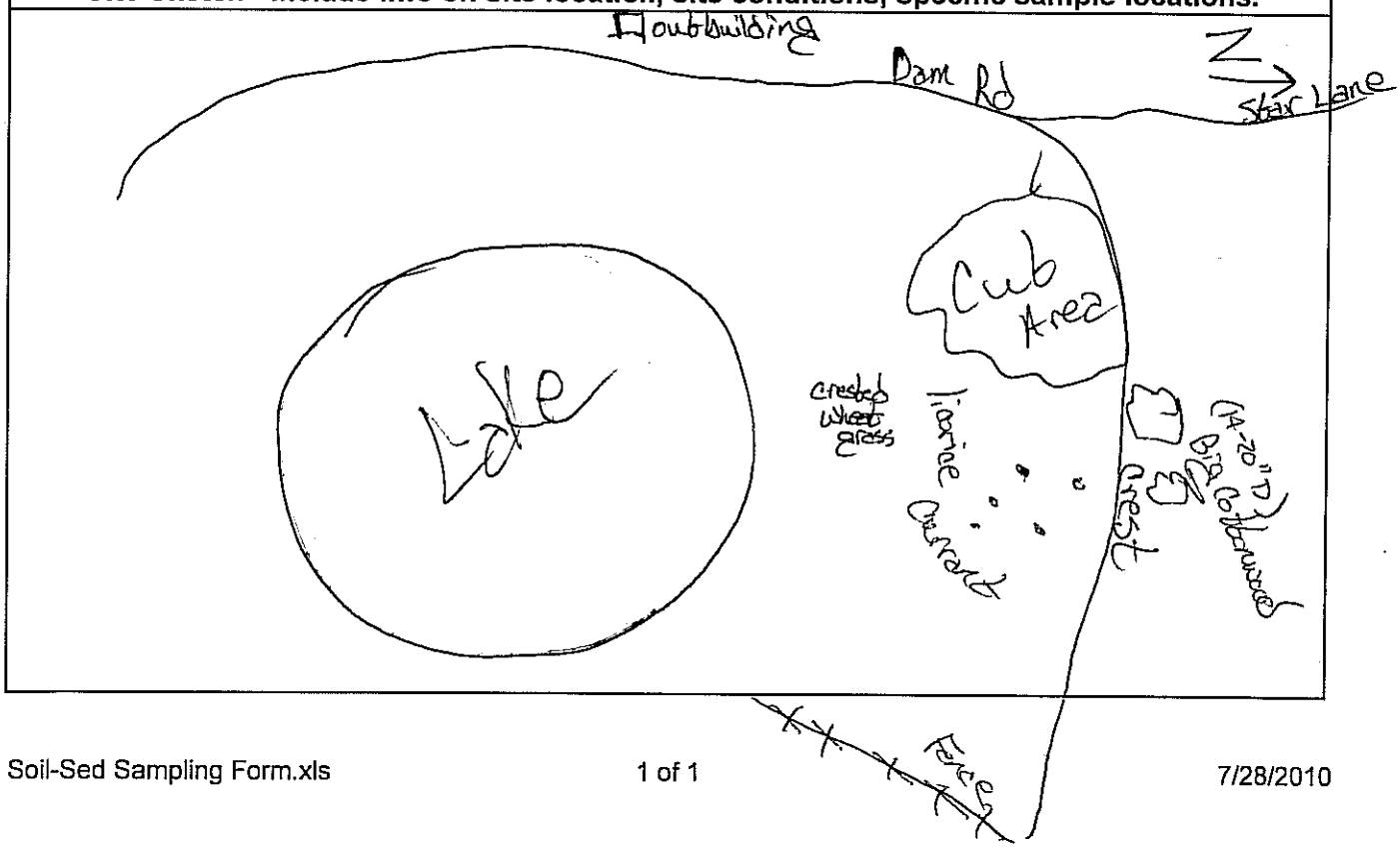
1 - looking ~~E~~ W across site 2 - looking ~~W~~ E

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEA-1007-328-SL	1415	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): upland bank above high water marks (~ 20-30' below crest + cottonwoods) amongst current + licorice. Lots of larger rock (cobble) to avoid.

Other Comments: Brown sandy silt w/ lots of roots.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

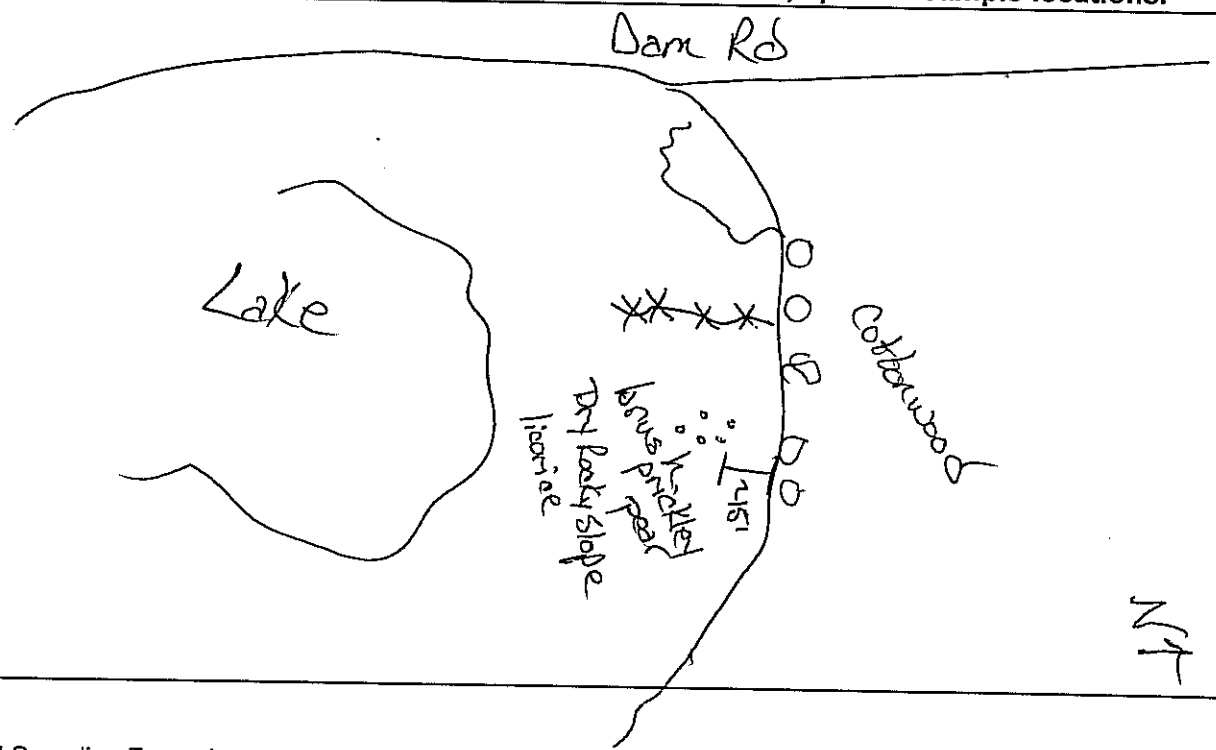
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10 MW, JC
Weather:	Partly Cloudy, 85°, Breeze
Site Designation:	Ref-NPS-4
Descriptive Location:	Northern Pacific Reservoir Upland Soils
GPS Coordinates	
Photo Log (photo #, orientation)	1- East across fence in frgrnd + M. Walker @ Site

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-329-SL	1430	1 Ziplock - Metals Short List

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Upland bank above high water mark (historic) Dry, Rocky, Cactus, Knapweed, Brushes

Other Comments: Orange/Brown sand fine, some silt, some gravel

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

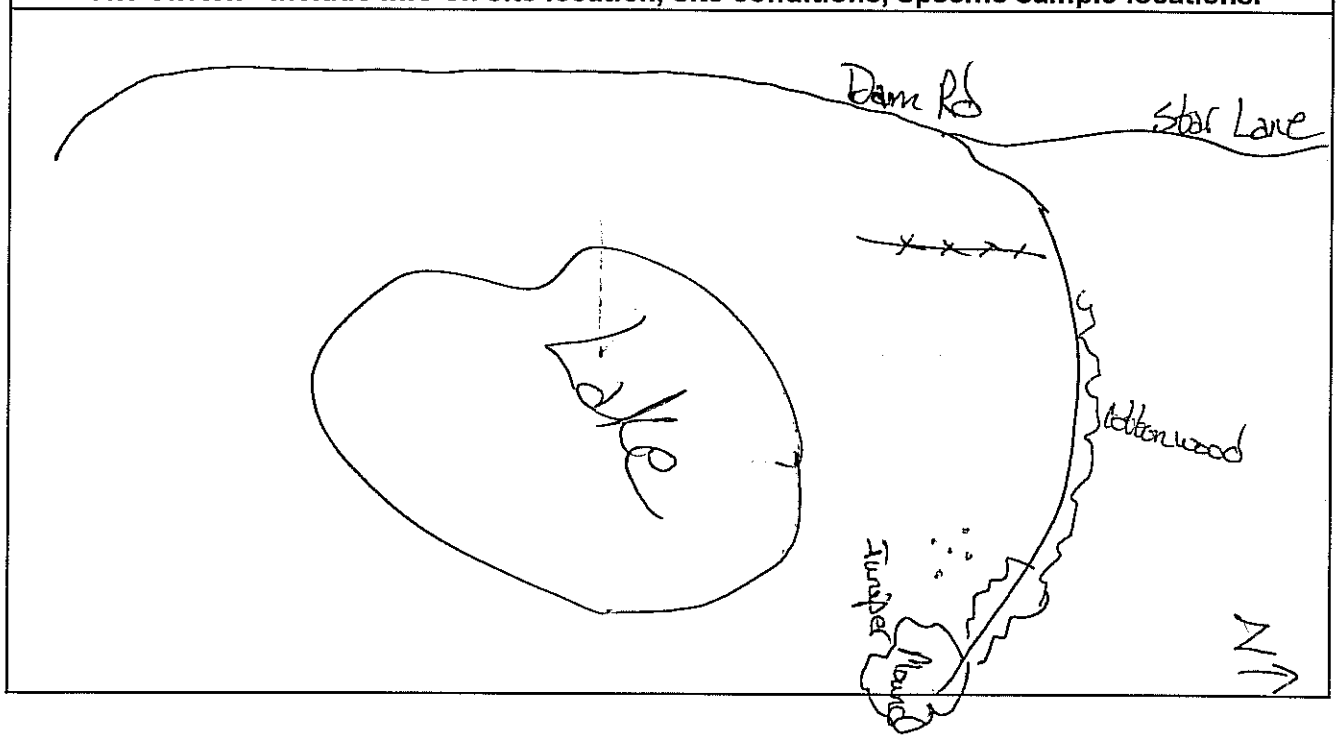
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather: Partly Cloudy, 85°, Breeze	
Site Designation:	Ref-NPS-5
Descriptive Location: Northern Pacific Reservoir Upland Soils	
GPS Coordinates	
Photo Log (photo #, orientation) 2-?. Panoramic Site from bruck 1 – looking E.; M. Walker (in center) just below sampling area	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-330-SL	1445	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Upland bank soil ~10' below lowest cottonwoods (above juniper) just before the ~~B~~ hummocky hill (to E)

Other Comments: Brown sandy silt w/ lots of roots
Lots of dragonflys all around Lake.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

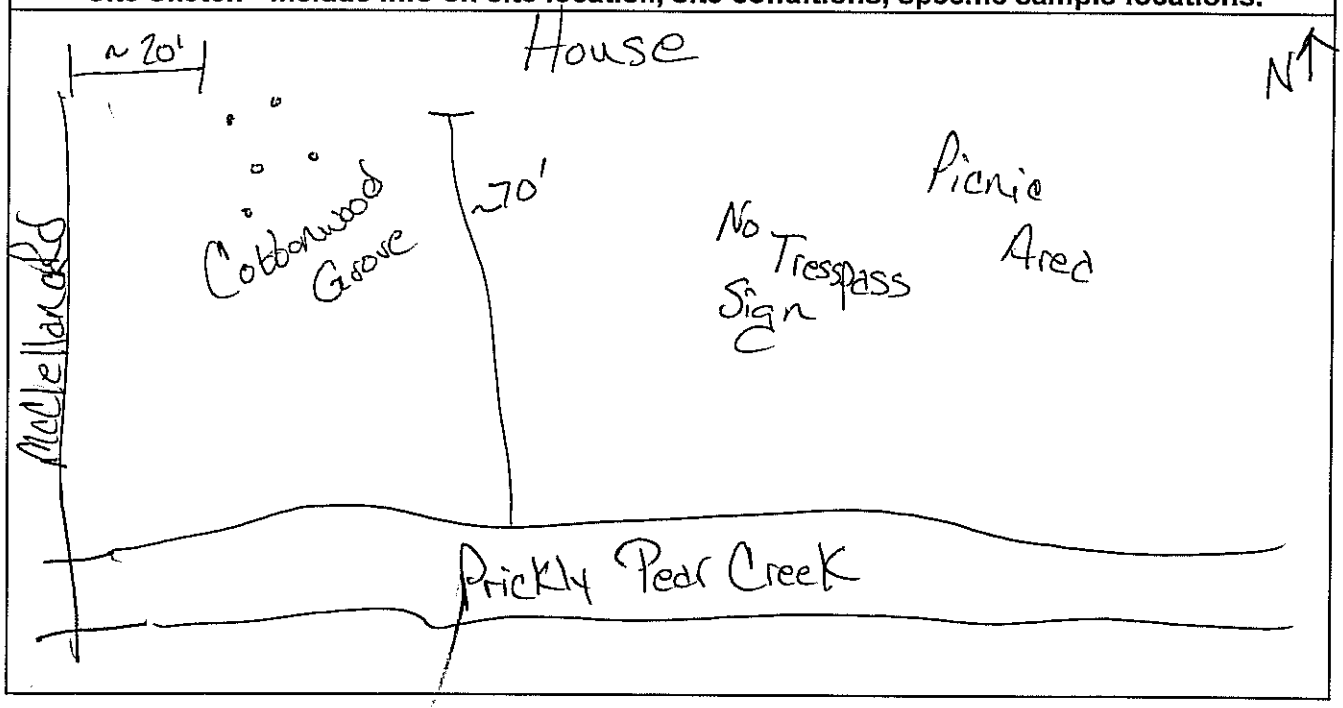
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10 MW, TLC
Weather: Mostly Sunny 85°, Breezy	
Site Designation:	Ref - US - 1
Descriptive Location: Near McClellan Ck Rd bridge across PPC. North side of Creek ~	
GPS Coordinates	
Photo Log (photo #, orientation) 1 - NE from Rd at site, 2 - SW from Rd bwd side PPC in Distance	

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.94 Sediment	NA		
Riparian Soil	NA		
Upland Soil	AES-1007-331-SL	1545	1 ziplock - Chemisbrd

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Flat bank ~ 70' from CK. under Cottonwood trees ~ 20' from Rd Berm

Other Comments: Cores include sandy silt loam w/ lots of organic litter (grass, twigs)

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

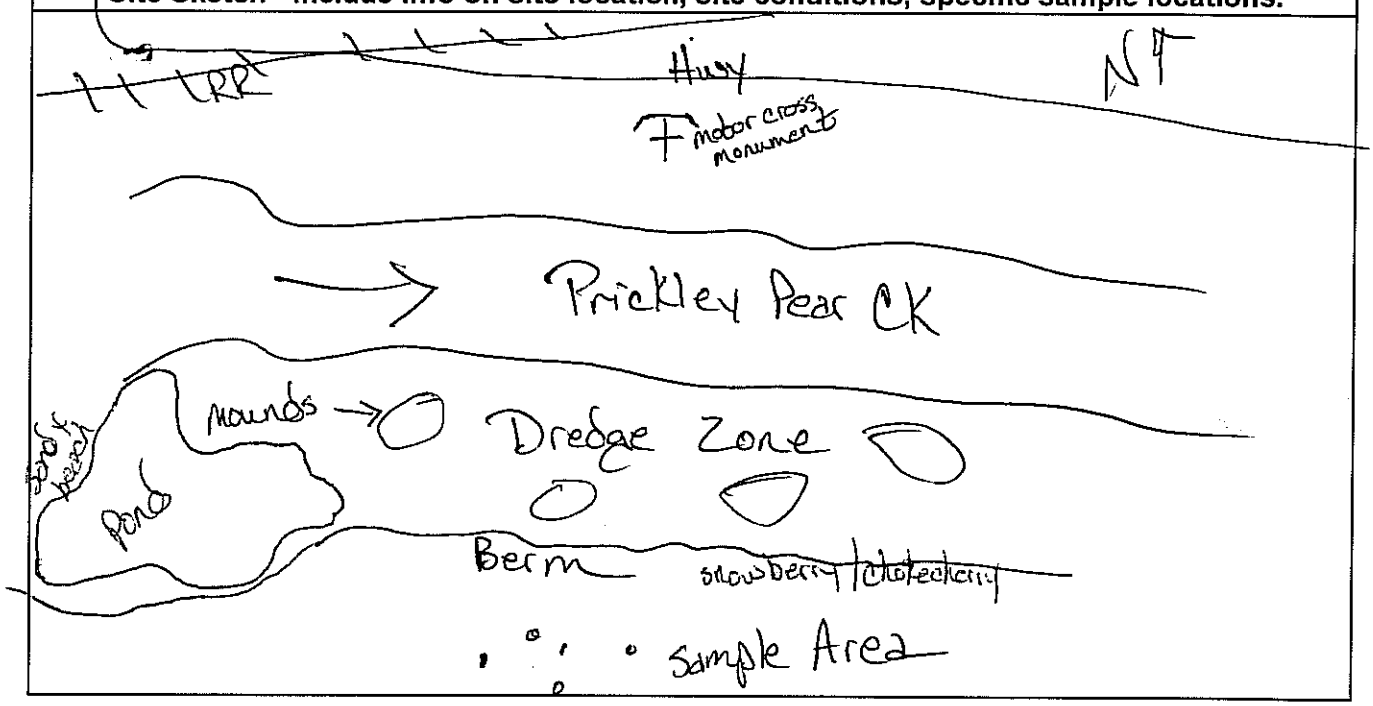
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather:	Mostly Sunny 90°, Breezy
Site Designation:	Ref-US-2
Descriptive Location:	Access from culvert on Hwy next to Ashgrove or across Bompart Property across Prickly Pear CK
GPS Coordinates	
Photo Log (photo #, orientation)	1- W facing towards sample area.

Sample Info:	**Number**	**Time**	**Containers**
pH = 8.02 Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-332-SL	1615	1 Ziplock - Metals/Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Upland zone on the right bank (looking downstream) beyond the dredge zone just prior to Ponderosa Pine

Other Comments: Brown silty sand w/ organics (roots)

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

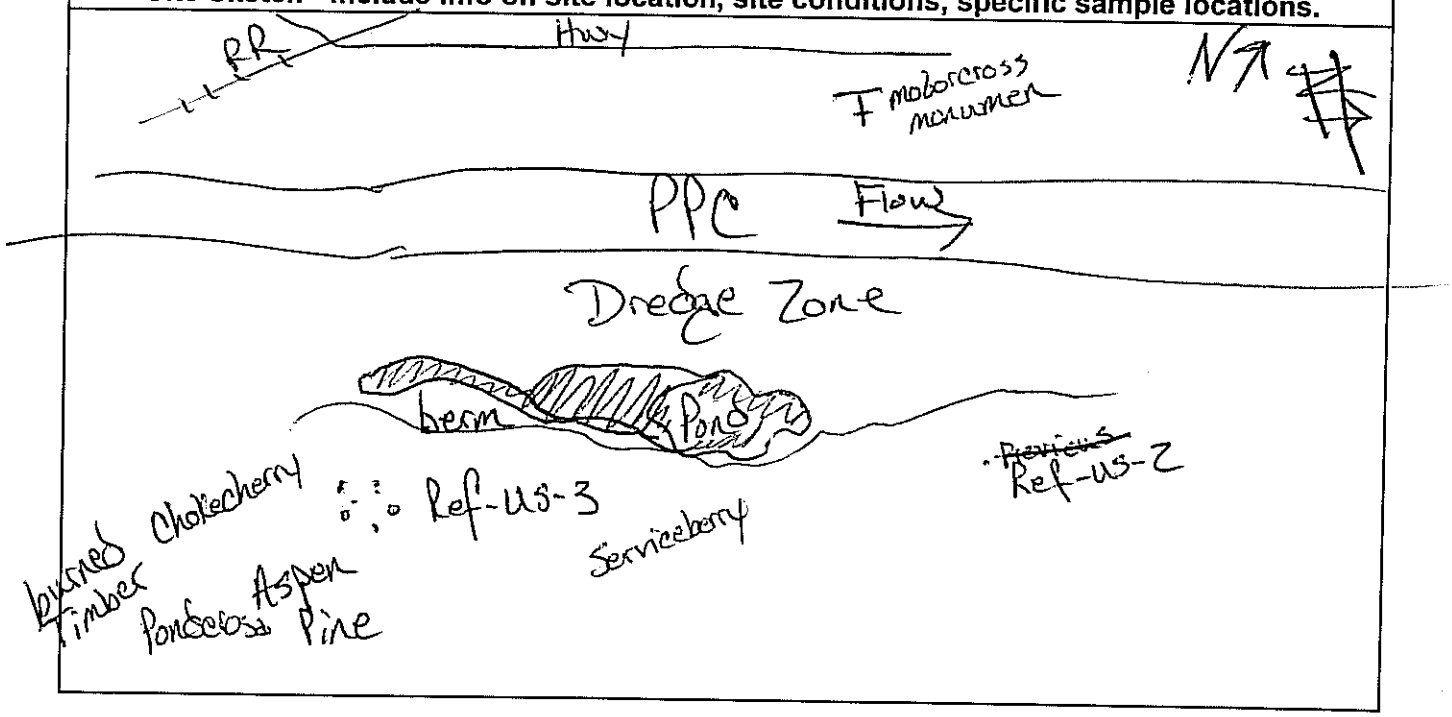
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather: Mostly Sunny 90°, Breezy	
Site Designation:	Ref-US-3
Descriptive Location: Access from culvert on Hwy or through Bomford Property across Prickly Pear CK	
GPS Coordinates	
Photo Log (photo #, orientation)	
1 - looking W across site	

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.86 Sediment	NA		
Riparian Soil	NA	1630	
Upland Soil	AEH-1007-333-SL	~~1630~~	1 ziplock metals/Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Beyond major dredge zone on SE side of PPC amongst the chokecherry + just before Ponderosa Pine/Aspen

Other Comments: Brown silty loam sample

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather: Sunny, Breezy 90°	
Site Designation:	Ref-US-4
Descriptive Location: Upland $ reference alongside PPCK. Couple hundred feet N (downstream) of ref-PPC-7.	
GPS Coordinates	

Photo Log (photo #, orientation)

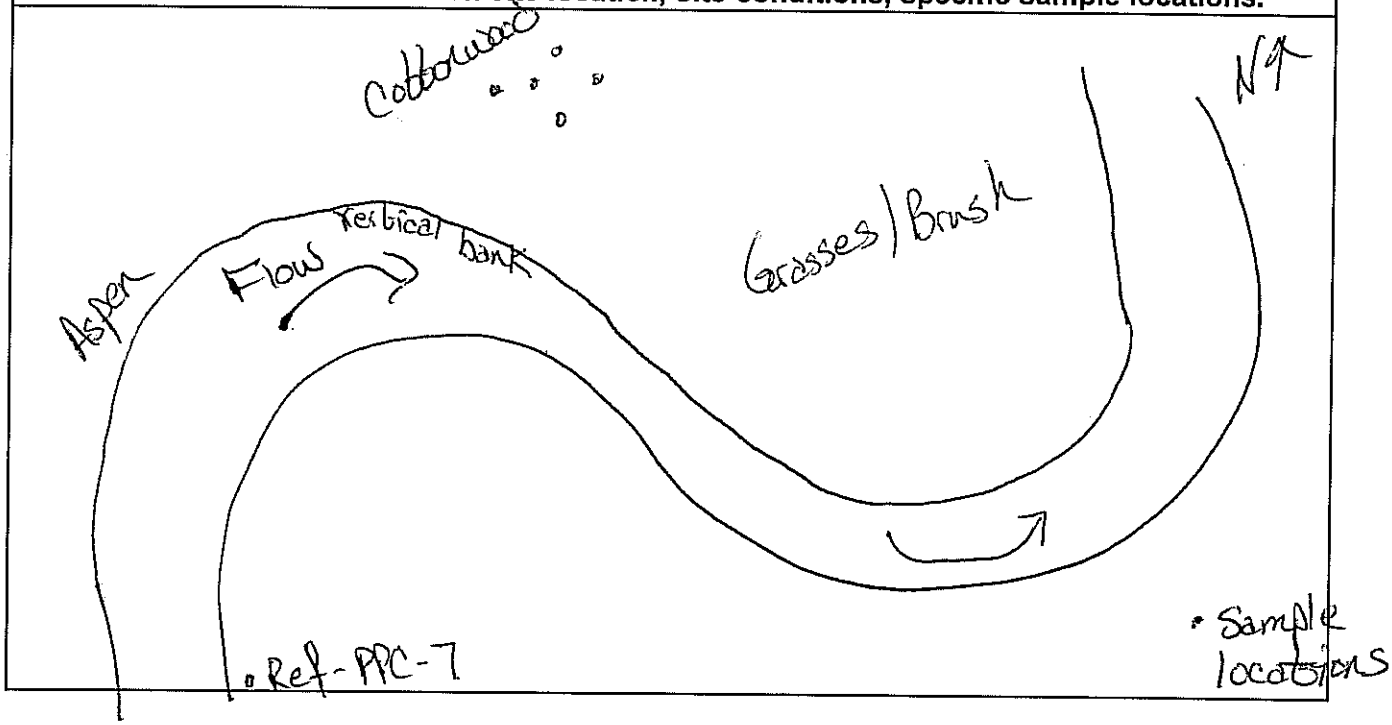
1-Towards US, PPC on left (flowing east); M. Walker/B. Anderson standing at site

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.88 Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-334-SL	1730	1 ziplock - Metals/Chemistry
Duplicate	AEH-1007-335-SL	1745	"

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Cottonwood (Aspen) grove on left bank (looking downstream) of PPC. Approx. 80' from creek on flat ~~bank~~ bench ~ 4' higher than CK. Underbrush mostly grass

Other Comments: Brown silty loam w/ organics (roots)

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

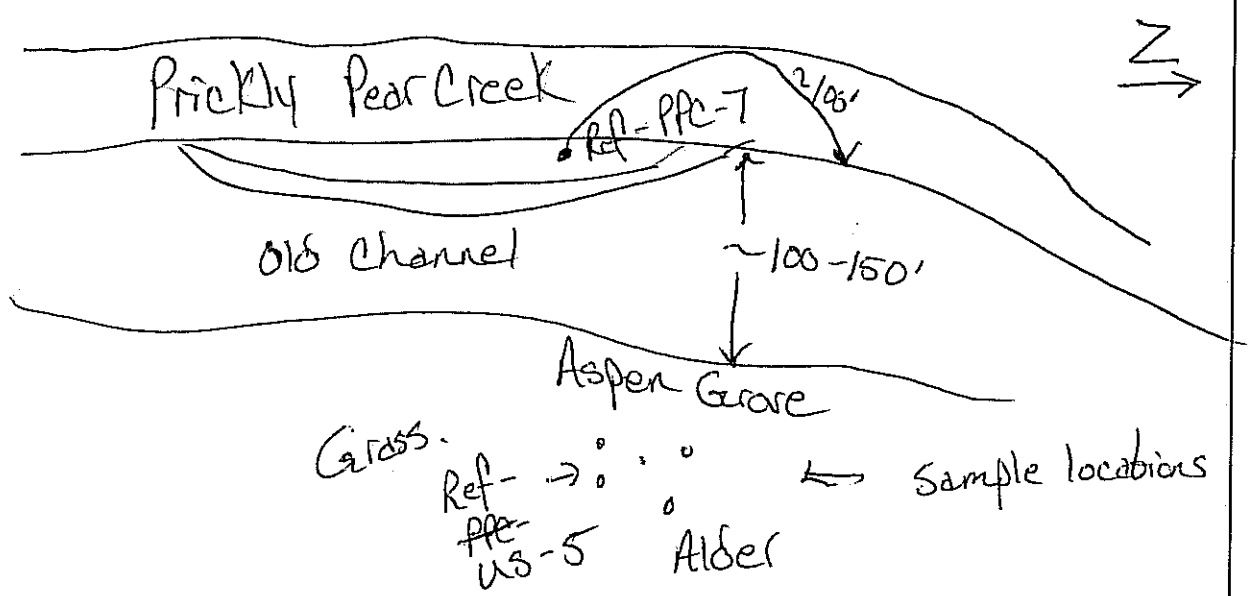
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/29/10
Weather:	Sunny, Breezy 90°
Site Designation:	Ref-US-5
Descriptive Location:	Upland soil reference along PPC. Immediately E of Ref-PPC-7.
GPS Coordinates	
Photo Log (photo #, orientation)	1 - Looking S at site

Sample Info:	**Number**	**Time**	**Containers**
pH = 8.09 Sediment	NA		
Riparian Soil	NA		
Upland Soil	AEH-1007-~~335~~-S2 3316	1800	1 ziplock - Metals/Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Raised bench, amongst alder + aspen, maybe 8' above water in Creek birch

Other Comments: Brown silty loam + some coarse sand

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

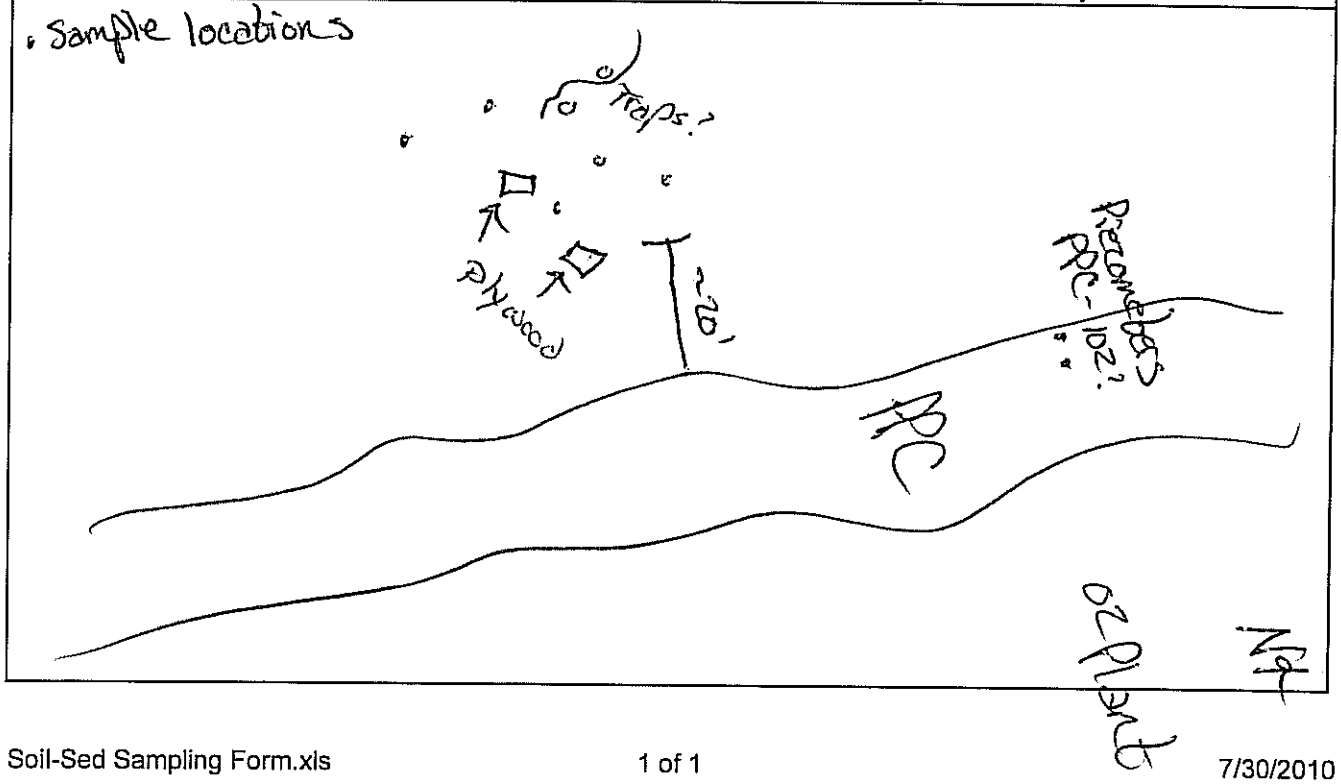
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/30/10 M. Walker, J. Clum
Weather:	Clear, Sunny 89°F, slight breeze
Site Designation:	PPC-RZ-5
Descriptive Location:	On left bank (looking downstream) of PPC, S of PPC-102 + OZ Plant (on opposite bank)
GPS Coordinates	
Photo Log (photo #, orientation)	1 - S across Site, PPC on left

Sample Info:		**Number**	**Time**	**Containers**
pH = 6.79	Sediment	NA		
	Riparian Soil	AEH-1007-337-SL	1245	1 Ziplock - Chemistry
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): On left bank (looking downstream) amongst concrete rubble, slag, + willows. Plywood boards + other bottle traps within site area.

Other Comments: Brown silty sand + gravel, some gravel sized slag pieces. Few large gravel thrown out + few wood chunks. Few roots left in sample.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

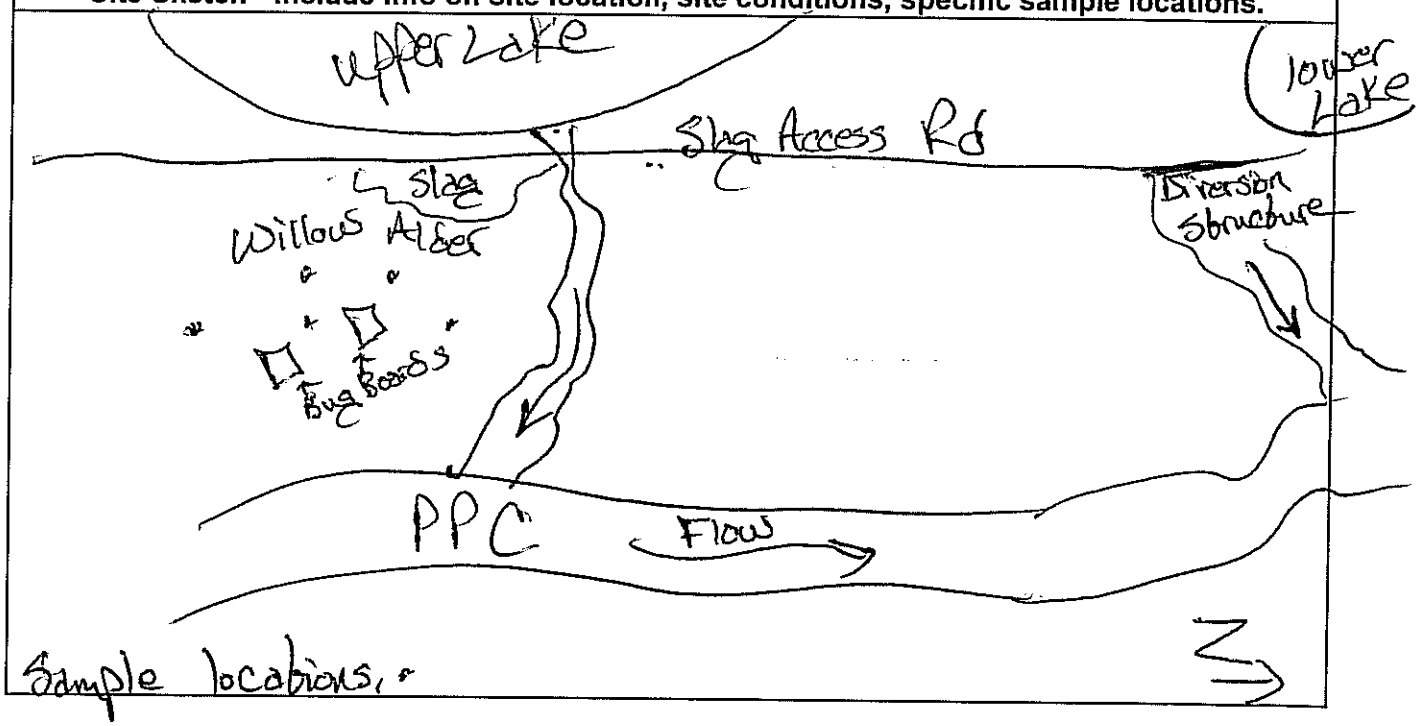
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/30/10 M. Walker, J. Clum
Weather:	Clear & Sunny & Hot 90°F no breeze
Site Designation:	PPC-RZ-4
Descriptive Location:	Left bank riparian zone of PPC (looking downstream). S of Diversion from upper Lake just beyond Tibo Park. ~1/2 way to S diversion. Access along slag road.
GPS Coordinates	
Photo Log (photo #, orientation)	~~Low~~ upper Lake flowing along left to PPC. 1- ESE from rd towards PPC across site. Small channel from

Sample Info:		**Number**	**Time**	**Containers**
pH=6.76	Sediment	NA		
	Riparian Soil	AEH-1007-338-SL	1310	1 Ziplock
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Alder, willow, grass bank ~2' above PPC. Btwn PPC & slag rd. Small channel running along N side of site.

Other Comments: Lots of organic (roots, wood, org), DK brown silty fine sand. Some cores contained coarse sand & gravel under surface layer.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/30/10 M. Walker, T. Clum
Weather:	Sunny, Clear 90°F Breezy
Site Designation:	PPC-RZ-3
Descriptive Location:	Riparian Soil sample on ~~R~~ left bank of PPC looking Downstream. Few 100 ft N of southern most concrete diversion structure.
GPS Coordinates	

Photo Log (photo #, orientation)

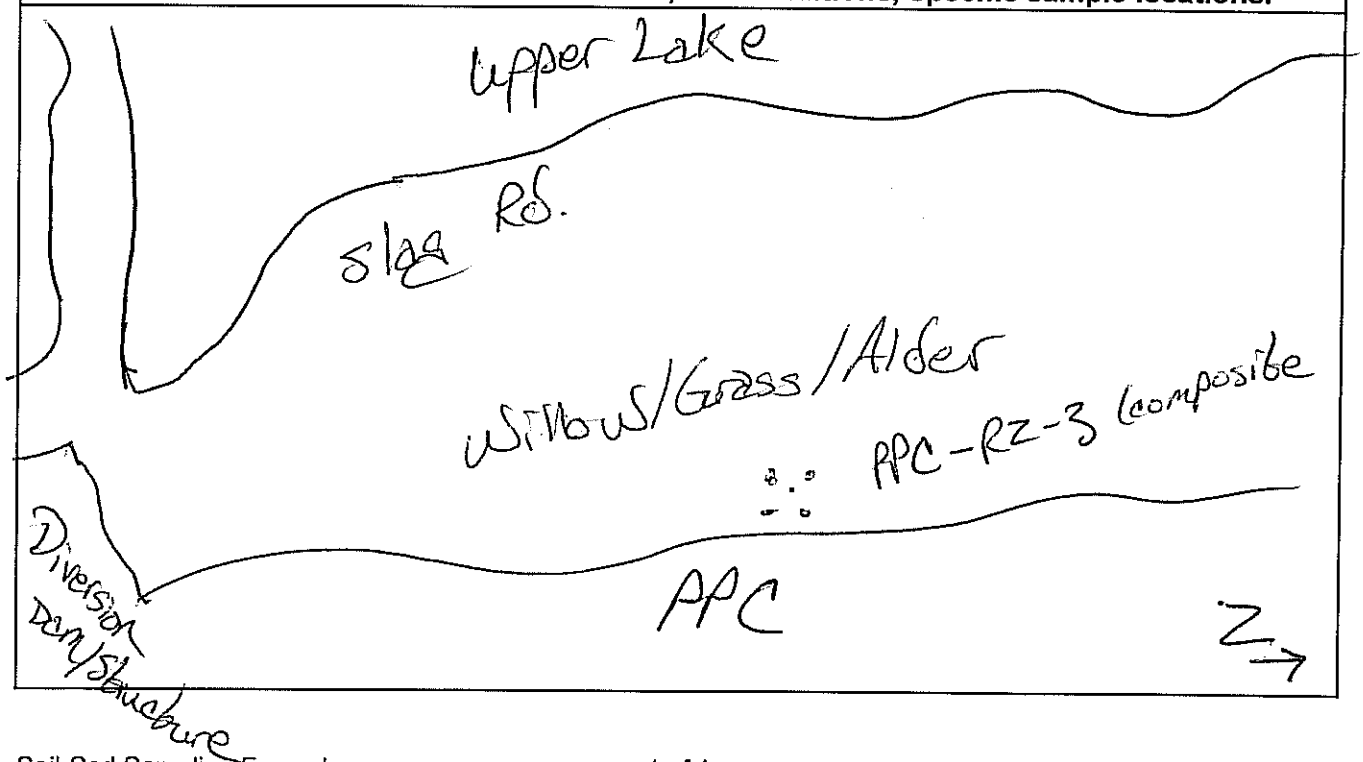
1-N, PPC on right looking downstream. (sample from lower ledge

Sample Info:		**Number**	**Time**	**Containers**
pH = 6.87	Sediment	NA		
	Riparian Soil	AEH-1007-339-SL	1430	1 Ziplock - Chemistry
	Upland Soil	NA		

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): ~~Bak~~ Bank slightly elevated ~ 2' from PPC. Grasses & Willow.

Other Comments: Dark Brown silt w/ some underlying fine-med sand.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

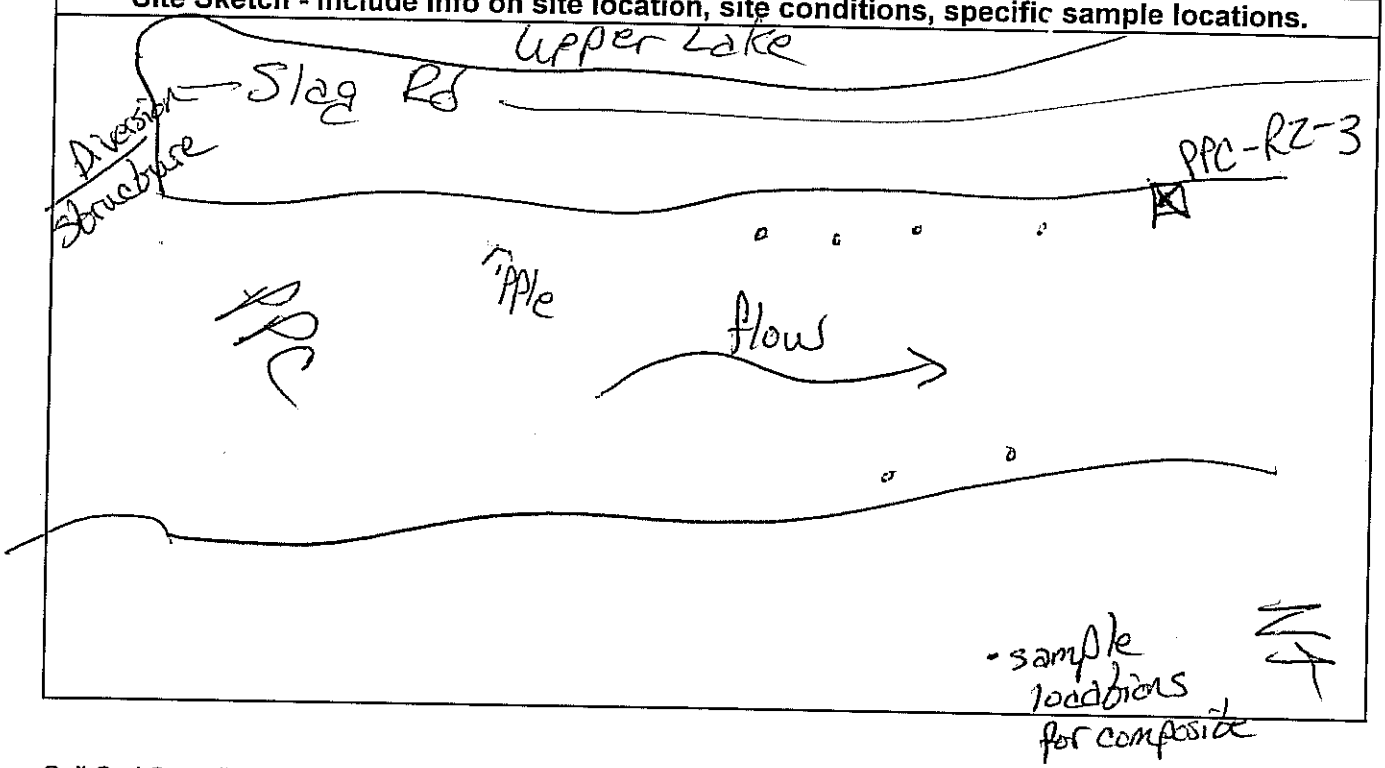
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	7/30/10 M. Walker, J. Clum
Weather: Sunny; Breeze 89°F breeze	
Site Designation:	PPC-22
Descriptive Location: Prickly Pear Creek Aquatic/Sediment Site	
GPS Coordinates	
Photo Log (photo #, orientation) 1- upstrm 2 - upstrm	

Sample Info:	**Number**	**Time**	**Containers**
pH= 7.06 Sediment	AEH-1007-340-SED	1445	1L - Chemistry
Riparian Soil	NA		2L - Sed/Tox
Upland Soil	NA		4 oz - AVS/SEM

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Gentle flow ~ 150' + (~250') below concrete Diversion at S-end of upper Lake. Good veg cover on banks, grass, Alder, willow, Dogwood

Other Comments: ~~Black~~ Dark Brown silty sand fine-med. some shiny flakes.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

BERA 2010

Project Name: East Helena ~~Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): MW, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-100~~8~~7- 341-RB
Sample Date: 7/30/10
Sample Time: 1550 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring-- other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25 — Comments
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate	Blank	for			
		Soil					

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	common	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena ~~Groundwater Monitoring~~ BERA 2010
Project Code: 10022
Sample Team Member(s): MW, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1006- 342-RB
Sample Date: 7/30/10 7
Sample Time: (military)

For Groundwater Samples

well volume formula:	$V = \frac{(TD-SWL)x(Dia.^3)}{25}$	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
		for	Sediment				

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump baller other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	common	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10 WC, JLC
Weather:	Sunny, Breezy 65°F Windy
Site Designation:	LL-25
Descriptive Location:	S side of Lower Lake (SW Corner) 3-4 ft off bank
GPS Coordinates	

Photo Log (photo #, orientation)

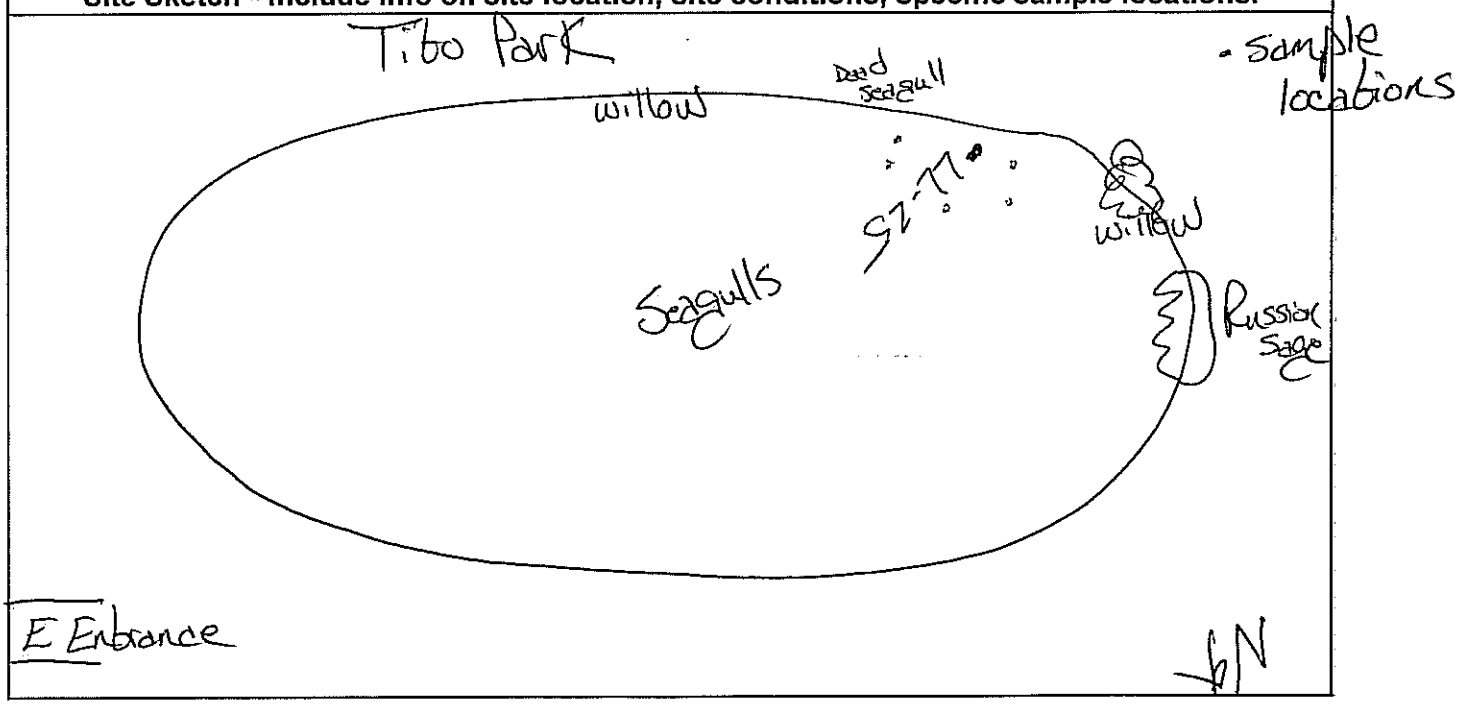
1 - looking NW across sample location (Walter Crane ab site)

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.70	Sediment	AEH-1008-343-SED	1000	1 Liter - Chemistry
	Riparian Soil	NA		1 4oz - AVS/SEM
	Upland Soil	NA		
	Water	AEH-1008-343-SW	1000	250-TRC 500-DISS ~~250~~ 8oz Glass HS

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Small movement from wind on surface. Banks mostly bare of veg. Cobble/gravel & med-coarse sand areas of substrate difficult to sample. Gray/black silty clay cores. ~~Feet~~ Dozen med gravel removed. Water Clear.

Other Comments: Some organic removed. Cores also contained some med-coarse sand.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10 WC, JLC
Weather: Partly Cloudy Breezy/Windy 70°	
Site Designation:	LL-22
Descriptive Location: SE Corner of Lower Lake	
GPS Coordinates	

Photo Log (photo #, orientation)

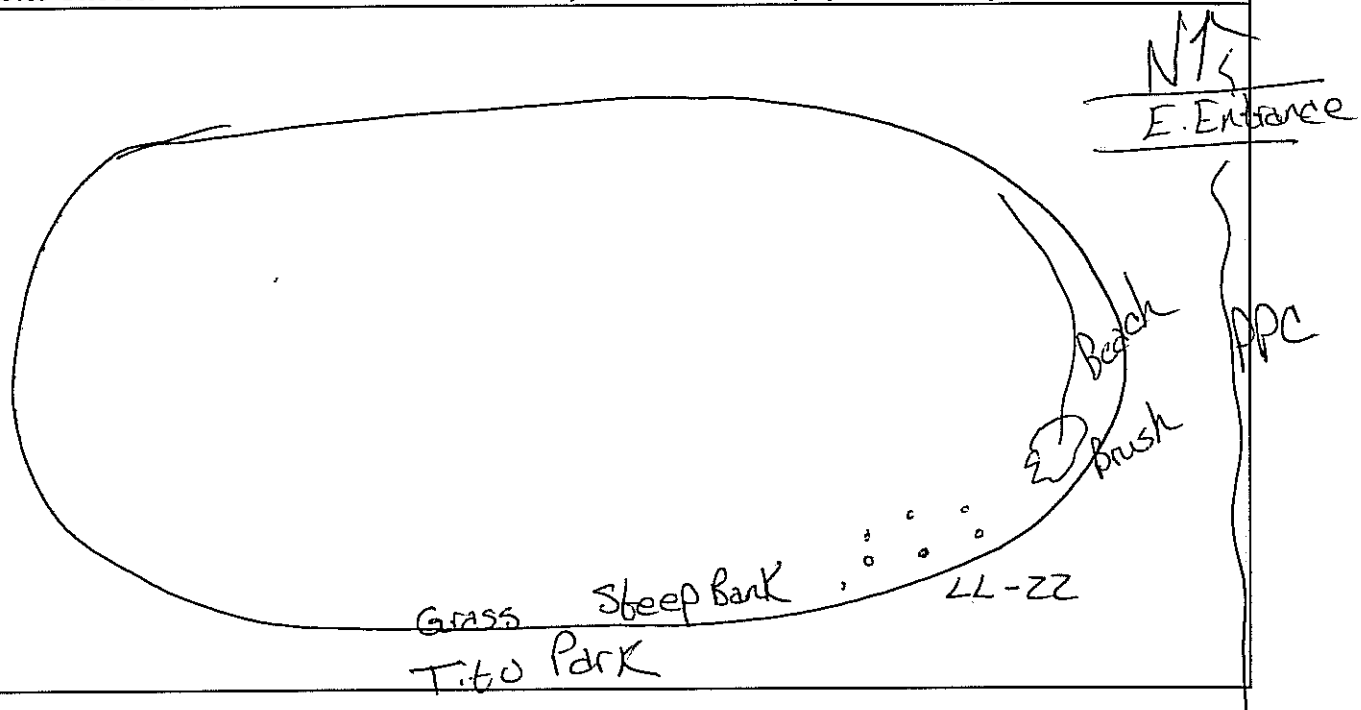
1 - looking E SE at site in approx. center (vertically) of photo

Sample Info:	**Number**	**Time**	**Containers**
pH=8.10 Sediment	AEH-1008-344-SED	1115	1 Liter - Chemistry
Riparian Soil	NA		1 4oz - AVS/SEM
Upland Soil	NA		
Water	AEH-1008-344-SDW	1115	250 - TRC 500 DISS 8oz Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): ~25' off corner of Lake.
Cores: fine - med sand, organic silt, some black clay layers
brown black
Threw several sticks + 1-2 gravel out of mix

Other Comments:
Substrate: fine-med sand + gravel

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10
Weather: Sunny, Windy 70°	
Site Designation:	LL-21
Descriptive Location: NE corner of Lower lake - Sampled off shelf 3-4' from exposed bank.	
GPS Coordinates	N 46.58169° W 111.91681° 3928' Accuracy 18 14

Photo Log (photo #, orientation)

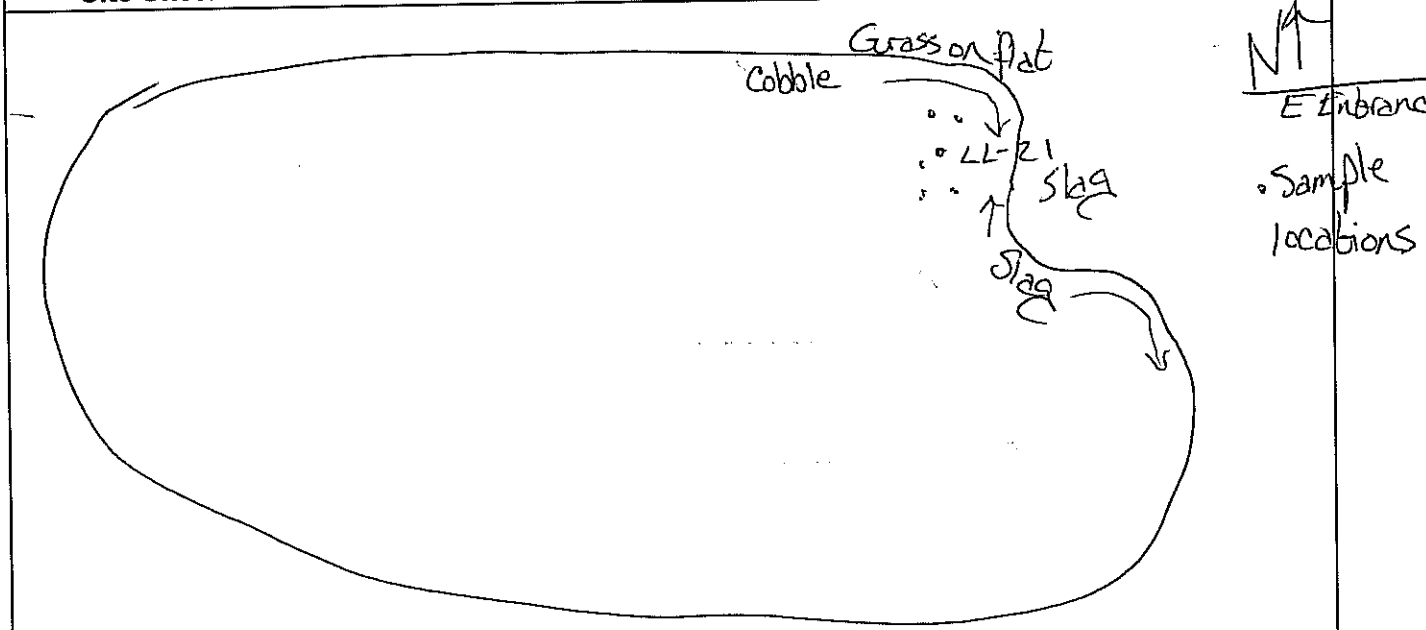
1 - looking SSE, nose of truck at approx. sample area

Sample Info:		**Number**	**Time**	**Containers**
pH ≈ 8.81	Sediment	AEH-1008-345-SED	1145	1L-Chem
	Riparian Soil	NA		14oz - AVS/SEM
	Upland Soil	NA		
	Water	AEH-1008-345-SW	1145	250-TRC 500-DISS 8oz-Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Slag along banks (bank near entrance may have built out with slag. Attempted to sample in areas w/cobble rather than slag. Sand & darker organic silty clay substrate. Petroleum sheen on water in bucket.

Other Comments: Core very variable recovery; black to white (possibly bentonite) clay layers. Also green with iron nodules, silty fine sand. Fine - med sand. Threw out several slag & gravel chunks. Not woody debris.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10
Weather: Sunny, Windy 75°	
Site Designation:	LL-24
Descriptive Location: NW Corner of lower lake.	
GPS Coordinates	N 46.58206° W 111.91845° 3934 ft Pt. 030. 21' Accurac

Photo Log (photo #, orientation)

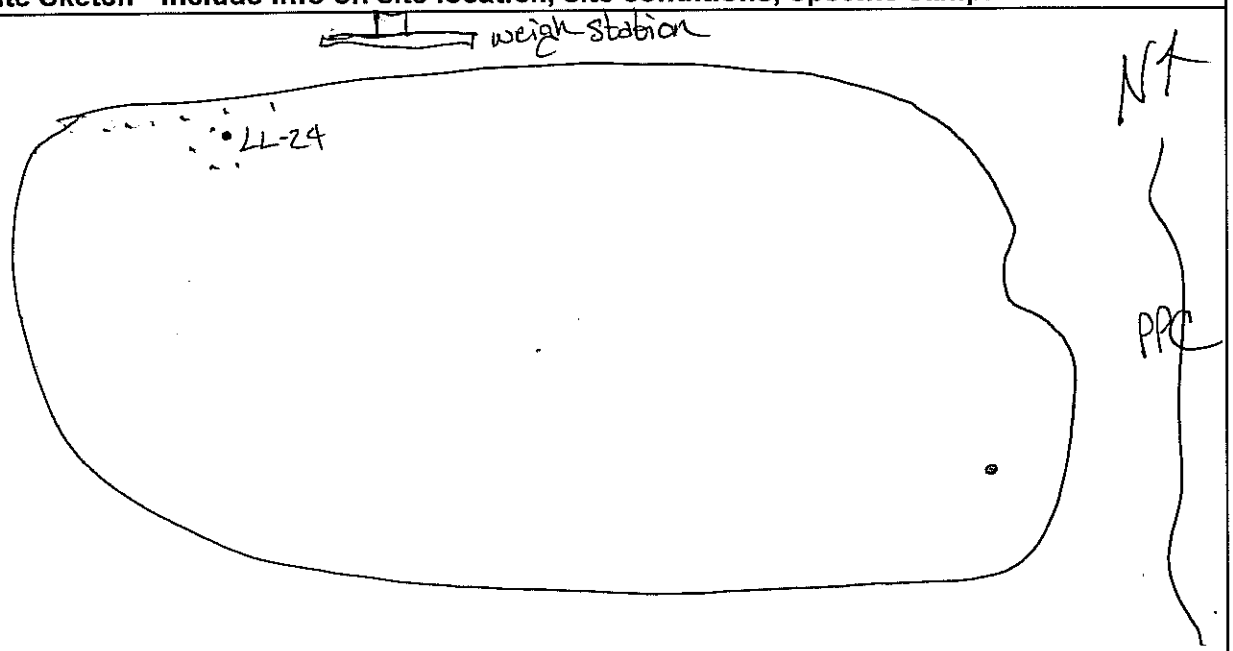
1 Photo looking W across sample area (flag pink + black stripe)

Sample Info:		**Number**	**Time**	**Containers**
pH=9.49	Sediment	AEH-1008-346-SED	1220	1L-Chem
	Riparian Soil	NA		14oz-AVS/SEM
	Upland Soil	NA		
	Water	AEH-1008-346-SW	1220	250 TRC-500 DISS 8oz Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Bank veg is sunflowers, dried shrub, few grass. Bank slope drops off fast gravel + cobble to sandy. Fairly clear water.

Other Comments: Very Difficult coring, 0% recovery on most cores. 0-2" on many. 0-6" on few. Mostly med-coarse gravel. Threw out most. Some clay cores, + a lot of fine black sandy material. Lots of fine gravel still in sample

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10
Weather: Sunny, Windy 70°	
Site Designation:	LL-23
Descriptive Location: Center of Lower Lake	
GPS Coordinates	

Photo Log (photo #, orientation)

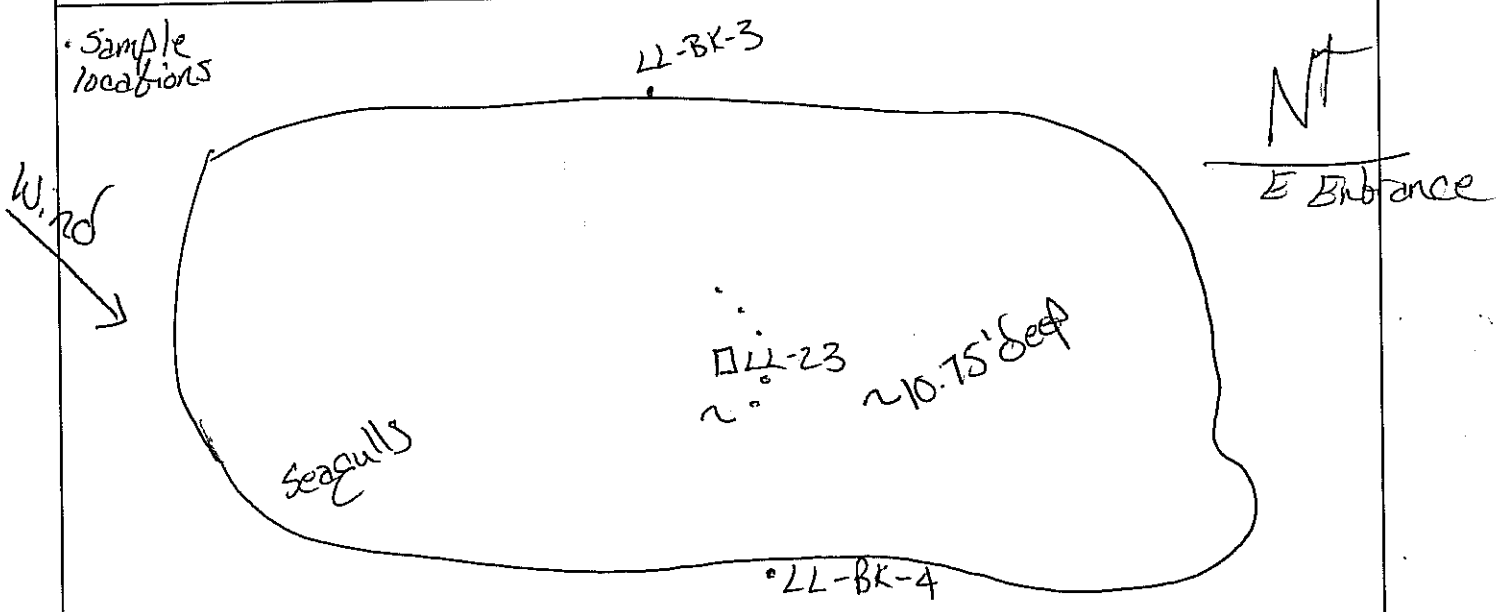
1 - looking W from E Bank, Lower Lake

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-347-SED	1330	1L-Chem 4OZ AVS/SEM
Riparian Soil	NA		
Upland Soil	NA		
Water	AEH-1008-347-SW	1330	250 TRC 500 DISS 8 oz Hg C

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Windy. Middle of lake between LL-BK-3 & LL-BK-4 flags, closer to S shore than N.

Other Comments: Black fine sand to silt. Great Recovery 6".

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/3/10
Weather: Partly Cloudy, Windy 75°	
Site Designation:	UL-21
Descriptive Location: Upper Lake & NE location	
GPS Coordinates	

Photo Log (photo #, orientation)

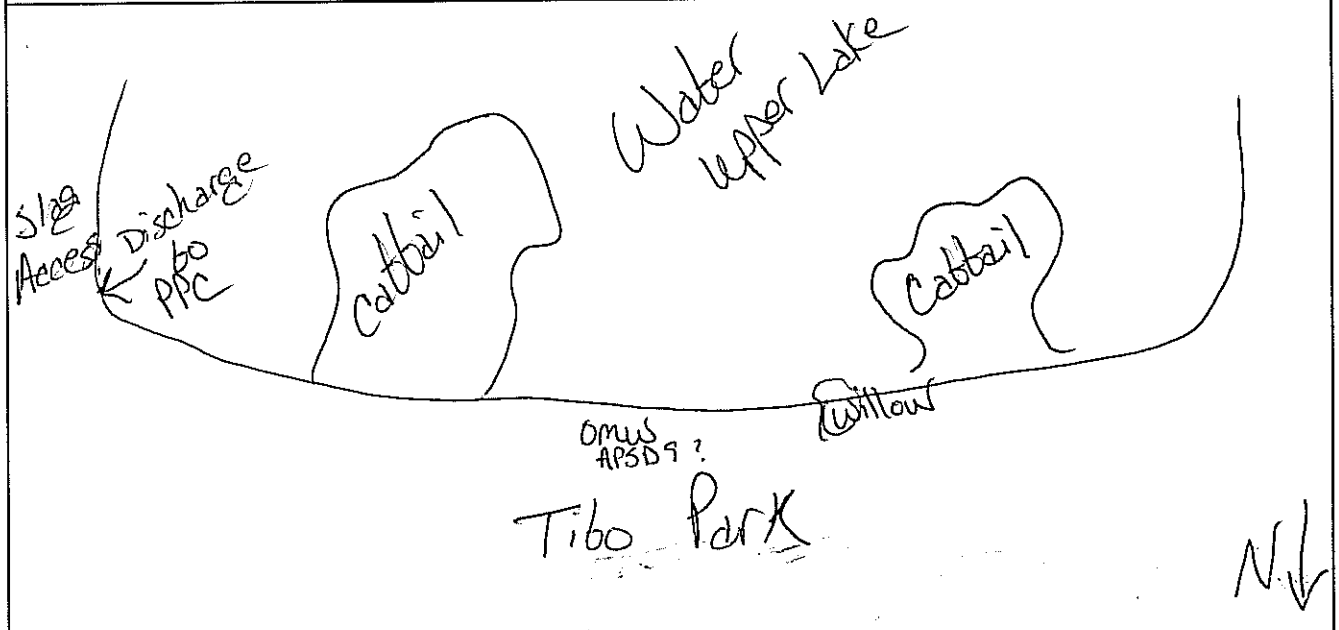
1-Twd SE from Tibo Park across site + Upper Lake

Sample Info:	**Number**	**Time**	**Containers**
pH= 7.63 Sediment	AEH-1008-348-SED	1645	1L Chem
Riparian Soil	NA		4oz AVS/SEM
Upland Soil	NA		
Water	AEH-1008-348-SW	1645	250-TRC 500-DISS 8oz H

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Cattail + willow nearby; Relatively steep bank but sparsely grass covered.

Other Comments: Many ~~Coarse~~ Cores: Fine-coarse sand + gravel Brown to red (brick). Many Black silty/organics. Threw out dozens med gravel, few wood pieces

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather: Sunny, Hazy, Cloudless 75°	
Site Designation:	UL-24
Descriptive Location: Upper lake NW corner	
GPS Coordinates	

Photo Log (photo #, orientation)

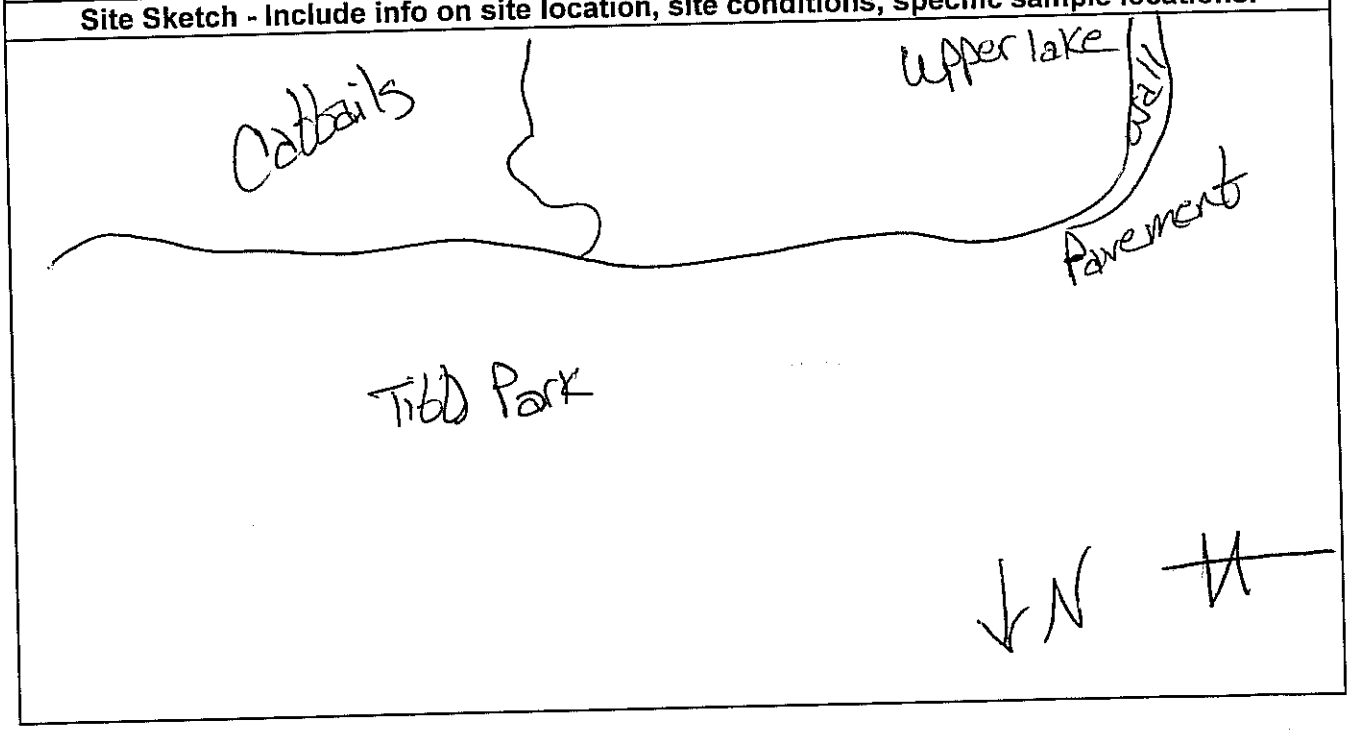
1- looking SE across Site

Sample Info:		**Number**	**Time**	**Containers**
pH=7.08	Sediment	AEH-1008-349-SED	1005	
	Riparian Soil	NA		
	Upland Soil	NA		
	Water	AEH-1008-349-SED	1005	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Calm, Cattails, floating veg.

Other Comments: Cores: Top layer of heavy organics black with intricate root network underlain by black/gray sandy silt + red coarse sand/fine gravel

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather: Sunny, Breezy 78°	
Site Designation:	UL-23
Descriptive Location: Upper Lake NW along Western Bank	
GPS Coordinates	

Photo Log (photo #, orientation)

1 - looking E across site 2 - + 3 - Same closup + further away

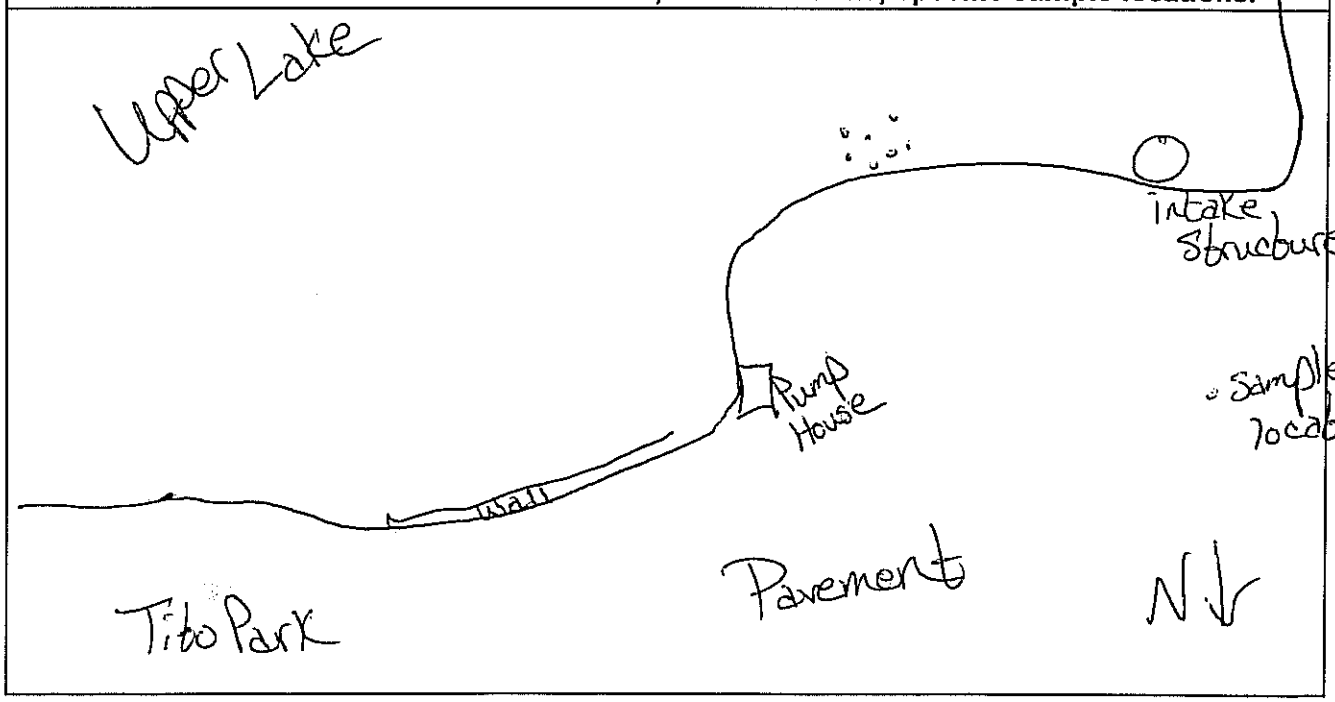
Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-350-SED	1050	
PH=6.96 Riparian Soil	NA		
Upland Soil	NA		
Water	AEH-1008-350-SW	1050	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Duplicate AEH-1008-351-SW 1100
-SED 1100

Rubble from bank extends into water. Threw out few/many med coarse gravel

Other Comments: Cores: upper 1-2 inch gray/brown sandy gravel + clay, some clay w/ high plasticity; lower portions of core all black organic silt.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

BERA 2010

Project Name: East Helena ~~Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): WC, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1008-352-RB
Sample Date: 8/5/10 8
Sample Time: 1115 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{3}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
			for Sediment				

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

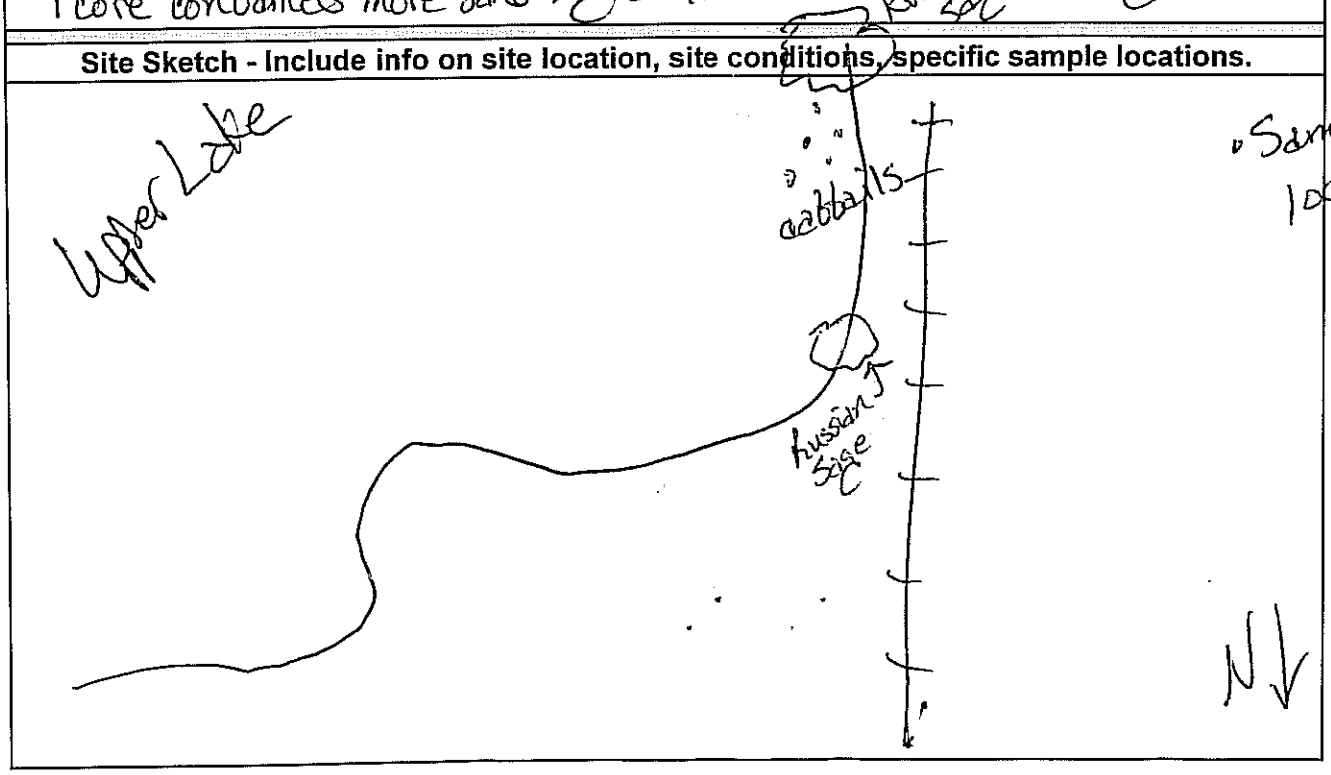
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/4/10
Weather: Sunny 80°	
Site Designation:	UL-22
Descriptive Location: Upper Lake West on West Bank	
GPS Coordinates	
Photo Log (photo #, orientation) 1-NE from RR track across site	

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.08 Sediment	AEH-1008-353-SED	1200	1 L-Chemistry
Riparian Soil	NA		4 oz ARS/SEM
Upland Soil	NA		
Water	AEH-1008-353-SW	1200	250-TRC 500-DISS 8 oz Total Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Lots of floating veg in water secured to bottom. Cattails along 4' margin from shore. Dragonflys & other skimmers abundant. Small <1" fish abundant.

Other Comments: Cores: Good Recovery – 6" – Mostly black organic fine sandy silt. 1 core contained more sand & gravel. Threw out Russian sage 2-3 gravel (med).

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10 WC, JLC
Weather: 85°, Sunny	
Site Designation:	UL-25
Descriptive Location: Upper Lake SW on West bank	
GPS Coordinates	

Photo Log (photo #, orientation)

1-S (boat at sample site) 2-SE across site

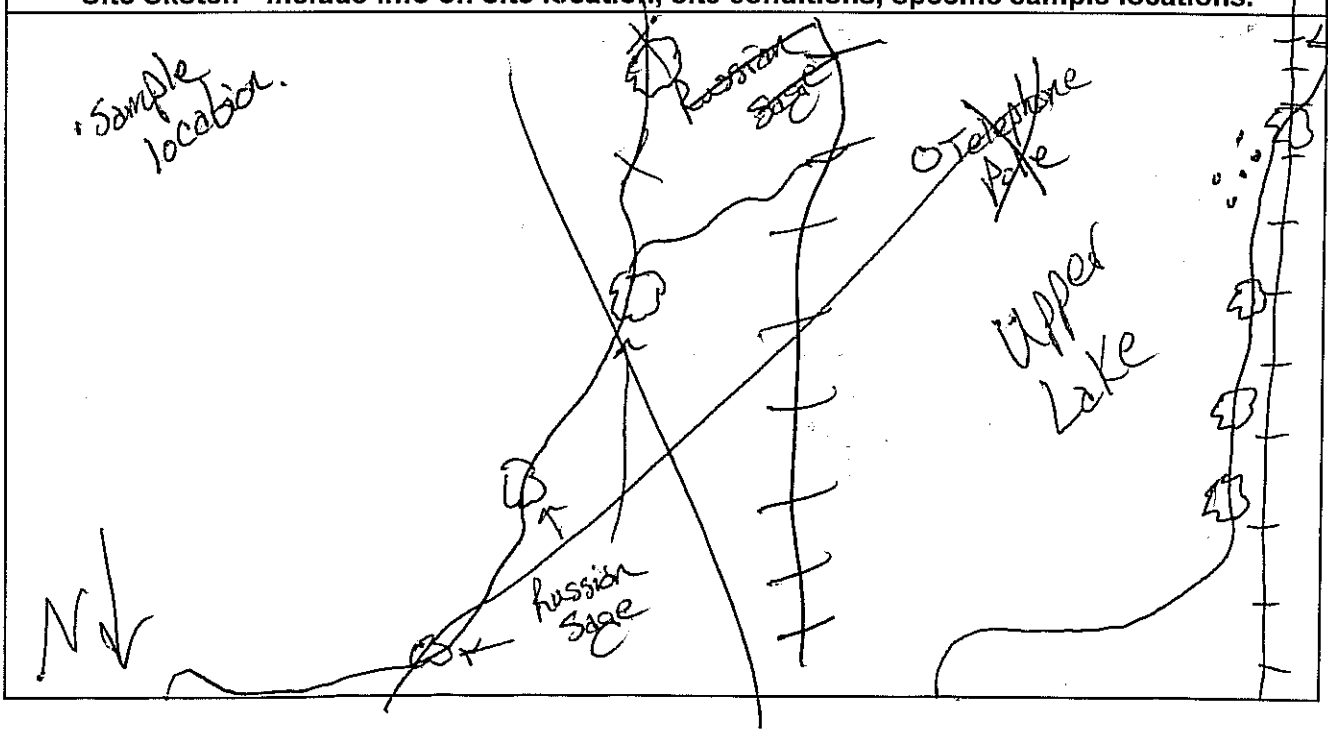
Sample Info:		**Number**	**Time**	**Containers**
pH=7.28	Sediment	AEH-1008-354-SED	1245	1 L Chemistry
	Riparian Soil	NA		~~8 oz~~ 4 oz AVS/SEM
	Upland Soil	NA		
		AEH-1008-354-SW	1245	250-TKC 500 DISS 8oz Hg To C

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Below bank of RR track; immed. N of trestle crossing lake. Cattails in 4' margin

Threw out 1/2 dozen med gravel.

Other Comments: Good Recovery. Hip Deep water with piston corer. Most Black fine sandy silt. Some Gray brown silt. Few med gravel. Lots of organics (roots). Closer to cattails + toe of bank cores contained more fine-med sand

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

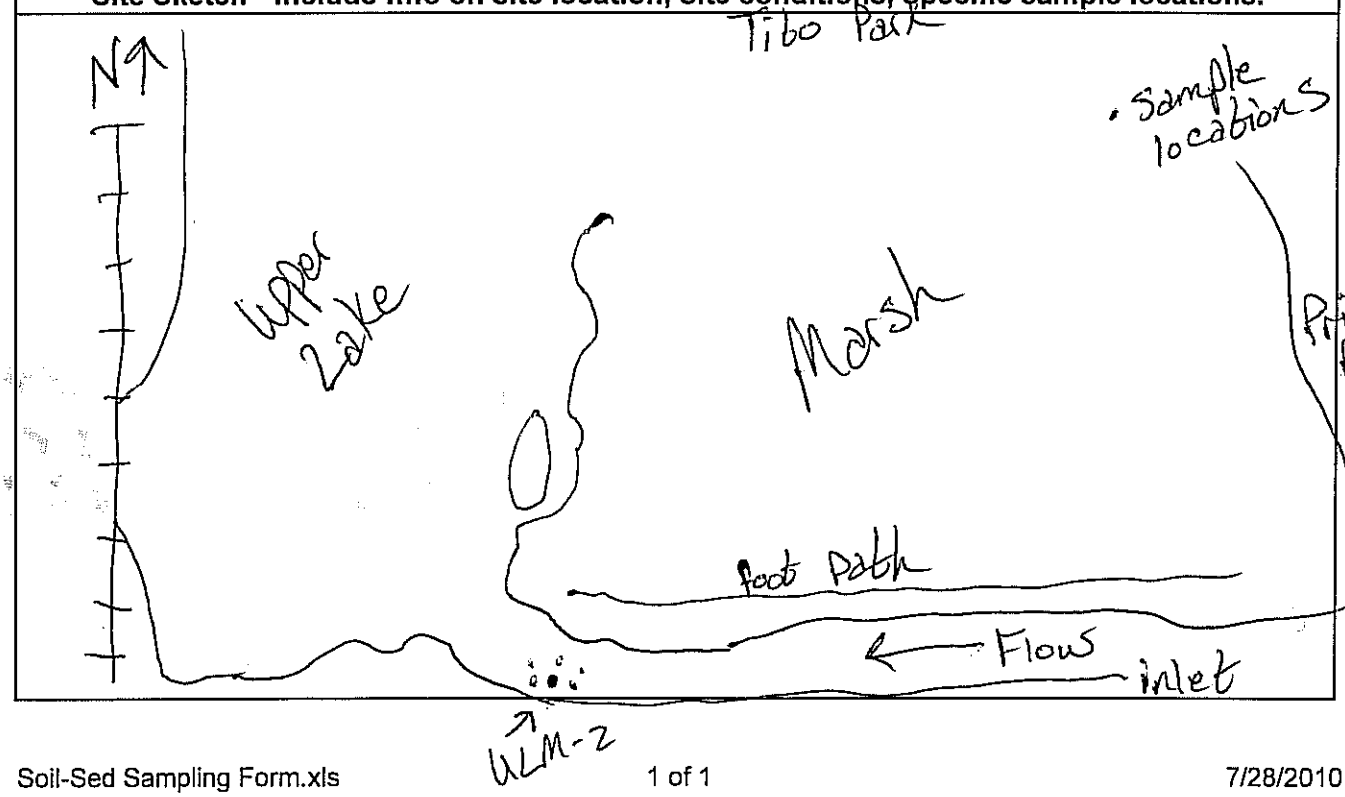
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/4/10
Weather: Sunny, Breezy 85°	
Site Designation:	ULM-2
Descriptive Location: Marsh Upper Lake; S side at Western pt of flowing channel from inlet.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-SE (upstream) towards inlet 2-NW towards Lake	

Sample Info:		**Number**	**Time**	**Containers**
pH= 6.97	Sediment	AEH-1008-355-SED	1315	1 L - Chemistry
	Riparian Soil			4 oz - AVS/SEM
	Upland Soil			
	water	AEH-1008-355-SW	1315	500-DISS 250-TRC 8 oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Flowing channel (from inlet) rimmed w/cattail on S side + willow/shrub/cattail + walking path on N side. Marsh conditions on S side w/difficult "mushy" walking. In channel sand substrate, well-sorted med brown/red sand.

Other Comments: Cores: Black silt w/ shiny flakes; no gravel, very little fine sand. layer of organic roots + such on top (upper 1-1½"). 1 core taken from center of channel all well-sorted med sand.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather: Sunny 85°	
Site Designation:	WL M3
Descriptive Location: Upper Lake Marsh SE side of cattail island across lake from RR trestle.	
GPS Coordinates	

Photo Log (photo #, orientation)

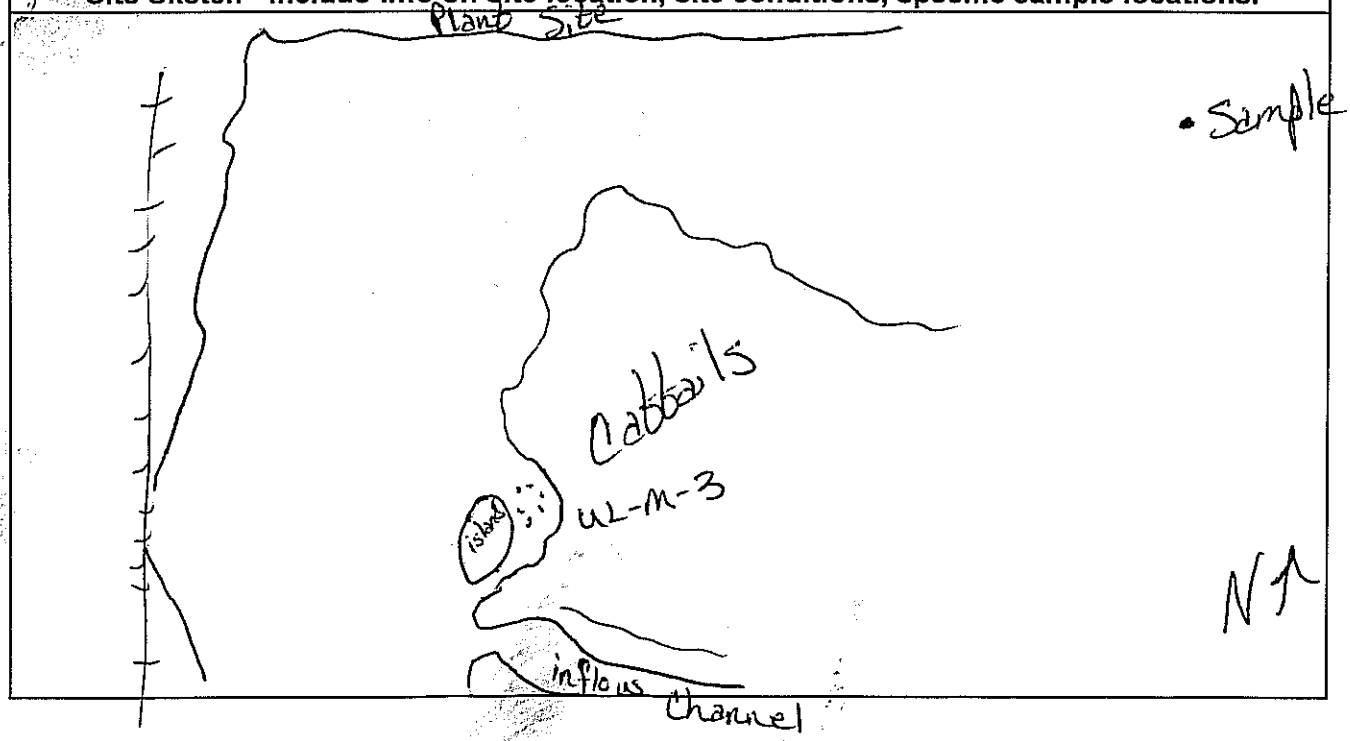
1- SW from behind island 2 NW from site towards upper lake + Plant Site

Sample Info:		**Number**	**Time**	**Containers**
pH=6.96	Sediment	AEH-1008-356-SED	1345	1 Liter Chemistry 4oz Hg/SE.
	Riparian Soil	NA		
	Upland Soil	NA		
	Water	AEH-1008-356-SW	1345	500-Diss Metals 250TRC 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Marsh channel surrounded by cattails - no apparent flow. Dragonflys. Substrate concealed by aquatic plants + green filamentous algae. Thousands of fish <1" as we've seen everywhere except in flowing channel.

Other Comments: Good Recovery w/ Piston Corer. All black silt w/ visually evident layers shown by slight color variations: black to dark gray. Also some layers of organic materials (roots, stems) as much as 4" deep but only 1/2-1" wide. No gravel, no sand

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

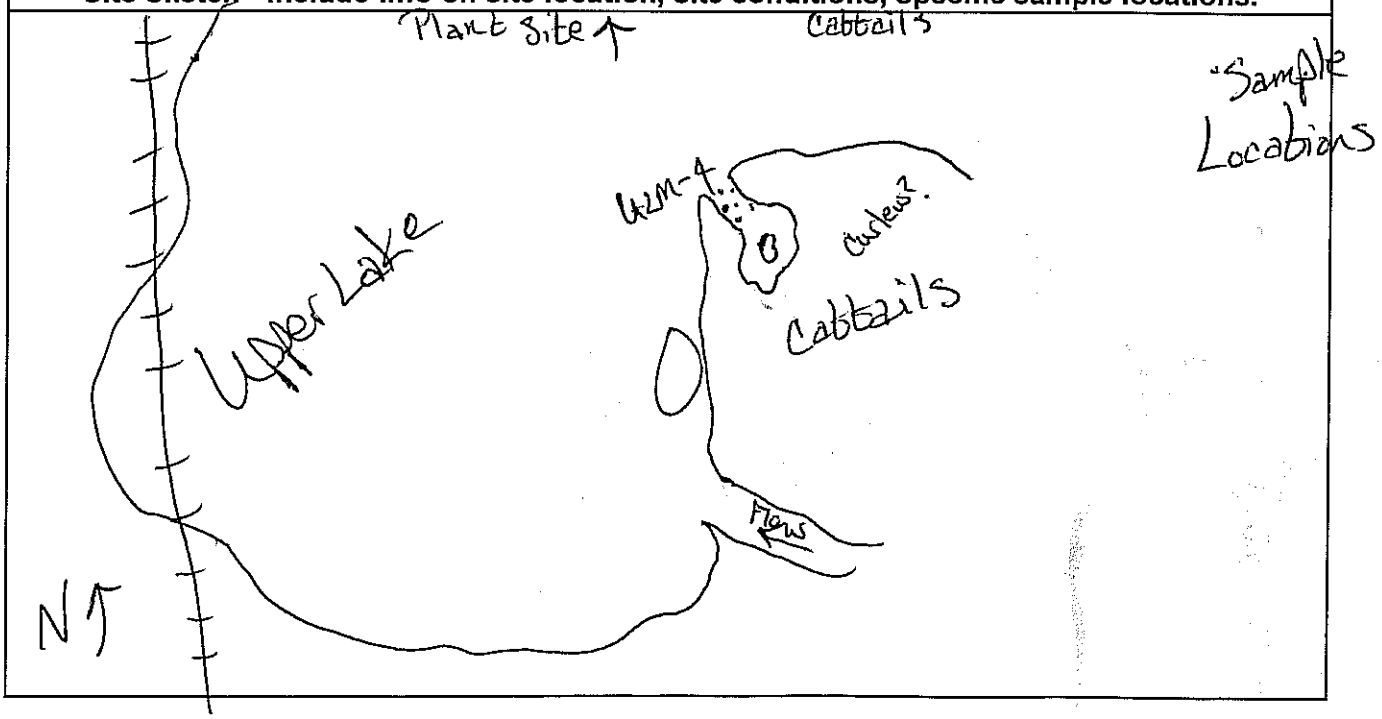
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather: Sunny 85° Slight Breeze	
Site Designation:	ULM-4
Descriptive Location: Upper Lake Marsh Due ~~West~~ East of RR Trestle (on W side of Lake) Within Cattails in Channel.	
GPS Coordinates	
Photo Log (photo #, orientation) 1-NW 2-SE at Site	

Sample Info:	**Number**	**Time**	**Containers**
pH= 6.86 Sediment	AEH-1008-357-SED	1545	1 Liter-Chemistry
Riparian Soil	NA		4-oz-AVS/SEM
Upland Soil	NA		
Water	AEH-1008-357-SW	1545	500-Diss 250-TRC/Metals 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): In a small channel w/i cattails deadends in to cul-de-sac with island. A noisy little brown curlew? is darting across water in & out of reeds. Squeaking at us. (Robin-sized) The cattails a floating islands that sink.

Other Comments: Cores: Good Recovery; Black silt w/ lots of vegetative matter. No Sand, No gravel. Chest deep water.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather: Sunny 90°	
Site Designation:	WLM-5
Descriptive Location: Upper Lake Marsh Northern (NW) Margin	
GPS Coordinates	AEH-1008-359-SED
Photo Log (photo #, orientation)	AEH-1008-359-SW

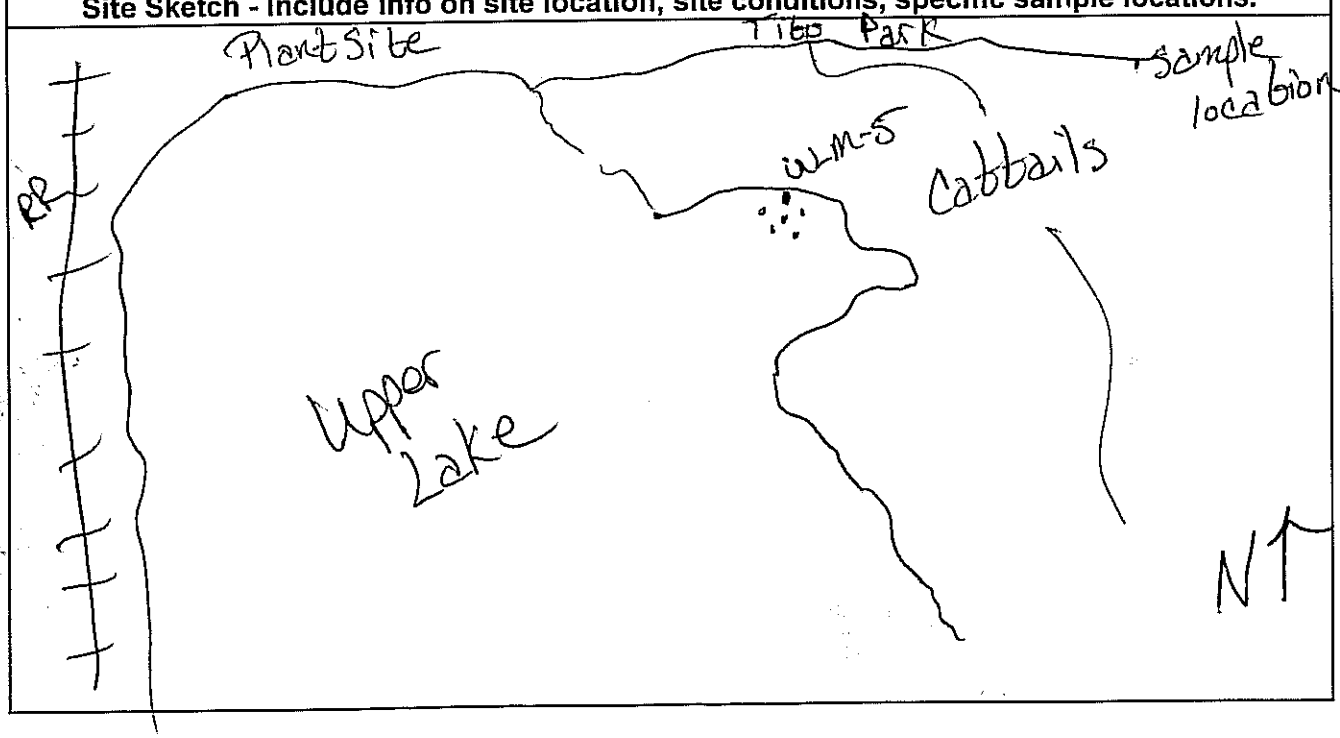
1-SW 2-NE from boat + sample site.

Sample Info:		**Number**	**Time**	**Containers**
pH=6.90	Sediment	AEH-1008-358-SED	1610	1 LT Chemistry
	Riparian Soil	NA		1 4oz AVS/SEM
	Upland Soil	NA		
	Water	AEH-1008-358-SW	1610	500-DISS 250-TRC 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Small bay in cattail island area - Lots of small fish. Aquatic vegetation covers large % age of surface of water in sampling area. Lots of bugs crawling around on reeds. None biting.

Other Comments: Good Recovery. Black silt w/ vegetative matter throughout. No sand, No Gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

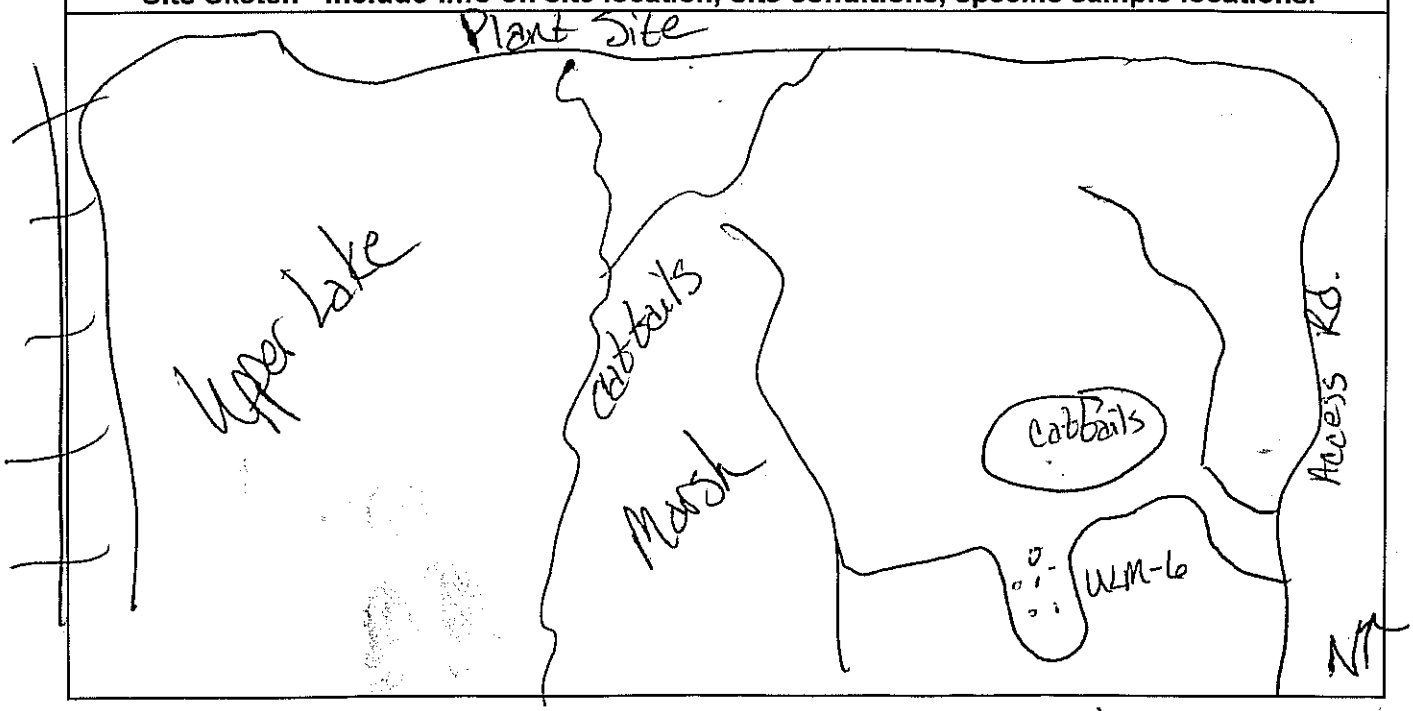
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/5/10
Weather:	Sunny 90°F
Site Designation:	WM-6
Descriptive Location:	Upper Lake Marsh North Central Site (Chemistry only)
GPS Coordinates	
Photo Log (photo #, orientation)	1-NW 2-W from site 3-SE tward site

Sample Info:		**Number**	**Time**	**Containers**
pH=6.78	Sediment	AEH-1008-3600-SED	1700	1 L - Chemistry
	Riparian Soil	NA		
	Upland Soil	NA		
	Water	AEH-1008-3600-SW	1700	500-Diss 250-TRC 8oz Hg Tot

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Lake w/ cattails & marshy substrate. Lots of aquatic veg. at surface & woody debris floating in water. Odor of decomposition? An aquatic hitchhiker in boat, worm, flat with sucker mouth attached to sed

Other Comments: Black silt w/ some shiny flakes & lots of vegetative matter in cores.

Site Sketch - Include info on site location, site conditions, specific sample locations.



• Sample locations

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

BERA 2010

Project Name: ~~East Helena Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): WC, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1006-3601-RB
Sample Date: 8/5/10 8
Sample Time: 1730 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25 — Comments
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
			for Sediment				

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	F or UF	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/5/10	**Samplers:**	Rick Lane, John Dixton
Weather: Calm, Clear, 80°-40° F.			
Site Designation:	ELM-1		
Descriptive Location: West Side of Dam, along road In wetlands			
GPS Coordinates	N. 46.57844 W. 111.91548		
Photo Log (photo #, orientation)			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-365-SED	11:45	AVS/SEM, T metals
Riparian Soil			
Upland Soil			
Surface Water	AEH-1008-365-SW	11:45	TRC, Dmet, T Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Sediment PH. 7.69. Standing Water along upper Lake Dam, Some Slag in The Soil

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.

See Map

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/5/10	**Samplers:**	Rick Lane, John Dixton
Weather: Calm, Clear, 80°-90° F.			
Site Designation:	ULM-7		
Descriptive Location: First Site along Upper Lake Diversion Road			
GPS Coordinates	N. 46.57675 W. 111.91642		
Photo Log (photo #, orientation)			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-366-SED	13:15	T metals
Riparian Soil	AEH-1008-366-SL	13:15	T metals.
Upland Soil			
Surface Water	AEH-1008-366-SW	13:15	TRL, D metals, THg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Soil Sample Taken from Earth Worm Diggings. All other Samples Taken Within 10' of this Site

Other Comments: Sediment PH 7.55

Site Sketch - Include info on site location, site conditions, specific sample locations.

See Map

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/5/10	**Samplers:**	Rick Lane, John Dayton
Weather: Calm, Clean, 80°-90° F.			
Site Designation:	HLM-9		
Descriptive Location: middle Site along Upper Lake Diversion Stream.			
GPS Coordinates	N 46.57632	W. 111.91764	
Photo Log (photo #, orientation)			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-367-SED	14:00	Tmetals
Riparian Soil			
Upland Soil			
Surface Water	AEH-1008-367-SW	14:00	TRC, DMet, T Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Samples Taken in Standing Water in the Wet Lands On South Side of Stream

Other Comments:

Sediment PH 7.67

Site Sketch - Include info on site location, site conditions, specific sample locations.

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/5/10	**Samplers:**	Rick Lane, John Dayton
Weather: Calm, Clear, 80°-90° F,			
Site Designation:	ELM-8		
Descriptive Location: South Side of Inlet Stream, above upper Lake			
GPS Coordinates	N.46.57632 W. 111.91900		
Photo Log (photo #, orientation)			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-368-SED	1440	TMetals
Riparian Soil			
Upland Soil			
Surface Water	AEH-1008-368-SW	1440	TRC, Dmet, Tfz

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Standing Water within wetlands, In Tall Willows Very Deep Sediment.

Other Comments: Sediment PH 6.93

Site Sketch - Include info on site location, site conditions, specific sample locations.

See map

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

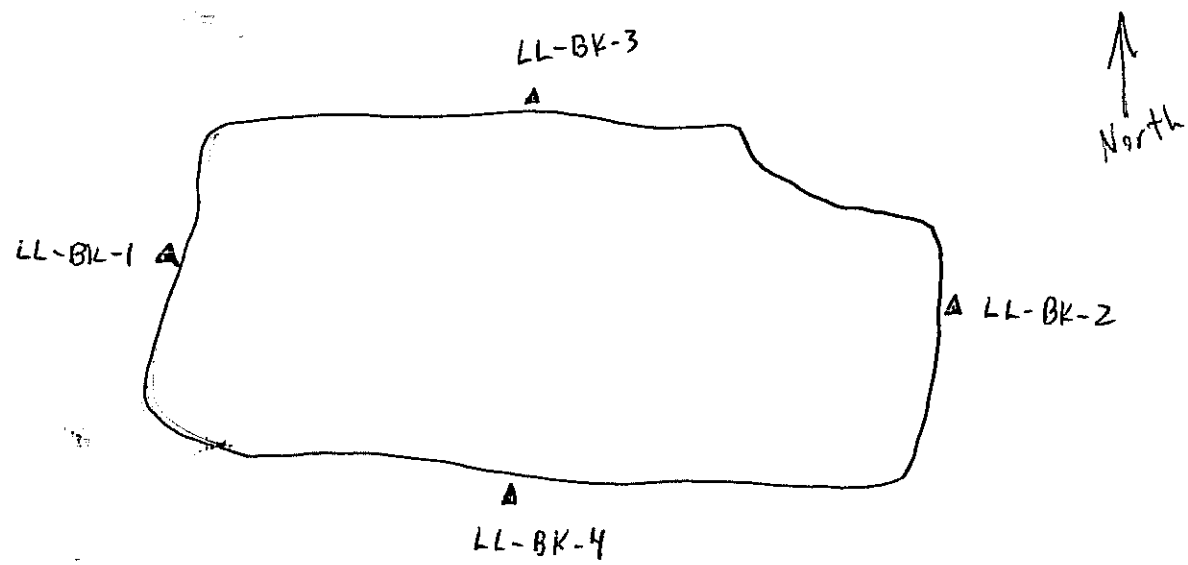
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Partly cloudy, 60°F SW breeze	
Site Designation:	LL-BK-1
Descriptive Location: Lower Lake bank, west shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 139	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1008-369-SL	1100	1 ziploc
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Undisturbed Lower Lake bank, grass cover

Other Comments: Clay soil, moist, dk. brown
saw fish in Lower Lake along shoreline

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 70°F, SW breeze	
Site Designation:	LL-BK-2
Descriptive Location: Lower Lake bank, east shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 138	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1008-370-SL	1125	1 ziploc
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Disturbed Lower Lake bank, open weedy cover

Other Comments: Silty sand, dry, gray

Site Sketch - Include info on site location, site conditions, specific sample locations.

see LL-BK-1 sketch

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 70°F, SW breeze	
Site Designation:	LL-BK-3
Descriptive Location: Lower Lake bank, north shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 137	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1008-371-SL	1145	1 ziploc
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Undisturbed Lower Lake bank, dead forb cover

Other Comments: Brown silty sand, moist

Site Sketch - Include info on site location, site conditions, specific sample locations.

See LL-BK-1 sketch

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 75° SE breeze	
Site Designation:	LL-BK-4
Descriptive Location: Lower Lake bank, south shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 136	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1008-372-SL	1200	1 ziploc
Upland Soil			
* Field Duplicate	AEH-1008-373-SL	1215	1 ziploc

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): disturbed Lower Lake bank, few weeds / open cover

Other Comments: Lt. brown silty sand, dry

Site Sketch - Include info on site location, site conditions, specific sample locations.

See LL-BK-1 sketch

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

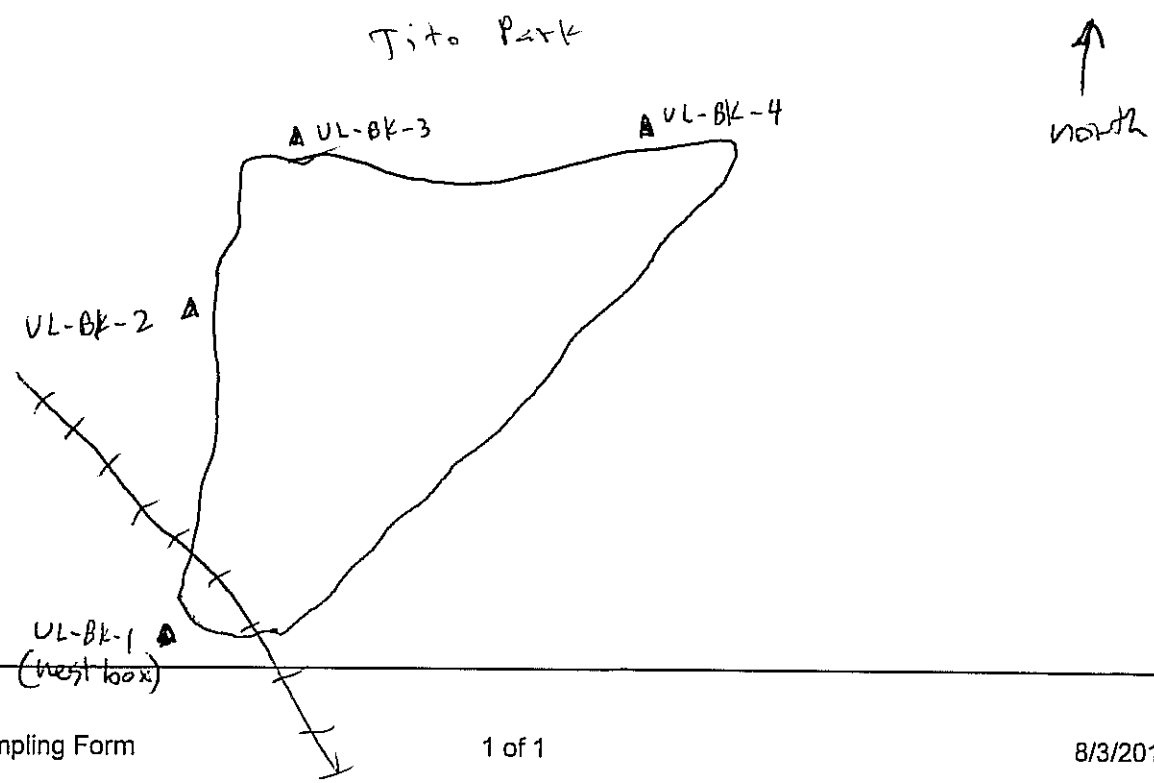
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 80°, East wind	
Site Designation:	UL-BK-1
Descriptive Location: Nest box above the SW corner of Upper Lake	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 135	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil			
Upland Soil	AEH-1008-374-SL	1245	1 ziploc

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Undisturbed upland ~ flat, grass cover

Other Comments: Fine silty clay, lt. brown, dry

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8 | 6 | 10	
Weather: Ptly cloudy, 80°, E wind	
Site Designation:	UL-BK-2
Descriptive Location: Upper Lake bank, west shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 134	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil			
Upland Soil	AEH-1008-375-SL	1305	1 ziploc

Site Conditions (stream channel/bed/bank conditions; riparian/upland slope/veg conditions; signs of fill/disturbance): Disturbed upland, top of berm, Θ vegetation

Other Comments: Lt brown silty sand, dry

Site Sketch - Include info on site location, site conditions, specific sample locations.

See UL-BK-1 sketch

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 80°, E wind	
Site Designation:	UL-BK-3
Descriptive Location: Upper Lakebank, NW shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 133	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1006-376-SL	1325	1 ziplock
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Disturbed bank/berm, sloping berm, scattered grass cover

Other Comments: Gray sand, sl. moist

Site Sketch - Include info on site location, site conditions, specific sample locations.

See UL-BK-1 sketch

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/6/10	
Weather: Ptly cloudy, 80°, East Wind	
Site Designation:	UL - BK - 4
Descriptive Location: Upper Lake bank, NE shore	
GPS Coordinates	
Photo Log (photo #, orientation) Photo 132	

Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil	AEH-1008-377-SL	1350	1 ziploc
Upland Soil			
~~SK~~ Rinsate Blank	AEH-1008-378-RB	1405	1 250 mL

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): ~~[illegible]~~ Disturbed bank, berm along road, few weeds

Other Comments: Lt brown silty clay, dry

Site Sketch - Include info on site location, site conditions, specific sample locations.

See UL-BK-1 sketch

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MW + ~~[illegible]~~ RL
Laboratory Used: Energy Labs

Site Designation: REF-PPC-8
Sample Code Number: AEH-1008-400SW
Sample Date: 8/3/10
Sample Time: 10:00 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Comments: no access/pumping

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water monitoring well domestic well adit seep spring– other:
Weather Conditions: (calm) breeze windy (no precip) rain snow (clear) p. cloudy overcast
Air Temperature: °C 60 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 74.7 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) (clear) MW moderate (slight) very

Sample Method: (describe) (grab) composite pump bailer other ~~large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	9.24	—
pH	7.65	—
SC (µmhos/cm)	225	—
Turbidity (ntu)		
H_2O Tmp. (°C)	14.3	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Cominons	**
1	250 ml	F or (UF)	HNO_3	TRC Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for Dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500 mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: RR debris in stream (spikes, rail, ballast)
Small amount organic detritus suspended in stream

Sample Team Member Signature: [illegible]

Page | of |

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11/30/2005/10:38 AM

Hydrometrics, Inc.

STANDARD OPERATING PROCEDURE
WATER SAMPLING FORM

Consulting Scientists, Engineers and Contractors

HF-FORM-430

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MW + ~~SEC~~ RL
Laboratory Used: Energy Labs

Site Designation: Ref - PPC-7
Sample Code Number: AEH-1008-401SW
Sample Date: 8/3/10
Sample Time: 1045 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

				Comments
well volume formula:	V = (TD-SWL)x(Dia.^{2}) / 25			
TD (ft):				
SWL (ft):				no access/pumping
Casing Diameter (I.D.")				
Water Volume (V) (gal):				
x 3=(gal.)				
Actual Vol. Removed (gal.)				
Water Level Recovery:	slow	moderate	rapid	

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)

Site Type: DRY (surface water) process water monitoring well domestic well adit seep spring other:

Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast

Air Temperature: °C 60° F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate

Other Flow or Description:

Flow: gpm 81.3 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear (slight) moderate very

Sample Method: (grab) composite pump bailer other (describe)

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.63	—
pH	7.74	—
SC (µmhos/cm)	2360	—
Turbidity (ntu)		
H_2O Tmp. (°C)	14.7	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Conventions	**
1	250 ml	F or (UF)	HNO_3	TRC Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for Dissolved metals		
	ml	F or UF	to be filtered by lab		
	ml	F or UF	from 500 mL/raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: Small amount organic detritus suspended in stream

Sample Team Member Signature: [signature]

Page 1 of 1

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HF-FORM-430 (1/98)

Water Sampling Form — HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MLD + ~~JG~~ RL
Laboratory Used: Energy Labs

Site Designation: Ref - PPC-6
Sample Code Number: AEH-1008-4102SW
Sample Date: 8/30/10
Sample Time: 1130 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm (breeze) windy
(no precip) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 70 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 78.2 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate (slight) very

Sample Method: (grab) composite pump bailer other
(describe) ~~large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.80	—
pH	7.78	—
SC (µmhos/cm)	223	—
Turbidity (ntu)		
H_2O Tmp. (°C)	15.2	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Cyanides	**
1	250 ml	F or (UF)	HNO_3	TRM Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for Dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500 mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: Slightly turbid - organic debris + silty particulated

Sample Team Member Signature: [signature] Page | of |

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Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MW + JC RL
Laboratory Used: Energy Labs

Site Designation: Ref-PPC-5
Sample Code Number: AEH-1008-4035W
Sample Date: 8/3/10
Sample Time: 1200 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Comments: no access/pumping

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 75 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 60.7 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate (slight) very

Sample Method: (grab) composite pump bailer other
(describe) ~~large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.13	—
pH	7.69	—
SC (µmhos/cm)	246	—
Turbidity (ntu)		
H_2O Tmp. (°C)	14.5	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Cations	**
1	250 ml	F or (UF)	HNO_3	TDL Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500 mL/ raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature]

Page 1 of 1

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Water Sampling Form — HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MW + ~~SC~~ RL
Laboratory Used: EI

Site Designation: Ref-PPC-4
Sample Code Number: AEH-1008-405SW
Sample Date: 8/3/10
Sample Time: 1230 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #: AEH-1008-405SW
Duplicate Sample Time: 1250

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25 — Comments

TD (ft):
SWL (ft): — no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 75 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 59.0 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate (slight) very

Sample Method: (describe) (grab) composite pump bailer other
~~large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.44	—
pH	7.90	—
SC (µmhos/cm)	256	—
Turbidity (ntu)		
H_2O Tmp. (°C)	15.1	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Cyanides	**
1	250 ml	F or (UF)	HNO_3	TPL Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500 mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: DUPLICATE COLLECTED

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MW + SC RL
Laboratory Used: EL

Site Designation: Ref-PPC-3
Sample Code Number: AEH-1008-4D1605W0
Sample Date: 8/3/10
Sample Time: 1345 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

TD (ft):
SWL (ft):
Casing Diameter (I.D."):
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Comments: no access/pumping

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 80 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 63.3 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear (slight) moderate very

Sample Method: (describe) (grab) composite pump bailer other
~~Large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	6.86	—
pH	8.21	—
SC (µmhos/cm)	248	—
Turbidity (ntu)		
H_2O Tmp. (°C)	16.1	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Conventions	**
1	250 ml	F or (UF)	HNO_3	TRC Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Sample for dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: 14" trout caught by anglers just upstream of site

Sample Team Member Signature: [signature]

Page 1 of 1

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11/30/2005/10:38 AM

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MWH RL
Laboratory Used: EL

Site Designation: Ref-PPC-2
Sample Code Number: AEH-1008-407SW
Sample Date: 8/3/10
Sample Time: 1420 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal)
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 85 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 61.2 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate (slight) very

Sample Method: (grab) composite pump bailer other
(describe) ~~large peristaltic~~

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	6.76	—
pH	8.36	—
SC (µmhos/cm)	239	—
Turbidity (ntu)		
H_2O Tmp. (°C)	16.8	—
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Raw	Cannons	**
1	250 ml	F or (UF)	HNO_3	TPC Metals	
1	250 ml	F or (UF)	HCl	Tot Hg	glass
	ml	F or UF			
	ml	F or UF	** Samples for dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments: Bridge site - pump intakes in water for Jeff Co shop. Sampled upstream of pumps.

Sample Team Member Signature: [signature]

Page 1 of 1

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11/30/2005/10:38 AM

Water Sampling Form — HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: ASARCO EH
Project Code: 10022
Sample Team Member(s): MD - ~~SE~~ RL
Laboratory Used: EL

Site Designation: Ref - PPC - 1
Sample Code Number: AEH - 1068 - 408 SW
Sample Date: 8/3/10
Sample Time: 1500 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Comments: no access/pumping

Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring- other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 85 °F

For Surface Water Samples

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 59.0 cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) (clear) slight moderate very

Sample Method: (describe) (grab) composite ~~large peristaltic~~ pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	6.26	
pH	8.40	
SC (µmhos/cm)	240	
Turbidity (ntu)		
H_2O Tmp. (°C)	17.4	
Color	none	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfill.	Preservative	Parameter	Additional Notes
1	500 ml	F or (UF)	Cominous	Raw	**
1	250 ml	F or (UF)	TRC Metals	HNO_3	
1	250 ml	F or (UF)	Tot Hg	HCl	
	ml	F or UF			
	ml	F or UF	** Sample for dissolved metals		
	ml	F or UF	to be filtered by lab from		
	ml	F or UF	500 mL raw bottle		
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature]

Page 1 of 1

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11/30/2005/10:38 AM

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): JLC RL
Laboratory Used: Energy Labs

Site Designation: SG-03A (PPC-22)
Sample Code Number: AEH-1008-409-SW
Sample Date: 8/14/10
Sample Time: 1430 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 65 °F

For Groundwater Samples

	well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.56	
pH	7.55	
SC (µmhos/cm)	226	
Turbidity (ntu)		
H_2O Tmp. (°C)	16.14	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Photo - 1 upstrm 2- Dwnstrm across tape

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): RL, JLC
Laboratory Used: Energy Labs

Site Designation: SG-06 (DC-102)
Sample Code Number: AEH-1008-410-SW
Sample Date: 8/4/10
Sample Time: 1245 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 65 °F

For Groundwater Samples

well volume formula:	V = (TD-SWL)x(Dia.²) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	6.97	
pH	7.19	
SC (µmhos/cm)	224	
Turbidity (ntu)		
H_2O Tmp. (°C)	16.49	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: 20gpm measured from O² Plant Effluent w/ 5 gal bucket
1- Upstrm 2- Upstrm across tape; O² effl. pipe on left (near bridge); Channel entering on right further upstrm
Beaver Dam in channel just upstream coming in from left (looking downstrm)

Sample Team Member Signature: [signature]

Page of

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Water Sampling F ~HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): RL, JLC
Laboratory Used: Energy Labs

Site Designation: SG-07 (PPC-5)
Sample Code Number: AEH-1008-411-SW
Sample Date: 8/4/10
Sample Time: 1200 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 65 °F

For Groundwater Samples

well volume formula:	V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: LEI
Flow: gpm cfs Staff Gage: 1.08 (upstre 0.82' (upstrm REB

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.~~24~~91	
pH	7.24	
SC (µmhos/cm)	221	
Turbidity (ntu)		
H_2O Tmp. (°C)	15.63	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Photos 1- Upstrm Across Tape 2- Dwnstrm

Sample Team Member Signature: [signature] Page of

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Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, RL
Laboratory Used: Energy Labs

Site Designation: SG-08 (PPC-23)
Sample Code Number: AEH-1008-412-SW
Sample Date: 8/4/10
Sample Time: 1115 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #: AEH-1008-416-SW
Duplicate Sample Time: 1125

For Groundwater Samples

Well volume formula:	V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring-- other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 60°F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage: 1.05' (Downstream)

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.97	
pH	7.28	Same
SC (µmhos/cm)	229	
Turbidity (ntu)		
H_2O Tmp. (°C)	7.15.65	
Color	Clear	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Staff gage just downstream of site = 1.05'
Photo: 1 - Upstream 2 - Downstream 3 - Upstream Across Tape

Sample Team Member Signature: [signature]

Page of

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8/4/2010/7:46 AM

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): G Bryce J Dyton
Laboratory Used: Energy Labs

Site Designation: S6-09
Sample Code Number: AEH-1008- 41354
Sample Date: 8-4-10
Sample Time: 11:00 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

	well volume formula: $V = (TD-SWL) \times (Dia.^2) / 25$	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring- other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C = 65 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): C Bryce J Dayton
Laboratory Used: Energy Labs

Site Designation: SG-10
Sample Code Number: AEH-1008-914 SW
Sample Date: 8-4-10
Sample Time: 10:45 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

	well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 36.5 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH	8.07	
SC (µmhos/cm)	248	
Turbidity (ntu)		
H_2O Tmp. (°C)	16.0	
Color	None	
Other:	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Site located @ long term monitoring site PPC-8. COEH park on Eastern Bank

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): CoBryce J. Dayton
Laboratory Used: Energy Labs

Site Designation: S6-11
Sample Code Number: AEH-1008-415-SW
Sample Date: 8-4-10
Sample Time: 10:15 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

	well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C ~ 65 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)	—	
DO (mg/l)	8.40	
pH	7.99	
SC (µmhos/cm)	253	
Turbidity (ntu)	—	
H_2O Tmp. (°C)	16.1	
Color	None	
Other:	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Site upstream of Irrigation Diversion

Sample Team Member Signature: [signature] Page of

Hydrometrics, Inc.

STANDARD OPERATING PROCEDURE
WATER SAMPLING FORM
HF-FORM-430

Consulting Scientists, Engineers and Contractors

Project Name: East Helena
Project Code: 10022
Sample Team Member(s): R. Lane, J. Dayton
Laboratory Used: Energy Labs

Site Designation: PPC-102
Sample Code Number: AEH-1008- 417-P2
Sample Date: 8/5/10
Sample Time: 10:15 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD(ft.) _____ Pumping Rate _____ gpm
SWL (ft): 1.97'
no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal): V x 3 =(gal)
MP Description
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes **No** Photo taken: Yes **No**
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring **other:** Peizometer
Weather Conditions: **calm** breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 85 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) **clear** slight moderate very

Sample Method: (describe) **grab** composite **pump** bailer other
Peristaltic

Field Parameters

	Sample	Duplicate
ORP (mV)	—	
DO (mg/l)	2.50	
pH	7.61	
SC (µmhos/cm)	421	
Turbidity (ntu)	—	
H_2O Tmp. (°C)	17.6	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1		uF	HNO_3	TRC met	
1		uF	~~HNO_3~~ Run	D met	
1		uF	HCL	T Hg	

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

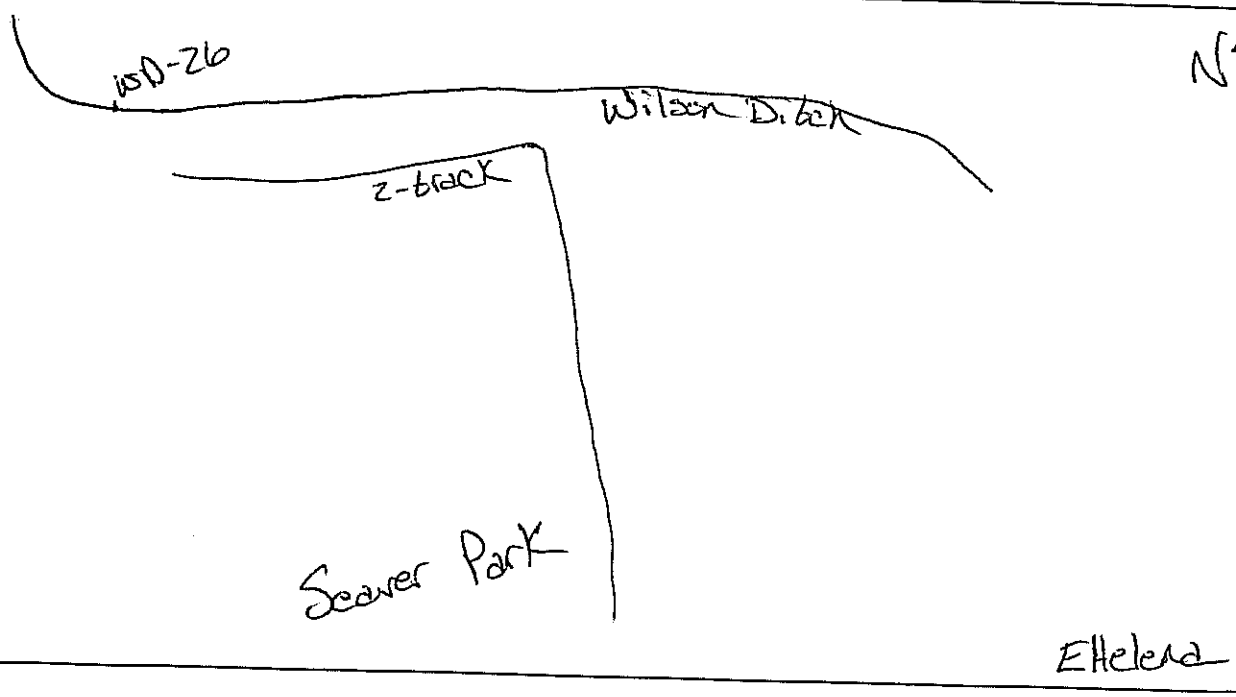
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/10/10
Weather:	Raining, 70° Partly Cloudy
Site Designation:	WD-26
Descriptive Location:	Wilson Ditch NW point, N of Seaver Park Subdivision
GPS Coordinates	
Photo Log (photo #, orientation)	1 - Along Ditch (E) 2 - W along ditch from site

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.57	Sediment	AEH-1008-417-SED	1120	1L - Chemistry
	Riparian Soil			
	Upland Soil			
	Water	AEH-1008-417-SW	1120	500 DISS, 250 TRC, 3 oz Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Irrigation ditch w/ very shallow water 1/2"-1" + considerable grass in channel. Flow is too slow to measure or not flowing. Found 0.2' wide channel funneling flow, ~0.1' deep, velocity 0.13 ft/sec.

Other Comments: Dark brown silt + sand, little gravel removed, pull vegetative material, manure in ditch. Estimate 1/2-1 gal

Site Sketch - Include info on site location, site conditions, specific sample locations.



Hydrometrics, Inc.

STANDARD OPERATING PROCEDURE
WATER SAMPLING FORM
HF-FORM-430

Consulting Scientists, Engineers and Contractors

Project Name: East Helena
Project Code: 10022
Sample Team Member(s): R. Lane, J. Dayton
Laboratory Used: Energy Labs

Site Designation: PPC-103
Sample Code Number: AEH-1008-418-P2
Sample Date: 8/5/10
Sample Time: 1045 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD(ft.) _____ Pumping Rate _____ gpm
SWL (ft): 1.66 no access/pumping
Casing Diameter (I.D.") _____
Water Volume (V) (gal): _____ V x 3 =(gal) _____
MP Description _____
Actual Vol. Removed (gal.) _____
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes **No** Photo taken: Yes **No**
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring **other** Piezometer
Weather Conditions: **calm** breeze windy
no precip rain snow
clear p. cloudy overcast
Air Temperature: °C 85 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: _____
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) **clear** moderate slight very

Sample Method: (describe) **grab** composite **pump** bailer other
Peristaltic

Field Parameters

	Sample	Duplicate
ORP (mV)	—	
DO (mg/l)	3.66	
pH	7.86	
SC (µmhos/cm)	561	
Turbidity (ntu)	—	
H_2O Tmp. (°C)	17.0	
Color	None	
Other; odor	None	

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1		4F	HNO_3	TRC met	
1		4F	Raw	D met	
1		4F	HCL	T Hg	

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date:	8/10/10
Weather: Windy, Partly Cloudy 75°	
Site Designation:	WD-25
Descriptive Location: Wilson Ditch in Lamping field near EH-133	
GPS Coordinates	

Photo Log (photo #, orientation)

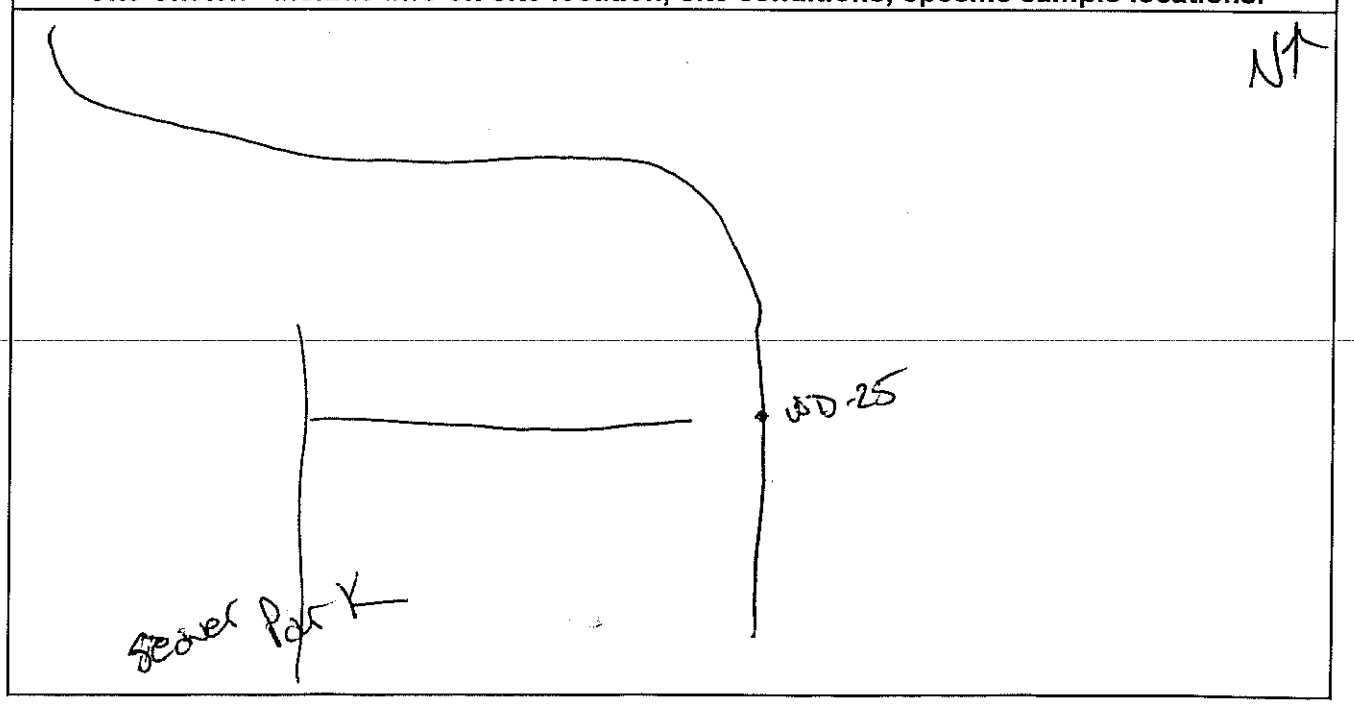
1- Ditch looking N, 2-Ditch looking S

Sample Info:	**Number**	**Time**	**Containers**
pH=7.49 Sediment	AEH-1008-418-SED	1200	1L-Chemistry (5-pb. compo
Riparian Soil			
Upland Soil	AEH-1008-418-SW	1200	500-DISS 250-TRC 8oz Hg Tot

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Fast flowing, Gravel + cobble substrate, fairly clear of vegetation. Sediment was collected over large area from small pools created by cowprint of other. No fine materials between gravel + cobble.

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

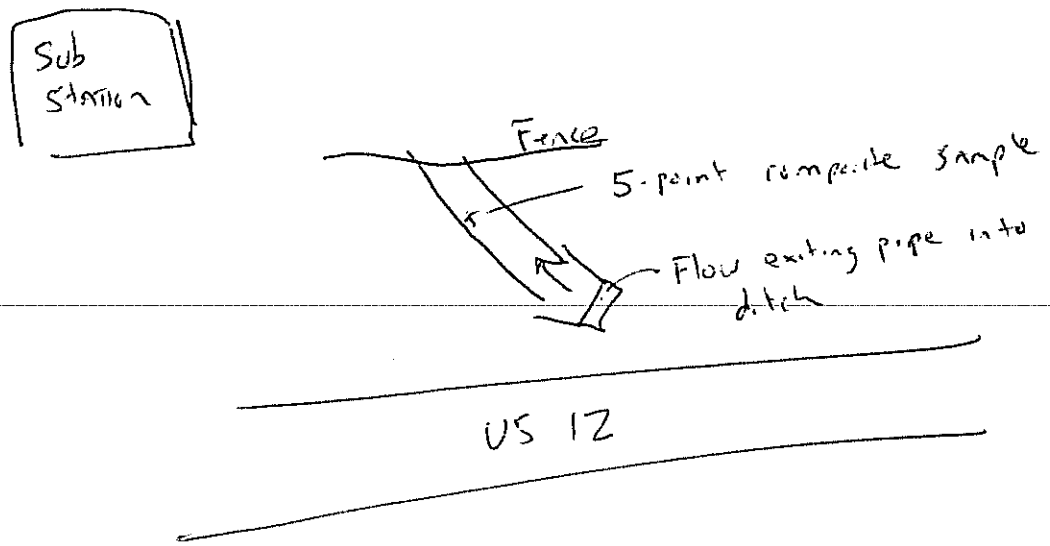
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/10/10	
Weather: P. Cloudy, Breezy, Very Lt. Rain	
Site Designation: WD-3	
Descriptive Location: Wilson Ditch exiting culvert on N. side of Highway 12 West	
GPS Coordinates	46° 35' 26.454" N 111° 56' 19.072" W
Photo Log (photo #, orientation) 1) Upstream 2) Downstream	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-419-SED	13:00	
SW Sample ~~Riparian Soil~~	AEH-1008-419-SW	13:00	
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Gravel and silt bottom with few cobbles. Banks overgrown with weeds + grass

Other Comments: Sample mainly Brown silt material

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

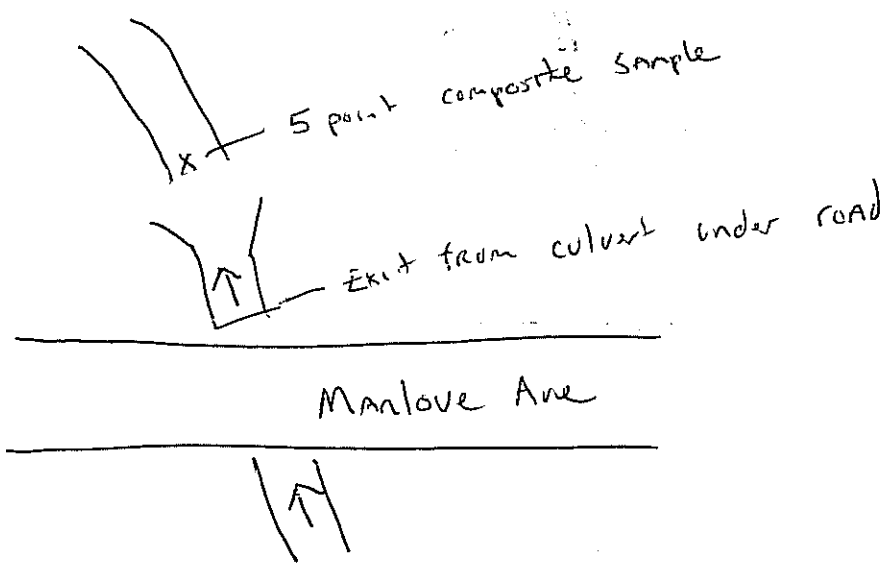
Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/10/10	
Weather: P. Cloudy, Breezy, 75°F	
Site Designation:	WD-4
Descriptive Location: Downstream of culvert under Manlove Ave	
GPS Coordinates	46° 35' 15.660" N 111° 55' 51.134" W
Photo Log (photo #, orientation) 1) Upstream 2) Downstream	

Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-420-SED	13:40	
SW Sample ~~Riparian Soil~~	AEH-1008-420-SW	13:40	
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Brown silt with some organics. Removed woody materials from sample. Bottom is silt with some cobbles

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment
Sample Date: 8/10/10	
Weather: Sunny, 75°F, Breezy	
Site Designation: WD-2	
Descriptive Location: Wilson Ditch ~~below~~ downstream of culvert under smelter Rd.	
GPS Coordinates	46° 35' 10.324" N 111° 55' 34.057" W
Photo Log (photo #, orientation) 1) Upstream 2) Downstream	

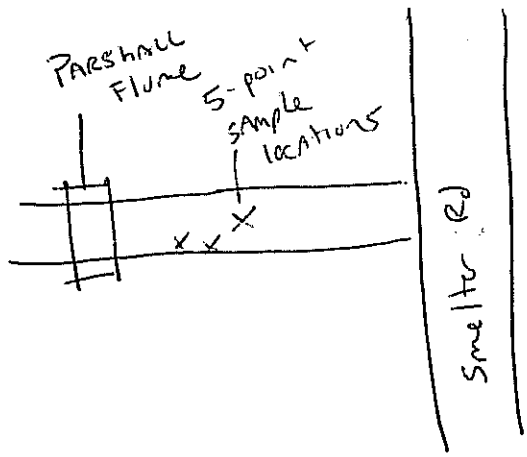
Sample Info:	**Number**	**Time**	**Containers**
Sediment	AEH-1008-421-SED	14:00	
SW Sample ~~Riparian Soil~~	AEH-1008-421-SW	14:00	
Upland Soil			

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Gravel + cobble bottom with some sand + patches of silty material

Organic rich Brown fine silt, gravel + some sand

Other Comments:

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena ~~Groundwater Monitoring~~ BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, GZ
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1006-422-RB
Sample Date: 8/10/10 8
Sample Time: 1445 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank for					
		Sediment					

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TKC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: Page of

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EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

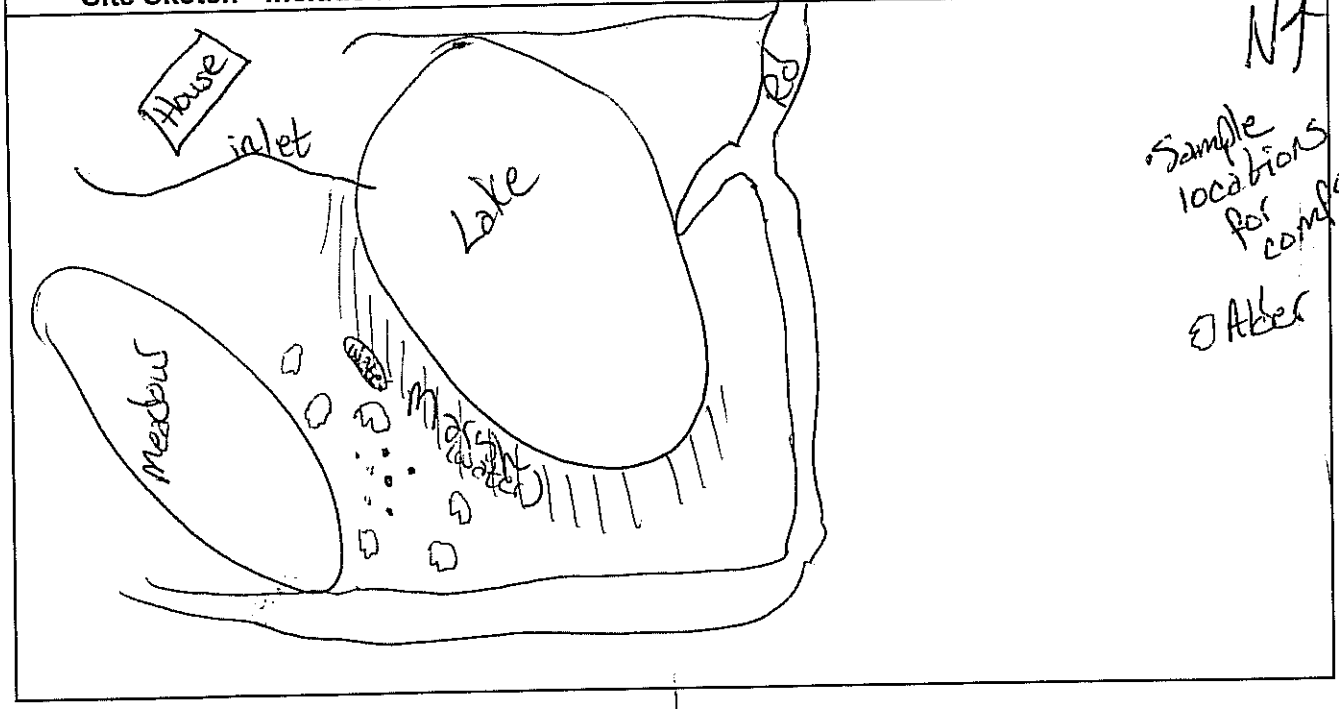
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Partly Cloudy, 70°F			
Site Designation:	WPS-3		
Descriptive Location: Walker Property soil sites surrounding lake/marsh			
GPS Coordinates			
Photo Log (photo #, orientation) 1-5 ~~X~~ across site; John Dayton 2-~~X~~ N across site			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
pH=5.95 Upland Soil	AEH-1008-423-SL	1045	1 ziplock - Metals, Physic
	AEH-1008-424-SL	1050	"

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Vegetated zone just ~~above~~ outside saturated soils. Alder, mint, etc. in abundance.
Cores: full recovery 0-6"; fine to med brown sand + brown silt w/ shiny bits + organics (roots)

Other Comments:
Threw out several med gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

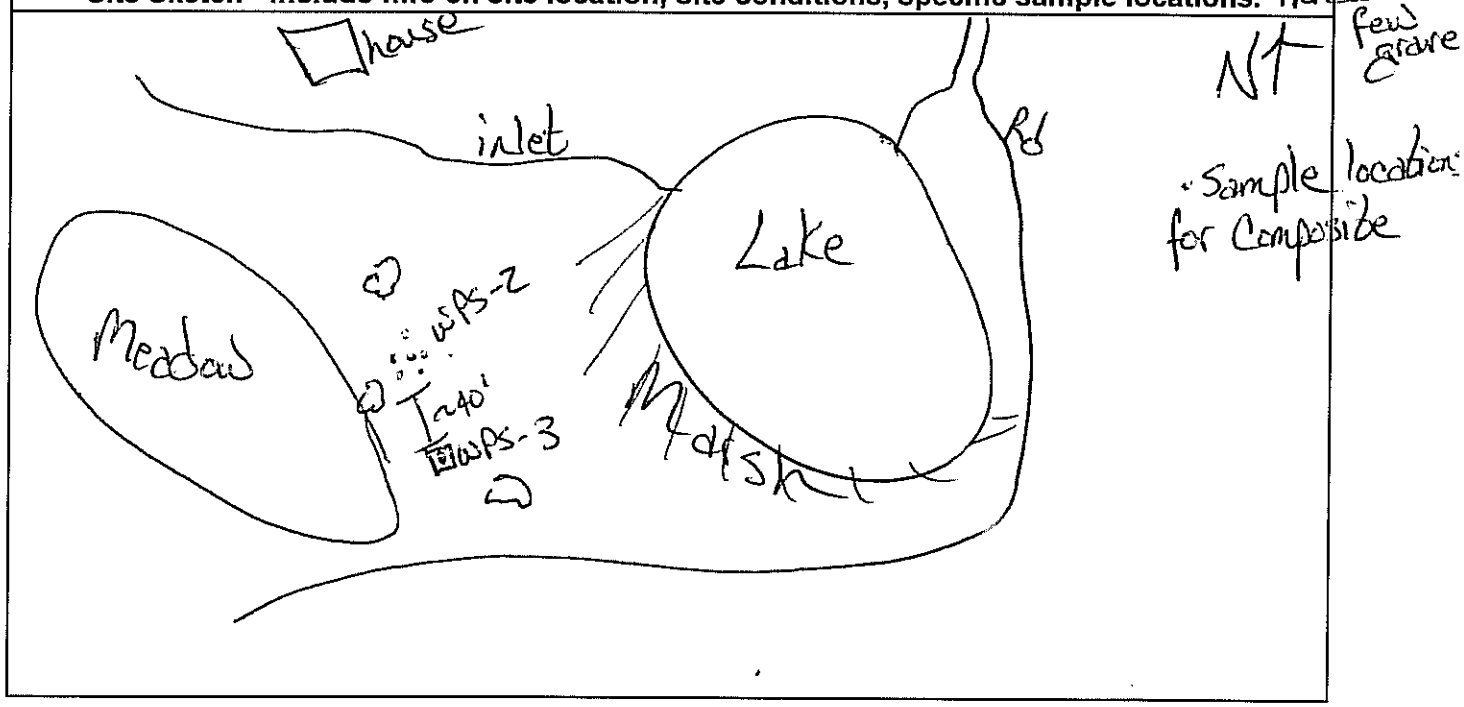
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JLC, JD
Weather: Partly Cloudy 70°			
Site Designation:	WPS-2		
Descriptive Location: Walker Property Lake + Marsh – Soil Samples "upland"			
GPS Coordinates			
Photo Log (photo #, orientation) 1-~~SE~~ across site 2-~~SW~~ N across site			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
pH = 6.04 Upland Soil	AEH-1008-425-SL	1110	Ziplock - Metals/Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Vegetative (Alder, Mint, grass, etc). zone just outside saturated soils. Found holes from previous samplers.

Other Comments:
Core: Full recovery; about 5" down standing water (heavy rain last night). Topsoil (brown silt) slightly thicker than WPS-3. Fine-med brown sand. Organ throughout few gravel

Site Sketch - Include info on site location, site conditions, specific sample locations.



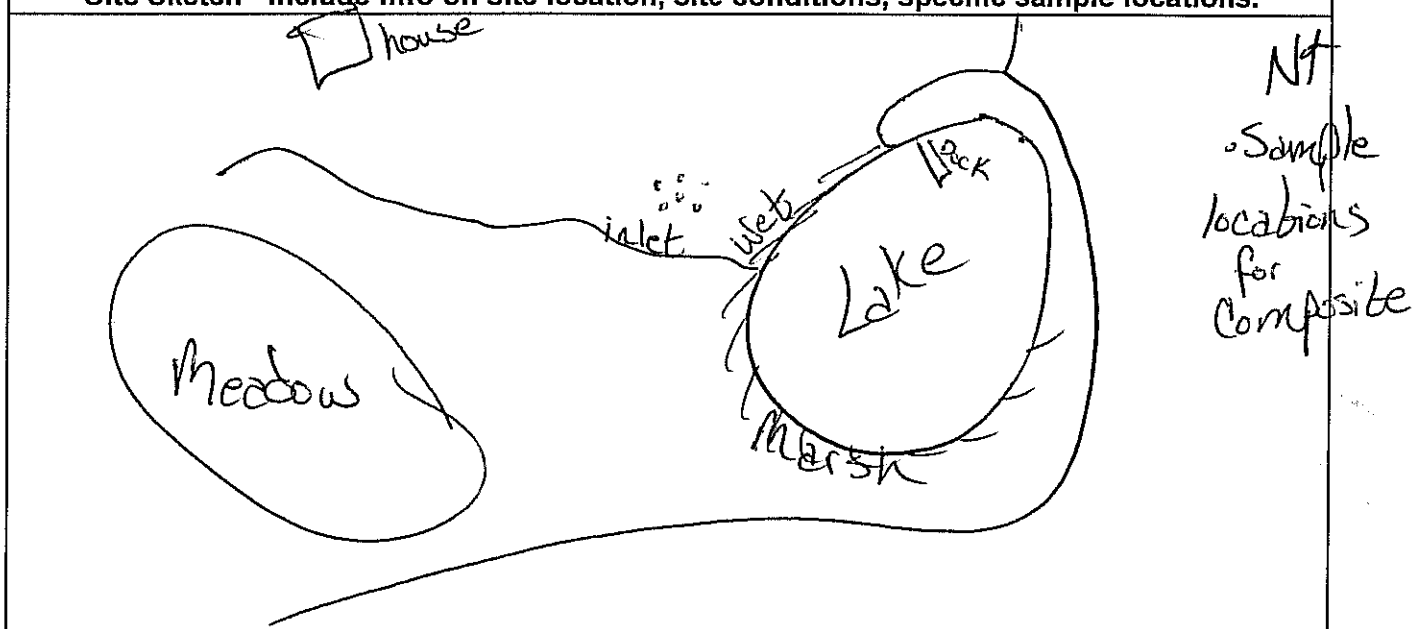
EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Partly Cloudy, 70°F			
Site Designation:	WPS-5		
Descriptive Location: Walker Property adjacent to Marsh + Lake			
GPS Coordinates			
Photo Log (photo #, orientation) 1- N; bucket on previous diggings 2-3 across site, inlet in background			
Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil			
pH=6.62 Upland Soil	AEH-1008-426-SL	1120	Ziplock - Metals, Physical
Duplicate	AEH-1008-427-SL	1130	

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Open grassy area w/ Knapweed, adjacent to saturated soils of marsh. Immediately next to inlet (on N side)
Previous sampling apparent at site.

Other Comments: Cores: Not best method, switched to trowel.
Very wet (heavy rain last night) but no standing water.
Dark brown fine sandy silt w/ some clay + lots of rootmatter. Fe staining in some cores.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena ~~Groundwater Monitoring~~ BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, JD
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1006-428-RB
Sample Date: 8/11/10 8
Sample Time: 1200 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25
Comments
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
		for Soil					

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

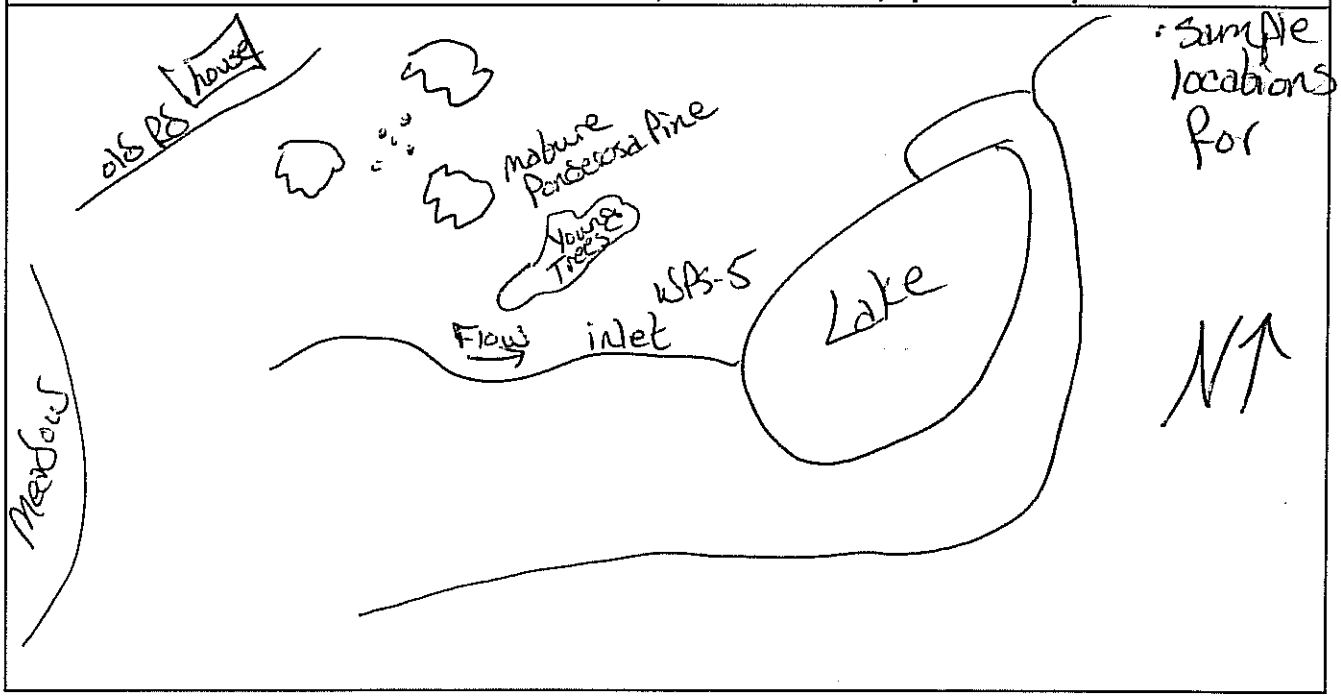
EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JLC, JD
Weather: Partly Cloudy, 75°F			
Site Designation:	WPS-1		
Descriptive Location: Walker Property Upland soil adjacent to Lake + Marsh			
GPS Coordinates			
Photo Log (photo #, orientation) 2- NW bwd house across site 1- SE bwd lake across site (John Daybor)			
Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil			
pH = 6.61 Upland Soil	AEH-1008-428-SL	1145	Ziplock - Chemistry/Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Knee high snowberry shrub surrounded by mature Ponderosa Pine. Two orange flags on trees - no sign of digging, but as on map. ("streamside Mgmt zone) Some rose shrub also.

Other Comments: Lots of roots so coring slow.
Brown fine sandy silt (Topsoil) + organics

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

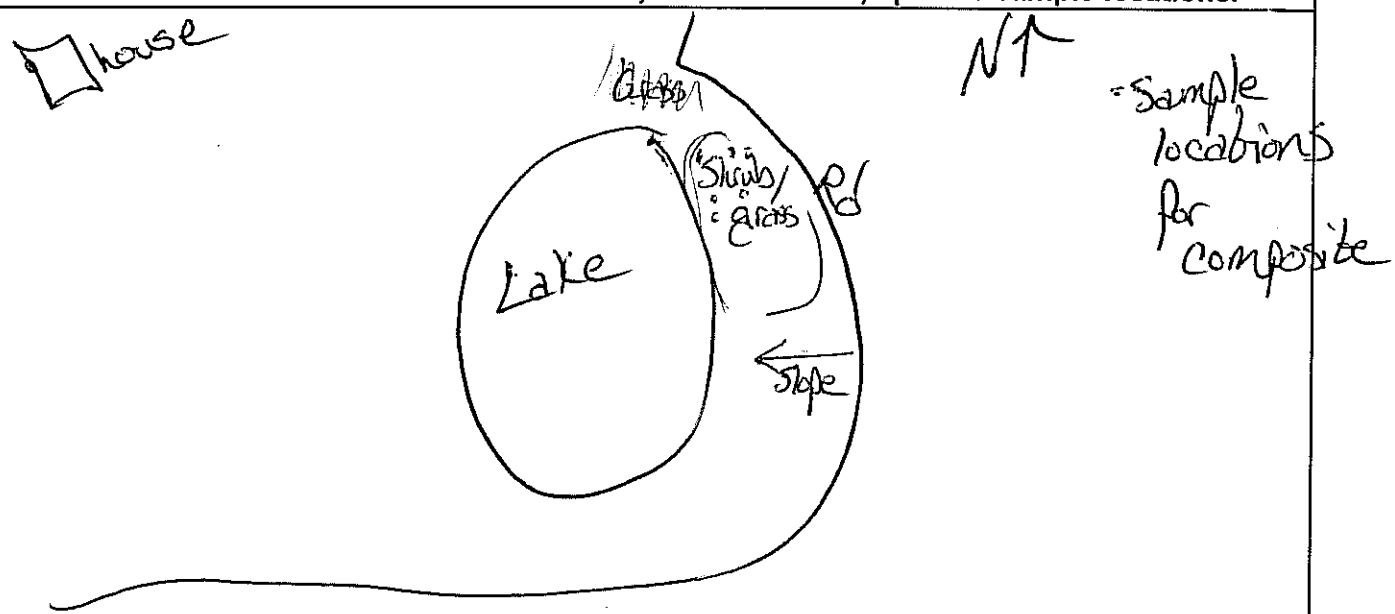
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JC
Weather: Partly Cloudy; Breezy, 75°F			
Site Designation:	WPS-4		
Descriptive Location: Walker Property - Upland soil adjacent to Lake/Marsh; NE bank of Lake just below RD.			
GPS Coordinates			
Photo Log (photo #, orientation) 1- NW; J. Dayton at site 2-NE			

Sample Info:	**Number**	**Time**	**Containers**
Sediment	NA		
Riparian Soil	NA		
pH - 4.98 Upland Soil	AEH-1008-429-SL	1215	Ziplock - Metals, Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Rose shrub, snowberry, grass adjacent to cattails + lake. Just below road across dam, along slope.

Other Comments:
Cores: Full recovery 0-6". Light brown silty fine sand w/ gravel. Threw of 2-3 med gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



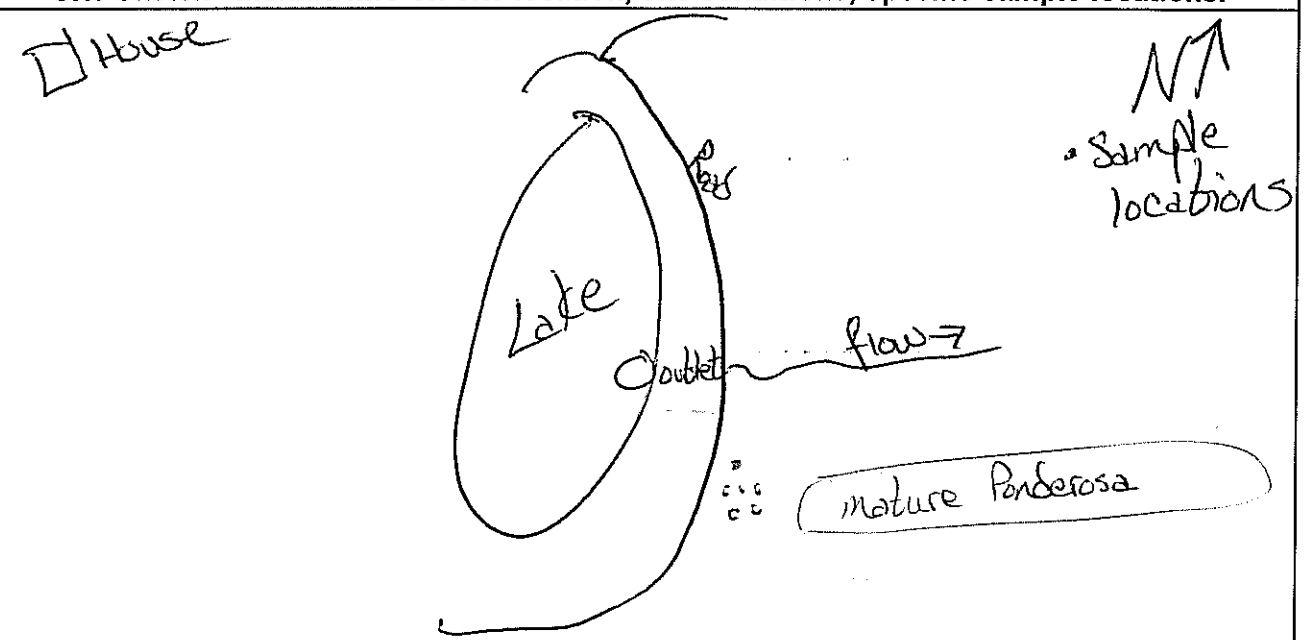
EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Partly Cloudy 75°			
Site Designation:	WPS-6		
Descriptive Location: Walker Property; Upland Soil on opposite side of dam from outlet (E side)			
GPS Coordinates			
Photo Log (photo #, orientation) 1-N across site 2-S across site			
Sample Info:	**Number**	**Time**	**Containers**
Sediment			
Riparian Soil			
pH=6.19 Upland Soil	AEH-1008-430-SL	1240	Ziplock; Metals, Physical

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): On E side of Dam on slope under Ponderosa Pine (mature) + smaller pine amongst the grasses.

Other Comments: Similar to WPS-4 - Light brown fine sandy silt w/ organics. Good recovery using piston corer.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

BERA 2010

Project Name: East Helena ~~Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): JLC, JD
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1006-431-RB
Sample Date: 8/11/10 8
Sample Time: 1250 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring-- other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
			for	Soil			

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

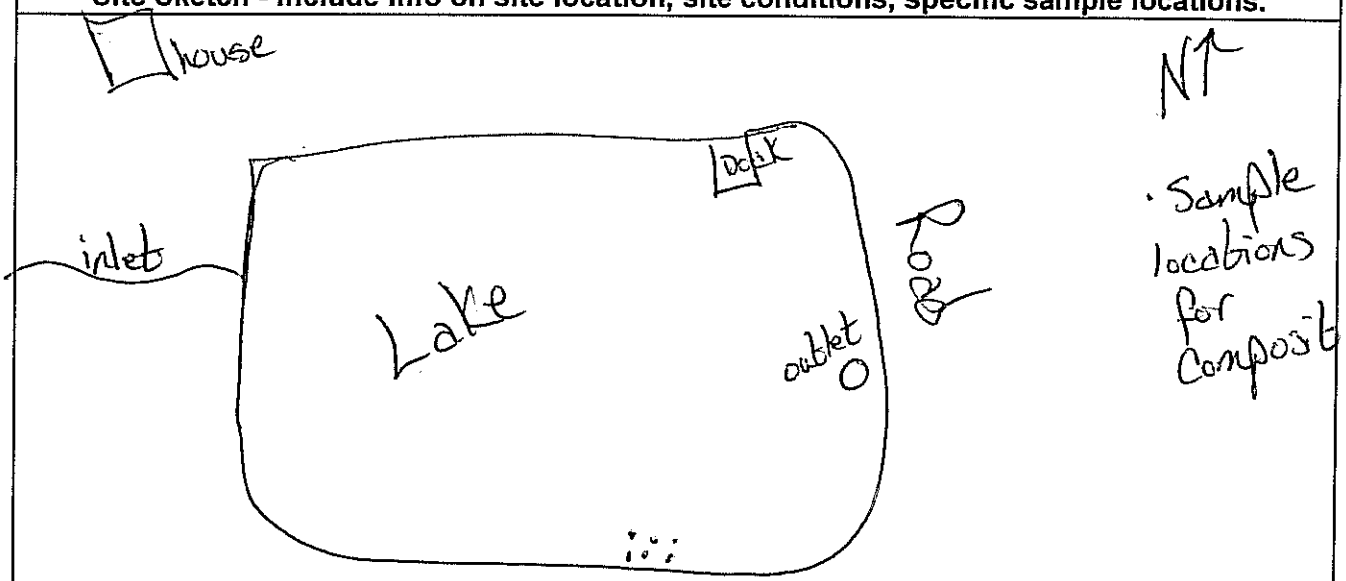
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Partly Cloudy, 80°F			
Site Designation:	WP-3		
Descriptive Location: Walker Pond			
GPS Coordinates			
Photo Log (photo #, orientation) ~~Duplicate AEH-~~ 1-NE 2-SW across site			

Sample Info:	**Number**	**Time**	**Containers**
pH=6.90 Sediment	AEH-1008-432-SED	1310	1-Chemistry
Riparian Soil	NA		4oz Ars/SEM
Upland Soil	NA		
Water	AEH-1008-432-SW	1310	500-DISS 250-TKC 8 oz Hg Tot

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): S side of Pond, somewhat steep slope with exposed tree roots. Under water slope drops off after 3'. Water slightly murky

Other Comments: Mostly good recovery w/ corer. Cores: Brown med sand 0-3" underlain by black silt. Threw out gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

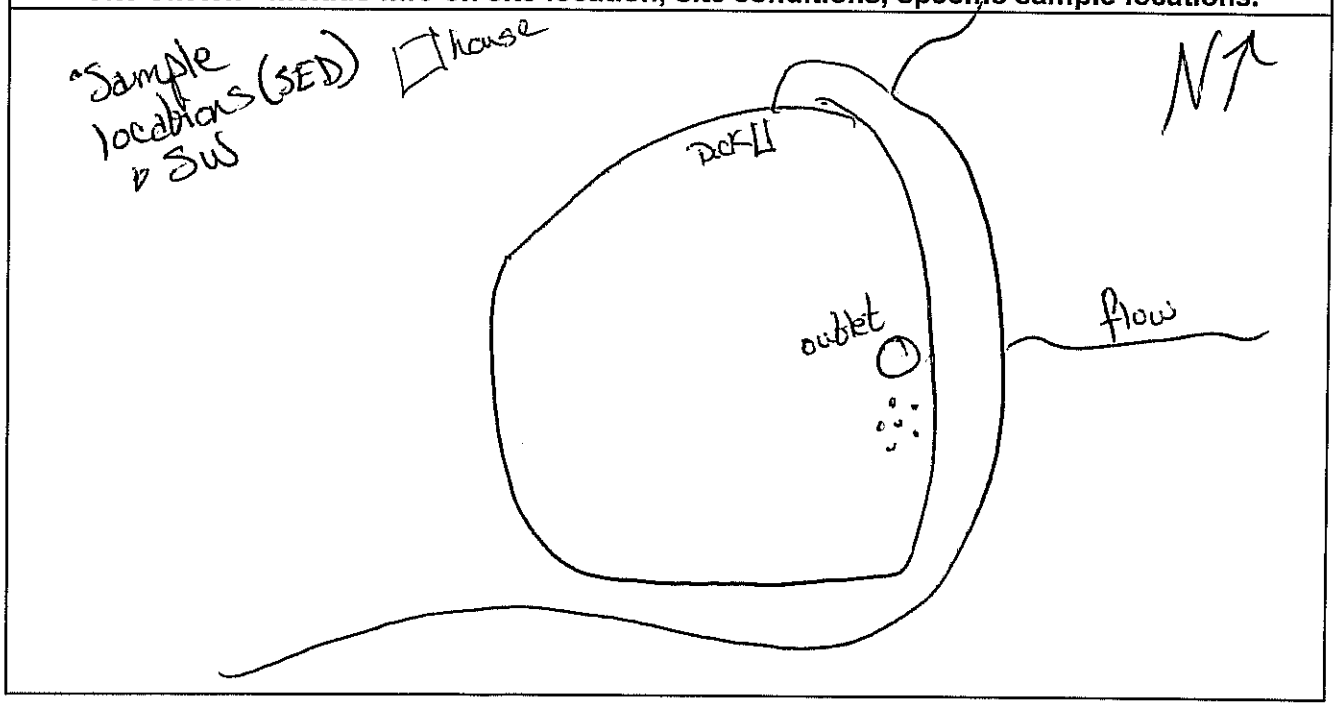
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Partly Cloudy, Breeze 80°F			
Site Designation:	WP-4		
Descriptive Location: Walker Pond; E side; S side of outlet			
GPS Coordinates			
Photo Log (photo #, orientation)			
1+2 - Twd NE from S Bank (outlet on far left)			

Sample Info:	**Number**	**Time**	**Containers**
pH = 6.86 Sediment	AEH-1008-433-SED	1335	2-Chemistry/Physical
Riparian Soil	NA		4 oz Ars/SEM
Upland Soil	NA		
Water	AEH-1008-433-SW	1335	500, 250, 8 oz Metals/Cyanide

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Next to outlet, flowing well. Grasses + open water near bank; Aquatic plants 3-4' out from bank (floating). Bank is sloped from road.

Other Comments:
Cores: Variable recovery. Gray to black silty, clayey fine-med sand w/gravel. Threw out 3-4 med gravel + 1 wood chunk.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JLC, JD
Weather: Sunny, Partly Cloudy, Breeze 80°			
Site Designation:	WP-5		
Descriptive Location: Walker Pond: East side, N of outlet			
GPS Coordinates			
Photo Log (photo #, orientation) 1 - From S bank at site (N) (beyond outlet) 2 - Outlet & beyond (NW)			

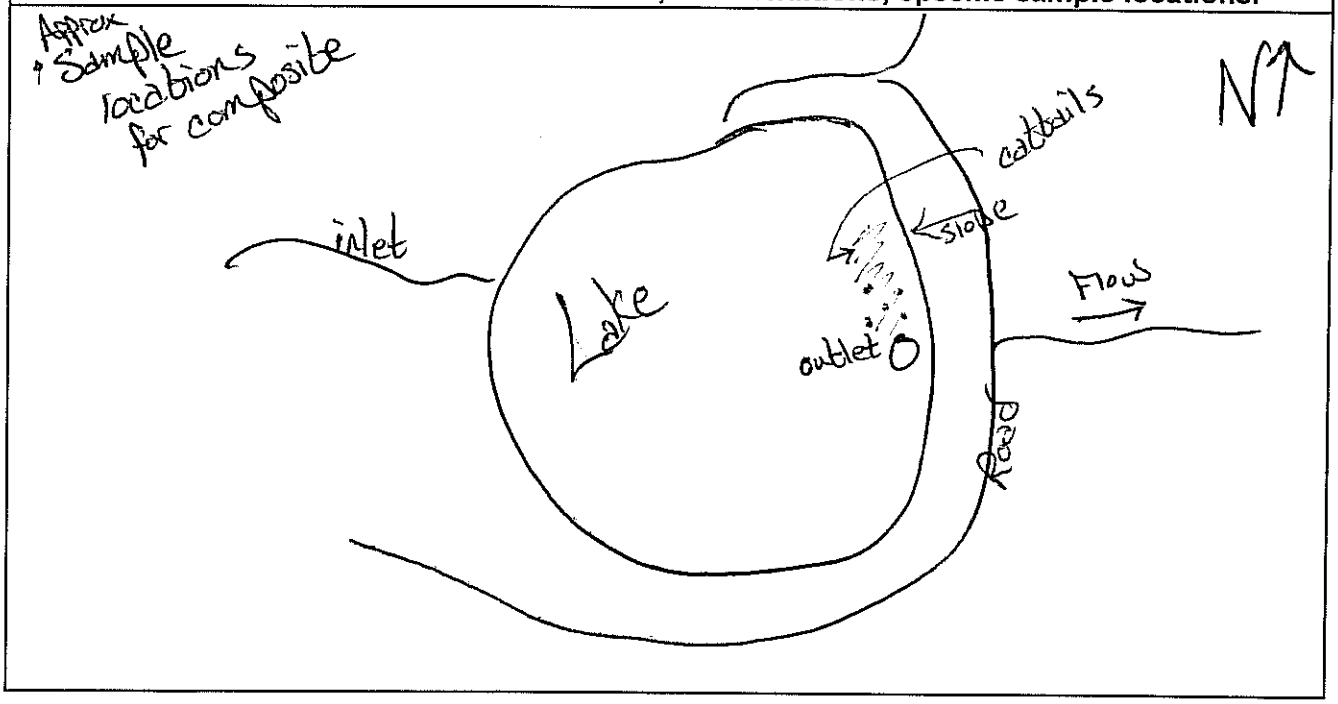
Sample Info:	**Number**	**Time**	**Containers**
pH = 6.89 Sediment	AEH-1008-434-SED	1400	1L - Chemistry
Riparian Soil	NA		4oz Ars/SE/H
Upland Soil	NA		
Water	AEH-1008-434-SW	1400	500 - DISS 250 TKC 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Duplicate AEH-1008-435-SED 1410
AEH-1008-435-SW 1410

N of outlet in cattails along bottom of slope from road.

Other Comments: Strong flow leaving pond through outlet.
Cores: largely 0-4" recovery until lib rock. Gray silty med sand w/ gravel & roots. Threw out many fine-coarse gravel & few woody bits.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

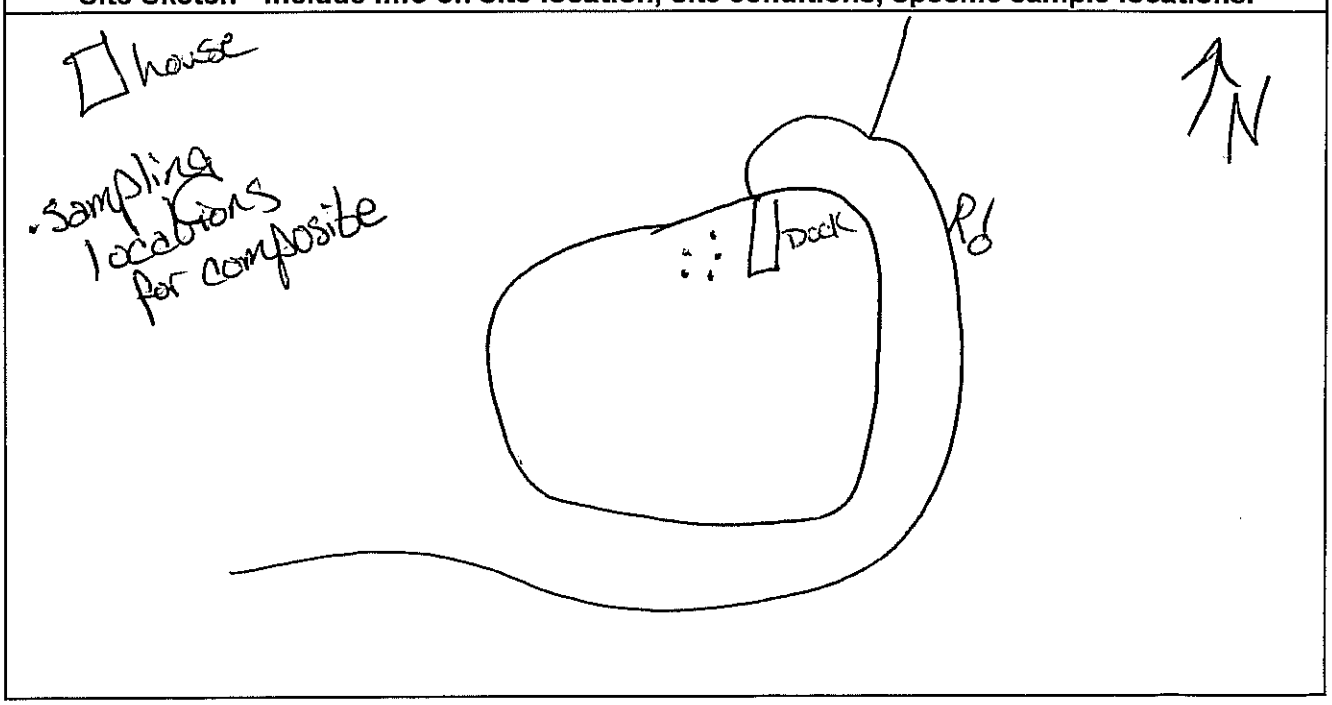
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Sunny, Partly Cloudy 80°			
Site Designation:	WP-1		
Descriptive Location: Walker Pond at dock.			
GPS Coordinates			
Photo Log (photo #, orientation) Duplicate - AEH-1008-437-SED 1445 AEH-1008-437-SW 1445 1-From Bank twds Lake (S) 2-W from dock across site			

Sample Info:	**Number**	**Time**	**Containers**
pH = 6.70 Sediment	AEH-1008-436-SED	1430	1 - Chemistry
Riparian Soil	NA		4 oz - AVS/SEM
Upland Soil	NA		
Water	AEH-1008-436-SW	1430	500 - DISS

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Lake next to dock. Sandy, gravel substrate. Alder & cattail vegetation w/good coverage.

Other Comments: Gray silty fine-med sand w/ few gravel. Little clay layers. Few Fe stained (rust color) areas.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

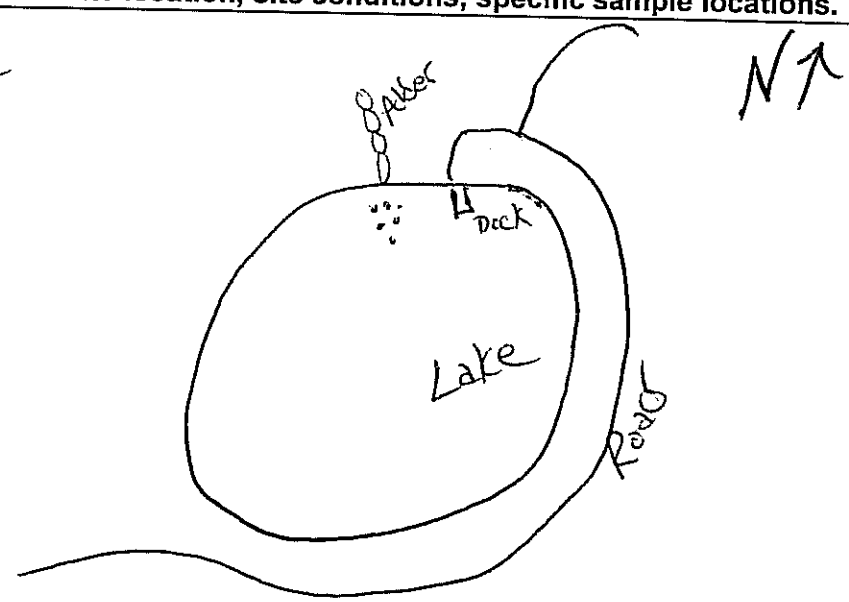
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, TLC
Weather: Sunny, Breezy, Partly Cloudy 80°; Thunder			
Site Designation:	WP-2		
Descriptive Location: Walker Pond; west side			
GPS Coordinates			
Photo Log (photo #, orientation) 2-W at site 1-N at Site from lake (Site in middle of photo)			

Sample Info:		**Number**	**Time**	**Containers**
pH = 7.01	Sediment	AEH-1008-438-SED	1515	2-Chemistry 4oz Avs/SEM
	Riparian Soil			
water	~~Upland Soil~~	AEH-1008-438-SW	1515	500-DISS, 250-TRC, 8oz Hg T

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Thick alder + grass on bank, Some grass in lake at edge. No puddles or marshlike soil (saturated) except immediately at edge of lake.

Other Comments: 0-6" recovery. Gray/Black silty fine-med sand. Few organics. One core had patch of iron staining.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena Groundwater Monitoring
Project Code: 10022
Sample Team Member(s): JD, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-1008-439-RB
Sample Date: ~~1500~~ 8 8/11/10
Sample Time: 1500 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.)^2 / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
.Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						
		Rinsate Blank					
		for Sediment					

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

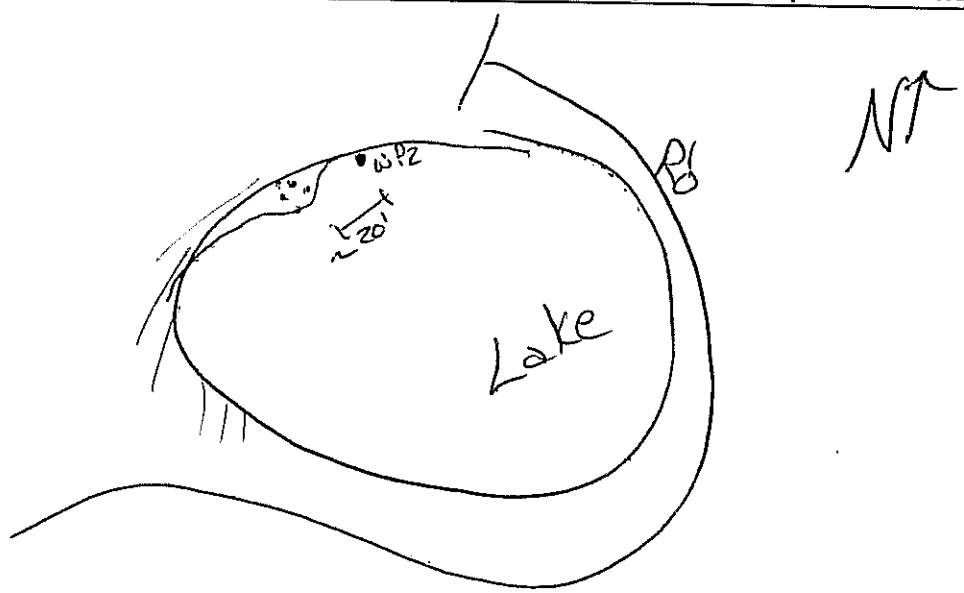
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Cloudy, Thunder 80°			
Site Designation:	WPM-1		
Descriptive Location: Walker Marsh 20' S of WP-2			
GPS Coordinates			
Photo Log (photo #, orientation) 1 - E at site			

Sample Info:	**Number**	**Time**	**Containers**
pH=6.48 Sediment	AEH-1008-440-SED	1540	
Riparian Soil			
Upland Soil			
Water	AEH-1008-440-SW	1540	500 DISS, 250 TRC 8 oz Total

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Directly at ~~at~~ lake edge in veg. No real puddle, water is lake water.

Other Comments: 0-4" cores mostly. Brown silty fine-med sand w/ 1/2-1" layer of dark brown silt at top w/ organics. ~~Brow~~ Rust mottling throughout lower layers.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

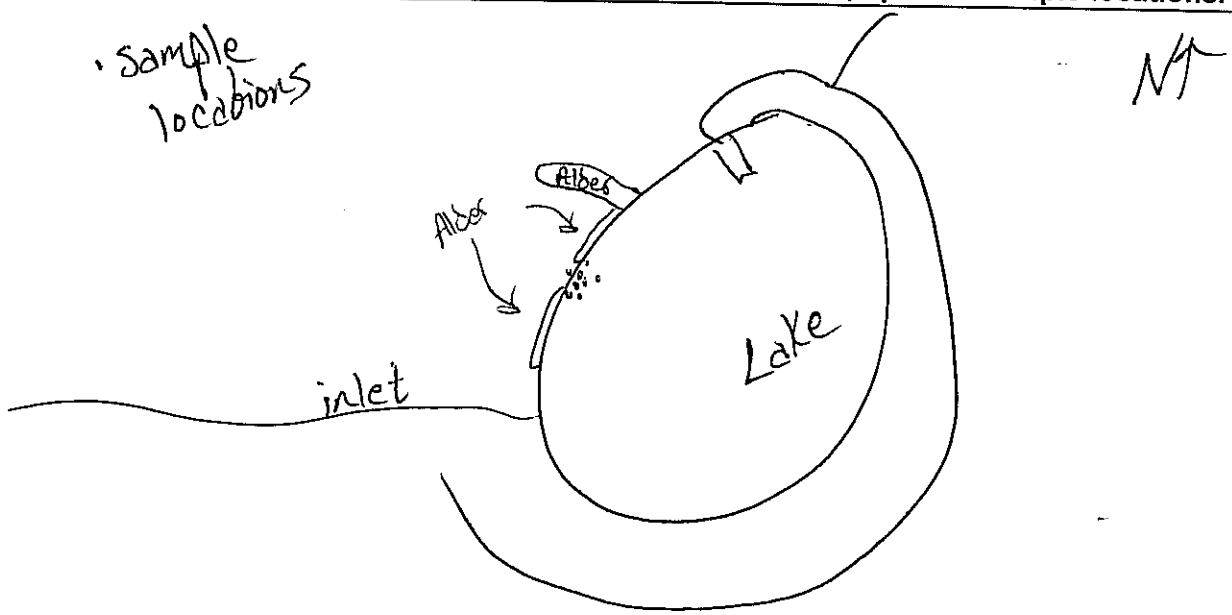
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/11/10	**Samplers:**	JD, JLC
Weather: Mostly Sunny, Windy 60°F			
Site Designation:	WPM-2		
Descriptive Location: Walker Pond; west side; Vegetative zone on the edge of the lake.			
GPS Coordinates			
Photo Log (photo #, orientation) 1 + 2 — SE across site			

Sample Info:	**Number**	**Time**	**Containers**
pH = 6.76 Sediment	AEH-1008-441-SED	0910	~~2p~~ 1 - Chemistry
Riparian Soil	NA		4oz - ARS/SEM
Upland Soil	NA		
Water	AEH-1008-441-SW	0910	500-DISS 250-TRC 8oz Hg TC

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Pond with grassy (Rush) veg + alder at edge. Fairly clear water

Other Comments: Cores: 0-6" recovery. Top 1-1½" Rust brown sandy silt w/ lots of organic matter such as root. Lower horizons black/gray silty fine sand w/ few fine gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

BERA 2010

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena ~~Groundwater Monitoring~~
Project Code: 10022
Sample Team Member(s): JLC, JD
Laboratory Used: Energy Labs

Site Designation: WC-1
Sample Code Number: AEH-1008- 442-SW
Sample Date: 8/12/10
Sample Time: 0925 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{2}) / 25

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Comments: no access/pumping

Site Conditions

New Site: (Yes) No
Photo taken: (Yes) No
Site Type: DRY (surface water) process water monitoring well domestic well adit seep spring– other:

Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						

Turbidity: (circle) clear slight moderate very

Sample Method: (describe) (grab) composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.87	
pH	6.19	
SC (µmhos/cm)	117	
Turbidity (ntu)		
H_2O Tmp. (°C)	10.90	
Color	Clear	
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	Dmetals	
1	500 ml	F or UF	Raw	common	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Inlet to Walker Pond (Walker Creek) – ~7' wide & ~3' deep

Sample Team Member Signature: [signature]

Page of

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6/25/2010/12:25 PM

EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

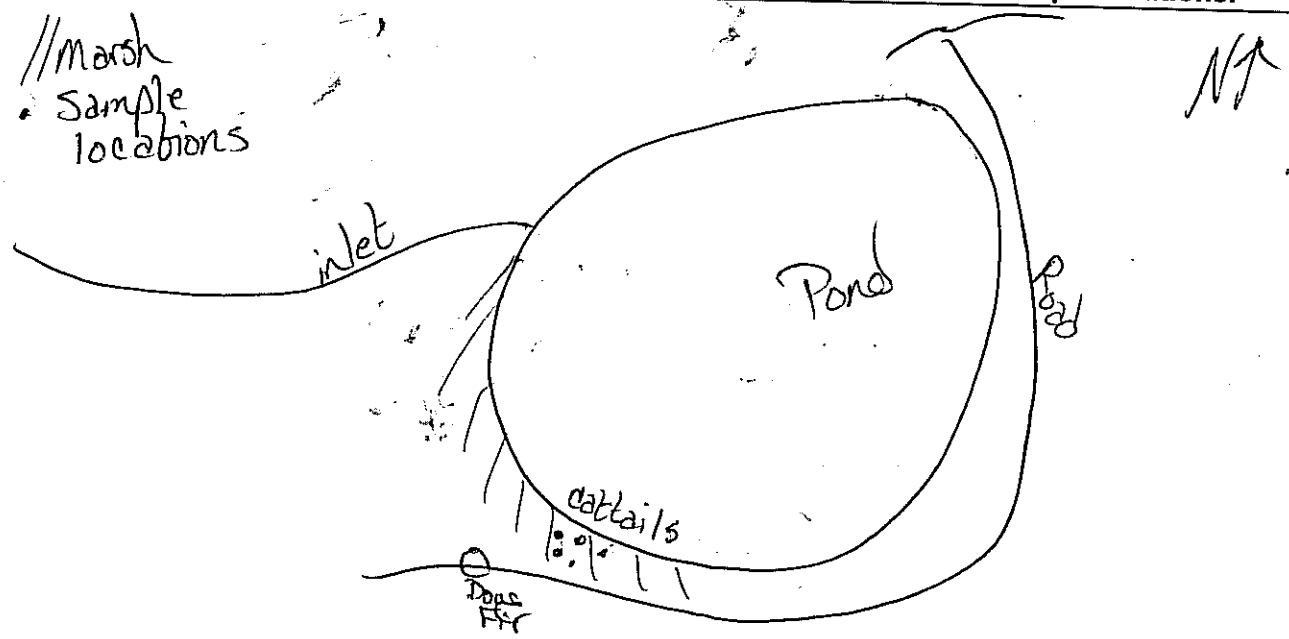
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/12/10	**Samplers:**	JD, JLC
Weather: Sunny, Windy ~~70°F~~ 63°			
Site Designation:	WPM-3		
Descriptive Location: Walker Marsh adj. to pond.			
GPS Coordinates			
Photo Log (photo #, orientation) 1 - N twd pond across site 2 - SE			

Sample Info:	**Number**	**Time**	**Containers**
pH = 7.13 Sediment	AEH-1008-443-SED	0940	2 - Chemistry
Riparian Soil			4oz ARS/SEM
Upland Soil			
	AEH-1008-443-SW	0940	500, 250 - Metals 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Marsh adj. to pond; Spongy, moss covered ground; Sedge, alder, mint, various grasses. Cow parsnip higher. Cattail at pond margin. Dogwood + ~~Dgs~~ Doug Fir higher up

Other Comments: Water collected was high in suspended particles; muddy colored. Gather water from puddles. Cores: Easy to Collect. Brown + Black silt with clay few med gravel removed. Slight "earthy" odor

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

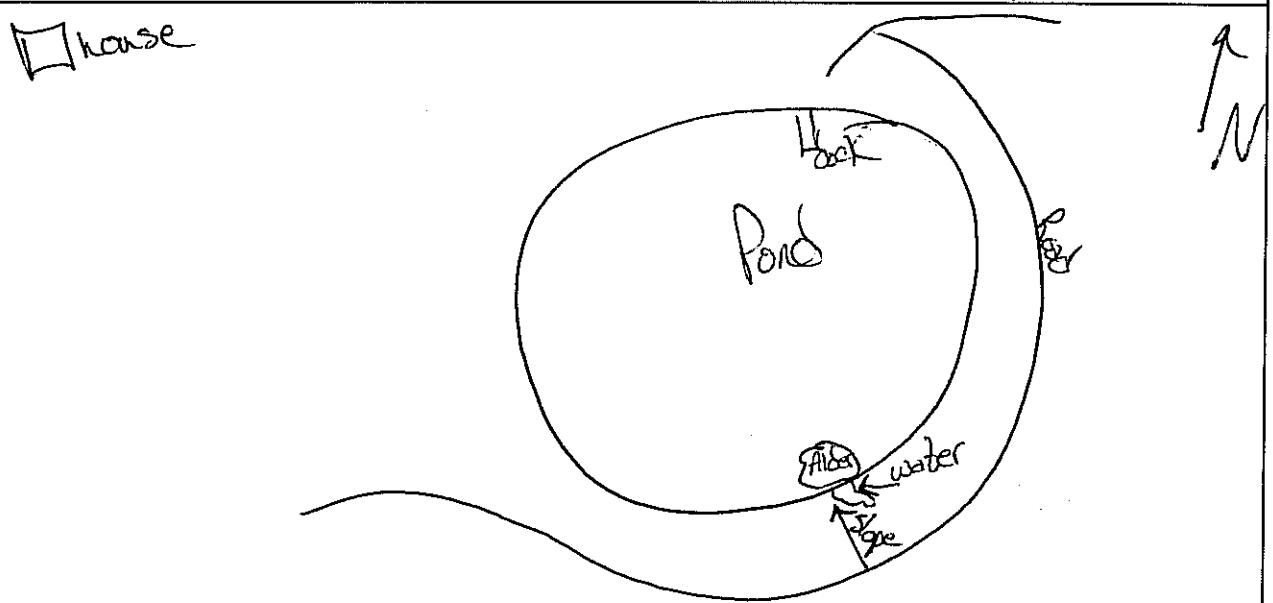
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/12/10	**Samplers:**	JD, JLC
Weather: Mostly Sunny, 65°F Breezy			
Site Designation:	WPM-4		
Descriptive Location: Walker Pond, adj. small Channel serving as marsh area.			
GPS Coordinates			
Photo Log (photo #, orientation) 1-3-N at site 4-NW in vicinity of site			

Sample Info:	**Number**	**Time**	**Containers**
pH = 6.47 Sediment	AEH-1008-444-SED	1010	2-Chemistry
Riparian Soil	NA		4 oz-AVS/SEM
Upland Soil	NA		
Water	AEH-1008-444-SW	1010	500-250-Metals 8oz Tot Hg

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Lacking true marsh zone. Channel leaving pond behind Alder, but essentially pond water. Grasses, Alder on pond edge.

Other Comments: Coring difficult. Lots of large roots + rock.

Site Sketch - Include info on site location, site conditions, specific sample locations.



EAST HELENA SOIL/SEDIMENT SAMPLING FIELD FORM

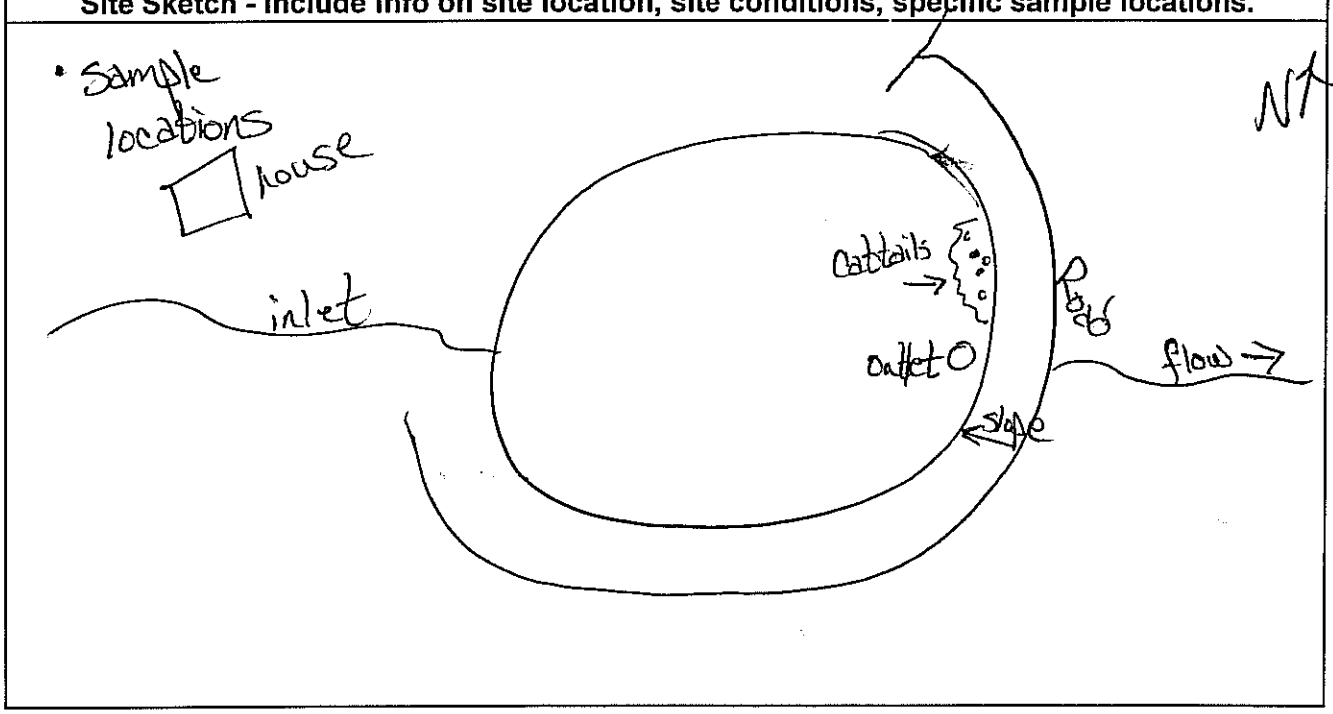
Project Number/Description:	10022/Baseline Eco Risk Assessment		
Sample Date:	8/12/10	**Samplers:**	JLC, JD
Weather: Sunny / Partly Cloudy, windy 65°F			
Site Designation:	WPM-5		
Descriptive Location: Walker Pond E side at toe of Dam			
GPS Coordinates			
Photo Log (photo #, orientation) 1- NE across site (in middle; in cattails)			

Sample Info:	**Number**	**Time**	**Containers**
pH=6.56 Sediment	AEH-1008-445-SED	1030	2-Chemistry
Riparian Soil			4 oz AVS/SEM
Upland Soil			
Water	AEH-1008-446-SW	1030	500, 250 Metals 8 oz Tot

Site Conditions (stream channel/bed/bank conditions; riaprian/upland slope/veg conditions; signs of fill/disturbance): Cattail along Pond margin, 100-150' N of outlet. Took samples at edge of pond, under water.

Other Comments: Cores: 0-4"-6" recovery. Top 1½-2" black silt w/ masses of roots + numerous larger woody pieces (removed). lower horizons dark brown w/ iron staining sandy, gravelly clay. Removed many med-coarse gravel.

Site Sketch - Include info on site location, site conditions, specific sample locations.



Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: East Helena ~~Groundwater Monitoring~~ BERA 2010
Project Code: 10022
Sample Team Member(s): JD, JLC
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: AEH-100~~6~~-446-RB
Sample Date: 8/12/10 8
Sample Time: 1058 (military)

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.^{3}) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes
	Pump On						

Rinsate Blank for Sediment

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)		
pH		
SC (µmhos/cm)		
Turbidity (ntu)		
H_2O Tmp. (°C)		
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	~~Dmetals~~	TRC
~~1~~	~~500 ml~~	~~F or UF~~	~~Raw~~	~~common~~	
	500 ml	F or UF	HCL		
	1000 ml	F or UF	H3PO4		
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): RL, JLC
Laboratory Used: Energy Labs

Site Designation: SG-04
Sample Code Number: AEH-1008- NA
Parameters/Flow
Sample Date: 8/4/10
Parameters/Flow
Sample Time: 1500 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip rain snow
clear p. cloudy overcast
Air Temperature: °C 70 °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25 — Comments
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.67	
pH	7.88	
SC (µmhos/cm)	226	
Turbidity (ntu)		
H_2O Tmp. (°C)	16.73	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Photos - 1- looking Downstream 2- looking upstream

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): RL, JLC
Laboratory Used: Energy Labs

Site Designation: SG-02
Sample Code Number: ~~ACH-1008-~~ NA
Parameters/Flow **Sample Date:** 8/4/10
" **Sample Time:** 1545 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring- other:
Weather Conditions: calm breeze windy
no precip rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

For Groundwater Samples

well volume formula:	V = (TD-SWL)x(Dia.²) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.51	
pH	7.87	
SC (µmhos/cm)	225	
Turbidity (ntu)		
H_2O Tmp. (°C)	17.50	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Photos Comments: Downstream
1- upstream 2- upstream

Sample Team Member Signature: [signature] Page of

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Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, KL
Laboratory Used: Energy Labs

Site Designation: SG-01
Sample Code Number: ~~AEH-1008-~~ NA
Sample Date: 8/4/10
Sample Time: 1630 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid
Comments

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	8.25	
pH	7.95	
SC (µmhos/cm)	224	
Turbidity (ntu)		
H_2O Tmp. (°C)	17.5	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Phobos - 1 - Upstrm w/ Trn 2 - Upstrm 3 - Dwnstrm

Sample Team Member Signature: [signature] Page of

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Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, KL
Laboratory Used: Energy Labs

Site Designation: SG-09 (PPC-7)
Sample Code Number: AEH-~~1008~~- NA
Sample Date: 8/4/10
Sample Time: 1700 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
~~no precip.~~ rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.²) / 25 — Comments
TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.85	7.85
pH	7.85	
SC (µmhos/cm)	227	
Turbidity (ntu)		
H_2O Tmp. (°C)	17.91	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:
Photo. 1- Downstream 2- upstream

Sample Team Member Signature: [signature] Page of

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Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): RL, JLC
Laboratory Used: Energy Labs

Site Designation: SG-0710 (PPC-8)
Sample Code Number: AE~~H-1008-~~ NA
Sample Date: 8/4/10
Sample Time: 1800 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula:	V = (TD-SWL)x(Dia.²) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.74	
pH	7.81	
SC (µmhos/cm)	225	
Turbidity (ntu)		
H_2O Tmp. (°C)	18.14	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments:
1 – Downstream 2 – upstream bwd bridge

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: BERA 2010
Project Code: 10022
Sample Team Member(s): JLC, RL
Laboratory Used: Energy Labs

Site Designation: SG-05 W (outlet)
Sample Code Number: AEH-~~1008~~- NA
Parameter/Flow ~~Sample~~ Date: 8/4/10
Parameter/Flow ~~Sample~~ Time: 1330 (military)

If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

For Groundwater Samples

well volume formula:	V = (TD-SWL)x(Dia.^{2}) / 25	Comments
TD (ft):		
SWL (ft):		no access/pumping
Casing Diameter (I.D.")		
Water Volume (V) (gal):		
x 3=(gal.)		
Actual Vol. Removed (gal.)		
Water Level Recovery:	slow moderate rapid	

Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 65°F

For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: 1 - 9.80 held w/ flow from Outlet
Outlet A Width 3.6'
Outlet A Depth 1.2'
See below also
Flow: gpm cfs Staff Gage: (Outlet 2)

Field Parameter Stabilization

Time (military)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/l)	pH	S.C. (µmhos/cm)	Turbidity (n.t.u.)	Temperature (°C)	Additional Parameters or Notes

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

Field Parameters

	Sample	Duplicate
ORP (mV)		
DO (mg/l)	7.05	
pH	7.26	
SC (µmhos/cm)	227	
Turbidity (ntu)		
H_2O Tmp. (°C)	16.63	
Color		
Other:		

Bottles Collected

Quantity	Size	Filter or Unfilt.	Preservative	Parameter	Additional Notes
1	250 ml	F or UF	HNO3	TRC Metals	
1	500 ml	F or UF	Raw	DISS Metals	Filter/ Pres in Lab
1	8 oz	F or UF	HCL	Total Hg	
	1000 ml	F or UF			
	VOA	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			
	ml	F or UF			

Comments: Photos - 1 looking SSE 2 - Same from Access Rd.
3-5 across both outlets from Tito Park
Outlet 1 to South, Outlet 2 to N (closer to Tito Park)

Sample Team Member Signature: Page of

Outlet ~~2~~B width 2.0' Depth 0.8' 8.60 + lots of leakage beneath culvert at through Dam toe

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(C) Leakage ~1.0 wide ~0.5' deep 1.8 ft/sec