



Pre-Permitting Environmental / Socio-Economic Data Report Series

Report Series E- Trace Elements (Sediments & Soils)

Report E-4 Summary of Transportation Corridor Sediment Inorganic Analytical Results, 2004 - 2007

Submitted to the Alaska Department of Natural Resources September 2008

Collected for the Pebble Partnership by: Bristol Environmental & Engineering Services Corporation

Preliminary data. Do not cite or quote.

The Pebble Partnership is providing environmental and socio-economic baseline data collected to inform the development of the Pebble Project to state and federal agencies, project stakeholders and the general public prior to project permitting as part of its commitment to full and open disclosure.

A comprehensive Environmental Baseline Document (EBD) will subsequently be prepared and appended to future project permit applications. The EBD will also be made publicly available when complete.



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Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Cadmium-SEM	Calcium	Chromium	Cobalt	Copper	Copper-SEM	Iron
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS11A	7/23/2004	9340	0.0878	1.78	34.3	0.181	ND	ND	ND		5630	3.15	3.48	8.64		15700
	9/23/2004	6440	ND	0.716	16.9	0.126	ND	ND	ND		3880	3.39	3.58	10.9		14400
	5/3/2005	5890	ND	0.848	22.5	0.0986	ND	ND	0.0854		3780	1.91	2.9	6.71		8970
	7/16/2005	9950	0.0893	1.58	34.2	0.195	ND	ND	0.252		5760	4.04	3.53	30.9		16500
	9/8/2005	10900	0.0453	1.47	34	0.246	ND	1.68	0.162		5770	3.37	4.14	8.91		14500
GS12A	01/08/2004	7190	0.155	3.17	20.3	0.162	0.0649	8.23	0.0992		3040	5.03	4	7.51		12600
	22/09/2004	7710	0.0431	2.96	20.8	0.18	ND	ND	0.0819		2830	6.19	4.45	8.26		14500
GS14A	7/20/2004	7120	0.121	12.9	39	0.223	0.0617	ND	0.0769		2680	8.47	3.6	6.65		14300
	9/22/2004	7410	0.081	12.5	46.7	0.188	ND	ND	ND		2550	8.03	3.71	6.05		13500
GS14B	23/07/2004	10600	0.109	5.89	35.5	0.249	ND	ND	0.0838		5480	7.34	3.47	6.62		15700
	22/09/2004	9570	0.0695	5.27	32.6	0.237	ND	ND	ND		4590	7.09	3.4	5.67		13100
	03/05/2005	12200	ND	6.5	40.2	0.199	ND	ND	0.2		5960	7.3	3.7	6.07		14900
	15/07/2005	10800	0.122	6.71	51.4	0.285	ND	ND	0.445		6590	9.9	4.31	9.3		15400
	09/09/2005	13500	0.064	7.57	44	0.272	ND	1.94	0.331		5900	6.66	4.06	6.81		18500
GS17A	7/20/2004	12200	0.274	14.7	33.9	0.274	0.113	ND	0.16		3320	15.2	7.35	14.5		24200
	9/21/2004	13200	0.139	19	40.4	0.25	0.17	3.66	0.144		3290	16.2	8.38	15.3		22800
	5/5/2005	13100	0.0351	17.2	72.9	0.257	0.153	ND	0.21		3350	14.1	8.33	15.5		24700
	7/16/2005	13500	0.173	14.3	45.3	0.245	0.112	4.33	0.311		3310	16.8	8.18	16.7		27300
	9/8/2005	16200	0.139	20.7	53.3	0.344	0.21	3.33	0.256		3940	18.6	10.4	19.1		29100
GS18A	20/07/2004	9400	0.101	17	57.2	0.285	0.155	ND	0.263		3240	8.38	4.15	9.46		17800
	21/09/2004	8570	0.0651	13.8	53.7	0.27	0.15	3.64	0.249		2740	9.25	4.69	8.87		16300
GS20	7/22/2004	7200	0.0814	13.7	48.6	0.147	ND	ND	ND		2770	6.73	3.71	4.47		15500
	9/20/2004	6670	0.0797	11.7	48.3	0.128	ND	ND	ND		2240	6.31	3.06	3.79		12100
	7/16/2005	7220	0.0946	21.7	77.8	0.182	ND	5.52	0.429		3610	11	5.85	6.23		16000
	9/8/2005	9090	0.0459	19.1	72.4	0.123	ND	1.89	0.176		3080	9.74	5.16	4.98		18600
GS20A	20/07/2004	8270	0.0998	13.4	32.6	0.132	ND	ND	0.11		3370	4.86	2.99	5.75		9110
	21/09/2004	7910	0.107	27.7	45.8	0.164	ND	5.57	0.133		4560	7.46	2.9	8.24		14900

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Lead	Lead-SEM	Magnesium	Manganese	Mercury	Mercury-SEM	Molybdenum	Nickel	Nickel-SEM	Potassium	Selenium	Silver	Sodium	Thallium	Tin
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(µg/Kg)	(µg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS11A	7/23/2004	2.65		3530	368	ND		ND	1.82		595	ND	0.0581	196	ND	0.986
	9/23/2004	2.15		2950	325	ND		ND	1.68		413	ND	0.0315	126	ND	0.974
	5/3/2005	2.17		2590	262	ND		ND	1.53		438	ND	ND	138	ND	0.957
	7/16/2005	3.13		3580	367	ND		ND	1.84		613	ND	ND	229	0.0245	1.27
	9/8/2005	3.26		3670	413	ND		ND	2.29		635	ND	0.0491	192	ND	1.22
GS12A	01/08/2004	3.56		3710	298	ND		0.512	3.01		418	0.486	0.0479	133	0.0161	0.972
	22/09/2004	3.58		4100	332	ND		ND	3.28		376	ND	0.0381	157	ND	0.987
GS14A	7/20/2004	3.69		3420	419	ND		0.831	4.85		331	0.479	0.0464	124	0.0192	0.958
	9/22/2004	4.21		2980	388	22.6		0.643	5.1		309	ND	0.0469	139	ND	0.99
GS14B	23/07/2004	4.09		3730	443	ND		0.717	3.89		490	0.483	0.0799	232	ND	0.966
	22/09/2004	3.79		2990	394	ND		0.502	3.82		398	ND	0.0578	183	ND	0.962
	03/05/2005	4.54		3330	422	ND		0.787	4.58		505	0.153	ND	242	ND	0.965
	15/07/2005	5.22		4370	510	145		0.912	4.71		622	0.817	ND	297	0.0328	1.63
	09/09/2005	5.31		4230	549	ND		0.956	4.11		568	ND	0.0914	214	ND	1.26
GS17A	7/20/2004	9.09		7330	526	ND		0.899	9.36		528	0.492	0.0681	196	0.041	0.983
	9/21/2004	11.9		6660	542	221		0.988	9.83		417	0.328	0.0596	186	ND	0.999
	5/5/2005	14.4		6580	546	ND		0.967	9.38		520	0.193	ND	185	ND	0.969
	7/16/2005	11.6		7850	552	ND		1.11	9.7		532	0.638	ND	191	0.0689	1.28
	9/8/2005	14.6		8040	614	ND		1.39	13		529	0.321	0.0709	219	0.0261	1.32
GS18A	20/07/2004	10.6		3840	258	ND		1.74	4.86		381	0.482	0.0679	178	0.0549	0.965
	21/09/2004	10.1		3910	257	14		1.29	5.35		312	0.357	0.0762	129	ND	0.964
GS20	7/22/2004	2.48		3510	402	ND		0.519	4.43		344	ND	0.0362	189	ND	0.973
	9/20/2004	2.89		2580	205	21.1		0.375	3.86		279	ND	0.107	189	0.0883	0.957
	7/16/2005	3.21		5420	412	78.6		0.831	6.33		439	0.706	ND	244	0.0448	1.31
	9/8/2005	3.31		4110	515	ND		0.591	6.11		369	ND	0.0473	209	ND	1.23
GS20A	20/07/2004	2.22		2360	164	15.5		3.22	2.81		194	0.556	ND	398	0.0347	0.983
	21/09/2004	3.06		1450	290	21.3		2.8	3.43		150	0.564	0.0606	314	ND	1.3

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
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Sample Station	Date	Vanadium	Zinc	Zinc-SEM	Chloride	Fluoride	Sulfate	Sulfur	Acid-Volatile Sulfide	Cyanide	Cyanide, Weak Acid Dissociable	Nitrogen, Ammonia (as N)
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS11A	7/23/2004	39.8	34.1		0.749	0.394	6.47			ND		ND
	9/23/2004	34.4	29.8		4.54	3.13	23.7			0.041		ND
	5/3/2005	24.9	27.4		0.637	ND	4.13			ND		10.2
	7/16/2005	36.9	34.8		0.49	ND	0.889			ND		ND
	9/8/2005	29.4	37.5		0.48	1.26	2.49			ND		7.15
GS12A	01/08/2004	30.2	43.3		0.443	ND	4.36			ND		13.8
	22/09/2004	30.6	42		5.21	0.428	17.7			0.034		17.4
GS14A	7/20/2004	31	41		1.33	0.429	36.1			0.049		35
	9/22/2004	29.7	40.4		2.54	ND	123			0.076		33
GS14B	23/07/2004	33.5	46.3		2.03	0.504	63.1			0.12		76.3
	22/09/2004	27	41.5		4.83	ND	201			0.098		24.3
	03/05/2005	31.3	46.5		1.83	0.41	14.5			0.057		79.4
	15/07/2005	37.6	52.3		1.63	0.522	ND			0.049		92.4
	09/09/2005	32.7	55.3		0.609	1.27	1.26			ND		17.1
GS17A	7/20/2004	55.1	67.3		1.2	0.42	20.4			0.067		23.8
	9/21/2004	53.8	65.2		3.87	ND	141			0.075		25.1
	5/5/2005	57.7	73.1		0.787	1.56	16.9			ND		41.3
	7/16/2005	59.6	75.9		0.527	0.488	5.01			0.028		19.9
	9/8/2005	66.4	84.6		0.948	1.34	4.25			ND		51.4
GS18A	20/07/2004	31.3	65.1		2.56	0.827	245			0.18		111
	21/09/2004	29.8	66.6		5.4	32.6	805			0.088		56.9
GS20	7/22/2004	33.2	38.8		0.805	0.307	74.8			0.31		33.5
	9/20/2004	29.1	24.3		3.13	2.53	167			0.067		4.29
	7/16/2005	47.7	50.8		1.44	ND	1.45			0.031		48.2
	9/8/2005	36.4	45.3		0.748	ND	4.41			ND		20.7
GS20A	20/07/2004	24.1	28.1		3.46	0.719	153			0.11		184
	21/09/2004	32.5	32		39.3	84	3760			0.098		149

mg/Kg milligram per kilogram

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SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Cadmium-SEM	Calcium	Chromium	Cobalt	Copper	Copper-SEM	Iron
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS21	8/18/2004	16600	ND	5.72	56.1	0.157	ND	8.65	0.198		4880	44.1	12.8	47.2		23000
	9/26/2004	17000	ND	5.27	54	0.118	ND	5.38	0.145		4840	37.4	12.5	41.6		23900
	5/3/2005	18000	ND	7.04	42.3	0.134	ND	ND	0.241		4840	43.2	13	52.8		25300
	7/13/2005	16600	ND	6.16	39.7	ND	ND	13.1	0.409		5690	32.3	9.75	40.3		21000
	9/9/2005	24400	ND	8.44	63.6	0.143	ND	4.28	0.344		6640	54.5	17	64.7		31700
GS22	14/07/2005	13400	0.0494	3.35	114	0.106	ND	ND	0.0853		6620	13.4	9.67	62.1		20100
	10/09/2005	21600	ND	5.83	92.3	0.13	ND	44.5	ND		9740	14.4	9.82	54.2		22600
GS23	7/14/2005	13300	0.0416	5.05	57.9	0.116	ND	ND	0.134		6410	19	9.36	45.8		36400
	9/9/2005	15100	ND	3.68	118	0.0957	ND	3.52	ND		7440	13.6	10.7	56.1		20400
GS3A	19/08/2004	12900	0.0927	3.71	139	0.144	ND	6.88	ND		6570	10.8	7.92	41		20800
	25/09/2004	10600	0.0519	2.74	107	0.0742	ND	5.71	ND		5570	8.91	6.08	33.8		15900
	03/05/2005	15600	ND	4.11	132	0.124	ND	ND	ND		7100	8.73	7.58	45.1		17600
	13/07/2005	15500	ND	3.58	122	ND	ND	ND	ND		6480	4.64	6.55	49.5		16900
	10/09/2005	15400	0.0432	3.43	143	0.121	ND	4.63	ND		6580	8.77	7.19	44.2		17200
GS4A	7/31/2004	4800	0.0917	0.787	59.7	0.0592	0.0756	ND	0.0621		2420	9.7	4.21	40.7		18700
	9/25/2004	3850	0.0461	0.566	62.2	0.0428	ND	ND	ND		1990	5.67	3.45	42.1		9620
	5/3/2005	4190	ND	0.633	52.8	0.061	0.067	ND	ND		2150	5.17	3.25	42.5		8950
	7/15/2005	3440	0.0684	1.12	63.7	0.0692	ND	ND	0.169		2370	5.45	3.51	56.2		6350
	9/10/2005	4600	ND	0.912	53.5	0.0423	ND	1.39	0.0779		1900	6.18	3.22	38.7		10400
GS4B	25/09/2004	2410	ND	ND	15.4	0.0336	ND	ND	ND		828	2.49	0.855	3.98		3810
GS6A	7/21/2004	7360	0.0622	7.06	27.6	0.134	ND	ND	0.276		2250	3.38	7.63	4.21		11300
	9/24/2004	7410	0.0832	35.1	47.6	0.145	0.202	ND	0.342		2370	2.05	13.5	4.45		11900
GS8A	21/07/2004	3020	ND	ND	19.3	0.113	ND	ND	ND		1590	2.75	1.48	4.29		12800
	24/09/2004	2600	ND	3.59	18.8	0.0781	ND	ND	ND		996	1.35	1.04	4.25		4550
	03/05/2005	2550	ND	0.451	16.8	0.0869	ND	ND	0.0821		1200	1.8	1.29	4.09		6350
	15/07/2005	2360	ND	ND	20.1	0.092	ND	ND	0.184		1240	2.66	1.42	5.71		4680
	09/09/2005	5660	ND	0.714	34.6	0.121	ND	0.743	0.0969		1930	3.19	1.93	6.98		9570

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Lead	Lead-SEM	Magnesium	Manganese	Mercury	Mercury-SEM	Molybdenum	Nickel	Nickel-SEM	Potassium	Selenium	Silver	Sodium	Thallium	Tin
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(µg/Kg)	(µg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS21	8/18/2004	3.84		12600	415	14.6		0.704	20.1		574	0.169	0.165	355	ND	0.989
	9/26/2004	2.89		12200	457	27.5		0.518	20		518	0.204	0.0395	284	ND	1.9
	5/3/2005	4.11		12900	500	14.7		0.896	20.8		504	0.319	ND	287	ND	0.978
	7/13/2005	3.53		10700	373	ND		ND	15.5		454	ND	ND	260	0.107	ND
	9/9/2005	5.27		15800	662	ND		1.08	28.2		714	0.453	0.0762	396	0.0125	1.4
GS22	14/07/2005	0.808		7380	201	ND		ND	8.67		1800	0.662	ND	910	0.0686	1.32
	10/09/2005	0.941		6290	283	ND		ND	10.4		1040	0.354	ND	1160	ND	1.21
GS23	7/14/2005	0.931		5840	240	ND		0.412	8.01		708	0.655	ND	751	0.0287	1.31
	9/9/2005	0.82		6200	216	ND		ND	10		1570	ND	ND	743	0.0158	1.27
GS3A	19/08/2004	1.45		5960	235	168		ND	6.49		1050	0.232	0.0946	428	ND	0.96
	25/09/2004	0.947		4560	161	22.3		ND	5.62		781	ND	ND	272	ND	0.984
	03/05/2005	1.98		6170	221	29.7		0.321	6.95		1070	ND	ND	401	ND	0.972
	13/07/2005	2.07		5480	185	25.3		ND	5.47		954	ND	ND	420	0.0938	ND
	10/09/2005	1.42		5660	209	ND		ND	6.62		1030	ND	ND	382	ND	1.32
GS4A	7/31/2004	2.74		2750	219	ND		0.822	3.4		956	0.483	ND	226	0.0127	0.965
	9/25/2004	2.17		2270	175	ND		0.683	3.25		902	ND	ND	165	ND	0.966
	5/3/2005	2.38		2300	168	ND		0.794	3.02		906	ND	ND	960	ND	0.987
	7/15/2005	3.12		2660	184	ND		1.07	3.07		944	ND	ND	244	0.0471	1.21
	9/10/2005	2.4		2270	192	ND		0.661	3.05		770	ND	ND	163	ND	1.24
GS4B	25/09/2004	0.646		539	50	ND		ND	1.23		84.6	ND	ND	109	ND	0.99
GS6A	7/21/2004	5.89		1370	695	ND		1.17	1.64		189	0.488	0.104	281	0.0271	0.977
	9/24/2004	7.94		2570	1420	ND		1.26	1.87		150	0.376	0.108	147	ND	0.995
GS8A	21/07/2004	3.11		1010	263	ND		0.353	1.41		232	0.479	ND	81.9	ND	0.957
	24/09/2004	3.5		1040	209	ND		ND	1.16		186	ND	ND	67	ND	0.963
	03/05/2005	3.96		1140	202	ND		0.318	2.2		262	ND	ND	84.4	ND	0.976
	15/07/2005	4.42		1340	240	ND		0.36	1.36		278	ND	ND	88.8	0.0251	1.15
	09/09/2005	9.3		2020	280	ND		0.723	4.18		494	ND	0.0966	123	0.0218	1.27

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Vanadium	Zinc	Zinc-SEM	Chloride	Fluoride	Sulfate	Sulfur	Acid-Volatile Sulfide	Cyanide	Cyanide, Weak Acid Dissociable	Nitrogen, Ammonia (as N)
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
GS21	8/18/2004	77.7	66.2		2.29	ND	16.8			0.093		129
	9/26/2004	73.9	64.9		3.55	ND	29.1			0.054		10.6
	5/3/2005	86.5	68.6		2.28	1.77	18.4			0.036		100
	7/13/2005	71.4	63.5		0.653	1.31	1.38			ND		45.1
	9/9/2005	106	87.2		0.887	1.43	11.5			0.032		62.8
GS22	14/07/2005	108	36.4		0.88	ND	1.23			ND		7.53
	10/09/2005	88.2	35.9		ND	ND	1.13			ND		17.5
GS23	7/14/2005	198	33.5		ND	ND	1.26			ND		ND
	9/9/2005	95.6	35.4		0.414	ND	1.49			ND		17
GS3A	19/08/2004	75.9	36.6		2.4	ND	9.23			0.073		64
	25/09/2004	58.8	28.5		2.37	ND	10.1			0.052		13
	03/05/2005	63.7	59.9		1.62	4.52	29.7			0.047		109
	13/07/2005	61.8	39.2		0.71	ND	2.25			0.035		57
	10/09/2005	59.3	37.5		ND	ND	1.61			ND		24.3
GS4A	7/31/2004	51.5	28		0.634	ND	6.9			ND		13.5
	9/25/2004	30.2	26.4		2.3	ND	33.3			0.055		4.52
	5/3/2005	29.2	26.1		1.09	0.33	8.51			ND		8.78
	7/15/2005	24.8	31.8		0.433	0.396	4.2			ND		ND
	9/10/2005	28.7	30		ND	1.26	3.06			ND		7.02
GS4B	25/09/2004	15.8	9.71		7.25	ND	12.7			ND		ND
GS6A	7/21/2004	33	66.6		2.47	0.662	64.1			0.16		87.8
	9/24/2004	22.5	92.3		7.1	ND	74			0.15		11.7
GS8A	21/07/2004	31.1	26.6		0.544	0.363	2.41			ND		8.11
	24/09/2004	8.81	22.6		2.41	0.857	0.729			0.037		ND
	03/05/2005	17.5	23.6		0.609	ND	3.32			ND		6.36
	15/07/2005	12.3	34.6		ND	ND	0.488			ND		ND
	09/09/2005	17	35.5		0.641	1.31	2.54			ND		12.9

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Cadmium-SEM	Calcium	Chromium	Cobalt	Copper	Copper-SEM	Iron
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
NHRIV	7/22/2004	6050	0.126	3.87	33.5	0.184	ND	ND	0.0957		2160	9.56	3.28	9.29		12500
	9/20/2004	5110	0.067	3.82	27.7	0.148	ND	3.09	ND		2050	10.3	3.55	12.7		12400
	5/5/2005	6860	ND	9.15	36	0.161	ND	ND	0.152		2390	8.97	4.08	13.3		14800
	7/11/2005	6110	0.188	2.46	38.5	ND	ND	ND	ND		2220	3.91	3.11	8.88		14400
	9/7/2005	8130	0.174	3.36	33.1	0.215	ND	1.76	0.137		2330	10.1	3.9	10.7		15200
POND1	02/08/2004	7310	0.162	13.6	31.3	0.193	ND	ND	ND		1810	10.9	2.84	4.4		12500
	23/09/2004	3450	0.0751	3.96	13	0.102	ND	ND	ND		2350	9.53	0.809	2.49		2600
	05/05/2005	9400	0.0673	32.5	39.3	0.289	0.0775	ND	0.0855		1890	11.8	4.68	10.6		15600
	12/07/2005	7920	0.269	43.5	26.5	0.341	0.096	ND	0.235		1870	13	4.39	8.11		14300
	08/09/2005	3910	ND	5.08	18.6	ND	ND	1.36	ND		2370	10.8	0.815	3.09		2990
POND2	8/2/2004	7660	0.0764	4.28	25.2	0.209	ND	ND	ND		1610	6.53	3.2	6.8		11300
	9/23/2004	7210	0.065	4.06	21	0.194	0.0633	ND	ND		1600	8.91	3.78	7.26		11000
	5/3/2005	8720	ND	3.79	20.7	0.159	0.0719	ND	0.0818		1550	8.03	3.63	6.77		9870
	7/12/2005	8190	0.206	4.77	19.9	0.297	0.149	ND	0.154		2030	9.77	4.31	10.7		10300
	9/8/2005	8480	0.0641	4.46	23.5	0.213	0.0888	1.61	0.127		1740	8.13	4.96	8.66		13200
POND3	02/08/2004	8750	0.0528	4.1	53.3	0.188	ND	ND	0.21		3770	6.7	3.45	5		8470
	23/09/2004	8450	0.033	4.62	62	0.202	0.0618	4.01	0.265		4010	8.39	3.89	5.7		8610
	03/05/2005	6890	ND	4.29	50.4	0.136	ND	ND	0.213		3250	5.49	3.14	4.24		7250
	12/07/2005	7550	0.119	8.15	62.5	0.254	ND	ND	0.693		4260	9.36	3.99	7.54		12400
	08/09/2005	8470	ND	4.36	69.5	0.166	ND	1.55	0.217		3840	7.69	3.89	4.64		8670
POND4	8/2/2004	8380	0.052	0.973	32.8	0.178	ND	ND	0.188		3380	5.71	1.93	5.76		6350
	9/23/2004	6520	0.0467	1.77	40.9	0.185	ND	ND	0.238		4130	7.16	2.81	7.26		6110
	5/3/2005	7260	ND	1.46	32.4	0.125	ND	ND	0.304		3450	5.09	2.19	6.04		5480
	7/12/2005	6020	ND	4.28	30.3	ND	ND	ND	0.624		3480	6.26	2.2	6.43		8770
	9/8/2005	10400	ND	2.18	45.8	0.173	ND	2.85	0.322		3820	8.2	2.8	9.09		10300

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Lead	Lead-SEM	Magnesium	Manganese	Mercury	Mercury-SEM	Molybdenum	Nickel	Nickel-SEM	Potassium	Selenium	Silver	Sodium	Thallium	Tin
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(µg/Kg)	(µg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
NHRIV	7/22/2004	7.85		3180	217	ND		0.363	5.52		480	ND	0.0313	140	0.0192	0.959
	9/20/2004	8.55		3010	232	ND		ND	5.62		407	ND	0.0422	127	ND	0.988
	5/5/2005	9.14		3580	310	ND		0.661	6.05		545	ND	ND	153	ND	0.957
	7/11/2005	8.1		2700	234	ND		ND	3.51		517	ND	ND	ND	0.0666	ND
	9/7/2005	17		3670	223	ND		0.451	7.65		519	0.574	0.0502	161	0.0345	1.15
POND1	02/08/2004	4.26		2920	141	ND		ND	3.59		500	0.478	ND	129	ND	0.956
	23/09/2004	2.11		683	29.6	ND		ND	1.73		174	0.335	ND	165	ND	0.968
	05/05/2005	9.27		3680	268	ND		0.7	7.55		518	ND	ND	107	ND	0.962
	12/07/2005	7.8		4260	268	ND		0.73	6.06		518	0.66	ND	123	0.0476	1.32
	08/09/2005	2.71		719	36.8	ND		ND	1.92		251	ND	ND	213	ND	4.24
POND2	8/2/2004	5.13		3130	232	ND		0.404	3.43		348	0.487	ND	151	ND	0.974
	9/23/2004	5.04		3060	219	ND		0.309	4.91		347	ND	0.0322	128	ND	0.986
	5/3/2005	5.8		3170	189	ND		0.442	4.55		349	ND	ND	184	ND	0.971
	7/12/2005	7.3		3330	235	ND		1.16	5.23		452	0.41	ND	234	0.0775	1.31
	9/8/2005	6.28		4220	310	ND		0.495	5.81		352	ND	0.0396	168	ND	1.14
POND3	02/08/2004	4.47		2960	151	ND		0.467	3.76		277	0.505	ND	307	ND	0.966
	23/09/2004	5.43		2840	155	ND		0.684	4.71		271	0.39	0.0377	242	ND	0.966
	03/05/2005	3.78		2650	155	12.1		0.548	4.04		245	ND	ND	235	ND	0.967
	12/07/2005	6.53		3330	159	ND		ND	4.7		407	2.9	ND	315	0.079	2.7
	08/09/2005	4.56		3180	185	ND		ND	5.04		342	ND	ND	312	ND	1.76
POND4	8/2/2004	1.96		1250	79.3	18		0.63	2.04		169	0.949	ND	360	ND	0.981
	9/23/2004	2.11		1300	98.4	ND		1.06	3.05		154	0.91	0.0481	353	ND	0.972
	5/3/2005	1.98		1150	76	85		0.892	2.33		159	0.648	ND	336	ND	0.987
	7/12/2005	1.76		1220	83.6	ND		ND	2.12		197	6.01	ND	389	0.0825	4.61
	9/8/2005	2.49		1370	103	ND		ND	3.43		175	ND	ND	463	ND	4.05

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Vanadium	Zinc	Zinc-SEM	Chloride	Fluoride	Sulfate	Sulfur	Acid-Volatile Sulfide	Cyanide	Cyanide, Weak Acid Dissociable	Nitrogen, Ammonia (as N)
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
NHRIV	7/22/2004	28.2	40.2		1.97	ND	68.4			0.047		21.4
	9/20/2004	29.5	36.4		1.53	0.801	61.5			ND		ND
	5/5/2005	30.3	47		1.78	1.97	31.2			ND		35.2
	7/11/2005	37	34.8		0.847	ND	2.71			ND		22.1
	9/7/2005	27.3	41.7		0.754	1.24	3.65			ND		16.2
POND1	02/08/2004	20.3	33.8		0.544	ND	15.7			0.035		57.7
	23/09/2004	6.98	10.8		4.3	6.73	42.9			0.12		179
	05/05/2005	35.3	40		1.43	ND	5.96			ND		35.4
	12/07/2005	34	48.2		0.984	ND	ND			ND		27.5
	08/09/2005	5.58	12.3		9.79	4.35	4.44			ND		528
POND2	8/2/2004	21.9	32.9		1.64	ND	16.2			ND		69.4
	9/23/2004	22.7	36		9.83	ND	17.4			0.027		ND
	5/3/2005	28.3	33.8		1.57	1.24	52.6			ND		45.9
	7/12/2005	39.1	41.8		0.906	0.658	1.82			ND		50.5
	9/8/2005	31.1	50.7		1.04	1.17	1.3			ND		37.8
POND3	02/08/2004	19.8	37.1		1.67	3.63	256			0.23		216
	23/09/2004	21.7	42.7		6.01	16.7	287			0.12		73.2
	03/05/2005	19.1	35.7		2.55	6.73	197			0.035		128
	12/07/2005	25.4	49.4		2.72	ND	21.1			0.033		223
	08/09/2005	20.8	40.3		1.56	1.76	42.1			ND		82.4
POND4	8/2/2004	19.7	28.8		12.8	2.84	201			ND		672
	9/23/2004	31.6	35.1		9.05	12.5	173			0.12		125
	5/3/2005	28.1	31.4		9.69	12.1	172			1.6		367
	7/12/2005	28.8	31.6		5.5	ND	11.8			ND		509
	9/8/2005	36	37.4		10.4	4.08	11.4			ND		543

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Cadmium-SEM	Calcium	Chromium	Cobalt	Copper	Copper-SEM	Iron
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
POND5	03/08/2004	3230	ND	0.917	11.2	0.0395	ND	ND	ND		1070	1.66	1.45	1.99		5440
	24/09/2004	3090	ND	1.16	11.6	0.0342	ND	ND	ND		952	1.74	1.45	2.42		5780
	04/05/2005	6080	ND	1.08	9.17	0.0505	ND	ND	ND		1470	3.92	2.49	11		8740
	16/07/2005	8160	ND	0.968	14.7	0.103	ND	ND	ND		2380	4.32	4.28	12.5		8240
	10/09/2005	5910	ND	1.44	14.5	0.064	ND	0.644	ND		1580	2.37	1.9	3.44		8570
POND6	8/30/2006	6470	0.0409	1.75	14.1	0.0902	0.262	1.68	ND	ND	1480	6.72	2.32	8.7	4.3	7180
	10/4/2007	9300	0.25	0.83	13	0.069	ND	ND	0.048		800	5.1	1.4	6		8100
PSC	13/07/2005	16600	0.0929	4.37	25.9	0.14	ND	4.42	0.283		6540	17	16.2	119		21500
PSD	7/13/2005	15500	0.0794	5.12	15.6	0.192	ND	ND	0.447		5780	49.6	15	58.1		21300
SWQ1	8/30/2006	10800	ND	13.1	78.1	0.0638	0.252	1.86	ND	ND	6900	1.95	5.98	18.9	6.4	8510
	04/10/2007	18000	0.46	3.1	71	0.17	ND	ND	0.099		1900	5.8	5.4	54		31000
SWQ2	8/30/2006	12200	ND	4.52	33.4	0.133	0.238	2.94	0.32	0.3	3060	42	12.7	41.7	29.4	ND
	9/13/2007	9000	0.23	4.8	9.4	0.13	ND	ND	0.23		970	22	6.7	17		12000
SWQ3	8/30/2006	12600	ND	1.75	12.1	0.0807	0.283	2.52	ND	ND	1660	24.8	8.09	15.4	7.9	19100
	04/10/2007	44000	0.65	3	44	0.3	ND	ND	0.28		1000	12	2.4	34		20000
SWQ4	8/30/2006	10600	ND	4.3	28.6	0.109	ND	5.95	0.108	0.1	9960	19.3	8.82	22.3	13.3	15200
	10/4/2007	14000	0.19	6.5	50	0.12	ND	ND	0.23		4200	28	11	49		22000

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Lead	Lead-SEM	Magnesium	Manganese	Mercury	Mercury-SEM	Molybdenum	Nickel	Nickel-SEM	Potassium	Selenium	Silver	Sodium	Thallium	Tin
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(µg/Kg)	(µg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
POND5	03/08/2004	1.29		988	146	ND		ND	0.389		125	0.478	ND	194	ND	0.957
	24/09/2004	1.58		980	116	ND		ND	0.884		102	ND	ND	150	ND	0.972
	04/05/2005	1.57		871	136	ND		0.353	1.27		105	ND	ND	207	ND	0.983
	16/07/2005	1.59		912	112	21.6		ND	1.09		107	0.835	ND	404	0.0296	1.67
	10/09/2005	5.53		1320	156	ND		ND	1.11		160	ND	ND	277	0.0149	1.33
POND6	8/30/2006	1.43	ND	1730	74.3	ND	ND	ND	5.13	3	83	1.81	ND	335	0.0823	1.31
	10/4/2007	1.5		980	47	ND		0.25	2.2		51	0.41	0.25	150	0.25	ND
PSC	13/07/2005	0.443		13800	598	ND		0.773	11.7		495	0.967	ND	148	0.0583	1.27
PSD	7/13/2005	1.62		12700	483	ND		0.517	20.6		387	0.73	ND	145	0.0307	1.32
SWQ1	8/30/2006	0.553	ND	3260	141	ND	ND	7.47	5.33	0.3	898	0.657	ND	699	0.0816	1.26
	04/10/2007	1.3		5400	140	ND		22	4		1100	1.3	0.46	120	0.46	ND
SWQ2	8/30/2006	3.27	3.1	11600	485	ND	ND	ND	22.8	3.8	506	0.658	ND	173	0.0825	1.19
	9/13/2007	1.8		3000	290	9.2		0.31	10		160	0.43	0.23	100	0.23	0.58
SWQ3	8/30/2006	2.82	1.8	8640	318	ND	ND	ND	17.7	6.5	197	1.85	ND	205	0.11	1.41
	04/10/2007	3.9		1500	63	100		1.5	3.7		130	3.2	0.65	170	0.65	1.6
SWQ4	8/30/2006	1.88	ND	8230	380	ND	ND	ND	14	2.7	715	ND	ND	1420	0.0147	1.24
	10/4/2007	3.4		12000	380	ND		1.2	16		500	0.34	0.19	250	0.19	ND

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals

Pebble Project
Summary of Transportation Corridor
Sediment Inorganic Analytical Results, 2004-2007

Sample Station	Date	Vanadium	Zinc	Zinc-SEM	Chloride	Fluoride	Sulfate	Sulfur	Acid-Volatile Sulfide	Cyanide	Cyanide, Weak Acid Dissociable	Nitrogen, Ammonia (as N)
Location ID	Sampled	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
POND5	03/08/2004	14.7	21.8		0.576	ND	6.82			ND		12
	24/09/2004	15	27.4		2.12	ND	11.5			0.045		4.39
	04/05/2005	35.8	17.8		2.82	4.01	56.7			0.048		79.1
	16/07/2005	22.4	14.6		1.72	0.672	13.7			0.057		92.8
	10/09/2005	19.1	24.5		1.01	1.37	9.36			ND		26.9
POND6	8/30/2006	35.6	14.7	5.4	0.901	ND	3.29	197	ND	0.04		93.4
	10/4/2007	30	10		ND	ND	3.5			ND		150
PSC	13/07/2005	68.4	68.7		ND	ND	1.46			ND		ND
PSD	7/13/2005	61.7	95.1		0.885	ND	2.62			ND		ND
SWQ1	8/30/2006	28.9	20.1	4.5	0.714	ND	1.96			ND		13
	04/10/2007	69	24		ND	0.32	6.3			ND		570
SWQ2	8/30/2006	69.8	79.4	30.6	ND	ND	2.37	199	ND	ND		15.2
	9/13/2007	52	26		ND	0.78	2			ND		31
SWQ3	8/30/2006	44.5	28	6.6	1.48	ND	3.41	129	ND	0.066		91.1
	04/10/2007	64	16		4.8	ND	6.2			16		320
SWQ4	8/30/2006	46.6	45.6	16.6	927	1.09	157	234	ND	ND		20.7
	10/4/2007	57	53		1.6	ND	5.2			9.3		130

mg/Kg milligram per kilogram

µg/Kg microgram per kilogram

ND not detected above method reporting limit

SEM Acid Volatile Sulfides Simultaneous Extracted Metals