M E M O R A N D U M

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To: File 742577

From: Steve Rossello

Subject: RHRL – Preliminary Evaluation of Trench Area Groundwater Extraction

cc: Steve Miller, P.E.
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The groundwater extraction trench with a downgradient HDPE barrier was installed to extract groundwater from the overburden and shallow bedrock in the South Area. While the HDPE barrier assists with groundwater control, the primary purpose to the HDPE barrier was to limit the potential downgradient migration of NAPL and the secondary purpose was to limit the infiltration of water into the trench from the South Pond.

Paired piezometers were installed to assess the effectiveness of groundwater extraction. One piezometer of each pair was installed in the groundwater extraction trench; the second piezometer of each pair was installed downgradient of the trench and barrier, approximately five feet from the trench piezometer. The trench piezometers were screened in bedrock and in the trench backfill both to measure water levels in the trench and to facilitate collection of groundwater from the shallow bedrock. The downgradient piezometers were screened in the till, just above bedrock. Although the in-trench piezometers are screened both in the trench backfill and the bedrock, the measured water levels represent water levels in the trench because the trench backfill has a much higher hydraulic conductivity than the bedrock. Water levels in a monitoring well that is screened in multiple zones are dominated by the most transmissive zone. The measured hydraulic conductivity of the trench backfill materials is 60 ft/day (2×10^{-2} cm/sec), while the measured average hydraulic conductivity of the bedrock is only 0.3 feet per day. Therefore, it is very unlikely that the water level readings are influenced by the bedrock water levels.

To assess the effectiveness of the groundwater extraction trench, groundwater elevations in the trench piezometers were initially compared to groundwater elevations in the downgradient piezometers. Since July 2006, weekly water-level measurements have been collected from both the monitoring wells and the collection sumps. Water levels are measured manually in the piezometers and with dedicated transducers in the sumps. Groundwater elevations are tabulated on Table 1; supporting data are provided on Table 2. As shown on Table 3, Figure 1, and Figure 2, water levels in the trench have generally been lower than in the downgradient piezometer at locations TMW-1/TMW-2 located at the north end of the trench, and SSC-2/TMW-4 located between sumps S-1 and S-2. Water levels at TMW-7/TMW-8 located at the south end of the trench show almost no gradient between the pair; water levels in the two

piezometers are within a few hundredths of a foot. Water levels at piezometer-pair locations SSC-1/TMW-3 located between sumps S-1 and S-2, and SSC-3/TMW-5 located between sumps S-2 and S-3, have been sporadically higher in the trench piezometers than in the respective downgradient piezometers. The water levels at piezometer-pair location SSC-4/TMW-6, located between sumps S-2 and S-3, frequently have been higher in the trench piezometer than in the downgradient piezometer.

As shown on Figure 1, a further review of water-level observations over time shows that groundwater extraction in the trench exerts hydraulic control by lowering water levels in formation outside of the trench. As an example, at the end of September, 2006, the water-levels in the sumps S-1 and S-2 were lowered to below the elevation of the South Pond to better demonstrate hydraulic control. North of sump S-2, the water levels in both the in-trench and in the downgradient piezometers rapidly decreased, demonstrating the hydraulic influence of the trench. The water level in S-3 was also lowered, but due to the high bedrock, could not be lowered below pond level. South of S-2, the water-level changes in the piezometers were less dramatic, likely due to the high bedrock that limited the depth of the trench.

North of S-2, the hydraulic control of the overburden by the groundwater trench is clearly demonstrated by large drawdowns in both the trench and downgradient piezometers and the comparative analysis of trench and downgradient groundwater elevations. While not necessary for hydraulic control, water levels in the piezometers and trench north of S-2 are generally lower than the level of the South Pond, further demonstrating control.

South of S-2, the drawdowns in the trench and piezometers, while less than in the north, are still significant and indicative of groundwater extraction and the mitigation of migration. The water levels in piezometer SSC-4, located in the trench between sumps S-2 and S-3, are frequently higher than in downgradient piezometer TMW-6. Water levels at the end of the trench in MW-8 are about the same as in MW-7, just outside the trench. However, based on the high permeability of the trench backfill, low hydraulic gradient and low permeability of the adjacent till, water in the south portion of the trench is more likely to travel through the high permeability trench backfill to the sumps than migrate to the east.

Groundwater from the shallow bedrock is being collected both through the portions of the trench in direct contact with bedrock and the in-trench piezometers that connect the shallow bedrock with the trench. Upwelling of shallow bedrock groundwater into the trench is aided by the natural upward hydraulic gradients between the bedrock and the overburden documented during the RI.

It is recommended that routine water-level data continue to be collected in accordance with the Draft O&M Plan to further evaluate the influence of sump set points on trench water levels

and to assess seasonal influences on the collection system and water levels. It is also recommended that groundwater sampling and analysis pursuant to O&M activities be initiated. The southern end of the groundwater extraction trench was installed to collect low concentrations of VOCs. An analysis of water samples collected from piezometers during O&M activities would provide data to assess the concentrations of VOCs, if present, at the southern end of the trench.

Prior to construction, five monitoring wells were located in the vicinity of the trench alignment (MW-3S, MW-3D, MW-5D, MW-7S, and MW-7D). All but MW-7D were destroyed during construction of the groundwater extraction trench. It is not believed that the loss of the monitoring wells has significantly affected the ability to monitor the effectiveness of the remedy because a dedicated piezometer system was installed to monitor the remedy pursuant to the approved remedial design. Although the exact replacement of the monitoring wells is not necessarily warranted, additional bedrock monitoring wells in the vicinity of the trench would help assess the effects of the trench on shallow bedrock groundwater. Those wells could be used to assess whether hydraulic gradients in the shallow bedrock are towards the trench or to assess hydraulic response during a recovery test as was conducted in the North Area. However, the need for and location of additional monitoring wells in the vicinity of the trench should be determined based on evaluation of groundwater quality data collected from the vicinity of the trench.

TABLE 1

RECOVERY TRENCH WATER ELEVATIONS
RICHARDSON HILL ROAD LANDFILL
SIDNEY CENTER, NEW YORK

	TMW-1	S-1	SSC-1	SSC-2	S-2	SSC-3	SSC-4	S-3	TMW-8	TMW-2	TMW-3	TMW-4	TMW-5	TMW-6	TMW-7	staff gauge
TOC (before 10/18/06):	1754.06		1755.43	1758.14		1760.21	1758.53		1755.23	1754.11	1755.47	1758.29	1760.25	1758.53	1755.46	1743.93
TOC (10/18/06 and after):															1755.3	
Transducer Elevation:		1737.59			1739.94			1743.71								
07/06/06	1745.41	#N/A	1745.03	1744.86	#N/A	1745.84	1746.98	#N/A	1746.72	1745.80	1745.01	1745.07	1746.66	1746.79	1746.72	#N/A
07/10/06	1745.36	#N/A	1744.93	1744.96	#N/A	1745.74	1746.93	#N/A	1746.70	1745.70	1744.93	1745.00	1746.38	1746.70	1746.72	#N/A
07/24/06	1745.59	#N/A	1744.89	1744.94	#N/A	1745.72	1746.81	#N/A	1746.61	1745.32	1744.86	1744.97	1746.15	1746.73	1746.61	#N/A
08/07/06	1745.12	#N/A	1744.80	1744.83	#N/A	1745.65	1746.69	#N/A	1746.60	1745.40	1744.77	1744.84	1746.07	1746.44	1746.55	#N/A
08/15/06	1745.17	#N/A	1744.53	1743.83	#N/A	1745.30	1745.98	#N/A	1745.72	1745.41	1744.44	1743.90	1745.57	1745.81	1745.72	#N/A
08/22/06	1745.49	1744.54	1744.51	1743.79	1743.90	1745.48	1746.04	1744.92	1745.56	1745.27	1744.44	1743.89	1745.57	1746.00	1745.57	#N/A
09/06/06	1745.20	1744.16	1744.40	1743.80	1743.93	1745.55	1746.33	1744.57	1745.62	1745.59	1744.57	1743.99	1745.71	1746.32	1745.64	1742.85
09/12/06	1745.01	1744.14	1744.29	1743.70	1743.82	1746.11	1747.85	#N/A	1747.83	1745.35	1744.27	1743.95	1745.93	1747.42	1747.83	1743.03
09/21/06	1745.05	1744.23	1744.35	1743.74	1743.86	1745.47	1746.15	1744.58	1745.21	1745.38	1744.32	1743.98	1745.57	1746.00	1745.17	1742.95
09/26/06	1745.09	1744.54	1744.43	1743.83	1743.99	1745.46	1746.15	1744.94	1745.21	1745.40	1744.41	1743.96	1745.50	1745.93	1745.20	1743.01
09/29/06	1743.11	1741.78	1741.97	1741.31	1741.26	1745.58	1746.23	1744.92	1745.39	1743.53	1742.03	1741.83	1745.55	1746.12	1745.37	1742.93
10/03/06	1743.42	1742.03	1742.18	1741.29	1741.15	1745.49	1746.40	1744.80	1745.31	1743.87	1742.17	1741.83	1745.49	1746.27	1745.32	1742.87
10/10/06	1742.91	1741.47	1741.84	1741.54	1741.85	1745.33	1746.39	1744.84	1745.19	1743.36	1741.89	1741.84	1745.32	1746.10	1745.18	1742.95
10/18/06	1742.50	1741.20	1741.70	1741.52	1741.92	1745.31	1746.23	1744.54	1745.17	1742.92	1741.70	1741.77	1745.15	1745.99	1745.17	1742.87
10/23/06	1743.75	1742.19	1742.23	1741.30	1741.47	1745.49	1746.50	1744.58	1745.28	1744.20	1742.25	1741.81	1745.42	1746.34	1745.25	1742.71
10/31/06	1744.12	1742.68	1742.53	1741.31	1741.16	1745.53	1746.75	1745.43	1745.61	1744.58	1742.54	1741.92	1745.46	1746.53	1745.60	1742.63
11/07/06	1743.56	1742.11	1742.22	1741.59	1741.83	1745.46	1746.50	1745.64	1745.43	1744.02	1742.27	1741.90	1745.35	1746.25	1745.44	1742.83
11/14/06	1743.39	1742.14	1742.13	1741.14	1741.06	1745.51	1746.53	1745.29	1745.52	1743.81	1742.15	1741.69	1745.35	1746.34	1745.50	1742.85
11/22/06	1744.16	1742.73	1742.73	1741.23	1741.00	1745.50	1746.79	1745.48	1745.50	1744.62	1742.57	1741.79	1745.46	1746.53	1745.50	1742.71
11/29/06	1743.52	1742.15	1742.23	1741.29	1741.38	1745.49	1746.60	1745.66	1745.47	1743.96	1742.23	1741.70	1745.35	1746.33	1745.47	1742.85
12/06/06	1743.63	1742.22	1743.33	1741.59	1741.80	1745.51	1746.63	1745.38	1745.48	1744.10	1742.32	1741.91	1745.35	1746.63	1745.47	1742.83
12/12/06	1743.17	1741.86	1742.06	1741.32	1741.51	1745.47	1746.55	1745.68	1745.42	1743.59	1742.04	1741.66	1745.26	1746.24	1745.40	1742.93
12/19/06	1742.91	1741.74	1741.93	1741.44	1741.54	1745.48	1746.44	1745.53	1745.33	1743.31	1741.97	1741.79	1745.22	1746.17	1745.32	1743.01
12/27/06	1743.64	1742.27	1742.26	1741.29	1741.29	1745.59	1746.58	1745.27	1745.46	1744.07	1742.29	1741.78	1745.39	1746.42	1745.47	1742.89
01/03/07	1743.65	1742.22	1742.33	1741.34	1741.69	1745.61	1746.73	1745.59	1745.45	1744.08	1742.34	1741.78	1745.35	1746.45	1745.42	1742.93
01/09/07	1744.76	1743.36	1743.28	1742.06	1741.92	1745.71	1747.01	1745.25	1745.61	1745.18	1743.26	1742.51	1745.55	1746.80	1745.58	1742.67
01/18/07	1745.81	1744.50	1744.58	1743.44	1743.40	1745.71	1746.88	1745.01	1745.63	1746.19	1744.53	1743.75	1745.65	1746.70	1745.60	1742.73
01/24/07	1744.22	1742.88	1742.88	1741.74	1741.52	1745.71	1747.02	1745.03	1745.42	1744.66	1742.87	1742.18	1745.45	1746.61	1745.40	1743.93
01/31/07	1743.23	1742.02	1742.23	1741.59	1741.51	1745.61	1746.58	1745.04	1746.18	1743.64	1742.22	1741.92	1745.27	1746.23	1745.25	1743.93
02/07/07	1742.85	1741.63	1742.00	1741.65	1741.87	1745.61	1746.43	1746.84	1745.53	1743.21	1741.97	1741.82	1745.17	1746.06	1745.52	1743.93
02/12/07	1742.62	1741.46	1741.76	1741.39	1741.56	1745.59	1746.23	1746.58	1745.51	1742.97	1741.71	1741.54	1745.10	1745.86	1745.48	1743.93
02/21/07	1742.41	1741.29	1741.63	1741.34	1741.55	1745.58	1746.28	1746.81	1745.50	1742.73	1741.59	1741.46	1745.00	1745.70	1745.45	1743.93
02/28/07	1742.36	1741.33	1741.71	1741.65	1741.89	1745.58	1745.95	1746.84	1745.45	1742.67	1741.72	1741.71	1744.99	1745.59	1745.45	1743.93
03/07/07	1742.88	1741.70	1742.00	1741.60	1741.93	1745.58	1746.20	1746.70	1745.58	1743.24	1742.04	1741.84	1745.17	1745.99	1745.55	1743.93
03/14/07	1743.70	1742.36	1742.45	1741.74	1741.61	1745.70	1746.51	1746.41	1745.68	1744.10	1742.48	1742.09	1745.35	1746.33	1745.65	1743.93
03/22/07	1745.73	1744.39	1744.53	1743.43	1743.28	1745.96	1746.78	1745.74	1745.74	1746.14	1744.49	1743.72	1745.55	1746.53	1745.70	1743.93
03/28/07	1749.21	1748.09	1748.48	1747.84	1747.74	1748.01	1748.53	1746.30	1748.38	1749.38	1748.37	1747.87	1747.13	1748.11	1748.36	1742.21
04/03/07	1748.86	1747.79	1748.18	1747.42	1747.25	1747.49	1748.02	1747.46	1747.78	1749.09	1748.04	1747.42	1747.62	1747.87	1747.75	1742.53
04/10/07	1747.01	1746.04	1746.33	1745.46	1745.31	1745.71	1746.83	1745.76	1746.00	1747.31	1746.23	1745.60	1746.61	1746.63	1745.94	1743.93
04/18/07	1748.34	1747.39	1747.68	1746.91	1746.73	1746.79	1746.88	1745.92	1746.08	1748.59	1747.57	1746.99	1746.65	1746.82	1746.05	1743.93
04/24/07	1749.04	1747.63	1748.35	1747.60	1747.41	1747.46	1746.90	1746.01	1746.05	1749.20	1748.20	1747.62	1747.69	1746.75	1746.00	1742.47
05/02/07	1747.26	1746.38	1746.69	1745.93	1745.72	1745.91	1746.66	1746.06	1746.01	1747.56	1746.61	1746.03	1746.75	1746.47	1745.97	1742.66
05/09/07	1745.43	1744.47	1744.71	1743.94	1743.70	1745.70	1746.68	1746.07	1745.87	1745.79	1744.67	1744.16	1745.87	1746.37	1745.83	1742.85
05/15/07	1744.45	1743.39	1743.54	1742.74	1742.50	1745.66	1746.61	1746.04	1745.83	1744.83	1743.54	1743.07	1745.60	1746.28	1745.80	1742.91
05/23/07	1743.36	1742.21	1742.38	1741.62	1741.32	1745.61	1746.43	1746.07	1745.80	1743.71	1742.39	1742.00	1745.40	1746.08	1745.77	1742.95
06/07/07	1740.55	1739.06	1739.73	1740.24	1740.42	1745.53	1746.21	1745.33	1745.28	1741.00	1739.97	1740.47	1745.17	1745.83	1745.23	1743.01
06/14/07	1740.46	1739.04	1739.91	1740.10	1740.25	1745.47	1745.99	1745.49	1745.13	1740.87	1739.91	1740.28	1745.05	1745.55	1745.10	1743.07
06/20/07	1740.42	1738.68	1739.88	1739.94	1740.14	1745.33	1745.89	1745.66	1745.13	1740.79	1739.84	1739.85	1744.95	1745.41	1745.10	1743.05
06/28/07	1740.46	1739.49	1740.03	1739.98	1740.14	1745.16	1745.82	1745.47	1745.16	1740.86	1739.92	1740.14	1744.80	1745.36	1745.14	1743.03

Elevations are in feet
TOC elevations from Lawson Surveying and Mapping (August 2006).
Water elevations at the sumps are calculated using height of water above the transducer recorded by OMI.
Water elevations at the piezometers and staff gauge are calculated using depth from TOC to water recorded by OMI.
In mid October, 2006, inner casing for MW-07 was cut down so that the well could be locked. Both MW-08 and MW-07 were resurveyed.

TABLE 2

TRENCH AREA GROUNDWATER DATA
RICHARDSON HILL ROAD LANDFILL
SIDNEY CENTER, NEW YORK

	DEPTH TO WATER IN FEET												TRANSDUCER			
	SSC-1	SSC-2	SSC-3	SSC-4	TMW-1	TMW-2	TMW-3	TMW-4	TMW-5	TMW-6	TMW-7	TMW-8	S-1	S-2	S-3	staff gauge
07/06/06	10.40	13.28	14.37	11.55	8.65	8.31	10.46	13.22	13.59	11.74	8.74	8.51	#N/A	#N/A	#N/A	#N/A
07/10/06	10.50	13.18	14.47	11.60	8.70	8.41	10.54	13.29	13.87	11.83	8.74	8.53	#N/A	#N/A	#N/A	#N/A
07/24/06	10.54	13.20	14.49	11.72	8.47	8.79	10.61	13.32	14.10	11.80	8.85	8.62	#N/A	#N/A	#N/A	#N/A
08/07/06	10.63	13.31	14.56	11.84	8.94	8.71	10.70	13.45	14.18	12.09	8.91	8.63	#N/A	#N/A	#N/A	#N/A
08/15/06	10.90	14.31	14.91	12.55	8.89	8.70	11.03	14.39	14.68	12.72	9.74	9.51	#N/A	#N/A	#N/A	#N/A
08/22/06	10.92	14.35	14.73	12.49	8.57	8.84	11.03	14.40	14.68	12.53	9.89	9.67	6.95	3.96	1.21	#N/A
09/06/06	11.03	14.34	14.66	12.20	8.86	8.52	10.90	14.30	14.54	12.21	9.82	9.61	6.57	3.99	0.86	1.08
09/12/06	11.14	14.44	14.10	10.68	9.05	8.76	11.20	14.34	14.32	11.11	7.63	7.40	6.55	3.88	#N/A	0.90
09/21/06	11.08	14.40	14.74	12.38	9.01	8.73	11.15	14.31	14.68	12.53	10.29	10.02	6.64	3.92	0.87	0.98
09/26/06	11.00	14.31	14.75	12.38	8.97	8.71	11.06	14.33	14.75	12.60	10.26	10.02	6.95	4.05	1.23	0.92
09/29/06	13.46	16.83	14.63	12.30	10.95	10.58	13.44	16.46	14.70	12.41	10.09	9.84	4.19	1.32	1.21	1.00
10/03/06	13.25	16.85	14.72	12.13	10.64	10.24	13.30	16.46	14.76	12.26	10.14	9.92	4.44	1.21	1.09	1.06
10/10/06	13.59	16.60	14.88	12.14	11.15	10.75	13.58	16.45	14.93	12.43	10.28	10.04	3.88	1.91	1.13	0.98
10/18/06	13.73	16.62	14.90	12.30	11.56	11.19	13.77	16.52	15.10	12.54	10.13	10.06	3.61	1.98	0.83	1.06
10/23/06	13.20	16.84	14.72	12.03	10.31	9.91	13.22	16.48	14.83	12.19	10.05	9.95	4.60	1.53	0.87	1.22
10/31/06	12.90	16.83	14.68	11.78	9.94	9.53	12.93	16.37	14.79	12.00	9.70	9.62	5.09	1.22	1.72	1.30
11/07/06	13.21	16.55	14.75	12.03	10.50	10.09	13.20	16.39	14.90	12.28	9.86	9.80	4.52	1.89	1.93	1.10
11/14/06	13.30	17.00	14.70	12.00	10.67	10.30	13.32	16.60	14.90	12.19	9.80	9.71	4.55	1.12	1.58	1.08
11/22/06	12.70	16.91	14.71	11.74	9.90	9.49	12.90	16.50	14.79	12.00	9.80	9.73	5.14	1.06	1.77	1.22
11/29/06	13.20	16.85	14.72	11.93	10.54	10.15	13.24	16.59	14.90	12.20	9.83	9.76	4.56	1.44	1.95	1.08
12/06/06	12.10	16.55	14.70	11.90	10.43	10.01	13.15	16.38	14.90	11.90	9.83	9.75	4.63	1.86	1.67	1.10
12/12/06	13.37	16.82	14.74	11.98	10.89	10.52	13.43	16.63	14.99	12.29	9.90	9.81	4.27	1.57	1.97	1.00
12/19/06	13.50	16.70	14.73	12.09	11.15	10.80	13.50	16.50	15.03	12.36	9.98	9.90	4.15	1.60	1.82	0.92
12/27/06	13.17	16.85	14.62	11.95	10.42	10.04	13.18	16.51	14.86	12.11	9.83	9.77	4.68	1.35	1.56	1.04
01/03/07	13.10	16.80	14.60	11.80	10.41	10.03	13.13	16.51	14.90	12.08	9.88	9.78	4.63	1.75	1.88	1.00
01/09/07	12.15	16.08	14.50	11.52	9.30	8.93	12.21	15.78	14.70	11.73	9.72	9.62	5.77	1.98	1.54	1.26
01/18/07	10.85	14.70	14.50	11.65	8.25	7.92	10.94	14.54	14.60	11.83	9.70	9.60	6.91	3.46	1.30	1.20
01/24/07	12.55	16.40	14.50	11.51	9.84	9.45	12.60	16.11	14.80	11.92	9.90	9.81	5.29	1.58	1.32	
01/31/07	13.20	16.55	14.60	11.95	10.83	10.47	13.25	16.37	14.98	12.30	10.05	9.05	4.43	1.57	1.33	
02/07/07	13.43	16.49	14.60	12.10	11.21	10.90	13.50	16.47	15.08	12.47	9.78	9.70	4.04	1.93	3.13	
02/12/07	13.67	16.75	14.62	12.30	11.44	11.14	13.76	16.75	15.15	12.67	9.82	9.72	3.87	1.62	2.87	
02/21/07	13.80	16.80	14.63	12.25	11.65	11.38	13.88	16.83	15.25	12.83	9.85	9.73	3.70	1.61	3.10	
02/28/07	13.72	16.49	14.63	12.58	11.70	11.44	13.75	16.58	15.26	12.94	9.85	9.78	3.74	1.95	3.13	
03/07/07	13.43	16.54	14.63	12.33	11.18	10.87	13.43	16.45	15.08	12.54	9.75	9.65	4.11	1.99	2.99	
03/14/07	12.98	16.40	14.51	12.02	10.36	10.01	12.99	16.20	14.90	12.20	9.65	9.55	4.77	1.67	2.70	
03/22/07	10.90	14.71	14.25	11.75	8.33	7.97	10.98	14.57	14.70	12.00	9.60	9.49	6.80	3.34	2.03	
03/28/07	6.95	10.30	12.20	10.00	4.85	4.73	7.10	10.42	13.12	10.42	6.94	6.85	10.50	7.80	2.59	1.72
04/03/07	7.25	10.72	12.72	10.51	5.20	5.02	7.43	10.87	12.63	10.66	7.55	7.45	10.20	7.31	3.75	1.40
04/10/07	9.10	12.68	14.50	11.70	7.05	6.80	9.24	12.69	13.64	11.90	9.36	9.23	8.45	5.37	2.05	
04/18/07	7.75	11.23	13.42	11.65	5.72	5.52	7.90	11.30	13.60	11.71	9.25	9.15	9.80	6.79	2.21	
04/24/07	7.08	10.54	12.75	11.63	5.02	4.91	7.27	10.67	12.56	11.78	9.30	9.18	10.04	7.47	2.30	1.46
05/02/07	8.74	12.21	14.30	11.87	6.80	6.55	8.86	12.26	13.50	12.06	9.33	9.22	8.79	5.78	2.35	1.27
05/09/07	10.72	14.20	14.51	11.85	8.63	8.32	10.80	14.13	14.38	12.16	9.47	9.36	6.88	3.76	2.36	1.08
05/15/07	11.89	15.40	14.55	11.92	9.61	9.28	11.93	15.22	14.65	12.25	9.50	9.40	5.80	2.56	2.33	1.02
05/23/07	13.05	16.52	14.60	12.10	10.70	10.40	13.08	16.29	14.85	12.45	9.53	9.43	4.62	1.38	2.36	0.98
06/07/07	15.70	17.90	14.68	12.32	13.51	13.11	15.50	17.82	15.08	12.70	10.07	9.95	1.47	0.48	1.62	0.92
06/14/07	15.52	18.04	14.74	12.54	13.60	13.24	15.56	18.01	15.20	12.98	10.20	10.10	1.45	0.31	1.78	0.86
06/20/07	15.55	18.20	14.88	12.64	13.64	13.32	15.63	18.44	15.30	13.12	10.20	10.10	1.09	0.20	1.95	0.88
06/28/07	15.40	18.16	15.05	12.71	13.60	13.25	15.55	18.15	15.45	13.17	10.16	10.07	1.90	0.20	1.76	0.90

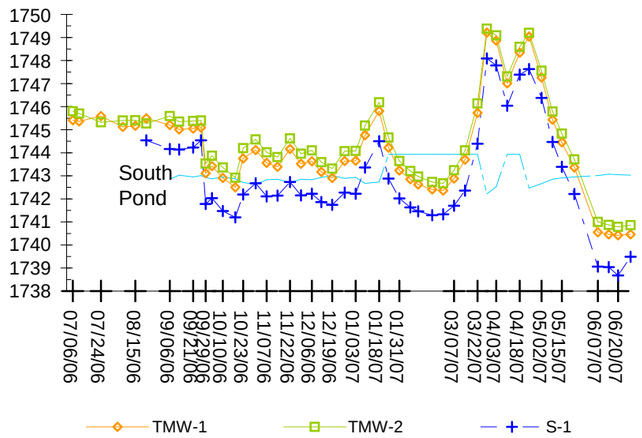
TOC elevations from Lawson Surveying and Mapping (August 2006).
Sump data are feet of water above the transducer recorded by OMI.
Piezometer and staff gauge data are depth in feet from TOC to water recorded by OMI.
In mid October, 2006, inner casing for MW-07 was cut down so that the well could be locked. Both MW-08 and MW-07 were resurveyed.

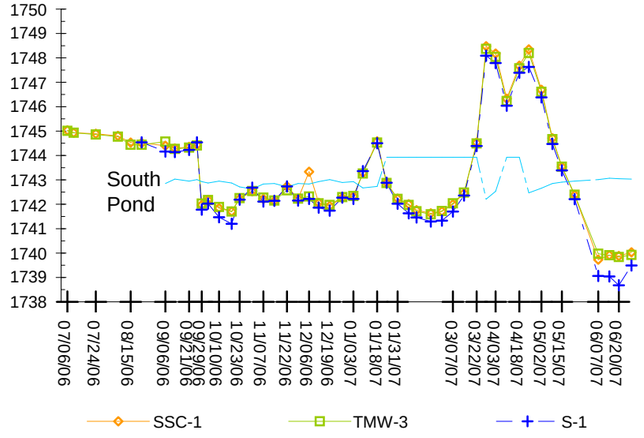
TABLE 3
WATER LEVEL RELATIONSHIPS BETWEEN PAIRED PIEZOMETERS IN THE GROUNDWATER EXTRACTION TRENCH AREA

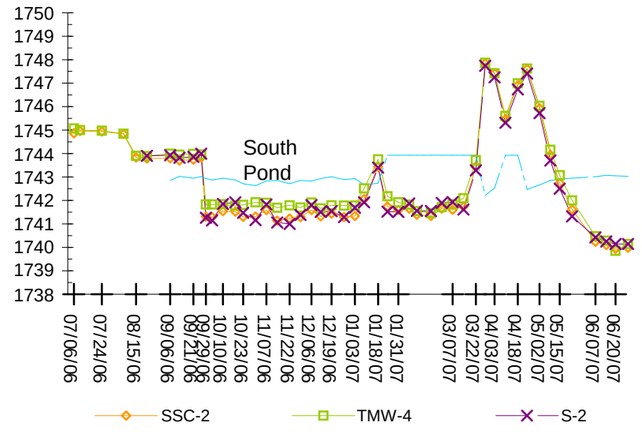
Richardson Hill Road Landfill
Sidney Center, New York

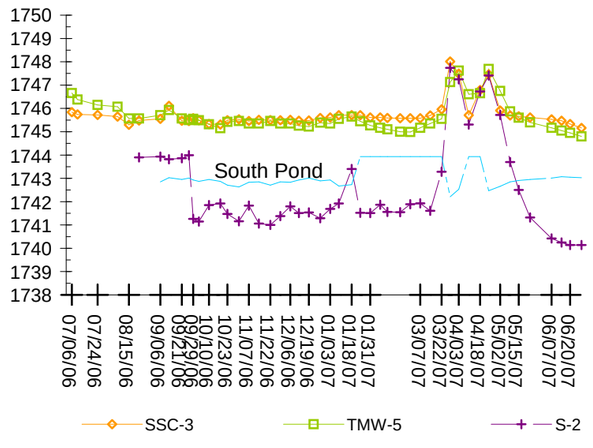
Date	TMW-1/TMW-2	SSC-1/TMW-3	SSC-2/TMW-4	SSC-3/TMW-5	SSC-4/TMW-6	TMW-8/TMW-7
7/6/2006	-0.39	**0.02**	-0.21	-0.82	**0.19**	0.00
7/10/2006	-0.34	0.00	-0.04	-0.64	**0.23**	-0.02
7/24/2006	**0.27**	**0.03**	-0.03	-0.43	**0.08**	0.00
8/7/2006	-0.28	**0.03**	-0.01	-0.42	**0.25**	**0.05**
8/15/2006	-0.24	**0.09**	-0.07	-0.27	**0.17**	0.00
8/22/2006	**0.22**	**0.07**	-0.10	-0.09	**0.04**	-0.01
9/6/2006	-0.39	-0.17	-0.19	-0.16	**0.01**	-0.02
9/12/2006	-0.34	**0.02**	-0.25	**0.18**	**0.43**	0.00
9/21/2006	-0.33	**0.03**	-0.24	-0.10	**0.15**	**0.04**
9/26/2006	-0.31	**0.02**	-0.13	-0.04	**0.22**	**0.01**
9/29/2006	-0.42	-0.06	-0.52	**0.03**	**0.11**	**0.02**
10/3/2006	-0.45	**0.01**	-0.54	0.00	**0.13**	-0.01
10/10/2006	-0.45	-0.05	-0.30	**0.01**	**0.29**	**0.01**
10/18/2006	-0.42	0.00	-0.25	**0.16**	**0.24**	0.00
10/23/2006	-0.45	-0.02	-0.51	**0.07**	**0.16**	**0.03**
10/31/2006	-0.46	-0.01	-0.61	**0.07**	**0.22**	**0.01**
11/7/2006	-0.46	-0.05	-0.31	**0.11**	**0.25**	-0.01
11/14/2006	-0.42	-0.02	-0.55	**0.16**	**0.19**	**0.02**
11/22/2006	-0.46	**0.16**	-0.56	**0.04**	**0.26**	0.00
11/29/2006	-0.44	0.00	-0.41	**0.14**	**0.27**	0.00
12/6/2006	-0.47	**1.01**	-0.32	**0.16**	0.00	**0.01**
12/12/2006	-0.42	**0.02**	-0.34	**0.21**	**0.31**	**0.02**
12/19/2006	-0.40	-0.04	-0.35	**0.26**	**0.27**	**0.01**
12/27/2006	-0.43	-0.03	-0.49	**0.20**	**0.16**	-0.01
1/3/2007	-0.43	-0.01	-0.44	**0.26**	**0.28**	**0.03**
1/9/2007	-0.42	**0.02**	-0.45	**0.16**	**0.21**	**0.03**
1/18/2007	-0.38	**0.05**	-0.31	**0.06**	**0.18**	**0.03**
1/24/2007	-0.44	**0.01**	-0.44	**0.26**	**0.41**	**0.02**
1/31/2007	-0.41	**0.01**	-0.33	**0.34**	**0.35**	**0.93**
2/7/2007	-0.36	**0.03**	-0.17	**0.44**	**0.37**	**0.01**
2/12/2007	-0.35	**0.05**	-0.15	**0.49**	**0.37**	**0.03**
2/21/2007	-0.32	**0.04**	-0.12	**0.58**	**0.58**	**0.05**
2/28/2007	-0.31	-0.01	-0.06	**0.59**	**0.36**	0.00
3/7/2007	-0.36	-0.04	-0.24	**0.41**	**0.21**	**0.03**
3/14/2007	-0.40	-0.03	-0.35	**0.35**	**0.18**	**0.03**
3/22/2007	-0.41	**0.04**	-0.29	**0.41**	**0.25**	**0.04**
3/28/2007	-0.17	**0.11**	-0.03	**0.88**	**0.42**	**0.02**
4/3/2007	-0.23	**0.14**	0.00	-0.13	**0.15**	**0.03**
4/10/2007	-0.30	**0.10**	-0.14	-0.90	**0.20**	**0.06**
4/18/2007	-0.25	**0.11**	-0.08	**0.14**	**0.06**	**0.03**
4/24/2007	-0.16	**0.15**	-0.02	-0.23	**0.15**	**0.05**
5/2/2007	-0.30	**0.08**	-0.10	-0.84	**0.19**	**0.04**
5/9/2007	-0.36	**0.04**	-0.22	-0.17	**0.31**	**0.04**
5/15/2007	-0.38	0.00	-0.33	**0.06**	**0.33**	**0.03**
5/23/2007	-0.35	-0.01	-0.38	**0.21**	**0.35**	**0.03**
6/7/2007	-0.45	-0.24	-0.23	**0.36**	**0.38**	**0.05**
6/14/2007	-0.41	0.00	-0.18	**0.42**	**0.44**	**0.03**
6/20/2007	-0.37	**0.04**	**0.09**	**0.38**	**0.48**	**0.03**
6/28/2007	-0.40	**0.11**	-0.16	**0.36**	**0.46**	**0.02**

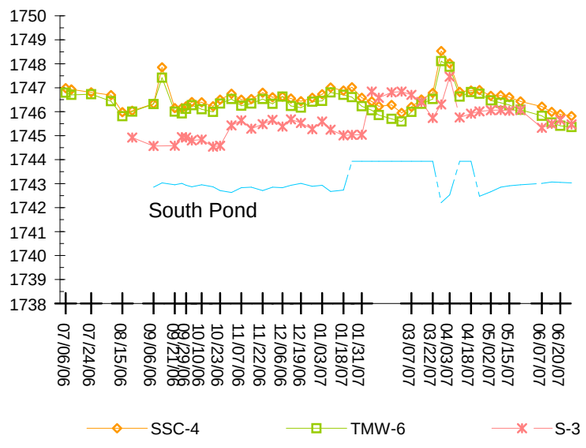
Numbers are difference between downgradient piezometer and trench piezometer in feet. Negative numbers indicate that the water level in the trench is lower than in the downgradient piezometer. Notes: A bolded, positive number indicates water levels in the trench piezometer are higher than in the downgradient piezometer.

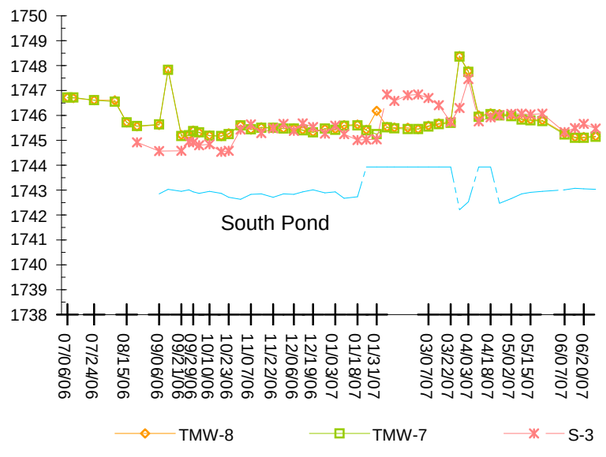


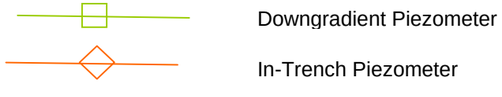










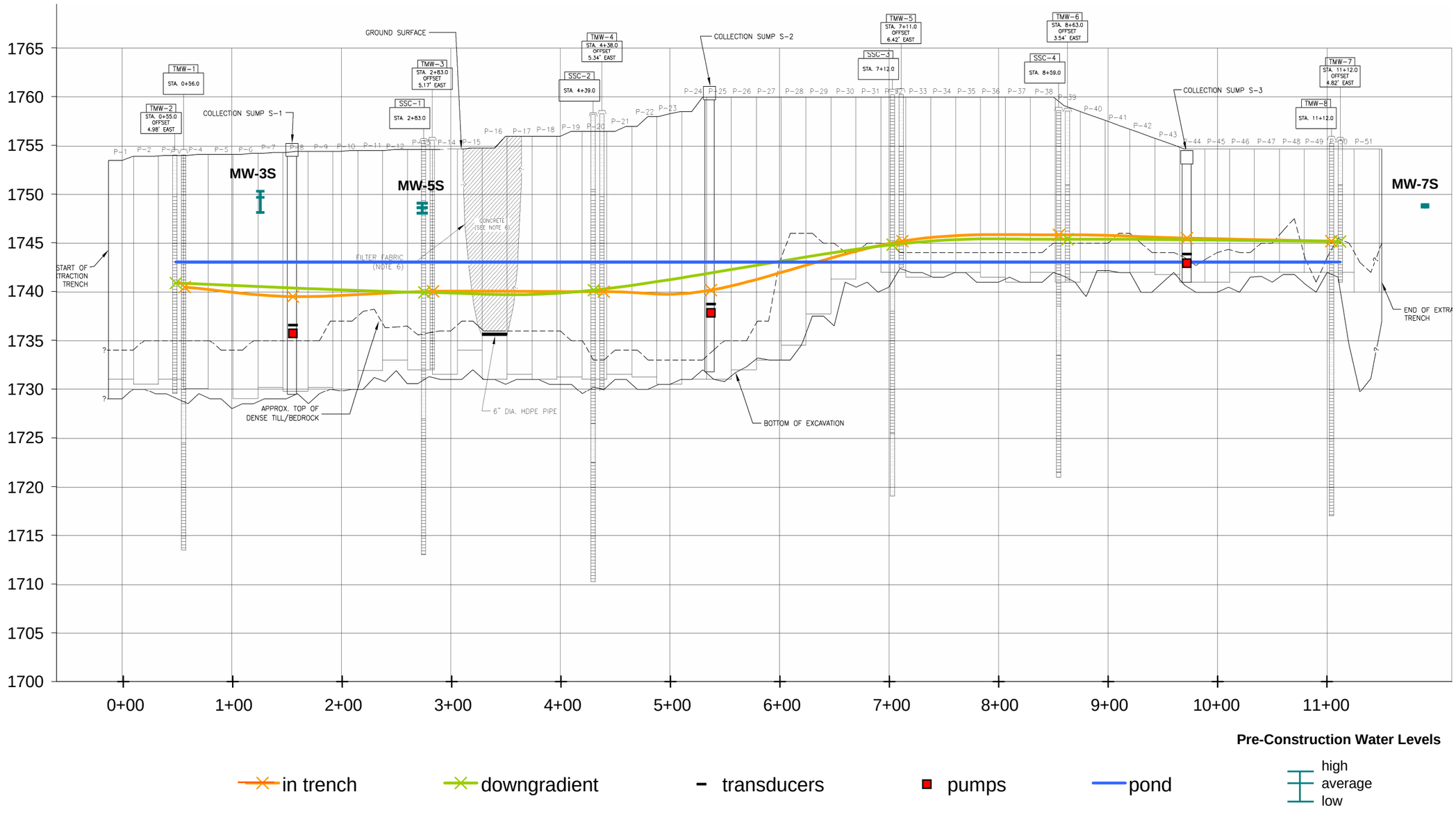


PARSONS

HYDROGRAPHS
JULY 2006 - JUNE 2007
Richardson Hill Road Landfill
Sidney Center, New York

Project No.
742577

Figure 1



PARSONS		**TRENCH WATER-LEVEL PROFILES** **June 28, 2007** **Richardson Hill Road Landfill** **Sidney Center, New York**	Project No. 742577 **Figure 2**