US EPA RECORDS CENTER REGION 5
474130

CONESTOGA-ROVERS & ASSOCIATES

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MEMORANDUM

TO: Michael Berkoff, USEPA

REF. NO.: 056393-08

FROM: Greg Carli/Jodie Dembowske/20

DATE: June 6, 2013

C.C.: 12th Street Landfill Technical Team:
Richard Gay, Weyerhaeuser; Kristi Zakrzewski, MDEQ;
John Bradley, MDEQ; Jeff Keiser, CH2MHill;
Scott Hutsell, CH2MHill

RE: **January 2013 semiannual Groundwater Sampling Results**
12th Street Landfill-Operable Unit No. 4-Allied Paper/Portage Creek/Kalamazoo River Superfund Site, Otsego Township, Michigan

This memorandum has been prepared by Conestoga-Rovers & Associates (CRA) to summarize the results of the January 2013 semiannual groundwater sampling event performed at the 12th Street Landfill, Operable Unit No. 4 - Allied Paper/Portage Creek/Kalamazoo River Superfund Site, located in Otsego Township, Michigan between January 28th and 29th, 2013.

The January 2013 sampling event was performed as part of the Operation, Maintenance, and Monitoring (OM&M) activities at the Site. The most recent sampling event prior to this was the October 2012 quarterly event.

A total of 15 groundwater monitoring wells (MW-101S, MW-101D, MW-102S, MW-102D, MW-103D, MW-104S, MW-104D, MW-105S, MW-105D, MW-106S, MW-106D, MW-107S, MW-108S, MW-108D, and MW-109D) were installed in February 2011, at varying depths, around the perimeter of the landfill to complete the OM&M monitoring well network. The locations of the monitoring wells are shown on Figure 1. Prior to the October 2012 sampling event, CRA collected static water levels for 2 weeks from each well and the river staff gauge, as required by the OM&M Plan (December 2012). Monitoring well construction details and groundwater elevations from the water level collection event are presented in Table 1. Figure 2 presents the shallow groundwater elevation contours, and Figure 3 presents the deep groundwater elevation contours, both from the pre-sampling water level event on January 28, 2013.

During the January 2013 groundwater sampling event, samples were collected from each monitoring well in the monitoring well network. Field measurements of pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity (mS/cm), temperature (Deg C), and turbidity (NTU) were collected. Samples were collected using low flow sampling methods and submitted for laboratory analysis of target compound list (TCL) volatile organic compounds (VOCs), TCL semi volatile organic compounds (SVOC), polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDD/PCDF), polychlorinated biphenyls (PCBs), and target analyte list (TAL) metals. CRA requested (January 7, 2013) that the hexavalent chromium analysis be deferred until the April 2013 event due to hold time issues and short daylight hours during the month of January. This request was approved by both the USEPA and MDEQ.

REGISTERED COMPANY FOR
ISO 9001
ENGINEERING DESIGN

The January 2013 analytical results were compared to Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria, identified by Michigan Department of Environmental Quality (MDEQ) Remediation and Redevelopment Division (RRD) updated September 28, 2012, pursuant to 1994 PA 451, as amended. The January 2013 analytical results and field parameters are presented in Table 2.

The analytical results of the January 2013 sampling event yielded only mercury exceeding relevant Part 201 Cleanup Criteria and Part 213 Risk-Based Criteria at three monitoring wells. The groundwater surface water interface (GSI) criterion of 0.0013 micrograms per liter (µg/L) for mercury was exceeded at MW-101D (0.00136 µg/L), MW-106S (0.00777µg/L) and MW-108S (0.00380 µg/L).

The analytical results for metals exceeding GSI criteria from previous sampling events performed in October 2011, February 2012, April 2012, July 2012, and October 2012 are shown on Figure 4 in addition to the January 2013 exceedances. Figure 4 also includes total PCB detections from these six sampling events.

The following summarizes the January 2013 analytical results:

- VOC parameters reported were estimated values below the method detection levels, and well below GSI criteria
- SVOC parameters were reported below criteria
- PCBs parameters reported were estimated values, well below the GSI criteria of 0.2 µg/L
- Dioxins/Furans total toxic equivalents were calculated for MW-101D at 0.00000003450 µg/L which is well below the GSI criteria of 0.00001 µg/L
- Mercury was detected in three of the January 2013 samples at MW-101D, MW-106S and MW-180S. The detections were above the GSI criteria of 0.0013 µg/L
- Cyanide was non-detect

Quarterly and semiannual groundwater monitoring will continue at the Site as described in the OM&M Plan, approved by the United States Environmental Protection Agency (USEPA) on May 23, 2013.

The next sampling event is scheduled to occur in April 2013 and will consist of a quarterly event as outlined in the OM&M Plan [i.e., TCL VOCs, PCBs, and specific metals including mercury, magnesium, and sodium] with the addition of hexavalent chromium.

No	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- 718 FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- GV-1 GAS VENT LOCATION
- MW-106S MONITORING WELL LOCATION
- GP-1 GAS PROBE LOCATION
- SG-101 STAFF GAUGE LOCATION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

MONITORING WELL LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
J. DEMBOWSKE	G. CARLI	DECEMBER 2012	
Scale: AS SHOWN	Project No: 056393-08	Report No: MEMO020	Drawing No: figure 1

056393-08(MEMO020)GN-SC003 MAY 13/2013

Nº	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- GV-1 — GAS VENT LOCATION
- MW-106S — MONITORING WELL LOCATION
- GP-1 — GAS PROBE LOCATION
- SG-101 — STAFF GAUGE LOCATION
- 700.50 — GROUNDWATER ELEVATION CONTOUR
- (700.48) — GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

NOTE: DUE TO INCONSISTENT READINGS COMPARED TO HISTORICAL DATA, THE GROUNDWATER ELEVATION OBTAINED FROM MW-106S WAS OMITTED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

GROUNDWATER ELEVATION CONTOURS
SHALLOW - JANUARY 28, 2013

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
J. DEMBOWSKE	G. CARLI	MARCH 2013	
Scale: AS SHOWN	Project Nº: 056393-08	Report Nº: MEMO020	Drawing Nº: figure 2

056393-08(MEMO020)GN-SC002 JUN 5/2013

No.	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- GV-1 — GAS VENT LOCATION
- MW-106S — MONITORING WELL LOCATION
- GP-1 — GAS PROBE LOCATION
- SG-101 — STAFF GAUGE LOCATION
- 700.40 — GROUNDWATER ELEVATION CONTOUR
- (700.33) — GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

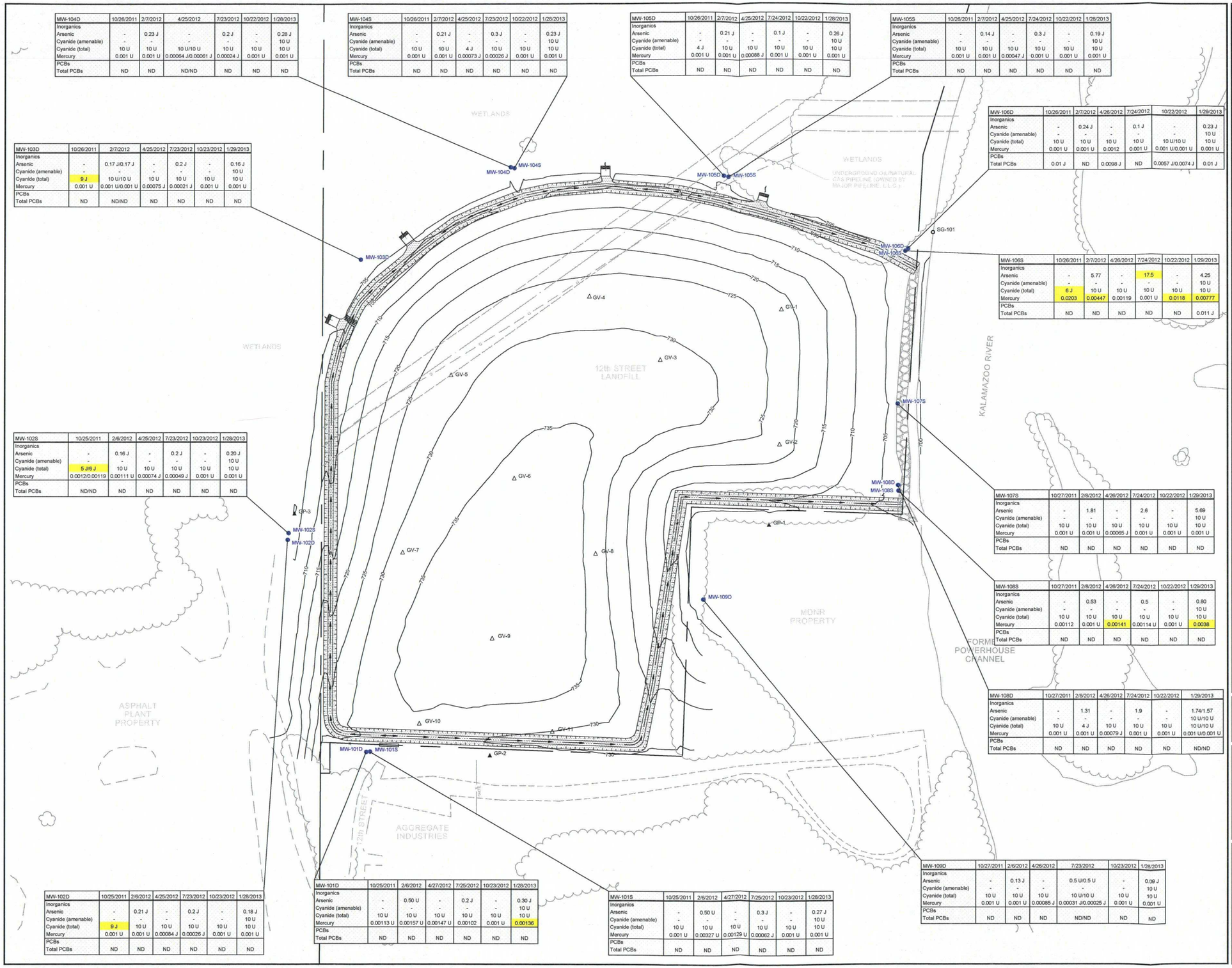
GROUNDWATER ELEVATION CONTOURS
DEEP - JANUARY 28, 2013

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
J. DEMBOWSKE	G. CARLI	MARCH 2013	
Scale: AS SHOWN	Project N#: 056393-08	Report N#: MEMO020	Drawing N#: figure 3

056393-08(MEMO020)GN-SC001 MAY 6/2013



MW-104D	10/26/2011	2/7/2012	4/25/2012	7/23/2012	10/22/2012	1/28/2013
Inorganics						
Arsenic	-	0.23 J	-	0.2 J	-	0.28 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U/10 U	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00064 J/0.00061 J	0.00024 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND/ND	ND	ND	ND

MW-104S	10/26/2011	2/7/2012	4/25/2012	7/23/2012	10/22/2012	1/28/2013
Inorganics						
Arsenic	-	0.21 J	-	0.3 J	-	0.23 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	4 J	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00073 J	0.00026 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-105D	10/26/2011	2/7/2012	4/25/2012	7/24/2012	10/22/2012	1/28/2013
Inorganics						
Arsenic	-	0.21 J	-	0.1 J	-	0.26 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	4 J	10 U	10 U	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00088 J	0.001 U	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-105S	10/26/2011	2/7/2012	4/25/2012	7/24/2012	10/22/2012	1/28/2013
Inorganics						
Arsenic	-	0.14 J	-	0.3 J	-	0.19 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	0.00047 J	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-106D	10/26/2011	2/7/2012	4/26/2012	7/24/2012	10/22/2012	1/29/2013
Inorganics						
Arsenic	-	0.24 J	-	0.1 J	-	0.23 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U	10 U/10 U	10 U
Mercury	0.001 U	0.001 U	0.0012	0.001 U	0.001 U/0.001 U	0.001 U
PCBs						
Total PCBs	0.01 J	ND	0.0098 J	ND	0.0057 J/0.0074 J	0.01 J

MW-103D	10/26/2011	2/7/2012	4/25/2012	7/23/2012	10/23/2012	1/29/2013
Inorganics						
Arsenic	-	0.17 J/0.17 J	-	0.2 J	-	0.16 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	9 J	10 U/10 U	10 U	10 U	10 U	10 U
Mercury	0.001 U	0.001 U/0.001 U	0.00075 J	0.00021 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND/ND	ND	ND	ND	ND

MW-106S	10/26/2011	2/7/2012	4/26/2012	7/24/2012	10/22/2012	1/29/2013
Inorganics						
Arsenic	-	5.77	-	17.5	-	4.25
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	6 J	10 U	10 U	10 U	10 U	10 U
Mercury	0.0203	0.00447	0.00119	0.001 U	0.0118	0.00777
PCBs						
Total PCBs	ND	ND	ND	ND	ND	0.011 J

MW-102S	10/25/2011	2/6/2012	4/25/2012	7/23/2012	10/23/2012	1/28/2013
Inorganics						
Arsenic	-	0.16 J	-	0.2 J	-	0.20 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	5 J/6 J	10 U	10 U	10 U	10 U	10 U
Mercury	0.0012/0.00119	0.00111 U	0.00074 J	0.00049 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND/ND	ND	ND	ND	ND	ND

MW-107S	10/27/2011	2/8/2012	4/26/2012	7/24/2012	10/22/2012	1/29/2013
Inorganics						
Arsenic	-	1.81	-	2.6	-	5.69
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00065 J	0.001 U	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-108S	10/27/2011	2/8/2012	4/26/2012	7/24/2012	10/22/2012	1/29/2013
Inorganics						
Arsenic	-	0.53	-	0.5	-	0.80
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U	10 U	10 U
Mercury	0.00112	0.001 U	0.00141	0.00114 U	0.001 U	0.0038
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-108D	10/27/2011	2/8/2012	4/26/2012	7/24/2012	10/22/2012	1/29/2013
Inorganics						
Arsenic	-	1.31	-	1.9	-	1.74/1.57
Cyanide (amenable)	-	-	-	-	-	10 U/10 U
Cyanide (total)	10 U	4 J	10 U	10 U	10 U	10 U/10 U
Mercury	0.001 U	0.001 U	0.00079 J	0.001 U	0.001 U	0.001 U/0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND/ND

MW-102D	10/25/2011	2/6/2012	4/25/2012	7/23/2012	10/23/2012	1/28/2013
Inorganics						
Arsenic	-	0.21 J	-	0.2 J	-	0.18 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	9 J	10 U	10 U	10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00084 J	0.00026 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-101D	10/25/2011	2/6/2012	4/27/2012	7/25/2012	10/23/2012	1/28/2013
Inorganics						
Arsenic	-	0.50 U	-	0.2 J	-	0.30 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U	10 U	10 U
Mercury	0.00113 U	0.00157 U	0.00147 U	0.00102	0.001 U	0.00136
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-101S	10/25/2011	2/6/2012	4/27/2012	7/25/2012	10/23/2012	1/28/2013
Inorganics						
Arsenic	-	0.50 U	-	0.3 J	-	0.27 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U	10 U	10 U
Mercury	0.001 U	0.00327 U	0.00129 U	0.00062 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND	ND	ND

MW-109D	10/27/2011	2/6/2012	4/26/2012	7/23/2012	10/23/2012	1/28/2013
Inorganics						
Arsenic	-	0.13 J	-	0.5 U/0.5 U	-	0.09 J
Cyanide (amenable)	-	-	-	-	-	10 U
Cyanide (total)	10 U	10 U	10 U	10 U/10 U	10 U	10 U
Mercury	0.001 U	0.001 U	0.00085 J	0.00031 J/0.00025 J	0.001 U	0.001 U
PCBs						
Total PCBs	ND	ND	ND	ND/ND	ND	ND

0 20 50ft

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE
- GV-1 — GAS VENT LOCATION
- MW-106S — MONITORING WELL LOCATION
- GP-1 — GAS PROBE LOCATION
- SG-101 — STAFF GAUGE
- ug/L — MICROGRAMS PER LITRE
- U — NOT PRESENT AT OR ABOVE THE ASSOCIATED VALUE
- J — ESTIMATED CONCENTRATION
- 10 U/10 U — PARENT/DUPLICATE SAMPLE RESULT
- ND — NON DETECT
- \- — NOT ANALYZED
- RESULT EXCEEDS GSI CRITERIA

MW-106D	4/7/2011 ug/L	10/26/2011 ug/L	2/7/2012 ug/L
Inorganics			
Arsenic	0.09 J	-	0.24 J
Cyanide (total)	-	10 U	10 U
Mercury	0.20 U	0.001 U	0.00053 J
PCBs			
Total PCBs	0.0083 J	0.01 J	ND

SAMPLE LOCATION
SAMPLE DATE
RESULT UNIT
RESULT (ug/L)
PARAMETER

	Groundwater Surface Water Interface Criteria
Inorganics (ug/L)	
Arsenic	10
Cyanide (total)	5.2
Mercury	0.0013
PCBs (ug/L)	
Total PCBs	0.2

NOTE:
MICHIGAN ACT 451, PART 201 CLEANUP CRITERIA AND PART 213 RISK-BASED SCREENING LEVELS: RESIDENTIAL AND NON-RESIDENTIAL GENERIC CLEANUP CRITERIA (1).

(1) CLEANUP CRITERIA IDENTIFIED BY MDEQ RRD OP MEMO NO. 1, UPDATED 9/28/2012, PURSUANT TO 1994 PA 451 AS AMENDED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

POST REMEDIAL ACTION GROUNDWATER ANALYTICAL DATA

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
J. DEMBOWSKE	G. CARLI	MAY 2013	
Scale:	Project N°:	Report N°:	Drawing N°:
AS SHOWN	056393-08	MEMO020	figure 4

056393-08(MEMO020)GN-SC004 MAY 13/2013

TABLE 1

GROUNDWATER MONITORING WELLS
JANUARY 2013 WATER LEVEL DATA
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Locations	*Ground Surface Elevation (feet AMSL)*	*Reference Elevation (feet AMSL)*	*Monitoring Well Depth (feet bgs)*	*Screened Interval (feet AMSL)*	*January 2013 Water Level Data Depth to Water (feet bgs)*						
					14-Jan-13	*16-Jan-13*	*18-Jan-13*	*21-Jan-13*	*23-Jan-13*	*25-Jan-13*	*28-Jan-13*
MW-101S	734.35	737.46	39	702.35 to 695.35	36.42	36.36	36.40	36.58	36.83	36.75	36.62
MW-101D	734.33	737.14	75	664.33 to 659.33	36.1	36.04	36.08	36.27	36.52	36.45	36.32
MW-102S	704.18	707.36	10	701.18 to 694.18	6.23	6.16	6.22	6.40	6.68	6.54	6.43
MW-102D	704.43	707.43	45	664.43 to 659.43	6.26	6.18	6.25	6.42	6.70	6.57	6.47
MW-103D	704.37	707.36	35	674.37 to 669.37	6.79	6.76	6.86	7.04	7.29	7.14	6.68
MW-104S	703.86	706.55	25.5	684.86 to 677.86	6.47	6.44	6.54	6.76	7.08	6.81	6.70
MW-104D	703.48	706.42	45	663.48 to 658.48	6.32	6.28	6.38	6.60	6.92	6.65	6.56
MW-105S	704.89	707.86	12	699.89 to 692.89	7.92	7.86	7.98	8.26	8.64	8.25	8.20
MW-105D	704.78	707.89	47	662.78 to 657.78	7.8	7.68	7.83	8.10	8.50	8.09	8.10
MW-106S	703.88	706.96	9	701.88 to 694.88	6.98	6.97	7.14	7.47	7.89	7.42	6.75
MW-106D	703.66	706.36	45	664.66 to 659.66	6.4	6.26	6.42	6.76	7.17	6.66	6.26
MW-107S	703.76	706.73	13	695.76 to 690.76	7.66	6.52	6.70	7.04	7.46	6.94	6.65
MW-108S	703.32	706.21	9	701.32 to 694.32	6	5.89	6.05	6.38	6.80	6.30	6.02
MW-108D	703.39	706.16	45	663.39 to 658.39	6.01	5.88	6.04	6.39	6.82	6.30	6.03
MW-109D	707.41	710.46	23	689.41 to 684.41	9.72	9.65	9.76	10.00	10.38	10.07	10.05
SG-101	700.9	703.05	-	-	9.94	0.1	9.88	9.42	ICE	ICE	0.1

Notes:

[ ] Indicates that water level in monitoring well is lower than the river elevation

feet AMSL - feet above mean sea level

feet bgs - feet below ground surface

NC - ice around staff gauge prevented reading.

TABLE 1

GROUNDWATER MONITORING WELLS
JANUARY 2013 WATER LEVEL DATA
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Locations	*Ground Surface Elevation (feet AMSL)*	*Reference Elevation (feet AMSL)*	*Monitoring Well Depth (feet bgs)*	*Screened Interval (feet AMSL)*	*January Water Level Data Water Level Elevation (feet AMSL)*						
					14-Jan-13	*16-Jan-13*	*18-Jan-13*	*21-Jan-13*	*23-Jan-13*	*25-Jan-13*	*28-Jan-13*
MW-101S	734.35	737.46	39	702.35 to 695.35	701.04	701.10	701.06	700.88	700.63	700.71	700.84
MW-101D	734.33	737.14	75	664.33 to 659.33	701.04	701.10	701.06	700.87	700.62	700.69	700.82
MW-102S	704.18	707.36	10	701.18 to 694.18	701.13	701.20	701.14	700.96	700.68	700.82	700.93
MW-102D	704.43	707.43	45	664.43 to 659.43	701.17	701.25	701.18	701.01	700.73	700.86	700.96
MW-103D	704.37	707.36	35	674.37 to 669.37	700.57	700.60	700.50	700.32	700.07	700.22	700.68
MW-104S	703.86	706.55	25.5	684.86 to 677.86	700.08	700.11	700.01	699.79	699.47	699.74	699.85
MW-104D	703.48	706.42	45	663.48 to 658.48	700.10	700.14	700.04	699.82	699.50	699.77	699.86
MW-105S	704.89	707.86	12	699.89 to 692.89	699.94	700.00	699.88	699.60	699.22	699.61	699.66
MW-105D	704.78	707.89	47	662.78 to 657.78	700.09	700.21	700.06	699.79	699.39	699.80	699.79
MW-106S	703.88	706.96	9	701.88 to 694.88	699.98	699.99	699.82	699.49	699.07	699.54	700.21
MW-106D	703.66	706.36	45	664.66 to 659.66	699.96	700.10	699.94	699.60	699.19	699.70	700.10
MW-107S	703.76	706.73	13	695.76 to 690.76	699.07	700.21	700.03	699.69	699.27	699.79	700.08
MW-108S	703.32	706.21	9	701.32 to 694.32	700.21	700.32	700.16	699.83	699.41	699.91	700.19
MW-108D	703.39	706.16	45	663.39 to 658.39	700.15	700.28	700.12	699.77	699.34	699.86	700.13
MW-109D	707.41	710.46	23	689.41 to 684.41	700.74	700.81	700.70	700.46	700.08	700.39	700.41
SG-101	700.9	703.05	-	-	699.69	699.65	699.63	699.17	NC	NC	699.65

Notes:

[ ] Indicates that water level in monitoring well is lower than the river ele

feet AMSL - feet above mean sea level

feet bgs - feet below ground surface

NC - ice around staff gauge prevented reading.

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria* [1]			*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*
Sample Identification		*Residential Drinking Water* [a]	*Non-Residential Drinking Water* [b]	*Groundwater Surface Water Interface* [c]	*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*
Sample Date					*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type								
Sample Elevation (feet AMSL)					*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*
	Units							
Volatile Organic Compounds (VOCs)								
Acetone	ug/L	730	2100	1700	R	R	R	R
Benzene	ug/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	ug/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/L	13000	38000	2200	R	R	R	R
Carbon disulfide	ug/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/L	100	100	25	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/L	430	1700	1100	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	ug/L	80	80	350	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	ug/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	0.2	0.2	-	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	ug/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	ug/L	0.05	0.05	5.7	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/L	600	600	13	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/L	6.6	19	28	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/L	75	75	17	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	ug/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/L	7	7	130	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	ug/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/L	5	5	230	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	ug/L	74	74	18	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	ug/L	1000	2900	ID	R	R	R	R
Isopropyl benzene	ug/L	800	2300	28	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert butyl ether (MTBE)	ug/L	40	40	7100	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/L	1800	5200	ID	R	R	R	R
Methylene chloride	ug/L	5	5	1500	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/L	5	5	60	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/L	790	790	270	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/L	70	70	99	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	ug/L	200	200	89	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	ug/L	2600	7300	-	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	ug/L	2	2	13	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/L	280	280	41	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	ug/L	-	-	-	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria* [1]			*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*
Sample Identification		*Residential Drinking Water* [a]	*Non-Residential Drinking Water* [b]	*Groundwater Surface Water Interface* [c]	*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*
Sample Date					*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type								
Sample Elevation (feet AMSL)					*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*
	Units							
Semi-Volatile Organic Compounds (SVOCs)								
Acenaphthene	ug/L	1300	3800	38	0.20 U	0.20 U	0.19 U	0.20 U
Acenaphthylene	ug/L	52	150	ID	0.20 U	0.20 U	0.19 U	0.20 U
Anthracene	ug/L	43	43	ID	0.20 U	0.20 U	0.19 U	0.20 U
Benzo(a)anthracene	ug/L	2.1	8.5	ID	0.20 U	0.20 U	0.19 U	0.20 U
Benzo(a)pyrene	ug/L	5	5	ID	0.20 U	0.20 U	0.19 U	0.20 U
Benzo(b)fluoranthene	ug/L	1.5	1.5	ID	0.20 U	0.20 U	0.19 U	0.20 U
Benzo(g,h,i)perylene	ug/L	1	1	-	0.20 U	0.20 U	0.19 U	0.20 U
Benzo(k)fluoranthene	ug/L	1	1	-	0.20 U	0.20 U	0.19 U	0.20 U
Butyl benzylphthalate (BBP)	ug/L	1200	2700	67	0.20 U	0.20 U	0.19 U	0.20 U
Carbazole	ug/L	85	350	10	0.20 U	0.20 U	0.19 U	0.20 U
4-Chloro-3-methylphenol	ug/L	150	420	7.4	0.49 U	0.49 U	0.48 U	0.48 U
bis(2-Chloroethyl)ether	ug/L	2	8.3	1	0.20 U	0.20 U	0.19 U	0.20 U
2-Chlorophenol	ug/L	45	130	18	0.49 U	0.49 U	0.48 U	0.48 U
Chrysene	ug/L	1.6	1.6	ID	0.20 U	0.20 U	0.19 U	0.20 U
Dibenz(a,h)anthracene	ug/L	2	2	ID	0.20 U	0.20 U	0.19 U	0.20 U
Dibenzofuran	ug/L	ID	ID	4	0.20 U	0.20 U	0.19 U	0.20 U
3,3'-Dichlorobenzidine	ug/L	1.1	4.3	0.3	2.0 U	2.0 U	1.9 U	2.0 U
2,4-Dichlorophenol	ug/L	73	210	11	0.49 U	0.49 U	0.48 U	0.48 U
Diethyl phthalate	ug/L	5500	16000	110	0.20 U	0.20 U	0.19 U	0.20 U
Dimethyl phthalate	ug/L	73000	210000	-	0.20 U	0.20 U	0.19 U	0.20 U
2,4-Dimethylphenol	ug/L	370	1000	380	3.9 U	3.9 U	3.8 U	3.9 U
Di-n-butylphthalate (DBP)	ug/L	880	2500	9.7	0.20 U	0.20 U	0.19 U	0.20 U
4,6-Dinitro-2-methylphenol	ug/L	20	20	-	2.0 U	2.0 U	1.9 U	2.0 U
2,4-Dinitrotoluene	ug/L	7.7	32	-	0.20 U	0.20 U	0.19 U	0.20 U
Di-n-octyl phthalate (DnOP)	ug/L	130	380	ID	0.20 U	0.040 J	0.19 U	0.034 J
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	6	6	25	0.97 U	0.98 U	0.95 U	0.96 U
Fluoranthene	ug/L	210	210	1.6	0.20 U	0.20 U	0.19 U	0.20 U
Fluorene	ug/L	880	2000	12	0.20 U	0.20 U	0.19 U	0.20 U
Hexachlorobenzene	ug/L	1	1	0.2	0.20 U	0.20 U	0.19 U	0.20 U
Hexachlorobutadiene	ug/L	15	42	0.053	0.20 U	0.20 U	0.19 U	0.20 U
Hexachlorocyclopentadiene	ug/L	50	50	ID	0.97 U	0.98 U	0.95 U	0.96 U
Hexachloroethane	ug/L	7.3	21	6.7	0.20 U	0.20 U	0.19 U	0.20 U
Indeno(1,2,3-cd)pyrene	ug/L	2	2	ID	0.20 U	0.20 U	0.19 U	0.20 U
Isophorone	ug/L	770	3100	1300	0.20 U	0.20 U	0.19 U	0.20 U
2-Methylnaphthalene	ug/L	260	750	19	0.20 U	0.20 U	0.19 U	0.20 U
2-Methylphenol	ug/L	370	1000	30	0.49 U	0.49 U	0.48 U	0.48 U
4-Methylphenol	ug/L	370	1000	30	0.49 U	0.49 U	0.48 U	0.48 U
Naphthalene	ug/L	520	1500	11	0.20 U	0.20 U	0.19 U	0.20 U
Nitrobenzene	ug/L	3.4	9.6	180	0.20 U	0.20 U	0.19 U	0.20 U
2-Nitrophenol	ug/L	20	58	ID	0.49 U	0.49 U	0.48 U	0.48 U
N-Nitrosodi-n-propylamine	ug/L	5	5	-	0.20 U	0.20 U	0.19 U	0.20 U
N-Nitrosodiphenylamine	ug/L	270	1100	-	0.20 U	0.20 U	0.19 U	0.20 U
Pentachlorophenol	ug/L	1	1	G,X	0.97 UJ	0.98 UJ	0.95 UJ	0.96 UJ
Phenanthrene	ug/L	52	150	2	0.20 U	0.20 U	0.19 U	0.20 U
Phenol	ug/L	4400	13000	450	0.49 U	0.49 U	0.48 U	0.48 U
Pyrene	ug/L	140	140	ID	0.20 U	0.20 U	0.19 U	0.20 U
2,4,5-Trichlorophenol	ug/L	730	2100	-	0.49 U	0.49 U	0.48 U	0.48 U
2,4,6-Trichlorophenol	ug/L	120	470	5	0.49 U	0.49 U	0.48 U	0.48 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

		Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]						
Sample Location					*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*
Sample Identification		*Residential Drinking Water* [a]	*Non-Residential Drinking Water* [b]	*Groundwater Surface Water Interface* [c]	*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*
Sample Date					*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type								
Sample Elevation (feet AMSL)					*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Aroclor-1221 (PCB-1221)	ug/L	-	-	-	0.041 U	0.040 U	0.040 U	0.041 U
Aroclor-1232 (PCB-1232)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Aroclor-1242 (PCB-1242)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Aroclor-1248 (PCB-1248)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Aroclor-1254 (PCB-1254)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Aroclor-1260 (PCB-1260)	ug/L	-	-	-	0.021 U	0.020 U	0.020 U	0.021 U
Total PCBs	ug/L	0.5	0.5	0.2	ND	ND	ND	ND
Dioxins/Furans								
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ug/L	-	-	-	0.00000345 J	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzofuran (HpCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzofuran (HxCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1;2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ug/L	-	-	-	0.0000481 U	0.0000481 U	0.0000481 UJ	0.0000481 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ug/L	-	-	-	0.0000481 U	0.0000481 U	0.0000481 UJ	0.0000481 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzofuran (PeCDF)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	-	-	-	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total tetrachlorodibenzofuran (TCDF)	ug/L	-	-	-	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ug/L	-	-	-	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00003	0.00003	0.00001	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Total tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	-	-	-	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Total TEQ	ug/L	0.00003	0.00003	0.00001	0.00000003450	0	0	0

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

		Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]						
Sample Location					*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*
Sample Identification		*Residential*	*Non-Residential*	*Groundwater*	*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*
Sample Date		*Drinking Water* [a]	*Drinking Water* [b]	*Surface Water*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type				*Interface* [c]				
Sample Elevation (feet AMSL)					*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*
	Units							
Metals								
Aluminum	ug/L	50	50	-	28.3	10.2	1.5 J	1.5 J
Antimony	ug/L	6	6	130	0.05 U	0.05 U	0.05 U	0.05 U
Arsenic	ug/L	10	10	10	0.30 J	0.27 J	0.18 J	0.20 J
Barium	ug/L	2000	2000	1400	78.2	77.3	72.7	80.3
Beryllium	ug/L	4	4	41	0.020 U	0.020 U	0.020 U	0.020 U
Cadmium	ug/L	5	5	5.1	0.020 U	0.020 U	0.020 U	0.020 U
Chromium	ug/L	100	100	11	1.16 U	2.05	0.87	0.78
Cobalt	ug/L	40	100	100	0.280	0.166	0.113	0.212
Copper	ug/L	1000	1000	23	0.86	0.62	0.45	0.67
Cyanide (amenable)	ug/L	200	200	-	10 U	10 U	10 U	10 U
Cyanide (total)	ug/L	200	200	5.2	10 U	10 U	10 U	10 U
Iron	ug/L	300	300	-	202	110	20.0 U	13.2 J
Lead	ug/L	4	4	34	0.265	0.077	0.020 U	0.042
Magnesium	ug/L	400000	1100000	-	23900	24000	22400	24700
Manganese	ug/L	50	50	5200	6.53	5.22	0.06	52.3[ab]
Mercury	ug/L	2	2	0.0013	0.00136[c]	0.001 U	0.001 U	0.001 U
Nickel	ug/L	100	100	130	2.91	2.57	2.37	2.72
Selenium	ug/L	50	50	5	0.4 J	0.5 J	0.4 J	0.5 J
Silver	ug/L	34	98	0.2	0.027	0.020 U	0.020 U	0.020 U
Sodium	ug/L	120000	350000	-	24500	21700	20000	18500
Thallium	ug/L	2	2	3.7	0.020 U	0.020 U	0.020 U	0.022 U
Vanadium	ug/L	4.5	62	27	0.43	0.66	0.33	0.22
Zinc	ug/L	2400	5000	310	2.80	1.24 U	0.57 U	2.06
Field Parameters								
Conductivity	mS/cm	-	-	-	0.830	0.812	0.646	0.733
Dissolved oxygen (DO)	mg/L	-	-	-	8.59	4.11	2.03	3.39
Oxidation reduction potential (ORP)	millivolt	-	-	-	74.9	-97	107.3	93.7
pH	s.u.	6.5-8.5	6.5-8.5	-	7.38	8.53	7.09	6.90
Temperature	Deg C	-	-	-	11.44	10.06	12.16	7.78
Turbidity	NTU	-	-	-	3.2	2.8	0.84	1.30

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*	*MW-105S*	*MW-106D*	*MW-106S*
Sample Identification		*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*	*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*
Sample Date		*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/29/2013*
Sample Type								
Sample Elevation (feet AMSL)		*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*	*699.89-687.89*	*664.66-620.66*	*701.89-692.89*
	Units							
Volatile Organic Compounds (VOCs)								
Acetone	ug/L	R	R	R	R	R	R	R
Benzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/L	R	R	R	R	R	R	R
Carbon disulfide	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.070 J	0.12 J
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	ug/L	0.50 UJ	0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 UJ
1,1-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	ug/L	R	R	R	R	R	R	R
Isopropyl benzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert butyl ether (MTBE)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/L	R	R	R	R	R	R	R
Methylene chloride	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.12 J	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*	*MW-105S*	*MW-106D*	*MW-106S*
Sample Identification		*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*	*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*
Sample Date		*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/29/2013*
Sample Type								
Sample Elevation (feet AMSL)		*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*	*699.89-687.89*	*664.66-620.66*	*701.89-692.89*
	Units							
Semi-Volatile Organic Compounds (SVOCs)								
Acenaphthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Acenaphthylene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(k)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Butyl benzylphthalate (BBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbazole	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Chloro-3-methylphenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
bis(2-Chloroethyl)ether	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Chlorophenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
Chrysene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenz(a,h)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenzofuran	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3,3'-Dichlorobenzidine	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dichlorophenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
Diethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dimethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dimethylphenol	ug/L	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	4.0 U	3.9 U
Di-n-butylphthalate (DBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4,6-Dinitro-2-methylphenol	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dinitrotoluene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Di-n-octyl phthalate (DnOP)	ug/L	0.20 U	0.046 J	0.20 U	0.049 J	0.20 U	0.20 U	0.036 J
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	0.96 U	0.97 U	0.96 U	0.96 U	0.97 U	0.99 U	0.96 U
Fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Fluorene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorocyclopentadiene	ug/L	0.96 U	0.97 U	0.96 U	0.96 U	0.97 U	0.99 U	0.96 U
Hexachloroethane	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Isophorone	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylnaphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylphenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
4-Methylphenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
Naphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nitrobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrophenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
N-Nitrosodi-n-propylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
N-Nitrosodiphenylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Pentachlorophenol	ug/L	0.96 UJ	0.97 UJ	0.96 UJ	0.96 UJ	0.97 UJ	0.99 UJ	0.96 UJ
Phenanthrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Phenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
Pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4,5-Trichlorophenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U
2,4,6-Trichlorophenol	ug/L	0.48 U	0.49 U	0.48 U	0.48 U	0.49 U	0.50 U	0.48 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*	*MW-105S*	*MW-106D*	*MW-106S*
Sample Identification		*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*	*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*
Sample Date		*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/29/2013*
Sample Type								
Sample Elevation (feet AMSL)		*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*	*699.89-687.89*	*664.66-620.66*	*701.89-692.89*
	Units							
PCBs								
Aroclor-1016 (PCB-1016)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	ug/L	0.041 U	0.041 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.010 J	0.011 J
Aroclor-1260 (PCB-1260)	ug/L	0.021 U	0.021 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Total PCBs	ug/L	ND	ND	ND	ND	ND	0.01 J	0.011 J
Dioxins/Furans								
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ug/L	0.0000481 U	0.000051 U	0.0000481 U	0.0000481 U	0.0000481 U	0.000049 UJ	0.0000481 UJ
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ug/L	0.0000481 U	0.000051 U	0.0000481 U	0.0000481 U	0.0000481 U	0.000049 UJ	0.0000481 UJ
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.0000255 U	0.000024 U	0.000024 U	0.000024 U	0.0000245 U	0.000024 U
Total tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.0000051 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000537 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.0000051 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000537 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000831 U	0.0000051 U	0.00000481 U	0.00000481 U	0.00000481 U	0.0000056 U	0.00000677 U
Total tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000831 U	0.0000051 U	0.00000481 U	0.00000481 U	0.00000481 U	0.0000056 U	0.00000677 U
Total TEQ	ug/L	0	0	0	0	0	0	0

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*	*MW-105S*	*MW-106D*	*MW-106S*
Sample Identification		*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*	*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*
Sample Date		*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/29/2013*
Sample Type								
Sample Elevation (feet AMSL)		*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*	*699.89-687.89*	*664.66-620.66*	*701.89-692.89*
	Units							
Metals								
Aluminum	ug/L	2.1	4.3	2.8	8.3	1.0 J	2.1	2.7
Antimony	ug/L	0.05 U	0.05 U	0.05 U	0.03 J	0.05 U	0.07	1.65
Arsenic	ug/L	0.16 J	0.28 J	0.23 J	0.26 J	0.19 J	0.23 J.	4.25
Barium	ug/L	64.5	69.7	73.6	79.2	115	79.6	301
Beryllium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Cadmium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.112
Chromium	ug/L	0.79	1.05	0.95	1.26	1.10	1.19	2.49
Cobalt	ug/L	0.136	0.137	0.150	0.166	0.320	0.121	0.568
Copper	ug/L	0.56	0.52	0.51	0.69	0.62	0.57	5.40
Cyanide (amenable)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyanide (total)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Iron	ug/L	20.0 U	19.3 J	11.9 J	52.7	53.8	3.8 J	3370[a,b]
Lead	ug/L	0.020 U	0.042	0.020 U	0.090	0.020 U	0.020 U	0.027 U
Magnesium	ug/L	22300	22900	23100	23600	29500	23600	39200
Manganese	ug/L	0.08	0.66	0.59	1.48	67.0[a,b]	0.10	131[a,b]
Mercury	ug/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00777
Nickel	ug/L	2.57	2.30	2.27	2.70	3.01	2.56	7.87
Selenium	ug/L	0.4 J	0.5 J	0.4 J	0.4 J	0.4 J	0.5 J	0.7 J
Silver	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	ug/L	18700	20900	20800	21100	24600	22600	12800
Thallium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vanadium	ug/L	0.25	0.35	0.36	0.37	0.34	0.33	0.59
Zinc	ug/L	1.89	1.40	1.58	5.46	1.66	1.34 U	174
Field Parameters								
Conductivity	mS/cm	0.665	0.656	0.665	0.693	0.835	0.688	1.087
Dissolved oxygen (DO)	mg/L	4.26	1.62	2.42	2.05	8.62	2.52	5.64
Oxidation reduction potential (ORP)	millivolt	71.0	86.5	110.0	173.7	103.3	75	11.8
pH	s.u.	7.27	7.03	7.06	6.84	6.71	7.20	6.79
Temperature	Deg C	11.62	9.17	10.15	10.44	7.96	11.89	6.59
Turbidity	NTU	1.84	0.69	2.19	2.60	1.31	3.1	1.96

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type				*Duplicate*		
Sample Elevation (feet AMSL)		*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units					
Volatile Organic Compounds (VOCs)						
Acetone	ug/L	R	R	R	R	R
Benzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/L	R	R	R	R	R
Carbon disulfide	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	ug/L	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 U
1,1-Dichloroethane	ug/L	0.50 U	0.12 J	0.10 J	0.50 U	0.50 U
1,2-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	ug/L	R	R	R	R	R
Isopropyl benzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert butyl ether (MTBE)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/L	R	R	R	R	R
Methylene chloride	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	ug/L	0.50 U	0.12 J	0.13 J	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type				*Duplicate*		
Sample Elevation (feet AMSL)		*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units					
Semi-Volatile Organic Compounds (SVOCs)						
Acenaphthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Acenaphthylene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	ug/L	0.20 U	0.20 U	0.20 U	0.086 J	0.20 U
Benzo(k)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Butyl benzylphthalate (BBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbazole	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Chloro-3-methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
bis(2-Chloroethyl)ether	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Chlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Chrysene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenz(a,h)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenzofuran	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3,3'-Dichlorobenzidine	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Diethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dimethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dimethylphenol	ug/L	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Di-n-butylphthalate (DBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4,6-Dinitro-2-methylphenol	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dinitrotoluene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Di-n-octyl phthalate (DnOP)	ug/L	0.083 J	0.20 U	0.20 U	0.20 U	0.20 U
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	0.97 U	0.98 U	0.96 U	1.6	0.96 U
Fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Fluorene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorocyclopentadiene	ug/L	0.97 U	0.98 U	0.96 U	0.97 U	0.96 U
Hexachloroethane	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Isophorone	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylnaphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
4-Methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Naphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nitrobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrophenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
N-Nitrosodi-n-propylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
N-Nitrosodiphenylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Pentachlorophenol	ug/L	0.97 UJ	0.98 UJ	0.96 UJ	0.97 UJ	0.96 UJ
Phenanthrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Phenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4,5-Trichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
2,4,6-Trichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U

TABLE 2
SUMMARY OF JANUARY 2013 GROUNDWATER ANALYTICAL RESULTS
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type				*Duplicate*		
Sample Elevation (feet AMSL)		*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units					
PCBs						
Aroclor-1016 (PCB-1016)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1221 (PCB-1221)	ug/L	0.041 U	0.040 U	0.042 U	0.041 U	0.040 U
Aroclor-1232 (PCB-1232)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1242 (PCB-1242)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1248 (PCB-1248)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1254 (PCB-1254)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1260 (PCB-1260)	ug/L	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Total PCBs	ug/L	ND	ND	ND	ND	ND
Dioxins/Furans						
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.0000035 J	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.00000195 J
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ug/L	0.0000481 UJ	0.0000481 U	0.0000481 U	0.0000481 U	0.0000481 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ug/L	0.0000481 UJ	0.0000481 U	0.0000481 U	0.0000294 J	0.0000481 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Total tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Total TEQ	ug/L	0	0	0	0	0

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12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

Sample Location		*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type				*Duplicate*		
Sample Elevation (feet AMSL)		*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units					
Metals						
Aluminum	ug/L	2.4	2.1	1.5 J	682[a,b]	2.3
Antimony	ug/L	0.03 J	0.03 J	0.03 J	0.09	0.03 J
Arsenic	ug/L	5.69	1.74	1.57	0.80	0.09 J
Barium	ug/L	161	271	269	37.0	83.4
Beryllium	ug/L	0.020 U	0.020 U	0.020 U	0.022 U	0.020 U
Cadmium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Chromium	ug/L	2.27	0.86	0.97	2.09	1.20
Cobalt	ug/L	0.591	0.524	0.514	0.344	0.148
Copper	ug/L	0.62	0.50	0.52	1.92	0.76
Cyanide (amenable)	ug/L	10 U	10 U	10 U	10 U	10 U
Cyanide (total)	ug/L	10 U	10 U	10 U	10 U	10 U
Iron	ug/L	10600[a,b]	403[a,b]	365[a,b]	1140[a,b]	20.0 U
Lead	ug/L	0.030 U	0.020 U	0.020 U	0.867	0.020 U
Magnesium	ug/L	28000	24500	24400	4220	23900
Manganese	ug/L	801[a,b]	209[a,b]	212[a,b]	35.2	0.07
Mercury	ug/L	0.001 U	0.001 U	0.001 U	0.0038	0.001 U
Nickel	ug/L	4.61	2.98	3.07	1.87	3.07
Selenium	ug/L	0.4 J	0.3 J	0.4 J	1.0 U	0.3 J
Silver	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	ug/L	18500	29900	30000	3810	22700
Thallium	ug/L	0.020 U	0.053	0.051	0.020 U	0.020 U
Vanadium	ug/L	0.68	0.24	0.28	1.32	0.35
Zinc	ug/L	2.09	1.02 U	1.66	3.29	2.21
Field Parameters						
Conductivity	mS/cm	0.982	0.7414	0.7414	0.214	0.833
Dissolved oxygen (DO)	mg/L	5.67	0.18	0.18	8.60	3.68
Oxidation reduction potential (ORP)	millivolt	-0.2	-86	-86	47	170
pH	s.u.	6.59	73.18	73.18	7.56	7.11
Temperature	Deg C	9.30	11.57	11.57	8.39	11.54
Turbidity	NTU	4.59	1.36	1.36	1.29	1.15

Notes:

U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
R - Rejected.

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MEMORANDUM

TO:	Greg Carli	REF. NO.:	056393
FROM:	Susan Scrocchi/cs/19 SS	DATE:	March 26, 2013
CC:	Jodie Dembowske		E-Mail and Hard Copy if Requested
RE:	**Analytical Results and Full Validation Groundwater Monitoring 12th Street Landfill Otsego Township, Michigan January 2013**		

INTRODUCTION

The following document details a validation of analytical results for groundwater samples collected in support of the semi-annual groundwater monitoring at the 12th Street Landfill Site in Otsego Township, Michigan, during January 2013. Samples were submitted to ALS Environmental (ALS) in Kelso, Washington and ALS in Houston, Texas. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody form(s), calibration data, blank data, duplicate data, recovery data from surrogate spikes, laboratory control samples (LCS), and matrix spike samples (MS); and field quality assurance/quality control (QA/QC) samples . The assessment of analytical and in-house data included checks for: data consistency (by observing comparability of duplicate analyses); adherence to accuracy and precision criteria; and transmittal errors.

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, October 1999

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R-94-013, February 1994

iii) "USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Chlorinated Dioxin/Furan Data Review", EPA 540-R-02-003, August 2002

These guidelines are collectively referred to as the "Guidelines" in this Memorandum.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. The data quality assessment and validation presented in the following subsections were performed based on the sample results, supporting quality assurance/quality control (QA/QC) and all raw data provided.

SAMPLE HOLDING TIME AND PRESERVATION

The sample holding time criteria for the analyses are summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and/or analyzed within the required holding times.

All samples were properly preserved and delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

GAS CHROMATOGRAPHY/MASS SPECTROMETER (GC/MS) - TUNING AND MASS CALIBRATION (INSTRUMENT PERFORMANCE CHECK) AND INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER (ICP/MS)

Organic Analyses

Prior to volatile organic compound (VOC), semi-volatile organic compound (SVOC), and dioxin/furan (PCDD/PCDF) analyses, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, methods require the analysis of specific tuning compounds and criteria. The resulting spectra must meet the criteria cited in the methods before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

Tuning compounds were analyzed at the required frequency throughout the VOC, SVOC and PCDD/PCDF analysis periods. All tuning criteria were met; indicating that proper optimization of the instrumentation was achieved.

Inorganic Analyses

To ensure adequate mass resolution, identification, and to some degree, sensitivity; the performance of each ICP/MS instrument used for metals analyses is checked prior to calibration and initiating an analysis sequence through the analysis of a tuning solution.

Instrument performance check data were reviewed. The tuning solution was analyzed at the required frequency throughout the analyses. The results of all instrument performance checks were within the method acceptance criteria, indicating that proper optimization of the instrumentation was achieved.

INITIAL CALIBRATION - ORGANIC ANALYSES

Initial calibration data are used to demonstrate that each instrument is capable of generating acceptable quantitative data. A minimum five point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each over a specific concentration range.

Initial calibration criteria for organic analyses are evaluated against the following criteria:

i. GC/MS (VOCs/SVOCs) – must meet a minimum mean relative response factor (RRF) of 0.05

ii. GC/MS (VOCs/SVOCs) – the percent relative standard deviation (RSD) values must not exceed 30.0 percent or a minimum coefficient of determination of 0.99 if quadratic equation calibration curves are used

iii. GC/MS (PCDD/PCDF) -the percent relative standard deviation (%RSD) for the mean relative response factors from the unlabeled native analytes must not exceed 20 percent, and the %RSD for the labeled internal standards must not exceed 35 percent

iv. GC (all compounds using an average for multi-response compounds) – the percent RSD must not exceed 20 percent or a correlation coefficient of 0.995 when linear regression calibration curves are used

Calibration standards were analyzed at the required frequency and the results met the above criteria for linearity. Some VOCs did not meet the criteria for sensitivity. All associated sample results were non-detect and rejected due to the poor sensitivity (see Table 4).

INITIAL CALIBRATION – INORGANIC ANALYSES

Initial calibration of the instruments ensures that they are capable of producing satisfactory quantitative data at the beginning of a series of analyses. For Inductively Coupled Plasma (ICP) and ICP/MS analysis, a calibration blank and at least one standard must be analyzed at each wavelength to establish the analytical curve.

For instrumental wet chemistry analysis, a calibration blank and a minimum of four standards must be analyzed to establish the analytical curve. Resulting correlation coefficients for curves consisting of a blank and four or more standards must be at least 0.995.

For low level mercury analyses, three blanks and a minimum of five standards are analyzed. The average blank response is used to correct each standard response, and the corrected responses are used to calculate calibration factors. The calibration is acceptable if the RSD of the calibration factors is less than 15 percent and if recovery of the lowest standard is 75 to 125 percent.

After the analyses of the calibration curves an initial calibration verification (ICV) standard must be analyzed to verify the analytical accuracy of the calibration curves. All analyte recoveries from the analyses of the ICVs must be within the following control limits:

Analytical Method	*Parameter*	*Control Limits*
ICP	Metals	90 - 110%
Atomic Fluorescence	Mercury	77 - 123%
Instrumental Wet Chemistry	Cyanide	85 - 115%

Upon review of the data, it was determined that the calibration curves and ICVs were analyzed at the proper frequencies and that all of the above-specified criteria were met. The laboratory effectively demonstrated that the instrumentation used for metals and general chemistry analyses were properly calibrated prior to sample analysis.

CONTINUING CALIBRATION - ORGANIC ANALYSES

GC/MS

To ensure that instrument calibration for VOC, SVOC and PCDD/PCDF analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours.

The following criteria were employed to evaluate continuing calibration data:

i. GC/MS (VOCs/SVOCs) – must meet a minimum mean RRF of 0.05

ii. GC/MS (VOCs/SVOCs) – the percent difference between the mean initial calibration RRF and the continuing calibration RRF must not exceed 25 percent

iii. GC/MS (VOCs/SVOCs determined by quadratic curve) – the percent drift between the true value and the continuing calibration value must not exceed 25 percent

iv. GC/MS (PCDD/PCDF) – the percent difference between the mean initial calibration RRF and the continuing calibration RRF must not exceed 20 percent for the unlabeled native analyte (30% for the labeled)

Calibration standards were analyzed at the required frequency, and the results met the above criteria for instrument sensitivity. Some compounds exhibited variability greater than 25% and were qualified as estimated. A summary of the qualified data is presented in Table 5.

GC

To ensure that the calibration of the instrument for organic analyses by GC is valid throughout the sample analysis period, continuing calibration standards are analyzed and evaluated on a regular basis.

The following criteria were employed to evaluate continuing calibration data:

i. GC (all compounds using average for multi-response compounds) – the percent difference between mean initial calibration factor and the continuing calibration factor must not exceed 15 percent

ii. GC (compounds determined by linear regression) – the percent drift between the true value and the continuing calibration value must not exceed 15 percent

All continuing calibration standards were analyzed at the required frequency. All %D values and compound retention times met the above criteria indicating acceptable instrument calibration throughout the analysis period.

CONTINUING CALIBRATION - INORGANIC ANALYSES

To ensure that instrument calibration is acceptable throughout the sample analysis period, continuing calibration verification (CCV) standards are analyzed on a regular basis. Each CCV is deemed acceptable if all analyte recoveries are within the control limits specified above for the ICVs. If some of the CCV analyte recoveries are outside the control limits, samples analyzed before and after the CCV, up until the previous and proceeding CCV analyses, are affected.

For this study, CCVs were analyzed at the proper frequency. All analyte recoveries reported for the CCVs were within the specified limits.

CONTRACT REQUIRED DETECTION LIMIT (CRDL) STANDARD ANALYSES

To verify the linearity of the ICP or ICP/MS calibration near the detection limit, a standard is analyzed which contains the ICP or ICP/MS analytes at specified concentrations. This standard must be analyzed at the beginning and end of each sample analysis run or a minimum of twice per 8-hour period.

CRDL recoveries were evaluated using the criteria specified in the October 2004 "Guidelines". The CRDL recoveries were acceptable.

LABORATORY BLANK ANALYSES

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. Additionally, initial and continuing calibration blanks (ICBs/CCBs) are routinely analyzed after each ICV/CCV for the inorganic parameters.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per 20 investigative samples and/or one per analytical batch.

Organic Analyses
Most method blank results were non-detect. Some VOCs and SVOCs were present at low concentrations. All associated sample results with similar concentrations were qualified as non-detect.

Inorganic Analyses
Upon review of the ICBs, CCBs, and method blanks, it was noted that metal concentrations were observed above the method detection limit (MDL). All associated sample results with similar concentrations were qualified as non-detect. Most investigative samples associated with the low level detections reported either non-detect concentrations or concentrations significantly greater than the associated laboratory blank

concentrations for the analytes of interest. These sample results were not impacted by the contamination detected. Associated positive sample results with similar concentrations to the levels reported in the blanks were qualified as non-detect.

A summary of qualified results is presented in Table 6.

SURROGATE SPIKE RECOVERIES

In accordance with the methods employed, all samples, blanks and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOCs, SVOCs and PCBs determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of semi-volatile organic compound (SVOC) analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

INTERNAL STANDARDS (IS) ANALYSES

Internal standard data were evaluated for all VOC, SVOC and ICP/MS sample analyses.

Organics Analyses

To ensure that changes in the GC/MS sensitivity and response do not affect sample analysis results, internal standard compounds are added to each sample prior to analysis. All results are then calculated as a ratio of the internal standard responses.

The sample internal standard results were evaluated against the following criteria:

i) The retention time of the internal standard must not vary more than ±30 seconds from the associated calibration standard.

ii) Internal standard area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated calibration standard.

All organic internal standard recoveries and retention times met the above criteria.

Inorganic Analyses
Internal standard elements were added to all samples prior to metals analysis by ICP/MS. Overall instrument stability and performance for metals analyses were monitored using the internal standard intensity data. Internal standard recoveries were assessed using control limits of 60-125%.

All inorganic internal standard recoveries were acceptable, demonstrating adequate analytical performance.

SPIKED LABELED COMPOUNDS

Labeled PCDDs/PCDFs are added to each sample and method blank prior to extraction to be an internal standard for the quantitation of the native compounds, and to serve as surrogates for the assessment of method performance in the sample matrix.

Most labeled compound recoveries were within the laboratory control limits demonstrating acceptable analytical accuracy. Where outliers were observed, the qualified samples are outlined in Table 7.

LABORATORY CONTROL SAMPLE (LCS) ANALYSES

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCSs were analyzed at a minimum frequency of one per 20 investigative samples and/or one per analytical batch. Some LCSs were analyzed in duplicate.

Organic Analyses
The LCS/LCSD contained all compounds of interest the compounds specified in the method. All LCS recoveries and relative percent differences were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision, where applicable. Variability was observed between one pair of recoveries. All associated sample results were non-detect and would not have been impacted by the implied variability.

Inorganic Analyses
The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES - ORGANIC ANALYSES

To evaluate the effects of sample matrices on the extraction or digestion process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

MS/MSD analyses were performed as specified in Table 1.

Organic Analyses
The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

Inorganic Analyses
The MS/MSD samples were spiked with the analytes of interest and the results were evaluated using the "Guidelines". All percent recoveries and RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision.

ICP and ICP/MS SERIAL DILUTION

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. A minimum of one per 20 investigative samples or at least one per analytical batch must be analyzed at a five-fold dilution. For samples with sufficient analyte concentrations (> 50 times the method detection limit), the serial dilution results must agree within 10 percent of the original results.

A serial dilution was performed on each MS/MSD sample. All results met the criteria above.

ICP INTERFERENCE CHECK SAMPLE ANALYSIS (ICS)

To verify that the laboratory has established proper inter-element and background correction factors, ICSs are analyzed. These samples contain high concentrations of aluminum, calcium, magnesium and iron and are analyzed at the beginning and end of each sample analysis period. The ICSs are evaluated against recovery control limits of 80 to 120 percent.

ICS analysis results were evaluated for all samples using the criteria in the "Guidelines". All ICS recoveries and results were acceptable.

FIELD QA/QC SAMPLES

The field QA/QC consisted of 4 trip blank samples, 1 rinse blank sample, and 1 field duplicate sample set.

Trip Blank Sample Analysis
To evaluate contamination from sample collection, transportation, storage, and analytical activities, trip blanks were submitted to the laboratory for VOC and mercury analysis. All results were non-detect for the compounds of interest with the exception of toluene and mercury present at low concentrations. All associated results with similar concentrations were qualified as non-detect (see Table 8).

Rinse Blank Sample Analysis

To assess field decontamination procedures, ambient conditions at the site, and cleanliness of sample containers, a rinse blanks was submitted for analysis, as identified in Table 1. All associated sample results were non-detect for the analytes of interest with the exception of some metals present at low concentrations. All associated results with similar concentrations were qualified as non-detect (see Table 9).

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, 1 field duplicate sample was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 and 100 percent for water and soil samples, respectively. If the reported concentration in either the investigative sample or its duplicate is less than five times the practical quantitation limit (PQL), the evaluation criteria is one or two times the PQL value for water and soil samples, respectively.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

ANALYTE REPORTING

The laboratory reported detected results down to the laboratory's MDL for each analyte. Positive analyte detections less than the PQL but greater than the MDL were qualified as estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the PQL in Table 2.

TARGET COMPOUND IDENTIFICATION

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra (if applicable) were evaluated according to the identification criteria established by the methods. The organic compounds reported adhered to the specified identification criteria.

CONCLUSION

Based on this assessment of the information provided, the data produced by ALS were found to exhibit acceptable levels of accuracy and precision and may be used with the qualifications and exceptions noted.

TABLE 1

SAMPLE COLLECTION AND ANALYSIS SUMMARY
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

					Analysis/Parameters								
Sample Identification	*Location*	*Matrix*	*Collection Date (mm/dd/yyyy)*	*Collection Time (hr:min)*	*TCL VOC*	*TCL PCB*	*TCL SVOC*	*PCDD/PCDF*	*TAL Metals*	*LL Mercury*	*Cyanide (amenable)*	*Cyanide (total)*	*Comments*
GW-56393-012813-JV-117	MW-109D	water	1/28/2013	9:50	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-118	MW-105D	water	1/28/2013	9:42	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-119	MW-105S	water	1/28/2013	11:22	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-120	MW-104D	water	1/28/2013	13:05	X	X	X	X	X	X	X	X	MS/MSD
GW-56393-012813-JV-121	MW-104S	water	1/28/2013	14:25	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-122	MW-101D	water	1/28/2013	13:10	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-123	MW-101S	water	1/28/2013	15:35	X	X	X	X	X	X	X	X	
EB-56393-012813-JV-124	-	water	1/28/2013	16:30	X	X	X	X	X	X	X	X	Equipment Blank
GW-56393-012813-JV-125	MW-102D	water	1/28/2013	16:48	X	X	X	X	X	X	X	X	
GW-56393-012813-JV-126	MW-102S	water	1/28/2013	16:08	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-127	MW-107S	water	1/29/2013	9:48	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-128	MW-108S	water	1/29/2013	10:10	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-129	MW-108D	water	1/29/2013	9:35	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-130	MW-108D	water	1/29/2013	9:58	X	X	X	X	X	X	X	X	Field duplicte of GW-56393-012913-JV-129
GW-56393-012913-JV-131	MW-103D	water	1/29/2013	12:02	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-132	MW-106D	water	1/29/2013	12:55	X	X	X	X	X	X	X	X	
GW-56393-012913-JV-133	MW-106S	water	1/29/2013	13:52	X	X	X	X	X	X	X	X	
TB-56393-012913-JV-134	-	water	1/29/2013	23:59	X								Trip Blank
TB-56393-012913-JV-135	-	water	1/29/2013	23:59						X			Trip Blank
TB-56393-012913-JV-136	-	water	1/29/2013	23:59	X								Trip Blank
TB-56393-012913-JV-137	-	water	1/29/2013	23:59						X			Trip Blank

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*	*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*
Sample Identification		*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*	*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*
Sample Date		*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type									
Screen Depth		*Screen_Depth: (70-75)*	*Screen_Depth: (32-29)*	*Screen_Depth: (40-45)*	*Screen_Depth: (3-10)*	*Screen_Depth: (30-35)*	*Screen_Depth: (40-45)*	*Screen_Depth: (20-25)*	*Screen_Depth: (42-47)*
Sample Elevation (feet AMSL)		*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*	*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*
	Units								
Volatile Organic Compounds (VOCs)									
Acetone	ug/L	R	R	R	R	R	R	R	R
Benzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/L	R	R	R	R	R	R	R	R
Carbon disulfide	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	ug/L	R	R	R	R	R	R	R	R
Isopropyl benzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert butyl ether (MTBE)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/L	R	R	R	R	R	R	R	R
Methylene chloride	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*	*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*
Sample Identification		*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*	*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*
Sample Date		*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type									
Screen Depth		*Screen_Depth: (70-75)*	*Screen_Depth: (32-29)*	*Screen_Depth: (40-45)*	*Screen_Depth: (3-10)*	*Screen_Depth: (30-35)*	*Screen_Depth: (40-45)*	*Screen_Depth: (20-25)*	*Screen_Depth: (42-47)*
Sample Elevation (feet AMSL)		*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*	*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*
	Units								
Semi-Volatile Organic Compounds (SVOCs)									
Acenaphthene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Acenaphthylene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Anthracene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)anthracene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)pyrene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(k)fluoranthene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Butyl benzylphthalate (BBP)	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbazole	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Chloro-3-methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
bis(2-Chloroethyl)ether	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Chlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
Chrysene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenz(a,h)anthracene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenzofuran	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3,3'-Dichlorobenzidine	ug/L	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
Diethyl phthalate	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dimethyl phthalate	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dimethylphenol	ug/L	3.9 U	3.9 U	3.8 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Di-n-butylphthalate (DBP)	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4,6-Dinitro-2-methylphenol	ug/L	2.0 U	2.0 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dinitrotoluene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Di-n-octyl phthalate (DnOP)	ug/L	0.20 U	0.040 J	0.19 U	0.034 J	0.20 U	0.046 J	0.20 U	0.049 J
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	0.97 U	0.98 U	0.95 U	0.96 U	0.96 U	0.97 U	0.96 U	0.96 U
Fluoranthene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Fluorene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobenzene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorocyclopentadiene	ug/L	0.97 U	0.98 U	0.95 U	0.96 U	0.96 U	0.97 U	0.96 U	0.96 U
Hexachloroethane	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Isophorone	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylnaphthalene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
4-Methylphenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
Naphthalene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nitrobenzene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrophenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
N-Nitrosodi-n-propylamine	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
N-Nitrosodiphenylamine	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Pentachlorophenol	ug/L	0.97 UJ	0.98 UJ	0.95 UJ	0.96 UJ	0.96 UJ	0.97 UJ	0.96 UJ	0.96 UJ
Phenanthrene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Phenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
Pyrene	ug/L	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4,5-Trichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
2,4,6-Trichlorophenol	ug/L	0.49 U	0.49 U	0.48 U	0.48 U	0.48 U	0.49 U	0.48 U	0.48 U
PCBs									
Aroclor-1016 (PCB-1016)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	ug/L	0.041 U	0.040 U	0.040 U	0.041 U	0.041 U	0.041 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	ug/L	0.021 U	0.020 U	0.020 U	0.021 U	0.021 U	0.021 U	0.020 U	0.020 U
Total PCBs	ug/L	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-101D*	*MW-101S*	*MW-102D*	*MW-102S*	*MW-103D*	*MW-104D*	*MW-104S*	*MW-105D*
Sample Identification		*GW-56393-012813-JV-122*	*GW-56393-012813-JV-123*	*GW-56393-012813-JV-125*	*GW-56393-012813-JV-126*	*GW-56393-012913-JV-131*	*GW-56393-012813-JV-120*	*GW-56393-012813-JV-121*	*GW-56393-012813-JV-118*
Sample Date		*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*	*1/29/2013*	*1/28/2013*	*1/28/2013*	*1/28/2013*
Sample Type									
Screen Depth		*Screen_Depth: (70-75)*	*Screen_Depth: (32-29)*	*Screen_Depth: (40-45)*	*Screen_Depth: (3-10)*	*Screen_Depth: (30-35)*	*Screen_Depth: (40-45)*	*Screen_Depth: (20-25)*	*Screen_Depth: (42-47)*
Sample Elevation (feet AMSL)		*664.33-589.33*	*702.35-663.35*	*664.43-619.43*	*701.18-691.18*	*674.37-639.37*	*633.48-618.48*	*684.86-658.86*	*662.79-615.79*
	Units								
Dioxins/Furans									
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ug/L	0.00000345 J	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ug/L	0.0000481 U	0.0000481 U	0.0000481 UJ	0.0000481 U	0.0000481 U	0.000051 U	0.0000481 U	0.0000481 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ug/L	0.0000481 U	0.0000481 U	0.0000481 UJ	0.0000481 U	0.0000481 U	0.000051 U	0.0000481 U	0.0000481 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000255 U	0.000024 U	0.000024 U
Total tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.0000051 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.0000051 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000831 U	0.0000051 U	0.00000481 U	0.00000481 U
Total tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000831 U	0.0000051 U	0.00000481 U	0.00000481 U
Metals									
Aluminum	ug/L	28.3	10.2	1.5 J	1.5 J	2.1	4.3	2.8	8.3
Antimony	ug/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.03 J
Arsenic	ug/L	0.30 J	0.27 J	0.18 J	0.20 J	0.16 J	0.28 J	0.23 J	0.26 J
Barium	ug/L	78.2	77.3	72.7	80.3	64.5	69.7	73.6	79.2
Beryllium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Cadmium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Chromium	ug/L	1.16 U	2.05	0.87	0.78	0.79	1.05	0.95	1.26
Cobalt	ug/L	0.280	0.166	0.113	0.212	0.136	0.137	0.150	0.166
Copper	ug/L	0.86	0.62	0.45	0.67	0.56	0.52	0.51	0.69
Cyanide (amenable)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyanide (total)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Iron	ug/L	202	110	20.0 U	13.2 J	20.0 U	19.3 J	11.9 J	52.7
Lead	ug/L	0.265	0.077	0.020 U	0.042	0.020 U	0.042	0.020 U	0.090
Magnesium	ug/L	23900	24000	22400	24700	22300	22900	23100	23600
Manganese	ug/L	6.53	5.22	0.06	52.3	0.08	0.66	0.59	1.48
Mercury	ug/L	0.00136	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Nickel	ug/L	2.91	2.57	2.37	2.72	2.57	2.30	2.27	2.70
Selenium	ug/L	0.4 J	0.5 J	0.4 J	0.5 J	0.4 J	0.5 J	0.4 J	0.4 J
Silver	ug/L	0.027	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	ug/L	24500	21700	20000	18500	18700	20900	20800	21100
Thallium	ug/L	0.020 U	0.020 U	0.020 U	0.022 U	0.020 U	0.020 U	0.020 U	0.020 U
Vanadium	ug/L	0.43	0.66	0.33	0.22	0.25	0.35	0.36	0.37
Zinc	ug/L	2.80	1.24 U	0.57 U	2.06	1.89	1.40	1.58	5.46

Notes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.
R Rejected.

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-105S*	*MW-106D*	*MW-106S*	*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*	*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/28/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type							*Duplicate*		
Screen Depth		*Screen_Depth: (5-12)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (8-13)*	*Screen_Depth: (40-45)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (22-27)*
Sample Elevation (feet AMSL)		*699.89-687.89*	*664.66-620.66*	*701.89-692.89*	*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units								
Volatile Organic Compounds (VOCs)									
Acetone	ug/L	R	R	R	R	R	R	R	R
Benzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/L	R	R	R	R	R	R	R	R
Carbon disulfide	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	ug/L	0.50 U	0.070 J	0.12 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	ug/L	0.50 U	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 U
1,1-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.12 J	0.10 J	0.50 U	0.50 U
1,2-Dichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Hexanone	ug/L	R	R	R	R	R	R	R	R
Isopropyl benzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert butyl ether (MTBE)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/L	R	R	R	R	R	R	R	R
Methylene chloride	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	ug/L	0.12 J	0.50 U	0.50 U	0.50 U	0.12 J	0.13 J	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl chloride	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	ug/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-105S*	*MW-106D*	*MW-106S*	*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*	*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/28/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type							*Duplicate*		
Screen Depth		*Screen_Depth: (5-12)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (8-13)*	*Screen_Depth: (40-45)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (22-27)*
Sample Elevation (feet AMSL)		*699.89-687.89*	*664.66-620.66*	*701.89-692.89*	*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units								
Semi-Volatile Organic Compounds (SVOCs)									
Acenaphthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Acenaphthylene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(a)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(b)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.086 J	0.20 U
Benzo(k)fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Butyl benzylphthalate (BBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbazole	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Chloro-3-methylphenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
bis(2-Chloroethyl)ether	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Chlorophenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Chrysene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenz(a,h)anthracene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibenzofuran	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
3,3'-Dichlorobenzidine	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dichlorophenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Diethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dimethyl phthalate	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4-Dimethylphenol	ug/L	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Di-n-butylphthalate (DBP)	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4,6-Dinitro-2-methylphenol	ug/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4-Dinitrotoluene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Di-n-octyl phthalate (DnOP)	ug/L	0.20 U	0.20 U	0.036 J	0.083 J	0.20 U	0.20 U	0.20 U	0.20 U
bis(2-Ethylhexyl)phthalate (DEHP)	ug/L	0.97 U	0.99 U	0.96 U	0.97 U	0.98 U	0.96 U	1.6	0.96 U
Fluoranthene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Fluorene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorocyclopentadiene	ug/L	0.97 U	0.99 U	0.96 U	0.97 U	0.98 U	0.96 U	0.97 U	0.96 U
Hexachloroethane	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Indeno(1,2,3-cd)pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Isophorone	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylnaphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Methylphenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
4-Methylphenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Naphthalene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nitrobenzene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Nitrophenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
N-Nitrosodi-n-propylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
N-Nitrosodiphenylamine	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Pentachlorophenol	ug/L	0.97 UJ	0.99 UJ	0.96 UJ	0.97 UJ	0.98 UJ	0.96 UJ	0.97 UJ	0.96 UJ
Phenanthrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Phenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
Pyrene	ug/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,4,5-Trichlorophenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
2,4,6-Trichlorophenol	ug/L	0.49 U	0.50 U	0.48 U	0.49 U	0.49 U	0.48 U	0.49 U	0.48 U
PCBs									
Aroclor-1016 (PCB-1016)	ug/L	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1221 (PCB-1221)	ug/L	0.040 U	0.040 U	0.040 U	0.041 U	0.040 U	0.042 U	0.041 U	0.040 U
Aroclor-1232 (PCB-1232)	ug/L	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1242 (PCB-1242)	ug/L	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1248 (PCB-1248)	ug/L	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1254 (PCB-1254)	ug/L	0.020 U	0.010 J	0.011 J	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Aroclor-1260 (PCB-1260)	ug/L	0.020 U	0.020 U	0.020 U	0.021 U	0.020 U	0.021 U	0.021 U	0.020 U
Total PCBs	ug/L	ND	0.01 J	0.011 J	ND	ND	ND	ND	ND

TABLE 2

ANALYTICAL RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Sample Location		*MW-105S*	*MW-106D*	*MW-106S*	*MW-107S*	*MW-108D*	*MW-108D*	*MW-108S*	*MW-109D*
Sample Identification		*GW-56393-012813-JV-119*	*GW-56393-012913-JV-132*	*GW-56393-012913-JV-133*	*GW-56393-012913-JV-127*	*GW-56393-012913-JV-129*	*GW-56393-012913-JV-130*	*GW-56393-012913-JV-128*	*GW-56393-012813-JV-117*
Sample Date		*1/28/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/29/2013*	*1/28/2013*
Sample Type							*Duplicate*		
Screen Depth		*Screen_Depth: (5-12)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (8-13)*	*Screen_Depth: (40-45)*	*Screen_Depth: (40-45)*	*Screen_Depth: (2-9)*	*Screen_Depth: (22-27)*
Sample Elevation (feet AMSL)		*699.89-687.89*	*664.66-620.66*	*701.89-692.89*	*695.76-682.76*	*663.39-618.39*	*663.39-618.39*	*701.32-692.32*	*689.41-666.41*
	Units								
Dioxins/Furans									
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzofuran (HpCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total heptachlorodibenzo-p-dioxin (HpCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.0000035 J	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzofuran (HxCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total hexachlorodibenzo-p-dioxin (HxCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.00000195 J
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	ug/L	0.0000481 U	0.000049 UJ	0.0000481 UJ	0.0000481 UJ	0.0000481 U	0.0000481 U	0.0000481 U	0.0000481 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	ug/L	0.0000481 U	0.000049 UJ	0.0000481 UJ	0.0000481 UJ	0.0000481 U	0.0000481 U	0.0000294 J	0.0000481 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzofuran (PeCDF)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total pentachlorodibenzo-p-dioxin (PeCDD)	ug/L	0.000024 U	0.0000245 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U	0.000024 U
Total tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000537 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	ug/L	0.00000481 U	0.00000537 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.0000056 U	0.00000677 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Total tetrachlorodibenzo-p-dioxin (TCDD)	ug/L	0.00000481 U	0.0000056 U	0.00000677 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U	0.00000481 U
Metals									
Aluminum	ug/L	1.0 J	2.1	2.7	2.4	2.1	1.5 J	682	2.3
Antimony	ug/L	0.05 U	0.07	1.65	0.03 J	0.03 J	0.03 J	0.09	0.03 J
Arsenic	ug/L	0.19 J	0.23 J	4.25	5.69	1.74	1.57	0.80	0.09 J
Barium	ug/L	115	79.6	301	161	271	269	37.0	83.4
Beryllium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.022 U	0.020 U
Cadmium	ug/L	0.020 U	0.020 U	0.112	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Chromium	ug/L	1.10	1.19	2.49	2.27	0.86	0.97	2.09	1.20
Cobalt	ug/L	0.320	0.121	0.568	0.591	0.524	0.514	0.344	0.148
Copper	ug/L	0.62	0.57	5.40	0.62	0.50	0.52	1.92	0.76
Cyanide (amenable)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cyanide (total)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Iron	ug/L	53.8	3.8 J	3370	10600	403	365	1140	20.0 U
Lead	ug/L	0.020 U	0.020 U	0.027 U	0.030 U	0.020 U	0.020 U	0.867	0.020 U
Magnesium	ug/L	29500	23600	39200	28000	24500	24400	4220	23900
Manganese	ug/L	67.0	0.10	131	801	209	212	35.2	0.07
Mercury	ug/L	0.001 U	0.001 U	0.00777	0.001 U	0.001 U	0.001 U	0.0038	0.001 U
Nickel	ug/L	3.01	2.56	7.87	4.61	2.98	3.07	1.87	3.07
Selenium	ug/L	0.4 J	0.5 J	0.7 J	0.4 J	0.3 J	0.4 J	1.0 U	0.3 J
Silver	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	ug/L	24600	22600	12800	18500	29900	30000	3810	22700
Thallium	ug/L	0.020 U	0.020 U	0.020 U	0.020 U	0.053	0.051	0.020 U	0.020 U
Vanadium	ug/L	0.34	0.33	0.59	0.68	0.24	0.28	1.32	0.35
Zinc	ug/L	1.66	1.34 U	174	2.09	1.02 U	1.66	3.29	2.21

Notes:

U Not detected at the associated reporting limit.
J Estimated concentration.
UJ Not detected; associated reporting limit is estimated.
R Rejected.

TABLE 3

ANALYTICAL METHODS AND HOLDING TIME CRITERIA
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Method* [1]	*Matrix*	*Holding Time*	
			Collection to Extraction (Days)	*Collection or Extraction to Analysis (Days)*
TCL VOC	SW-846 8260	Water	-	14
TCL SVOC	SW-846 8270C	Water	7	40
PCB	SW-846 8082	Water	7	40
TAL Metals (except Al, Fe, Mg, Na)	SW-846 6020	Water	-	180
Metals - Al, Fe, Mg, Na	SW-846 6010B			
Mercury	EPA 1631	Water	-	28
Cyanide (Amenable)	SW-846 9012	Water	-	14
Cyanide (Total)	SW-846 9012	Water	-	14
Dioxins/Furans	SW-846 8290	Water	30	45

Notes:

SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions.
EPA Environmental Protection Agency

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Analyte*	*Calibration Date*	*Correlation Coefficient*	*Associated Sample ID*	*Qualified Result*	*Units*
VOCs	2-Butanone	1/30/13	0.011	GW-56393-012813-JV-117	R	
				GW-56393-012813-JV-118	R	
				GW-56393-012813-JV-119	R	
				GW-56393-012813-JV-120	R	
				GW-56393-012813-JV-121	R	
				GW-56393-012813-JV-122	R	
				GW-56393-012813-JV-123	R	
				GW-56393-012813-JV-125	R	
				GW-56393-012813-JV-126	R	
				GW-56393-012913-JV-127	R	
				GW-56393-012913-JV-128	R	
				GW-56393-012913-JV-129	R	
				GW-56393-012913-JV-130	R	
				GW-56393-012913-JV-131	R	
				GW-56393-012913-JV-132	R	
				GW-56393-012913-JV-133	R	
VOCs	2-Hexanone	1/30/13	0.029	GW-56393-012813-JV-117	R	
				GW-56393-012813-JV-118	R	
				GW-56393-012813-JV-119	R	
				GW-56393-012813-JV-120	R	
				GW-56393-012813-JV-121	R	
				GW-56393-012813-JV-122	R	
				GW-56393-012813-JV-123	R	
				GW-56393-012813-JV-125	R	
				GW-56393-012813-JV-126	R	
				GW-56393-012913-JV-127	R	
				GW-56393-012913-JV-128	R	
				GW-56393-012913-JV-129	R	
				GW-56393-012913-JV-130	R	
				GW-56393-012913-JV-131	R	
				GW-56393-012913-JV-132	R	
				GW-56393-012913-JV-133	R	
VOCs	4-Methyl-2-pentanone	1/30/13	0.038	GW-56393-012813-JV-117	R	
				GW-56393-012813-JV-118	R	
				GW-56393-012813-JV-119	R	
				GW-56393-012813-JV-120	R	
				GW-56393-012813-JV-121	R	
				GW-56393-012813-JV-122	R	
				GW-56393-012813-JV-123	R	
				GW-56393-012813-JV-125	R	
				GW-56393-012813-JV-126	R	
				GW-56393-012913-JV-127	R	
				GW-56393-012913-JV-128	R	
				GW-56393-012913-JV-129	R	
				GW-56393-012913-JV-130	R	
				GW-56393-012913-JV-131	R	
				GW-56393-012913-JV-132	R	
				GW-56393-012913-JV-133	R	
VOCs	Acetone	1/30/13	0.022	GW-56393-012813-JV-117	R	
				GW-56393-012813-JV-118	R	
				GW-56393-012813-JV-119	R	
				GW-56393-012813-JV-120	R	
				GW-56393-012813-JV-121	R	
				GW-56393-012813-JV-122	R	
				GW-56393-012813-JV-123	R	
				GW-56393-012813-JV-125	R	
				GW-56393-012813-JV-126	R	
				GW-56393-012913-JV-127	R	
				GW-56393-012913-JV-128	R	
				GW-56393-012913-JV-129	R	
				GW-56393-012913-JV-130	R	
				GW-56393-012913-JV-131	R	
				GW-56393-012913-JV-132	R	
				GW-56393-012913-JV-133	R	

Notes:
R Rejected.
VOC Volatile Organic Compounds.

TABLE 5

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Analyte*	*Calibration Date*	*RRF*	*%D*	*Associated Sample ID*	*Qualified Result*	*Units*
VOCs	Dichlorodifluoromethane	2/5/13	-	30	GW-56393-012913-JV-127	0.50 UJ	ug/L
					GW-56393-012913-JV-128	0.50 UJ	ug/L
					GW-56393-012913-JV-129	0.50 UJ	ug/L
					GW-56393-012913-JV-130	0.50 UJ	ug/L
					GW-56393-012913-JV-131	0.50 UJ	ug/L
					GW-56393-012913-JV-132	0.50 UJ	ug/L
					GW-56393-012913-JV-133	0.50 UJ	ug/L
SVOCs	Pentachlorophenol	2/11/13		33	GW-56393-012813-JV-117	0.96 UJ	ug/L
					GW-56393-012813-JV-118	0.96 UJ	ug/L
					GW-56393-012813-JV-119	0.97 UJ	ug/L
					GW-56393-012813-JV-120	0.97 UJ	ug/L
					GW-56393-012813-JV-121	0.96 UJ	ug/L
					GW-56393-012813-JV-122	0.97 UJ	ug/L
					GW-56393-012813-JV-123	0.98 UJ	ug/L
					GW-56393-012813-JV-125	0.95 UJ	ug/L
					GW-56393-012813-JV-126	0.96 UJ	ug/L
					GW-56393-012913-JV-127	0.97 UJ	ug/L
					GW-56393-012913-JV-128	0.97 UJ	ug/L
					GW-56393-012913-JV-129	0.98 UJ	ug/L
SVOCs	Pentachlorophenol	2/12/13		27	GW-56393-012913-JV-130	0.96 UJ	ug/L
					GW-56393-012913-JV-131	0.96 UJ	ug/L
					GW-56393-012913-JV-132	0.99 UJ	ug/L
					GW-56393-012913-JV-133	0.96 UJ	ug/L

Notes:
- \- Not applicable.
- %D Percent difference.
- RRF Relative response factor.

TABLE 6

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Analyte*	*Analysis Date*	*Blank Result **	*Sample ID*	*Original Result*	*Qualified Result*	*Units*
SVOCs	bis(2-Ethylhexyl)phthalate	1/31/13	0.14	GW-56393-012813-JV-117	0.14 J	0.96 U	µg/L
				GW-56393-012813-JV-118	0.31 J	0.96 U	µg/L
				GW-56393-012813-JV-119	0.22 J	0.97 U	µg/L
				GW-56393-012813-JV-120	0.18 J	0.97 U	µg/L
				GW-56393-012813-JV-122	0.13 J	0.97 U	µg/L
				GW-56393-012813-JV-123	0.26 J	0.98 U	µg/L
				GW-56393-012813-JV-125	0.26 J	0.95 U	µg/L
				GW-56393-012913-JV-127	0.31 J	0.97 U	µg/L
				GW-56393-012913-JV-130	0.15 J	0.96 U	µg/L
				GW-56393-012913-JV-132	0.18 J	0.99 U	µg/L
				GW-56393-012913-JV-133	0.51 J	0.96 U	µg/L
SVOCs	Butyl benzylphthalate	1/31/13	0.034	GW-56393-012813-JV-117	0.023 J	0.20 U	µg/L
				GW-56393-012813-JV-118	0.026 J	0.20 U	µg/L
				GW-56393-012813-JV-120	0.027 J	0.20 U	µg/L
				GW-56393-012813-JV-122	0.021 J	0.20 U	µg/L
				GW-56393-012813-JV-125	0.028 J	0.19 U	µg/L
				GW-56393-012913-JV-132	0.028 J	0.20 U	µg/L
VOCs	Chloroform	2/4/13	0.14	GW-56393-012813-JV-125	0.13 J	0.50 U	µg/L
VOCs	Chloroform	2/5/13	0.14	GW-56393-012913-JV-131	0.11 J	0.50 U	µg/L
SVOCs	Diethyl phthalate	1/31/13	0.029	GW-56393-012813-JV-117	0.022 J	0.20 U	µg/L
				GW-56393-012813-JV-118	0.023 J	0.20 U	µg/L
				GW-56393-012813-JV-119	0.027 J	0.20 U	µg/L
				GW-56393-012813-JV-120	0.027 J	0.20 U	µg/L
				GW-56393-012813-JV-121	0.021 J	0.20 U	µg/L
				GW-56393-012813-JV-122	0.023 J	0.20 U	µg/L
				GW-56393-012813-JV-123	0.022 J	0.20 U	µg/L
				GW-56393-012813-JV-125	0.022 J	0.19 U	µg/L
				GW-56393-012813-JV-126	0.024 J	0.20 U	µg/L
				GW-56393-012913-JV-127	0.030 J	0.20 U	µg/L
				GW-56393-012913-JV-128	0.039 J	0.20 U	µg/L
				GW-56393-012913-JV-129	0.030 J	0.20 U	µg/L
				GW-56393-012913-JV-130	0.027 J	0.20 U	µg/L
				GW-56393-012913-JV-131	0.022 J	0.20 U	µg/L
				GW-56393-012913-JV-132	0.027 J	0.20 U	µg/L
				GW-56393-012913-JV-133	0.021 J	0.20 U	µg/L
SVOCs	Di-n-butylphthalate	1/31/13	0.029	GW-56393-012813-JV-118	0.027 J	0.20 U	µg/L
				GW-56393-012813-JV-119	0.027 J	0.20 U	µg/L
				GW-56393-012813-JV-121	0.024 J	0.20 U	µg/L
				GW-56393-012813-JV-123	0.024 J	0.20 U	µg/L
				GW-56393-012813-JV-125	0.036 J	0.19 U	µg/L
				GW-56393-012913-JV-127	0.028 J	0.20 U	µg/L
				GW-56393-012913-JV-129	0.025 J	0.20 U	µg/L
				GW-56393-012913-JV-130	0.026 J	0.20 U	µg/L
				GW-56393-012913-JV-132	0.035 J	0.20 U	µg/L
				GW-56393-012913-JV-133	0.045 J	0.20 U	µg/L
Metals	Zinc	2/7/2013	0.27J	GW-56393-012813-JV-123	1.24	1.24 U	µg/L
				GW-56393-012813-JV-125	0.57	0.57 U	µg/L
				GW-56393-012913-JV-129	1.02	1.02 U	µg/L
				GW-56393-012913-JV-132	1.34	1.34 U	µg/L
Metals	Beryllium	2/7/2013	0.008J	GW-56393-012913-JV-128	0.022	0.022 U	µg/L

TABLE 6

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Analyte*	*Analysis Date*	*Blank Result **	*Sample ID*	*Original Result*	*Qualified Result*	*Units*
Metals	Lead	2/7/2013	0.005J	GW-56393-012813-JV-117	0.015 J	0.020 U	µg/L
				GW-56393-012813-JV-119	0.014 J	0.020 U	µg/L
				GW-56393-012813-JV-121	0.019 J	0.020 U	µg/L
				GW-56393-012813-JV-125	0.005 J	0.020 U	µg/L
				GW-56393-012913-JV-129	0.015 J	0.020 U	µg/L
				GW-56393-012913-JV-130	0.013 J	0.020 U	µg/L
				GW-56393-012913-JV-131	0.014 J	0.020 U	µg/L
				GW-56393-012913-JV-132	0.012 J	0.020 U	µg/L
Metals	Silver	2/7/2013	0.005J	GW-56393-012913-JV-133	0.012 J	0.020 U	µg/L
Metals	Thallium	2/7/2013	0.007J	GW-56393-012813-JV-117	0.008 J	0.020 U	µg/L
				GW-56393-012813-JV-118	0.008 J	0.020 U	µg/L
				GW-56393-012813-JV-119	0.007 J	0.020 U	µg/L
				GW-56393-012813-JV-120	0.004 J	0.020 U	µg/L
				GW-56393-012813-JV-121	0.003 J	0.020 U	µg/L
				GW-56393-012813-JV-122	0.003 J	0.020 U	µg/L
				GW-56393-012813-JV-126	0.022	0.022 U	µg/L
				GW-56393-012913-JV-127	0.003 J	0.020 U	µg/L
				GW-56393-012913-JV-128	0.014 J	0.020 U	µg/L
				GW-56393-012913-JV-131	0.003 J	0.020 U	µg/L
				GW-56393-012913-JV-132	0.004 J	0.020 U	µg/L
Metals	Cadmium	2/7/2013	0.005J	GW-56393-012813-JV-117	0.008 J	0.020 U	µg/L
				GW-56393-012813-JV-118	0.003 J	0.020 U	µg/L
				GW-56393-012813-JV-119	0.007 J	0.020 U	µg/L
				GW-56393-012813-JV-120	0.005 J	0.020 U	µg/L
				GW-56393-012813-JV-121	0.005 J	0.020 U	µg/L
				GW-56393-012813-JV-122	0.004 J	0.020 U	µg/L
				GW-56393-012813-JV-123	0.005 J	0.020 U	µg/L
				GW-56393-012813-JV-125	0.003 J	0.020 U	µg/L
				GW-56393-012813-JV-126	0.008 J	0.020 U	µg/L
				GW-56393-012913-JV-128	0.014 J	0.020 U	µg/L
				GW-56393-012913-JV-129	0.007 J	0.020 U	µg/L
				GW-56393-012913-JV-130	0.005 J	0.020 U	µg/L
				GW-56393-012913-JV-131	0.006 J	0.020 U	µg/L
				GW-56393-012913-JV-132	0.006 J	0.020 U	µg/L
Metals	Lead	2/7/2013	0.008J	GW-56393-012913-JV-127	0.030	0.030 U	µg/L
			0.007J	GW-56393-012913-JV-133	0.027	0.027 U	µg/L

Notes:
* Blank result adjusted for sample factors where applicable.
U Not detected at the associated reporting limit.

TABLE 7

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INTERNAL STANDARD (IS) RECOVERIES
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Sample ID*	*Internal Standard*	*IS Area Count (percent)*	*Control Limits (percent)*	*Analytes*	*Qualified Result*	*Units*
PCDD/PCDF	GW-56393-012813-JV-125	13C-OCDD	37	40-135	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	48.1 UJ	pg/L
					1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	48.1 UJ	pg/L
PCDD/PCDF	GW-56393-012913-JV-127	13C-OCDD	38	40-135	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	48.1 UJ	pg/L
					1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	48.1 UJ	pg/L
PCDD/PCDF	GW-56393-012913-JV-132	13C-OCDD	34	40-135	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	49.0 UJ	pg/L
					1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	49.0 UJ	pg/L
PCDD/PCDF	GW-56393-012913-JV-133	13C-OCDD	37	40-135	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	48.1 UJ	pg/L
					1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	48.1 UJ	pg/L

Notes:

UJ Not detected; associated reporting limit is estimated.
PCDD/PCDF Polychlorinated dibenzo-p-dioxin/polychlorinated dibenzofurans

TABLE 8

QUALIFIED SAMPLE DATA DUE TO ANALYTE CONCENTRATIONS IN THE TRIP BLANKS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Blank Date*	*Analyte*	*Blank Result*	*Associated Sample ID*	*Original Result*	*Qualified Result*	*Units*
VOCs	01/29/13	Toluene	0.061J	GW-56393-012813-JV-126	0.060 J	0.50 U	ug/L
				GW-56393-012913-JV-130	0.070 J	0.50 U	ug/L
Metals	1/29/2013	Mercury	0.10J	GW-56393-012813-JV-117	0.48 J	1.0 U	ng/L
				GW-56393-012813-JV-118	0.19 J	1.0 U	ng/L
				GW-56393-012813-JV-119	0.17 J	1.0 U	ng/L
				GW-56393-012813-JV-120	0.24 J	1.0 U	ng/L
				GW-56393-012813-JV-121	0.22 J	1.0 U	ng/L
				GW-56393-012813-JV-125	0.10 J	1.0 U	ng/L
				GW-56393-012813-JV-126	0.40 J	1.0 U	ng/L
				GW-56393-012913-JV-127	0.16 J	1.0 U	ng/L
				GW-56393-012913-JV-129	0.23 J	1.0 U	ng/L
				GW-56393-012913-JV-130	0.22 J	1.0 U	ng/L
				GW-56393-012913-JV-131	0.14 J	1.0 U	ng/L
				GW-56393-012913-JV-132	0.18 J	1.0 U	ng/L

Notes:

U Not detected at the associated reporting limit.

TABLE 9

QUALIFIED SAMPLE DATA DUE TO ANALYTE CONCENTRATIONS IN THE RINSE BLANKS
GROUNDWATER MONITORING
12TH STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN
JANUARY 2013

Parameter	*Rinse Blank ID*	*Blank Date*	*Analyte*	*Blank Result*	*Associated Sample ID*	*Original Result*	*Qualified Result*	*Units*
Metals	EB-56393-012813-JV-124	1/28/2013	Chromium	0.36	GW-56393-012813-JV-122	1.16	1.16 U	ug/L
Metals	EB-56393-012813-JV-124	1/28/2013	Mercury	0.10J	GW-56393-012813-JV-123	0.20 J	1.0 U	ng/L

Notes:

U Not detected at the associated reporting limit.