REMEDIAL ACTION CONTRACT 2
FOR REMEDIAL, ENFORCEMENT OVERSIGHT, AND
NON-TIME CRITICAL REMOVAL ACTIVITIES
IN REGION 5

FIELD SAMPLING PLAN ADDENDUM
TAR LAKE AND RESIDENTIAL AREA INVESTIGATIONS
TAR LAKE SITE
MANCELONA, ANTRIM COUNTY, MICHIGAN

Prepared for
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

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1.0 INTRODUCTION

SulTRAC has prepared this field sampling plan (FSP) addendum to provide supplemental information regarding field and laboratory activities associated with a second phase of sampling at the Tar Lake Site in Mancelona, Michigan, under the U.S. Environmental Protection Agency (EPA) Remedial Action Contract (RAC) 2 for Region 5, Contract No. EP-S5-06-02, Work Assignment (WA) No. 164-TATA-0571. SulTRAC completed the first phase of sampling in general accordance with the approved FSP (SulTRAC 2011) in June 2011. SulTRAC provided a detailed summary of field activities and sample analytical results to EPA in a draft technical memorandum (TM) on February 21, 2012 (SulTRAC 2012). Figures and tables included in the draft TM that have been revised are included in Appendix A of this FSP addendum.

This FSP addendum for Phase 2 of the investigation is a supplement to an existing, detailed FSP for the Tar Lake and Residential (RES) areas of the Tar Lake site. Therefore, only portions of the FSP requiring updates or clarification are included. This FSP addendum was prepared to (1) clarify investigation sampling objectives, (2) describe source material identified during the first phase of sampling, (3) briefly evaluate possible remedial options based on the first phase sampling results, (4) provide rationale for additional proposed soil boring locations, and (5) justify deviations from existing FSP sampling methodology.

The sampling described in this FSP addendum is intended to generate data that will support development of an updated conceptual site model, and ultimately lead to selection of an appropriate remedial action to address site contamination.

2.0 BACKGROUND

Soil and groundwater sampling occurred within two investigative areas of the Tar Lake site: the Tar Lake area and the RES area. The following sections briefly summarize sample collection activities within each area.

2.1 TAR LAKE AREA

Soil borings were advanced using hollow-stem auger (HSA) drilling at 21 locations (SB01 through SB21) within the Tar Lake investigation area (Figure 1). Soil cores were collected using a stainless steel split spoon sampler. Soil cores were continuously collected from the entire vadose zone (except in areas

where significant overburden was present). Soil samples were collected from depth intervals that appeared to exhibit the highest contamination of volatile organics based on field observations and flame ionization detector (FID)/photoionization detector (PID) screening. In soil borings where visual contamination was present, additional samples were collected from suspected unimpacted soil in order to develop estimates for remediation. A total of 33 investigative soil samples were collected for Routine Analytical Services (RAS) Target Compound List (TCL) and Target Analyte List (TAL) parameters (volatile organic compounds [VOC], semivolatile organic compounds [SVOC], and metals).

Groundwater samples were collected from the depth corresponding to the observed water table at each soil boring using the methodology specified in the FSP. Two additional groundwater samples were collected from VAS01 and VAS16 at depth for a total of 23 groundwater samples. After groundwater samples had been collected, a temporary monitoring well screened across the water table was left in place. In addition, 34 groundwater samples were collected from existing monitoring wells within the Tar Lake investigation area. Each groundwater sample was analyzed for RAS TCL and TAL parameters. Existing wells in this area not sampled include MW-3, MW-3A-72, MW-13, SPW-1-55, SPW-4-54, and SPW-9-57. The groundwater elevation at each of these wells was below the dedicated pump intake.

2.2 3.48-ACRE RESIDENTIAL AREA

Surface soil samples were collected from depths between 0 and 6 inches below ground surface at 21 locations (RES01 through RES21) within the RES investigation area (Figure 2). In addition, a groundwater sample was collected from the existing residential well. Each sample was analyzed for RAS TCL and TAL parameters.

3.0 PROJECT OBJECTIVES

The FSP for investigation activities to address the Tar Lake Area and the RES Area of the site was submitted to EPA on February 25, 2011 (SulTRAC 2011). This FSP addendum revisits the project objectives and describes the remaining investigative activity required to meet these objectives. According to the approved FSP, additional data and/or evaluations were needed to (1) determine if any of the existing groundwater monitoring wells should be sampled or ultimately abandoned; (2) determine if wells present on Moeke Lumber property provide water consistent with Record of Decision (ROD) requirements for groundwater use; (3) identify the source of increasing groundwater contamination in the MW1-series wells and develop alternatives and cost estimates to address the increasing contamination; and (4) determine if any chemicals are present within the RES that would prevent its designation as unlimited use/unlimited exposure (UU/UE), and develop alternatives

to address contamination. The approach for achieving these objectives in specific areas of the site is summarized as follows.

Monitoring Well Inventory

In order to evaluate the effectiveness of existing monitoring wells throughout the site, SulTRAC completed a monitoring well survey in August 2010. A total of 56 monitoring wells were located, and evaluation of these for future sampling or abandonment will continue based on their locales (horizontal and vertical) and physical conditions. During Phase 2 investigation activities, SulTRAC will attempt to locate monitoring wells that previously could not be located (MW-04, MW-05, MW-09, and MW-17), and collect samples, if applicable. A total of 34 of the monitoring wells relevant to and located appropriately for the Tar Lake investigation (immediately upgradient and downgradient of the Tar Lake depression) were sampled in June 2011 as part of this investigation. Analytical results of these groundwater monitoring well samples are included in Tables 4 and 6 in Appendix A, and were summarized in the draft technical memorandum (SulTRAC 2012). As part of this FSP addendum, SulTRAC is also providing vertical hydraulic gradient calculations based on the groundwater elevations determined during Phase 1, as well as the groundwater elevations determined by Michigan Department of Environmental Quality (MDEQ) in 2009 (Table 14 in Appendix A). The data indicate that a downward vertical hydraulic gradient is predominant across the site, except near the MW-1A and MW-1B series. SulTRAC will obtain additional groundwater elevation data during Phase 2 of the investigation to verify the vertical hydraulic gradients calculated using the 2011 data. SulTRAC will provide conclusions and recommendations regarding the existing monitoring well network after Phase 2 investigative activities are completed.

Moeke Lumber

No available analytical data demonstrate that groundwater from both wells on Moeke Lumber property complies with ROD requirements for groundwater use. SulTRAC attempted to collect groundwater samples from each on-site well located inside the building during the June 2011 mobilization. However, no personnel were present to allow access to the wells. SulTRAC has included Moeke Lumber sampling in this FSP for remaining areas of the site, and has asked for EPA and MDEQ assistance in gaining access to the on-site wells prior to mobilization.

Tar Lake

In order to help identify the source of increasing groundwater contamination in the MW1-series wells and develop alternatives and cost estimates to address the increasing contamination, SulTRAC collected 33 soil and 57 groundwater samples (33 existing monitoring wells, 24 vertical aquifer samples) as part of

Phase 1 of investigative activities. Analytical results of the soil and groundwater samples are included in Tables 1 through 6 in Appendix A, and were summarized in the draft technical memorandum (SulTRAC 2012).

Field observations and analytical data from Phase 1 indicate that source material contributing to groundwater contamination is present. Specifically, visual tar and elevated concentrations of organics in analytical results from soil and groundwater samples collected at locations SB01, SB15, SB16, and SB20 provide evidence of a possible contiguous tar layer present along the western slope of the Tar Lake depression. This layer may also be present at slightly deeper elevations in the Tar Lake depression. Figures 3 through 6 indicate horizontal and vertical locations of identified and estimated unknown source material. In addition, soil analytical results indicate that inorganic (aluminum, arsenic, chromium, iron, and manganese) source material may be present at SB08, SB09, SB16, and SB20. Table 15 in Appendix A summarizes field screening results and observations during soil boring advancement.

Based on the Phase 1 investigation results, additional data are needed to determine the full horizontal and vertical nature and extent of source material and its impact on groundwater at the site. The additional data will allow adequate delineation of existing contamination in order to provide best possible remedial recommendations for the site. More accurate surface and groundwater elevation data are also required to verify localized groundwater flow and provide more accurate source volume estimates, and ultimately, a better evaluation of remedial options. Proposed soil boring locations, target depths, sample analyses, and rationale are specified in Section 4.0.

Although the Tar Lake area investigation is not complete, SulTRAC anticipates an expansion of the current biosparge system as the likely most viable remedial option for this area. Excavation of source material in shallow soils may also be combined, as applicable. Final conclusions and recommendations pertaining to applicable remedial options will be provided once Phase 2 investigative activities have been completed. Additionally, SulTRAC will provide conclusions and recommendations regarding the existing monitoring well network once Phase 2 investigative activities have been completed.

RES Area

In order to determine if any chemicals are present within the RES that would prevent designation as UU/UE, SulTRAC collected 21 surface soil samples and one residential water sample as part of Phase 1 investigative activities. Analytical results from the samples are included in Tables 7 through 9 in Appendix A, and were summarized in the draft technical memorandum (SulTRAC 2012).

Surface soil sampling results indicate that only inorganics (arsenic and iron) in surface soil exceed both the MDEQ Part 201 Residential Drinking Water Protection Criteria (DWPC) and the Statewide Background Default values. None of the inorganic sample results exceeded MDEQ Part 201 Residential Direct Contact Criteria (DCC). Concentrations of several detected polynuclear aromatic hydrocarbons (PAH) exceeded EPA groundwater protection Regional Screening Levels (RSL), although none of the concentrations exceeded the MDEQ Part 201 Residential DWPC or DCC. The residential groundwater well sampling results did not exceed any criteria.

In order to address the inorganic exceedances in surface soil, SulTRAC calculated a 95% Upper Confidence Limit (95UCL) using ProUCL version 4.1 for those contaminants. The ProUCL output was included in the draft technical memorandum (SulTRAC 2012). The results indicate that the 95UCL is below MDEQ Part 201 Residential DWPC. However, in order to fully characterize the inorganic exceedances, SulTRAC will perform additional soil screening and sampling. In addition, soil borings will be converted into a piezometer in order to collect groundwater samples and confirm groundwater flow direction. Proposed soil screening and sampling locations, target depths, sample analyses, and rationale are specified in Section 4.0.

4.0 FIELD SAMPLING ACTIVITY

Proposed field investigation activities and the rationale for conducting the additional Tar Lake Area activities are presented in Table T-1 at the end of the section. A detailed discussion of modifications to the original FSP sample collection procedures is in Section 5.0. All proposed sample locations are subject to change based on accessibility and feasibility. Moreover, sample collection rationale may be altered in the field based on field screening, visual observations, and spatial distribution. Figure 7 shows the proposed additional soil boring locations for the Tar Lake Area.

SulTRAC will conduct the following field activities as part of the Phase 2 investigation:

4.1 WELL INVENTORY

SulTRAC will attempt to locate monitoring wells that could not be located previously (MW-04, MW-05, MW-09, and MW-17), and collect samples, if applicable. In addition, monitoring wells that were dry in June 2011 will be revisited for possible sample collection. To collect a sample from each monitoring well equipped with a dedicated sampling pump above the water level, the pump will be pulled, and a sample

will be collected by either extending the sample pump tubing or using a non-dedicated bladder or submersible pump. Each sample will be analyzed for RAS TCL and TAL parameters. Groundwater elevation data from each monitoring well will also be obtained.

4.2 MOEKE LUMBER

If access to the building is granted, groundwater samples from each on-site well (inside building) will be collected and analyzed for RAS TCL and TAL parameters.

4.3 TAR LAKE AREA

SulTRAC will advance 13 additional and four duplicate soil borings at locations shown on Figure 7. The proposed additional soil boring locations will assist in refining the source material estimate and allow vertical delineation of the extent of contamination where required. The duplicate soil borings (SB08, SB09, SB16, and SB20) will provide information regarding the nature of the inorganics exceedances identified in 2011 (Table 2 in Appendix A). SulTRAC will collect duplicate samples from 2011 soil sample intervals; these samples will be analyzed for associated total inorganics exceedances, and will undergo Synthetic Precipitation Leaching Procedure (SPLP) analysis.

In order to facilitate appropriate inorganics sampling intervals at each additional soil boring location, SulTRAC will perform x-ray fluorescence (XRF) screening for metals throughout the vadose zone of each soil boring. Screening procedures will be conducted as described in Section 5.0 and in accordance with EPA Method 6200, "Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment."

SulTRAC will also subcontract a surveyor licensed in the State of Michigan to survey all existing temporary monitoring wells in order to provide reference elevations for determining groundwater flow direction and vertical hydraulic gradients within the Tar Lake depression.

4.4 RES AREA

SulTRAC will perform XRF screening for arsenic and iron at the two surface soil sample locations (RES06 and RES13 – see Figure 2) that contained MDEQ Part 201 Residential DWPC exceedances. In addition, XRF screening will be performed at eight "step-out" locations. The step-out locations will be located 10 feet north, south, east, and west of RES06 and RES13. Any surface soil XRF screening sample that exceeds MDEQ Part 201 Residential DWPC and statewide background default criteria for

arsenic (5.8 mg/kg) or iron (12,000 mg/kg) will be submitted for laboratory analysis of TAL metals. If the laboratory results indicate that the sample concentration exceeds MDEQ Part 201 Residential DWPC, SulTRAC will direct the laboratory to perform SPLP analysis for the specific inorganic exceedance.

SulTRAC will advance one soil boring near RES06 and RES13, respectively. If XRF screening indicates that higher arsenic and/or iron concentrations are located at a step-out location, SulTRAC will advance a soil boring at that location. Otherwise, the soil borings will be located at the original RES06 and RES13 locations. The soil borings will be utilized to characterize the subsurface soil at locations where surface soil contamination was identified.

One soil boring will also be advanced near RES04 in order to comply with the FSP. In addition, each soil boring will be converted into a piezometer in order to collect a groundwater sample and measure groundwater elevation for groundwater flow determination. Subsurface soil and groundwater samples will be analyzed for TAL metals and TCL SVOCs/VOCs.

XRF screening and sampling will be performed during soil boring advancement as described in Section 5.0. A surveyor licensed in the State of Michigan will be subcontracted to survey piezometers in order to provide reference elevations for determining groundwater flow direction and vertical hydraulic gradients within the RES area.

TABLE T-1
PROPOSED PHASE 2 FIELD SAMPLING ACTIVITIES AND RATIONALE
TAR LAKE, MANCELONA, MICHIGAN

Proposed Phase 2 Soil Boring IDs	Proposed Soil Boring Depths (feet below ground surface)	Rationale	Proposed Potential Samples
TL-SB22	50	Location proposed to confirm horizontal extent of groundwater contamination identified in VAS02. Propose to extend soil boring depth in this area to 50 feet bgs in order to verify that source material is not located in deeper soil. Also propose to collect a deeper groundwater sample (45-50 feet bgs) in order to confirm that groundwater impacts are only being observed in shallower groundwater.	Soil - 3 GW - 2
TL-SB23 and TL-SB29	40	Locations proposed to provide better delineation of observed soil contamination at SB03 above EPA 2002 ROD criteria. Propose to extend soil boring depth to 40 feet bgs in order to verify that source material is not located in deeper soil. Also propose to collect a deeper groundwater sample (35-40 feet bgs) in order to confirm that groundwater impacts are only being observed in shallower groundwater.	Soil - 6 GW - 4
TL-SB24 and TL-SB28	40	Locations proposed to provide better delineation and volume estimate of observed source material at SB01 and soil contamination at SB03 above EPA 2002 ROD criteria. Propose to extend soil boring depth to 40 feet bgs in order to verify that source material is not located in deeper soil. Also propose to collect a deeper groundwater sample (35-40 feet bgs) in order to confirm that groundwater impacts are only being observed in shallower groundwater.	Soil - 6 GW - 4
TL-SB25	75	Location proposed to provide better delineation and volume estimate of source material identified in SB16 and SB20. A deeper groundwater sample (70-75) will also be collected here for vertical delineation of groundwater impacts.	Soil - 3 GW - 2
TL-SB26 and TL-SB34	70	Locations proposed to provide better delineation and volume estimate of source material identified in SB15 and SB20. A deeper groundwater sample (65-70) will also be collected here for vertical delineation of groundwater impacts.	Soil - 6 GW - 4
TL-SB27	50	Location proposed to provide better delineation and volume estimate of source material identified in SB01. A deeper groundwater sample (45-50) will also be collected here for vertical delineation of groundwater impacts.	Soil - 3 GW - 2
TL-SB30	75	Location proposed to provide better delineation and volume estimate of source material identified in SB16 and SB20. A deeper groundwater sample (70-75) will also be collected here for vertical delineation of groundwater impacts.	Soil - 3 GW - 2
TL-SB31, TL-SB32, and TL-SB33	75	Locations proposed to provide better delineation and volume estimate of source material identified in SB16 and SB20 and soil and groundwater impacts identified in SB17 and SB18. Deeper groundwater samples (70-75) will also be collected here for vertical delineation of groundwater impacts.	Soil - 9 GW - 6
TL-SB08, TL-SB09, TL-SB16, and TL-SB20	Varies	Locations proposed to collect duplicate total metals (only those above criteria) samples for comparison to SPLP analysis. Each soil boring will be advanced only to the depth required to collect the duplicate sample.	Soil - 4
		Total	Soil - 43 GW - 26

5.0 FIELD SAMPLING PROCEDURES

This section describes changes to the sampling collection procedures and methods to be used during the Phase 2 Tar Lake area field investigation. Changes to the original FSP pertain only to the soil sampling procedures to be implemented.

Soil samples will be screened for (1) visual coloration changes, (2) organic vapors using only a PID, and (3) inorganics using XRF. Sample depths may be adjusted in the field, and additional samples may be collected at an individual boring location based on the observations of the field geologist.

XRF screening will be conducted on the same soil collected and placed in a re-sealable bag for PID screening. PID screening will precede XRF screening and follow identical procedures used during the 2011 sampling event and documented in the FSP (SulTRAC 2011). A rented Niton XL3t XRF or similar device will be used to conduct XRF screening. Operation of the XRF units will follow manufacturer specifications. XRF screening procedures will be as follows:

- Flatten the bag of soil to form a continuous uniform layer of at least 1-centimeter (0.4-inch) thickness. Place the measurement window of the analyzer on the bag.
- Position the instrument against the surface of the bagged sample, and initiate a reading by squeezing the shutter release, and firmly pressing the instrument flat against the sample. The trigger and the proximity sensor must both be engaged before the shutter will open and the measurement initiated.

The XRF readings of the key metals of interest (aluminum, arsenic, chromium, iron, and manganese) will be recorded on the soil boring log. XRF concentrations of these and other metals analyzed also will be recorded digitally by the XRF. If XRF screening results indicate that an inorganic chemical or chemicals exceeds MDEQ statewide background default criteria, SulTRAC will submit a sample for laboratory analysis for those specific analyte(s) from the interval with the highest inorganic concentration detected. Iron will also be analyzed from each sample selected for laboratory analysis. Additional sample volume will be collected from the same interval and archived. If the laboratory analysis confirms that a total concentration of an inorganic is above MDEQ statewide background default criteria, SulTRAC will direct the laboratory to conduct SPLP analysis for that metal.

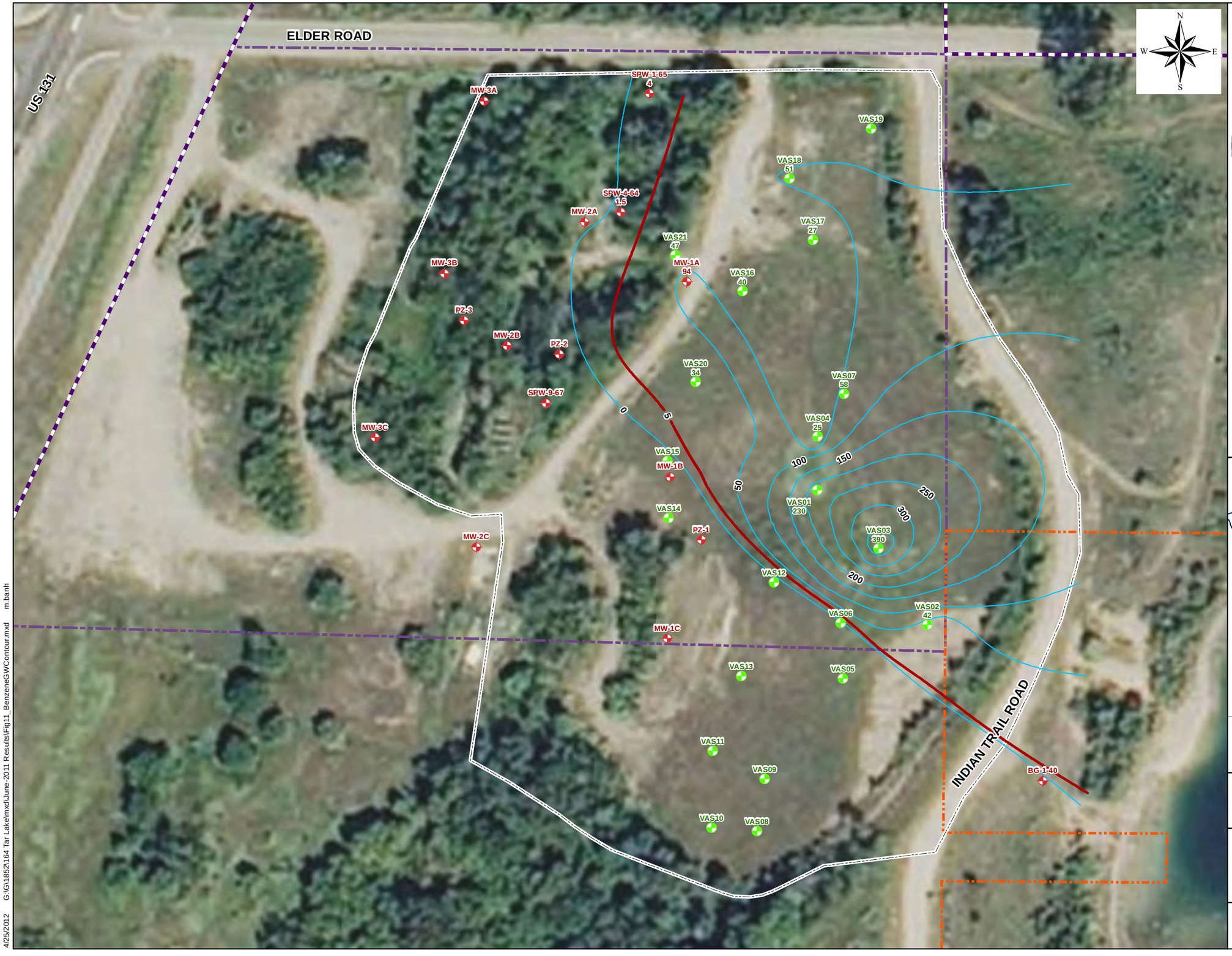
REFERENCES

SulTRAC. 2011. Field Sampling Plan – Tar Lake and Residential Area Investigations, Revision 2 – Technical Assistance Review Tar Lake Superfund Site, Mancelona Township, Michigan. June 8.

SulTRAC. 2012. Draft Technical Memorandum No. 1, Revision 1, Tar Lake Superfund Site, Mancelona Township, Michigan. February 22.

APPENDIX A

REVISED DRAFT TECHNICAL MEMORANDUM
FIGURES AND TABLES



LEGEND

- MONITORING WELL LOCATION
- VAS LOCATION
- EPA ROD/MDEQ DWC
- FENCELINE
- SITE BOUNDARY
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY

All sample results shown in micrograms per liter

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 11
BENZENE CONCENTRATIONS
TAR LAKE GROUNDWATER
JUNE 2011

SulTRAC

4/25/2012 G:\G\1852\164 Tar Lake\mxd\June-2011 Results\Fig11_BenzeneGWContour.mxd m.banh

ELDER ROAD

US 131

INDIAN TRAIL ROAD

MW-3A
SPW-1-65
VAS19
VAS18 4200
SPW-4-64 17
MW-2A
VAS17 2600
VAS21 1500
MW-1A 8200
MW-3B
VAS16 2800
PZ-3
MW-2B
PZ-2 0.16
VAS20 1700
VAS07 9800
SPW-9-67
MW-3C
VAS04 2900
VAS15 9.2
MW-1B
VAS01 19000
VAS14 0.48
PZ-1
MW-2C
VAS03 74000
VAS12 0.31
VAS02 3800
MW-1C
VAS06 9.4
VAS13 0.5
VAS05 1.6
VAS11 0.26
VAS09 7
BG-1-40
VAS10 1.3
VAS08 1.7

0
370
1000
5000
10000
10000
50000
40000
30000
20000
10000

N
W
E
S

LEGEND

- MONITORING WELL LOCATION
- VAS LOCATION
- MDEQ RESIDENTIAL DWC
- MDEQ NON-RESIDENTIAL DWC
- FENCELINE
- SITE BOUNDARY
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY

All sample results shown in micrograms per liter

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 12
2,4-DIMETHYLPHENOL CONCENTRATIONS
TAR LAKE GROUNDWATER
JUNE 2011

SulTRAC

12/5/2011 G:\GI\852\164 Tar Lake\mxd\June-2011 Results\Fig12_DimethylGWContour.mxd m.banh

ELDER ROAD

US 131

INDIAN TRAIL ROAD

MW-3A
SPW-1-65
VAS19
VAS18 4460
SPW-4-64
MW-2A
VAS17 4960
VAS21 298
MW-1A 17210
MW-3B
VAS16 2530
PZ-3
MW-2B
PZ-2
VAS20 83
VAS07 13140
SPW-9-67
VAS04 165
MW-3C
VAS15 12.1
MW-1B
VAS01 6600
VAS14 0.57
PZ-1
MW-2C
VAS03 205000
VAS12
VAS06 12.8
VAS02 6800
MW-1C
VAS13 0.38
VAS05 2.44
VAS11
VAS09 3.8
BG-1-40
VAS10 1.45
VAS08 1.74

1000
370
0
20000
40000
60000
80000
100000
120000
80000
40000
0

N
W
E
S

LEGEND

- MONITORING WELL LOCATION
- VAS LOCATION
- MDEQ RESIDENTIAL DWC
- MDEQ NON-RESIDENTIAL DWC
- FENCELINE
- SITE BOUNDARY
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY

All sample results shown in micrograms per liter

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 13
METHYLPHENOLS CONCENTRATIONS
TAR LAKE GROUNDWATER
JUNE 2011

SulTRAC

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TABLE 1
ORGANICS DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**SB01-2022**	**SB01-2830**	**SB02-1214**	**SB02-1820**	**SB03-0810**	**SB03-1416**	**SB04-1416**	**SB05-1416**	**SB06-1416**	**2002 ROD Criteria**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/13/2011**	**6/13/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/15/2011**				
At, Above, or Below Water Table?	Below	Below	Below	Below	At	Below	Below	Below	At				
PID/FID readings	100/1600	3/65	10/1900	8/150	65/600	20/20	2/580	0/2	3/3500				
VOCs													
ACETONE	13000 U	610 U	13	6.5 J	850 J	27	14 U	9.4 J	6.9 J	NC	15000/42000	73000000	2400
BENZENE	**1900 J**	54 J	5.1 J	5.3 U	**510 J**	56	3.6 J	6.4 U	5.6 U	100	100/100	400000	0.2[a]
2-BUTANONE	13000 U	180 J	8.1 J	11 U	750 J	57	8.6 J	13 U	11 U	NC	2.6E+05/7.6E+05	27000000	1000
CARBON DISULFIDE	6300 U	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	16000/46000	280000	210
CYCLOHEXANE	6300 U	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	NC	NC	18000
CIS-1,2-DICHLOROETHENE	160 J	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	1400/1400	640000	21[a]
TRANS-1,2-DICHLOROETHENE	230 J	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	2000/2000	1400000	29[a]
ETHYLBENZENE	**24000**	140 J	29	0.69 J	**2700**	19	47	6.4 U	5.6 U	1500	1500/1500	140000	780[a]
2-HEXANONE	13000 U	610 U	12 U	11 U	2400 U	180	14 U	13 U	11 U	NC	20000/58000	2500000	7.9
ISOPROPYLBENZENE	2500 J	22 J	3.2 J	0.17 J	310 J	1.5 J	3.6 J	1.6 J	0.54 J	NC	91000/2.6E+05	390000	11000000
METHYL ACETATE	6300 U	950	5.9 U	5.3 U	1000 J	5.2 U	6.8 U	6.4 U	5.6 U	NC	NC	NC	3200
METHYLCYCLOHEXANE	6300 U	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	NC	NC	NC
METHYLENE CHLORIDE	**640 J**	10 J	5.9 U	5.3 U	69 J	5.2 U	6.8 U	0.75 J	5.6 U	NC	100/100	2300000	1.3[a]
4-METHYL-2-PENTANONE	13000 U	610 U	12 U	11 U	2400 U	23	14 U	13 U	5.6 U	NC	36000/1.0E+05	2700000	230
STYRENE	**13000**	67 J	8.7	5.3 U	910 J	9.6	7.7	6.4 U	5.6 U	NC	2700/2700	520000	110[a]
TETRACHLOROETHENE	**200 J**	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	100/100	88000	2.3[a]
TOLUENE	**27000**	190 J	34	0.7 J	3100 J	72	48	6.4 U	5.6 U	16000	16000/16000	250000	690[a]
TRICHLOROETHENE	6300 U	300 U	5.9 U	5.3 U	1200 U	5.2 U	6.8 U	6.4 U	5.6 U	NC	100/100	500000	1.8[a]
M,P-XYLENES	55000	330	64	0.73 J	6000	43	120	6.4 U	5.6 U	NC	NC	NC	180
O-XYLENES	33000	200 J	42	0.83 J	3600	30	78	6.4 U	5.6 U	NC	NC	NC	190
TOTAL XYLENES	**88000**	530	106	1.56 J	**9600**	73	198	6.4 U	5.6 U	5600	5600/5600	150000	9800[a]
SVOCs													
1,1"-BIPHENYL	27000	900	450	130 J	600 J	85 J	370	13 J	33 J	NC	NC	NC	8.7
2,4-DIMETHYPHENOL	**58000**	5300	4700	610	*16000*	5800	2800	35 J	89 J	7400	7400/20000	36000000	320
2-METHYLNAPHTHALENE	*120000*	3700	1800	340	2700	330 J	1600	19 J	33 J	124000	57000/1.7E+05	26000000	140
2-METHYLPHENOL	10000 J	1800	1400	170 J	**8300**	5100	400	210 U	190 U	7400	NC	NC	580
4-METHYLPHENOL	25000	7000	3100	370	23000	8600	920	13 J	26 J	740	NC	NC	57
TOTAL METHYLPHENOLS	**35000**	*8800*	4500	540	**31300**	*13700*	1320	13 J	190 U	NC	7400/20000	36000000	540
ACENAPHTHENE	8500 J	290 J	150 J	50 J	220 J	1900 U	140 J	210 U	16 J	NC	3.0E+05/8.8E+05	130000000	4100
ACENAPHTHYLENE	*9300 J*	310 J	100 J	32 J	160 J	1900 U	92 J	210 U	190 U	NC	5900/17000	5200000	NC
ANTHRACENE	9000 J	310 J	130 J	44 J	150 J	1900 U	110 J	210 U	190 U	NC	41000/41000	730000000	42000
BENZALDEHYDE	2000 U	400 U	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	NC	NC	330
BENZO(A)ANTHRACENE	2300 J	81 J	39 J	13 J	56 J	1900 U	30 J	210 U	190 U	NC	NLL	80000	10
BENZO(A)PYRENE	1100 J	37 J	17 J	200 U	1600 U	1900 U	11 J	210 U	190 U	NC	NLL	8000	3.5
BENZO(B)FLUORANTHEHE	1200 J	42 J	22 J	7 J	1600 U	1900 U	16 J	210 U	190 U	NC	NLL	80000	35
BENZO(G,H,I)PERYLENE	350 J	400 U	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	NLL	7000000	NE
BENZO(K)FLUORANTHENE	220 J	13 J	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	NLL	800000	350
BIS(2-ETHYLHEXYL)PHTHALATE	2000 U	2000 U	2000 U	1000 U	8000 U	1900 U	1100 U	1100 U	1000 J	NC	NLL	10000000	1400[a]
BUTYLBENZYLPHTHALATE	2000 U	300 J	400 U	13 J	1600 U	1900 U	210 U	210 U	190 U	NC	3.1E+05/3.1E+05	310000	200
CARBAZOLE	2300 J	83 J	43 J	12 J	72 J	1900 U	29 J	210 U	190 U	NC	9400/39000	2400000	NC
CHRYSENE	2100 J	68 J	32 J	11 J	1600 U	1900 U	27 J	210 U	190 U	NC	NLL	9000000	1100
DIBENZO(A,H)ANTHRACENE	130 J	400 U	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	NLL	8000	11
DIBENZOFURAN	34000	1200	590	190 J	750 J	120 J	530	23 J	49 J	NC	ID	ID	110
DI-N-BUTYL PHTHALATE	2000 U	400 U	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	7.6E+05/7.6E+05	760000	1700
2,6-DINITROTOLUENE	400 U	400 U	400 U	200 U	1600 U	1900 U	210 U	26 J	190 U	NC	NC	NC	20
FLUORANTHENE	7800 J	250 J	110 J	35 J	120 J	1900 U	86 J	210 U	190 U	NC	7.3E+05/7.3E+05	130000000	70000
FLUORENE	26000	1000	510	160 J	650 J	96 J	480	28 J	62 J	NC	3.9E+05/8.9E+05	87000000	4000
INDENO(1,2,3-CD)PYRENE	400 J	18 J	400 U	200 U	1600 U	1900 U	210 U	210 U	190 U	NC	NLL	80000	120
NAPHTHALENE	**190000**	5200	2200	360	4000	510 J	2400	28 J	95 J	17000	35000/1.0E+05	52000000	0.47
PHENANTHRENE	36000	1200	600	190 J	610 J	93 J	500	20 J	52 J	12000	56000/1.6E+05	5200000	NC
PHENOL	2000 U	800 U	800 U	200 U	3700	3600 U	210 U	210 U	190 U	88000	88000/2.6E+05	12000000	2600
PYRENE	7900 J	260 J	120 J	42 J	130 J	1900 U	100 J	210 U	190 U	NC	4.8E+05/4.8E+05	84000000	9500

TABLE 1
ORGANICS DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**SB07-1618**	**SB08-0002**	**SB09-0406**	**SB10-1012**	**SB11-0810**	**SB12-3032**	**SB13-2830**	**SB14-4143**	**SB14-5254**	**2002 ROD Criteria**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/17/2011**	**6/17/2011**				
At, Above, or Below Water Table?	Below	Above	Above	Above	Above	Below	At	Below	Below				
PID/FID readings	4/4300	160/0	0/1	0.5/0.5	0.2/0.2	0/12	0/2	0/5	0/0.2				
VOCs													
ACETONE	12 J	65	9.3 U	8.3 J	11 U	8.9 J	10 U	22	10 U	NC	15000/42000	73000000	2400
BENZENE	6.0 J	2.0 J	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	100	100/100	400000	0.2[a]
2-BUTANONE	5.5 J	28	9.3 U	12 U	11 U	11 U	10 U	10	6.0 J	NC	2.6E+05/7.6E+05	27000000	1000
CARBON DISULFIDE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	1.0 J	5.2 U	3.9 J	1.1 J	NC	16000/46000	280000	210
CYCLOHEXANE	0.34 J	1.3 J	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	NC	NC	18000
CIS-1,2-DICHLOROETHENE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	1400/1400	640000	21[a]
TRANS-1,2-DICHLOROETHENE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	2000/2000	1400000	29[a]
ETHYLBENZENE	29	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	1500	1500/1500	140000	780[a]
2-HEXANONE	25	23 U	9.3 U	12 U	11 U	11 U	10 U	9.2 U	10 U	NC	20000/58000	2500000	7.9
ISOPROPYLBENZENE	0.95 J	11 U	4.7 U	0.97 J	5.5 U	0.51 J	5.2 U	0.27 J	0.39 J	NC	91000/2.6E+05	390000	11000000
METHYL ACETATE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	NC	NC	3200
METHYLCYCLOHEXANE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	NC	NC	NC
METHYLENE CHLORIDE	0.40 J	1.1 J	0.54 J	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	100/100	2300000	1.3[a]
4-METHYL-2-PENTANONE	4.4 J	23 U	4.7 U	12 U	5.5 U	5.3 U	5.2 U	9.2 U	10 U	NC	36000/1.0E+05	2700000	230
STYRENE	2.7 J	11 U	4.7 U	0.74 J	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	2700/2700	520000	110[a]
TETRACHLOROETHENE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	100/100	88000	2.3[a]
TOLUENE	44	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	16000	16000/16000	250000	690[a]
TRICHLOROETHENE	6.1 U	11 U	4.7 U	6.1 U	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	100/100	500000	1.8[a]
M,P-XYLENES	36	11 U	4.7 U	16	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	NC	NC	180
O-XYLENES	24	11 U	4.7 U	11	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	NC	NC	NC	190
TOTAL XYLENES	60	11 U	4.7 U	27	5.5 U	5.3 U	5.2 U	4.6 U	5.1 U	5600	5600/5600	150000	9800[a]
SVOCs													
1,1"-BIPHENYL	90 J	260 J	25 J	23 J	170 U	11 J	180 U	13 J	15 J	NC	NC	NC	8.7
2,4-DIMETHYPHENOL	6500	1400 J	130 J	620	170 U	200 U	180 U	190 U	190 U	7400	7400/20000	36000000	320
2-METHYLNAPHTHALENE	450 J	1300 J	140 J	160 J	7.8 J	200 U	180 U	8.7 J	10 J	124000	57000/1.7E+05	26000000	140
2-METHYLPHENOL	59 J	420 J	49 J	260	170 U	200 U	180 U	190 U	190 U	7400	NC	NC	580
4-METHYLPHENOL	7900	730 J	130 J	430	170 U	200 U	180 U	190 U	190 U	740	NC	NC	57
TOTAL METHYLPHENOLS	*7959*	1150	179	690	170 U	200 U	180 U	190 U	190 U	NC	7400/20000	36000000	540
ACENAPHTHENE	42 J	290 J	26 J	21 J	170 U	200 U	180 U	190 U	190 U	NC	3.0E+05/8.8E+05	130000000	4100
ACENAPHTHYLENE	1000 U	280 J	30 J	210 U	170 U	200 U	180 U	190 U	190 U	NC	5900/17000	5200000	NC
ANTHRACENE	1000 U	380 J	47 J	19 J	170 U	200 U	180 U	190 U	190 U	NC	41000/41000	730000000	42000
BENZALDEHYDE	1000 U	2000 U	190 U	210 U	170 U	200 U	180 U	190 U	190 U	NC	NC	NC	330
BENZO(A)ANTHRACENE	1000 U	670 J	70 J	22 J	170 U	200 U	180 U	190 U	190 U	NC	NLL	80000	10
BENZO(A)PYRENE	1000 U	470 J	53 J	210 U	170 U	200 U	180 U	190 U	190 U	NC	NLL	8000	3.5
BENZO(B)FLUORANTHEHE	1000 U	730 J	72 J	16 J	170 U	200 U	180 U	190 U	190 U	NC	NLL	80000	35
BENZO(G,H,I)PERYLENE	1000 U	380 J	35 J	210 U	170 U	200 U	180 U	190 U	190 U	NC	NLL	7000000	NE
BENZO(K)FLUORANTHENE	1000 U	180 J	18 J	210 U	170 U	200 U	180 U	190 U	190 U	NC	NLL	800000	350
BIS(2-ETHYLHEXYL)PHTHALATE	5000 J	10000 U	1000 U	1100 U	900 U	1000 U	900 U	1000 U	1000 U	NC	NLL	10000000	1400[a]
BUTYLBENZYLPHTHALATE	1000 U	2000 U	190 U	210 U	170 U	200 U	180 U	190 U	190 U	NC	3.1E+05/3.1E+05	310000	200
CARBAZOLE	1000 U	2000 U	190 U	210 U	170 U	200 U	180 U	190 U	190 U	NC	9400/39000	2400000	NC
CHRYSENE	1000 U	680 J	190 U	21 J	170 U	200 U	180 U	190 U	190 U	NC	NLL	9000000	1100
DIBENZO(A,H)ANTHRACENE	1000 U	140 J	190 U	210 U	170 U	200 U	180 U	190 U	190 U	NC	NLL	8000	11
DIBENZOFURAN	110 J	580 J	61 J	39 J	170 U	9.9 J	180 U	190 U	9.8 J	NC	ID	ID	110
DI-N-BUTYL PHTHALATE	1000 U	2000 U	190 U	210 U	170 U	200 U	180 U	10 J	190 U	NC	7.6E+05/7.6E+05	760000	1700
2,6-DINITROTOLUENE	1000 U	2000 U	190 U	210 U	170 U	200 U	180 U	190 U	190 U	NC	NC	NC	20
FLUORANTHENE	1000 U	1400 J	130 J	44 J	170 U	200 U	180 U	190 U	190 U	NC	7.3E+05/7.3E+05	130000000	70000
FLUORENE	130 J	520 J	66 J	45 J	170 U	20 J	180 U	190 U	24 J	NC	3.9E+05/8.9E+05	87000000	4000
INDENO(1,2,3-CD)PYRENE	1000 U	430 J	39 J	210 U	170 U	200 U	180 U	190 U	190 U	NC	NLL	80000	120
NAPHTHALENE	850 J	940 J	75 J	45 J	170 U	200 U	180 U	21 J	11 J	17000	35000/1.0E+05	52000000	0.47
PHENANTHRENE	74 J	1300 J	170 J	84 J	170 U	200 U	180 U	190 U	190 U	12000	56000/1.6E+05	5200000	NC
PHENOL	1000 U	2000 U	190 U	210 U	170 U	18 J	13 J	14 J	14 J	88000	88000/2.6E+05	12000000	2600
PYRENE	1000 U	2000	190	55 J	170 U	200 U	180 U	190 U	190 U	NC	4.8E+05/4.8E+05	84000000	9500

TABLE 1
ORGANICS DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**SB15-0305**	**SB15-4446**	**SB15-4850**	**SB16-2527**	**SB16-5254**	**SB16-7274**	**SB17-4850**	**SB17-6567**	**SB18-5759**	**2002 ROD Criteria**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/21/2011**	**6/21/2011**	**6/22/2011**				
At, Above, or Below Water Table?	Above	Below	Below	Above	Below	Below	Below	Below	Below				
PID/FID readings	99/38	0/421	0/14	54/2600	0/14100	0/11000	150/700	0/30	0/4300				
VOCs													
ACETONE	3700 J	24 U	24 U	3600 J	24 U	22 U	11	7.1 J	18	NC	15000/42000	73000000	2400
BENZENE	3900 U	5.8 U	5.9 U	4900 U	3.0 J	4.3 J	4.9 U	5.2 U	19	100	100/100	400000	0.2[a]
2-BUTANONE	7700 U	7.1 J	12 U	9800 U	12 U	11 U	6.4 J	10 U	18	NC	2.6E+05/7.6E+05	27000000	1000
CARBON DISULFIDE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	2.2 J	1.2 J	1.3 J	NC	16000/46000	280000	210
CYCLOHEXANE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	NC	NC	18000
CIS-1,2-DICHLOROETHENE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	1400/1400	640000	21[a]
TRANS-1,2-DICHLOROETHENE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	2000/2000	1400000	29[a]
ETHYLBENZENE	**6300**	5.8 U	5.9 U	**12000**	16	13	1.4 J	0.22 J	36	1500	1500/1500	140000	780[a]
2-HEXANONE	7700 U	12 U	12 U	9800 U	12 U	11 U	9.8 U	10 U	11 U	NC	20000/58000	2500000	7.9
ISOPROPYLBENZENE	740 J	5.8 U	0.31 J	1500 J	1.5 J	1.0 J	0.36 J	0.13 J	2.8 J	NC	91000/2.6E+05	390000	11000000
METHYL ACETATE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	NC	NC	3200
METHYLCYCLOHEXANE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	NC	NC	NC
METHYLENE CHLORIDE	7700 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	100/100	2300000	1.3[a]
4-METHYL-2-PENTANONE	7700 U	12 U	12 U	9800 U	12 U	2.1 J	9.8 U	10 U	11 U	NC	36000/1.0E+05	2700000	230
STYRENE	1200 J	0.20 J	5.9 U	970 J	0.85 J	1.1 J	4.9 U	5.2 U	4.9 J	NC	2700/2700	520000	110[a]
TETRACHLOROETHENE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	100/100	88000	2.3[a]
TOLUENE	4700	5.8 U	5.9 U	5100	6.0 U	16	1.6 J	0.79 J	78	16000	16000/16000	250000	690[a]
TRICHLOROETHENE	3900 U	5.8 U	5.9 U	4900 U	6.0 U	5.5 U	4.9 U	5.2 U	5.7 U	NC	100/100	500000	1.8[a]
M,P-XYLENES	15000	5.8 U	5.9 U	29000	15	20	0.33 J	0.35 J	48	NC	NC	NC	180
O-XYLENES	9100	5.8 U	5.9 U	17000	15	12	0.79 J	0.17 J	34	NC	NC	NC	190
TOTAL XYLENES	**24100**	5.8 U	5.9 U	**46000**	30	32	1.12	0.52	82	5600	5600/5600	150000	9800[a]
SVOCs													
1,1"-BIPHENYL	7000 J	200 U	190 U	43000 J	150 J	47 J	8.9 J	9.4 J	190 U	NC	NC	NC	8.7
2,4-DIMETHYPHENOL	**140000**	28 J	190 U	**31000**	480	870	180 U	99 J	780	7400	7400/20000	36000000	320
2-METHYLNAPHTHALENE	34000	9.4 J	190 U	**150000**	550	220	180 U	8.2 J	8.5 J	124000	57000/1.7E+05	26000000	140
2-METHYLPHENOL	38000	200 U	190 U	6200 J	30 J	9.0 J	180 U	190 U	23 J	7400	NC	NC	580
4-METHYLPHENOL	62000	13 J	190 U	25200	200	130 J	180 U	87 J	1100	740	NC	NC	57
TOTAL METHYLPHENOLS	**100000**	13 J	190 U	**31400**	230	139	180 U	87 J	1123	NC	7400/20000	36000000	540
ACENAPHTHENE	3000 J	200 U	190 U	13000	60 J	21 J	180 U	190 U	190 U	NC	3.0E+05/8.8E+05	130000000	4100
ACENAPHTHYLENE	2100 J	200 U	190 U	*6600 J*	24 J	190 U	180 U	190 U	190 U	NC	5900/17000	5200000	NC
ANTHRACENE	2900 J	200 U	190 U	15000	63 J	15 J	180 U	190 U	190 U	NC	41000/41000	730000000	42000
BENZALDEHYDE	24000 U	200 U	190 U	7800 U	19 J	190 U	180 U	190 U	190 U	NC	NC	NC	330
BENZO(A)ANTHRACENE	24000 U	200 U	190 U	4600 J	19 J	190 U	180 U	190 U	190 U	NC	NLL	80000	10
BENZO(A)PYRENE	24000 U	200 U	190 U	1500 J	190 U	190 U	180 U	190 U	190 U	NC	NLL	8000	3.5
BENZO(B)FLUORANTHEHE	24000 U	200 U	190 U	2400 J	190 U	190 U	180 U	190 U	190 U	NC	NLL	80000	35
BENZO(G,H,I)PERYLENE	24000 U	200 U	190 U	840 J	190 U	190 U	180 U	190 U	190 U	NC	NLL	7000000	NE
BENZO(K)FLUORANTHENE	24000 U	200 U	190 U	270 J	190 U	190 U	180 U	190 U	190 U	NC	NLL	800000	350
BIS(2-ETHYLHEXYL)PHTHALATE	120000 U	1000 U	1000 U	7800 UJ	1000 U	1000 U	21 J	21 J	190 U	NC	NLL	10000000	1400[a]
BUTYLBENZYLPHTHALATE	24000 U	200 U	190 U	7800 UJ	190 U	190 U	180 U	190 U	190 U	NC	3.1E+05/3.1E+05	310000	200
CARBAZOLE	24000 U	200 U	190 U	3400 J	17 J	190 U	180 U	190 U	190 U	NC	9400/39000	2400000	NC
CHRYSENE	24000 U	200 U	190 U	3700 J	17 J	190 U	180 U	190 U	190 U	NC	NLL	9000000	1100
DIBENZO(A,H)ANTHRACENE	24000 U	200 U	190 U	7800 UJ	190 U	190 U	180 U	190 U	190 U	NC	NLL	8000	11
DIBENZOFURAN	9500 J	200 U	190 U	59000	240	61 J	13 J	190 U	190 U	NC	ID	ID	110
DI-N-BUTYL PHTHALATE	24000 U	200 U	190 U	7800 U	190 U	190 U	180 U	190 U	190 U	NC	7.6E+05/7.6E+05	760000	1700
2,6-DINITROTOLUENE	24000 U	200 U	190 U	7800 U	190 U	190 U	180 U	190 U	190 U	NC	NC	NC	20
FLUORANTHENE	3500 J	7.8 J	190 U	15000 J	59 J	18 J	180 U	190 U	190 U	NC	7.3E+05/7.3E+05	130000000	70000
FLUORENE	8400 J	8.1 J	190 U	47000	200	59 J	13 J	9.5 J	10 J	NC	3.9E+05/8.9E+05	87000000	4000
INDENO(1,2,3-CD)PYRENE	24000 U	200 U	190 U	650 J	190 U	190 U	180 U	190 U	190 U	NC	NLL	80000	120
NAPHTHALENE	38000	8.4 J	190 U	**160000**	510	380	22 J	54 J	190 U	17000	35000/1.0E+05	52000000	0.47
PHENANTHRENE	12000 J	17 J	190 U	71000	280	67 J	180 U	190 U	190 U	12000	56000/1.6E+05	5200000	NC
PHENOL	2400 J	200 U	190 U	3700 J	14 J	190 U	180 U	190 U	190 U	88000	88000/2.6E+05	12000000	2600
PYRENE	3400 J	11 J	190 U	14000 J	64 J	22 J	180 U	190 U	190 U	NC	4.8E+05/4.8E+05	84000000	9500

TABLE 1
ORGANICS DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**SB18-7173**	**SB19-5759**	**SB20-1012**	**SB20-5355**	**SB20-7375**	**SB21-5557**	**2002 ROD Criteria**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**				
At, Above, or Below Water Table?	Below	Below	Above	Below	Below	Below				
PID/FID readings	0/15	0/50	0/20	0/8800	0/35	0/19000				
VOCs										
ACETONE	10	6.3 J	1700 U	8.8 J	8.2 J	4.0 J	NC	15000/42000	73000000	2400
BENZENE	0.82 J	5.0 U	**450 J**	2.8 J	4.8 U	2.9 J	100	100/100	400000	0.2[a]
2-BUTANONE	6.6 J	10 U	1700 U	11 U	5.8 J	11 U	NC	2.6E+05/7.6E+05	27000000	1000
CARBON DISULFIDE	5.3	1.2 J	850 U	5.4 U	1.1 J	0.51 J	NC	16000/46000	280000	210
CYCLOHEXANE	0.37 J	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	NC	NC	18000
CIS-1,2-DICHLOROETHENE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	1400/1400	640000	21[a]
TRANS-1,2-DICHLOROETHENE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	2000/2000	1400000	29[a]
ETHYLBENZENE	2.1 J	5.0 U	890	6	0.51 J	4.0 J	1500	1500/1500	140000	780[a]
2-HEXANONE	9.1 U	10 U	1700 U	11 U	9.7 U	11 U	NC	20000/58000	2500000	7.9
ISOPROPYLBENZENE	0.45 J	0.14 J	120 J	0.54 J	4.8 U	0.42 J	NC	91000/2.6E+05	390000	11000000
METHYL ACETATE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	NC	NC	3200
METHYLCYCLOHEXANE	1.2 J	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	NC	NC	NC
METHYLENE CHLORIDE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	100/100	2300000	1.3[a]
4-METHYL-2-PENTANONE	9.1 U	10 U	1700 U	11 U	9.7 U	5.6 U	NC	36000/1.0E+05	2700000	230
STYRENE	4.6 U	5.0 U	49 J	0.53 J	4.8 U	5.6 U	NC	2700/2700	520000	110[a]
TETRACHLOROETHENE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	100/100	88000	2.3[a]
TOLUENE	1.8 J	3.5 J	1500 J	13	2.4 J	5.6 U	16000	16000/16000	250000	690[a]
TRICHLOROETHENE	4.6 U	5.0 U	850 U	5.4 U	4.8 U	5.6 U	NC	100/100	500000	1.8[a]
M,P-XYLENES	3.2 J	0.13 J	2100	6.9	0.66 J	3.7 J	NC	NC	NC	180
O-XYLENES	1.8 J	5.0 U	1500	5.3	0.53 J	3.2 J	NC	NC	NC	190
TOTAL XYLENES	5	0.13 J	3600	12.2	1.19	6.9	5600	5600/5600	150000	9800[a]
SVOCs										
1,1"-BIPHENYL	190 U	7.9 J	14 J	14 J	11 J	14 J	NC	NC	NC	8.7
2,4-DIMETHYPHENOL	6.3 J	200 U	**130000**	1100	56 J	160 J	7400	7400/20000	36000000	320
2-METHYLNAPHTHALENE	190 U	200 U	13000	35 J	7.9 J	35 J	124000	57000/1.7E+05	26000000	140
2-METHYLPHENOL	190 U	200 U	74000	16 J	190 U	190 U	7400	NC	NC	580
4-METHYLPHENOL	190 U	200 U	170000	49 J	190 U	190 U	740	NC	NC	57
TOTAL METHYLPHENOLS	190 U	200 U	**244000**	65	190 U	190 U	NC	7400/20000	36000000	540
ACENAPHTHENE	190 U	200 U	2000 J	6.8 J	190 U	190 U	NC	3.0E+05/8.8E+05	130000000	4100
ACENAPHTHYLENE	190 U	200 U	5700 U	200 U	190 U	190 U	NC	5900/17000	5200000	NC
ANTHRACENE	190 U	200 U	3600 J	200 U	190 U	190 U	NC	41000/41000	730000000	42000
BENZALDEHYDE	190 U	6.2 J	5700 U	8.7 J	190 U	190 U	NC	NC	NC	330
BENZO(A)ANTHRACENE	190 U	200 U	1600 J	200 U	190 U	190 UJ	NC	NLL	80000	10
BENZO(A)PYRENE	190 U	200 U	610 J	200 U	190 U	190 U	NC	NLL	8000	3.5
BENZO(B)FLUORANTHEHE	190 U	200 U	840 J	200 U	190 U	190 U	NC	NLL	80000	35
BENZO(G,H,I)PERYLENE	190 U	200 U	280 J	200 U	190 U	190 UJ	NC	NLL	7000000	NE
BENZO(K)FLUORANTHENE	190 U	200 U	240 J	200 U	190 U	190 UJ	NC	NLL	800000	350
BIS(2-ETHYLHEXYL)PHTHALATE	190 U	1000 U	5700 U	200 U	190 U	1000 U	NC	NLL	10000000	1400[a]
BUTYLBENZYLPHTHALATE	190 U	200 U	5700 U	200 U	190 U	190 U	NC	3.1E+05/3.1E+05	310000	200
CARBAZOLE	190 U	200 U	1500 J	200 U	190 U	190 U	NC	9400/39000	2400000	NC
CHRYSENE	190 U	200 U	1500 J	200 U	190 U	190 UJ	NC	NLL	9000000	1100
DIBENZO(A,H)ANTHRACENE	190 U	200 U	180 J	200 U	190 U	190 U	NC	NLL	8000	11
DIBENZOFURAN	190 U	7.0 J	10000	200 U	190 U	14 J	NC	ID	ID	110
DI-N-BUTYL PHTHALATE	190 U	200 U	5700 U	200 U	190 U	10 J	NC	7.6E+05/7.6E+05	760000	1700
2,6-DINITROTOLUENE	190 U	200 U	5700 U	200 U	190 U	190 U	NC	NC	NC	20
FLUORANTHENE	190 U	200 U	5000 J	200 U	190 U	190 UJ	NC	7.3E+05/7.3E+05	130000000	70000
FLUORENE	190 U	12 J	5700 U	13 J	7.2 J	21 J	NC	3.9E+05/8.9E+05	87000000	4000
INDENO(1,2,3-CD)PYRENE	190 U	200 U	450 J	200 U	190 U	190 U	NC	NLL	80000	120
NAPHTHALENE	10 J	6.9 J	12000	85 J	30 J	55 J	17000	35000/1.0E+05	52000000	0.47
PHENANTHRENE	190 U	200 U	20000	200 U	190 U	190 U	12000	56000/1.6E+05	5200000	NC
PHENOL	190 U	200 U	45000	11 J	190 U	190 U	88000	88000/2.6E+05	12000000	2600
PYRENE	190 U	200 U	5100 J	200 U	190 U	190 UJ	NC	4.8E+05/4.8E+05	84000000	9500

TABLE 1
ORGANICS DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Notes:

All values expressed as micrograms per kilogram

All *italicized* values exceed only MDEQ Residential Soil Criteria
All **bold** values exceed MDEQ Non-Residential Soil Criteria
All shaded values exceed EPA 2002 ROD criteria

[a] = RSL is based on MCL. All other RSLs are risk-based.
DCC = Direct contact criteria
DWPC = Drinking water protection criteria
J = The associated numerical value was an estimated quantity.
J- = The result is an estimated quantity, but the result may be biased low.
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDEQ = Michigan Department of Environmental Quality
NC = No criteria available
NE = Not established
RSL = Regional Screening Level
U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**SB01-2022**	**SB01-2830**	**SB02-1214**	**SB02-1820**	**SB03-0810**	**SB03-1416**	**SB04-1416**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**	**Statewide Default Background Level**
Sample Date:	**6/13/2011**	**6/13/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**				
At, Above, or Below Water Table?	Below	Below	Below	Below	At	Below	Below				
Inroganics											
ALUMINUM	**830**	**869**	**992**	**887**	**3640**	**1120**	**1590**	1/1	370000	23000	6900
ANTIMONY	5.4 UJ	4.8 UJ	5.9 UJ	5.1 UJ	4.8 UJ	5.7 UJ	5.7 UJ	4.3/4.3	670	0.27[a]	NE
ARSENIC	1 U	1 U	1 U	1 U	1 U	1 U	0.95	4.6/4.6	37	0.29[a]	5.8
BARIUM	2.6 J-	2 J-	2.5 J-	2.3 J-	13.1 J-	2.7 J-	3 J-	1300/1300	130000	82[a]	75
BERYLLIUM	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	51/51	1600	3.2[a]	NE
CADMIUM	0.5 U	0.5 U	0.045 J-	0.5 U	0.5 U	0.5 U	0.5 U	6/6	2100	0.38[a]	1.2
CALCIUM	497	22400	1080 U	30600	2290	3630	871	NC	NC	NC	NE
CHROMIUM	3 J	2.5 J	2.5 J	2.5 J	5.2 J	2.3 J	1.7	30/30	9200	180000[a]	18
COBALT	5 U	0.54 J	5 U	0.57 J	*1.3 J*	5 U	5 U	0.8/2	9000	0.21	6.8
COPPER	3.2 J	2.1 J	2.7 J	2.7 J	20.4 J	14.7 J	4.3 J	5800/5800	73000	46[a]	32
IRON	**1900 J**	**1560**	**2040**	**1910**	**4210**	**1930**	**1610**	6/6	580000	270	12000
LEAD	1.2 J	0.77 J	1.6 J	0.82 J	3.4 J	1.4 J	8 J	700/700	900	14[a]	21
MAGNESIUM	315 J	3670	628	2470	1060	1920	354 J	8000/22000	1000000	NC	NE
MANGANESE	**16.2 J**	**26.2 J**	**16.6 J**	**31 J**	**101 J**	**21.7 J**	**16 J**	1/1	90000	21	440
NICKEL	1.8 J	2.2 J	2.1 J	2.3 J	4.9	2.5 J	1.4 J	100/100	150000	20	20
POTASSIUM	500 U	500 U	500 U	500 U	532	500 U	500 U	NC	NC	NC	NE
SELENIUM	3.5 U	3.5 U	3.5 U	3.5 U	0.55 J	0.6 J	0.64 J	4/4	9600	0.26[a]	NE
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.5/13	9000	0.6	1
SODIUM	500 U	500 U	500 U	500 U	500 U	500 U	500 U	2500/7000	1000000	NC	NE
THALLIUM	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.3/2.3	130	0.14[a]	NE
VANADIUM	3.3 J	2.7 J	3.9 J	3.6 J	7.8	3.1 J	2.3 J	72/990	5500	78	NE
ZINC	5.4 J	4.9 J	7	8.9	13.2	5.5 J	8.1	2400/5000	630000	290	47

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**SB05-1416**	**SB06-1416**	**SB07-1618**	**SB08-0002**	**SB09-0406**	**SB10-1012**	**SB11-0810**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**	**Statewide Default Background Level**
Sample Date:	**6/14/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/16/2011**	**6/16/2011**				
At, Above, or Below Water Table?	Below	At	Below	Above	Above	Above	Above				
Inroganics											
ALUMINUM	**1070**	**945**	**2230**	**18400**	**14300**	**1510**	**1820**	1/1	370000	23000	6900
ANTIMONY	6.5 UJ	5.6 UJ	6.5 UJ	6.5 UJ	4.9 UJ	5.5 UJ	6 UJ	4.3/4.3	670	0.27[a]	NE
ARSENIC	0.72 J-	0.64 J-	1.1 U	**6.9**	4.1	0.73 J-	1.9	4.6/4.6	37	0.29[a]	5.8
BARIUM	21.6 U	20 U	7.4 J	201	122	20 U	20 U	1300/1300	130000	82[a]	75
BERYLLIUM	0.54 U	0.5 U	0.54 U	3.2	2.9	0.5 U	0.5 U	51/51	1600	3.2[a]	NE
CADMIUM	0.54 U	0.094 J	0.54 U	0.54 U	0.5 U	0.5 U	0.5 U	6/6	2100	0.38[a]	1.2
CALCIUM	6070	500 U	595	52200	37600	878	89600	NC	NC	NC	NE
CHROMIUM	2.9 J	2.1 J	3.9 J	26.5 J	14.3 J	3.3 J	3.6 J	30/30	9200	180000[a]	18
COBALT	5.4 U	5 U	*1 J*	**2.3 J**	**2.1 J**	0.61 J	*1.2 J*	0.8/2	9000	0.21	6.8
COPPER	2.7 U	5.3 J	3.9 J	61.8 J	59.7 J	5.2 J	4.6 J	5800/5800	73000	46[a]	32
IRON	**2030**	**1780**	**2420**	**91100**	**11100**	**2760**	**3890**	6/6	580000	270	12000
LEAD	1.1 J	1.9 J	2.4 J	52.2 J	10.2 J	2 J	1.2 J	700/700	900	14[a]	21
MAGNESIUM	1210	380 J	795	6990	5700	424 J	*16500*	8000/22000	1000000	NC	NE
MANGANESE	**18.9 J**	**13 J**	**21.1 J**	**3000 J**	**1880 J**	**23.7 J**	**92.4 J**	1/1	90000	21	440
NICKEL	2.2 J	2.8 J	3.6 J	4.7	5.7	3.2 J	4.4	100/100	150000	20	20
POTASSIUM	541 U	500 U	540 U	5610	2740	500 U	500 U	NC	NC	NC	NE
SELENIUM	3.8 U	3.5 U	3.8 U	3.8 U	3.5 U	3.5 U	3.5 U	4/4	9600	0.26[a]	NE
SILVER	1.1 U	1 U	1.1 U	1.1 U	1 U	1 U	1 U	4.5/13	9000	0.6	1
SODIUM	541 U	500 U	540 U	541 U	500 U	500 U	500 U	2500/7000	1000000	NC	NE
THALLIUM	0.24 J	2.5 U	2.7 U	5.4 U	0.93 J	2.5 U	0.65 J	2.3/2.3	130	0.14[a]	NE
VANADIUM	3.5 J	3.4 J	4.7 J	34.2	29.3	3.5 J	5.6	72/990	5500	78	NE
ZINC	5.2 J	7	14.4	80.5	27.9	7.8	12.1	2400/5000	630000	290	47

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**SB12-3032**	**SB13-2830**	**SB14-4143**	**SB14-5254**	**SB15-0305**	**SB15-4446**	**SB15-4850**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**	**Statewide Default Background Level**
Sample Date:	**6/16/2011**	**6/16/2011**	**6/17/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**				
At, Above, or Below Water Table?	Below	At	Below	Below	Above	Below	Below				
Inroganics											
ALUMINUM	**1140**	**893**	**1000**	**1400**	**2530**	**563**	**653**	1/1	370000	23000	6900
ANTIMONY	5.2 UJ	5 UJ	4.8 UJ	5.2 UJ	6.3 UJ	5.8 UJ	5.4 UJ	4.3/4.3	670	0.27[a]	NE
ARSENIC	0.78 J-	0.57 J-	1.5	0.81 J	1.3	0.97 UJ	0.89 UJ	4.6/4.6	37	0.29[a]	5.8
BARIUM	20 U	20 U	20 U	20 U	26	2.2 J	2.5 J	1300/1300	130000	82[a]	75
BERYLLIUM	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	51/51	1600	3.2[a]	NE
CADMIUM	0.5 U	0.5 U	0.012 J-	0.5 U	0.35 J	0.5 U	0.5 U	6/6	2100	0.38[a]	1.2
CALCIUM	24600	20500	119000	109000	10600	13200 J	27700 J	NC	NC	NC	NE
CHROMIUM	2.7 J	3.6 J	3.6 J	3.3 J	17.4 J	1.5	1.7	30/30	9200	180000[a]	18
COBALT	*0.92 J*	0.6 J	*0.89 J*	*1.1 J*	*0.98 J*	5 U	5 U	0.8/2	9000	0.21	6.8
COPPER	2.7 J	2.2 J	3.3	3	121 J	2.5 U	2.5 U	5800/5800	73000	46[a]	32
IRON	**2400**	**2120 J**	**3110**	**3210**	**4340**	**1230**	**1390**	6/6	580000	270	12000
LEAD	1.3 J	0.78 J	0.79 J	0.52 J	11 J	0.43 J	0.56 J	700/700	900	14[a]	21
MAGNESIUM	2830	3340	*8980*	3460	1370	1710	*8210*	8000/22000	1000000	NC	NE
MANGANESE	**35.9 J**	**38 J**	**112 J**	**71.9 J**	**108 J**	**20.8**	**42.3**	1/1	90000	21	440
NICKEL	3.2 J	2.4 J	3.1 J	3.1 J	4.4	1.2 J	1.4 J	100/100	150000	20	20
POTASSIUM	500 U	500 U	500 U	500 U	529 U	500 U	500 U	NC	NC	NC	NE
SELENIUM	3.5 U	3.5 U	3.5 U	3.5 U	3.7 U	3.5 U	3.5 U	4/4	9600	0.26[a]	NE
SILVER	1 U	1 U	1 U	1 U	1.1 U	1 U	1 U	4.5/13	9000	0.6	1
SODIUM	500 U	500 U	500 U	500 U	529 U	500 U	500 U	2500/7000	1000000	NC	NE
THALLIUM	0.62 J	0.4 J	0.31 J	2.5 U	2.6 U	0.2 J-	2.5 U	2.3/2.3	130	0.14[a]	NE
VANADIUM	3.9 J	3.5 J	3.8 J	5.1	6.3	5 U	5 U	72/990	5500	78	NE
ZINC	7.7	5.1	10.7	7	84.2	3 J	3.6 J	2400/5000	630000	290	47

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**SB16-2527**	**SB16-5254**	**SB16-7274**	**SB17-4850**	**SB17-6567**	**SB18-5759**	**SB18-7173**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**	**Statewide Default Background Level**
Sample Date:	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/21/2011**	**6/21/2011**	**6/22/2011**	**6/22/2011**				
At, Above, or Below Water Table?	Above	Below	Below	Below	Below	Below	Below				
Inroganics											
ALUMINUM	**6850**	**825**	**802**	**789**	**740**	**731**	**1140**	1/1	370000	23000	6900
ANTIMONY	6.8 UJ	5.9 UJ	5.7 UJ	5.1 UJ	5.9 UJ	5.1 UJ	6.7 UJ	4.3/4.3	670	0.27[a]	NE
ARSENIC	4.3 J	0.98 UJ	0.94 UJ	1.1 J+	0.98 UJ	1.1 J+	1.3 J+	4.6/4.6	37	0.29[a]	5.8
BARIUM	72.6	3 J	2.7 J	2.4 J	2.6 J	2.2 J	3.7 J	1300/1300	130000	82[a]	75
BERYLLIUM	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	51/51	1600	3.2[a]	NE
CADMIUM	0.57 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	6/6	2100	0.38[a]	1.2
CALCIUM	35200 J	11200 J	37300 J	20800 J	19600 J	16800 J	55000 J	NC	NC	NC	NE
CHROMIUM	**34.2**	1.9	2.5	1.7	2.5	2.2	6.3	30/30	9200	180000[a]	18
COBALT	**2.8 J**	5 U	0.64 J	5 U	5 U	5 U	*0.89 J*	0.8/2	9000	0.21	6.8
COPPER	171	2.5 U	2.5 U	2.2	2.5 U	2.5 U	2.8 U	5800/5800	73000	46[a]	32
IRON	**154000**	**1640**	**1930**	**2760**	**1720**	**2220**	**3130**	6/6	580000	270	12000
LEAD	42.1	0.78 J	0.4 J	0.74 J	0.44 J	0.55 J	0.66 J	700/700	900	14[a]	21
MAGNESIUM	1730	2210	3240	2270	2260	2280	*13500*	8000/22000	1000000	NC	NE
MANGANESE	**1390**	**20.5**	**46.7**	**25.8**	**26.7**	**24.8**	**59.5**	1/1	90000	21	440
NICKEL	4.6	1.7 J	2.2 J	1.9 J	1.6 J	1.4 J	2.8 J	100/100	150000	20	20
POTASSIUM	1510	500 U	500 U	500 U	500 U	500 U	557 U	NC	NC	NC	NE
SELENIUM	7.9 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.9 U	4/4	9600	0.26[a]	NE
SILVER	1.1 U	1 U	1 U	1 U	1 U	1 U	1.1 U	4.5/13	9000	0.6	1
SODIUM	567 U	500 U	500 U	500 U	500 U	500 U	557 U	2500/7000	1000000	NC	NE
THALLIUM	28.3 U	0.28 J-	2.5 U	0.24 J-	0.24 J-	0.42 J-	2.8 U	2.3/2.3	130	0.14[a]	NE
VANADIUM	65.5	5 U	5 U	5 U	5 U	5 U	5.6 U	72/990	5500	78	NE
ZINC	60.9	6.3	4.5 J	4.5 J	3.4 J	3.4 J	6.5 J	2400/5000	630000	290	47

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**SB19-5759**	**SB20-1012**	**SB20-5355**	**SB20-7375**	**SB21-5557**	**MDEQ Residential/Non-Residential Soil Criteria (DWPC)**	**MDEQ Non-Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**	**Statewide Default Background Level**
Sample Date:	**6/22/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**				
At, Above, or Below Water Table?	Below	Above	Below	Below	Below				
Inroganics									
ALUMINUM	**1230**	**2120**	**810**	**698**	**1180**	1/1	370000	23000	6900
ANTIMONY	5.9 UJ	7.7 UJ	6.3 UJ	5 UJ	5.7 UJ	4.3/4.3	670	0.27[a]	NE
ARSENIC	1.7 J	0.79 J	0.76 J	0.59 J	1 U	4.6/4.6	37	0.29[a]	5.8
BARIUM	3.7 J	67.4	3 J	2.6 J	5.2 J	1300/1300	130000	82[a]	75
BERYLLIUM	0.5 U	0.64 U	0.52 U	0.5 U	0.5 U	51/51	1600	3.2[a]	NE
CADMIUM	0.5 U	0.93	0.52 U	0.5 U	0.5 U	6/6	2100	0.38[a]	1.2
CALCIUM	17600 J	20600 J	24400 J	29300 J	21600 J	NC	NC	NC	NE
CHROMIUM	2.9	15.3	2.5	4.4	3.5	30/30	9200	180000[a]	18
COBALT	*1.1 J*	*1.2 J*	0.67 J	0.55 J	*0.98 J*	0.8/2	9000	0.21	6.8
COPPER	4.5	109	2.6 U	2.5 U	3.9	5800/5800	73000	46[a]	32
IRON	**3870**	**30400**	**1970**	**1880**	**3130**	6/6	580000	270	12000
LEAD	1.5	16.2	0.99 J	0.72 J	1.5	700/700	900	14[a]	21
MAGNESIUM	2970	1690	2390	4160	2210	8000/22000	1000000	NC	NE
MANGANESE	**32.3**	**520**	**32.8**	**35.7**	**50.5**	1/1	90000	21	440
NICKEL	4 U	5.1 U	4 U	4 U	4 U	100/100	150000	20	20
POTASSIUM	500 U	766	525 U	500 U	500 U	NC	NC	NC	NE
SELENIUM	3.5 U	4.5 U	3.7 U	3.5 U	3.5 U	4/4	9600	0.26[a]	NE
SILVER	1 U	1.3 U	1 U	1 U	1 U	4.5/13	9000	0.6	1
SODIUM	500 U	640 U	525 U	500 U	500 U	2500/7000	1000000	NC	NE
THALLIUM	0.34 J-	3.2 U	2.6 U	2.5 U	0.44 J-	2.3/2.3	130	0.14[a]	NE
VANADIUM	6.4	8.1	5.2 U	5 UJ	4.9	72/990	5500	78	NE
ZINC	7.7	194	5.2 J	3.8 J	8.8	2400/5000	630000	290	47

TABLE 2
METAL DATA SUMMARY SHEETS FOR SOIL SAMPLES
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Notes:

All values expressed as milligrams per kilogram

All *italicized* values indicate that the detected concentration only exceeds MDEQ Residential Soil Criteria

All **bold** values indicate that the detected concentration exceeds MDEQ Non-Residential Soil Criteria

All shaded values indicate that the detected concentration exceeds both MDEQ Non-Residential Soil Criteria and statewide background default level

[a] = RSL is based on MCL. All other RSLs are risk-based.

DCC = Direct contact criteria

DWPC = Drinking water protection criteria

J = The associated numerical value was an estimated quantity.

J- = The result is an estimated quantity, but the result may be biased low.

J+ = The result is an estimated quantity, but the result may be biased high.

MCL = Maximum Contaminant Level

MDEQ = Michigan Department of Environmental Quality

NC = No criteria available

NE = Not established

U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 3
ORGANICS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	VAS01-0813	VAS01-2025	VAS02-1015	VAS03-0813	VAS04-1318	VAS05-1217	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/13/2011**	**6/13/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**				
VOCs										
ACETONE	29	27	39	62	20 U	20 U	NC	730/2100	31000000	12000
ACETOPHENONE	100 U	100 U	100 U	100 U	100 U	5 U	NC	1500/4400	6100000	1500
BENZENE	**230**	**100**	**42**	**390**	**25**	5 U	5	5/5	11000	5
2-BUTANONE	6.1 J	4 J	16	160	10 U	10 U	NC	13000/38000	240000000	4900
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	NC	800/2300	1200000	720
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	NC	260/1100	490000	190
ETHYLBENZENE	**210**	**200**	61	**100**	59	4.4 J	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	480	6.9 J	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	7.8	8	3.9 J	4.2 J	2 J	1.1 J	NC	800/2300	56000	390
METHYL ACETATE	5 U	5 U	5 U	2.8 J	5 U	5 U	NC	NC	NC	16000
4-METHYL-2-PENTANONE	10 U	10 U	10 U	89	5.4 J	10 U	NC	1800/5200	13000000	1000
STYRENE	**110**	**120**	9.1	43	4.3 J	5	NC	100/100	9700	100
TOLUENE	**1100**	**790**	120 J	570	150	5 U	NC	790/790	530000	1000
M,P-XYLENES	460	440	120	210	140	1.6 J	NC	NC	NC	190
O-XYLENES	300	280	75	140	88	2.2 J	NC	NC	NC	190
TOTAL XYLENES	**760**	**720**	195	**350**	228	3.8	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	21 J	17 J	100 U	200 U	100 U	0.66 J	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	**19000**	**10000**	**3800**	**74000**	**5900**	1.6 J	370	370/1000	520000	270
2-METHYLNAPHTHALENE	100	93 J	62 J	46 J	32 J	0.17 J	260	260/350	25000	27
2-METHYLPHENOL	2400	4000	1700	75000	35 J	0.74 J	370	NC	NC	720
4-METHYLPHENOL	4200	12000	5100	130000	130	1.7 J	370	NC	NC	72
TOTAL METHYLPHENOLS	**6600**	**16000**	**6800**	**205000**	165	2.44	370	370/1000	810000	670
ACENAPHTHENE	100 U	100 U	100 U	200 U	100 U	0.34 J	NC	1300/3800	4200	400
BENZO(G,H,I)PERYLENE	100 U	100 U	100 U	200 U	100 U	5 U	NC	5/5	0.26	NC
BIS(2-ETHYLHEXYL)PHTHALATE	100 U	100 U	100 U	200 U	100 U	0.31 J	NC	6/6	320	6
CARBAZOLE	100 U	100 U	100 U	200 U	100 U	5 U	NC	85/350	7400	NC
DIBENZO(A,H)ANTHRACENE	100 U	100 U	100 U	200 U	100 U	5 U	NC	5/5	0.31	0.0029[b]
DIBENZOFURAN	100 U	14 J	100 U	200 U	100 U	0.86 J	NC	ID	ID	5.8
FLUORENE	100 U	100 U	100 U	200 U	100 U	0.73 J	NC	880/2000	2000	220
INDENO(1,2,3-CD)PYRENE	100 U	100 U	100 U	200 U	100 U	5 U	NC	5/5[a]	0.022	0.029[b]
NAPHTHALENE	*550*	*570*	260	300	200	0.56 J	520	520/1500	31000	0.14[b]
PHENANTHRENE	100 U	100 U	100 U	200 U	100 U	0.24 J	52	52/150	1000	NC
PHENOL	270	920	1000	**38000**	100 U	5 U	4400	4400/13000	29000000	4500

TABLE 3
ORGANICS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	VAS06-1318	VAS07-1318	VAS08-2328	VAS09-2530	VAS10-2631	VAS11-3338	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**				
VOCs										
ACETONE	20 U	38	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
ACETOPHENONE	5 U	100 U	5 U	5 U	5 U	5 U	NC	1500/4400	6100000	1500
BENZENE	5 U	**60**	5 U	5 U	5 U	5 U	5	5/5	11000	5
2-BUTANONE	10 U	9.1 J	10 U	10 U	10 U	10 U	NC	13000/38000	240000000	4900
CARBON DISULFIDE	5 U	5 U	5 U	5 U	5 U	5 U	NC	800/2300	1200000	720
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	NC	260/1100	490000	190
ETHYLBENZENE	10	**110**	0.16 J	0.26 J	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	67	10 U	10 U	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	0.89 J	2.2 J	5 U	5 U	5 U	5 U	NC	800/2300	56000	390
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	16000
4-METHYL-2-PENTANONE	10 U	31	10 U	10 U	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	0.51 J	7.1	5 U	5 U	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	310	0.51 J	0.36 J	5 U	0.34 J	NC	790/790	530000	1000
M,P-XYLENES	8.7	150	0.31 J	0.45 J	0.18 J	5 U	NC	NC	NC	190
O-XYLENES	7.3	100	0.16 J	0.37 J	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	16	250	0.47	0.82	0.18	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	1.2 J	100 U	5 U	0.2 J	5 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	9.4	**9800**	1.7 J	7	1.3 J	0.26 J	370	370/1000	520000	270
2-METHYLNAPHTHALENE	0.54 J	18 J	0.22 J	0.71 J	5 U	5 U	260	260/350	25000	27
2-METHYLPHENOL	7.1	140	0.44 J	1.7 J	0.49 J	5 U	370	NC	NC	720
4-METHYLPHENOL	5.7	13000	1.3 J	2.1 J	0.96 J	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	12.8	**13140**	1.74	3.8	1.45	5 U	370	370/1000	810000	670
ACENAPHTHENE	0.49 J	100 U	5 U	0.37 J	5 U	5 U	NC	1300/3800	4200	400
BENZO(G,H,I)PERYLENE	5 U	100 U	5 U	5 U	5 U	5 U	NC	5/5[a]	0.26	NC
BIS(2-ETHYLHEXYL)PHTHALATE	0.25 J	100 U	5 U	5 U	0.45 J	5 U	NC	6/6	320	6
CARBAZOLE	0.18 J	100 U	5 U	5 U	5 U	5 U	NC	85/350	7400	NC
DIBENZO(A,H)ANTHRACENE	5 U	100 U	5 U	5 U	5 U	5 U	NC	5/5[a]	0.31	0.0029[b]
DIBENZOFURAN	1.3 J	100 U	5 U	0.54 J	5 U	5 U	NC	ID	ID	5.8
FLUORENE	1.4 J	100 U	5 U	0.29 J	5 U	5 U	NC	880/2000	2000	220
INDENO(1,2,3-CD)PYRENE	**10**	**130**	0.43 J	1.4 J	5 U	0.17 J	NC	5/5[a]	0.022	0.029[b]
NAPHTHALENE	2.3	4.4	4.7	3.4	7.3	5.7	520	520/1500	31000	0.14[b]
PHENANTHRENE	0.64 J	100 U	5 U	5 U	5 U	5 U	52	52/150	1000	NC
PHENOL	5 UJ	100 U	5 U	5 U	5 UJ	5 U	4400	4400/13000	29000000	4500

TABLE 3
ORGANICS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	VAS12-2934	VAS13-2934	VAS14-4146	VAS15-4247	VAS16-5257	VAS16-6974	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/17/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
ACETOPHENONE	5 U	5 U	5 U	0.37 J	50 U	50 U	NC	1500/4400	6100000	1500
BENZENE	5 U	5 U	5 U	5 U	**40**	**59**	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	8.5 J	4.2 J	NC	13000/38000	240000000	4900
CARBON DISULFIDE	5 U	5 U	5 U	5 U	0.71 J	0.36 J	NC	800/2300	1200000	720
CHLOROMETHANE	5 U	5 U	5 U	5 U	5 U	5 U	NC	260/1100	490000	190
ETHYLBENZENE	1.3 J	5 U	5 U	5 U	52	61	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	9 J	13	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	0.27 J	5 U	5 U	0.22 J	2.8 J	2.8 J	NC	800/2300	56000	390
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	16000
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	7.6 J	15	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	2.4 J	3.2 J	NC	100/100	9700	100
TOLUENE	0.45 J	5 U	5 U	5 U	85	140	NC	790/790	530000	1000
M,P-XYLENES	0.39 J	5 U	5 U	5 U	69	94	NC	NC	NC	190
O-XYLENES	0.23 J	5 U	5 U	5 U	50	65	NC	NC	NC	190
TOTAL XYLENES	0.62	5 U	5 U	5 U	119	159	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	0.37 J	4.9 J	8.3 J	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	0.31 J	0.5 J	0.48 J	9.2	**2800**	**3200**	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	1.7 J	24 J	45 J	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	0.17 J	4.4 J	130	83	370	NC	NC	720
4-METHYLPHENOL	5 U	0.38 J	0.4 J	7.7	1900	830	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	0.38	0.57	12.1	**2030**	*913*	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	0.19 J	50 U	50 U	NC	1300/3800	4200	400
BENZO(G,H,I)PERYLENE	5 U	5 U	5 U	5 U	50 U	50 U	NC	5/5[a]	0.26	NC
BIS(2-ETHYLHEXYL)PHTHALATE	5 U	25 U	25 U	25 U	50 U	50 U	NC	6/6	320	6
CARBAZOLE	5 U	5 U	5 U	5 U	50 U	50 U	NC	85/350	7400	NC
DIBENZO(A,H)ANTHRACENE	5 U	5 U	5 U	5 U	50 U	50 U	NC	5/5[a]	0.31	0.0029[b]
DIBENZOFURAN	5 U	5 U	5 U	0.34 J	3.8 J	50 U	NC	ID	ID	5.8
FLUORENE	5 U	5 U	5 U	0.32 J	50 U	50 U	NC	880/2000	2000	220
INDENO(1,2,3-CD)PYRENE	5 U	5 U	5 U	5 U	50 U	50 U	NC	5/5[a]	0.022	0.029[b]
NAPHTHALENE	0.21 J	0.31 J	0.26 J	2.5 J	110	150	520	520/1500	31000	0.14[b]
PHENANTHRENE	5 U	5 U	5 U	0.21 J	50 U	50 U	52	52/150	1000	NC
PHENOL	5 U	5 U	0.21 J	2.1 J	27 J	17 J	4400	4400/13000	29000000	4500

TABLE 3
ORGANICS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS17-4853**	**VAS18-5560**	**VAS19-5560**	**VAS20-5055**	**VAS21-5560**	**2002 ROD Criteria**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**				
VOCs									
ACETONE	26	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
ACETOPHENONE	5 U	50 U	5 U	250 U	100 U	NC	1500/4400	6100000	1500
BENZENE	**27**	**51**	5 U	**34**	**47**	5	5/5	11000	5
2-BUTANONE	2.4	2.8	1.3	9.9	3.3	NC	13000/38000	240000000	4900
CARBON DISULFIDE	5 U	5 U	5 U	0.48 J	5 U	NC	800/2300	1200000	720
CHLOROMETHANE	1 U	5 U	5 U	1.1 J	0.41 J	NC	260/1100	490000	190
ETHYLBENZENE	28	54	5 U	48	40	NC	74/74	170000	700
2-HEXANONE	27	25	10 U	4.6 J	4.5 J	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	1.5 J	2.6 J	5 U	2.4 J	2.6 J	NC	800/2300	56000	390
METHYL ACETATE	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	16000
4-METHYL-2-PENTANONE	9.3 J	12	10 U	5.7 J	4.9 J	NC	1800/5200	13000000	1000
STYRENE	3.2 J	5.9	5U	1.5 J	0.91 J	NC	100/100	9700	100
TOLUENE	70	150	5 U	84	77	NC	790/790	530000	1000
M,P-XYLENES	37	76	5 U	47	41	NC	NC	NC	190
O-XYLENES	28	55	5 U	35	31	NC	NC	NC	190
TOTAL XYLENES	65	131	5 U	82	72	NC	280/280	190000	10000
SVOCs									
1,1"-BIPHENYL	5 U	50 U	0.26 J	250 U	100 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	**2600**	**4100**	5 U	**1700**	**1500**	370	370/1000	520000	270
2-METHYLNAPHTHALENE	2.2 J	2.7 J	0.38 J	250 U	4.3 J	260	260/350	25000	27
2-METHYLPHENOL	360 J	160	5 U	13 J	18 J	370	NC	NC	720
4-METHYLPHENOL	4600	4300	5 U	70 J	280	370	NC	NC	72
TOTAL METHYLPHENOLS	**4960**	**4460**	5 U	83	298	370	370/1000	810000	670
ACENAPHTHENE	5 U	50 U	5 U	250 U	100 U	NC	1300/3800	4200	400
BENZO(G,H,I)PERYLENE	5 U	50 U	5 U	**10 J**	**5 J**	NC	5/5[a]	0.26	NC
BIS(2-ETHYLHEXYL)PHTHALATE	5 U	50 U	25 U	250 U	100 U	NC	6/6	320	6
CARBAZOLE	5 U	50 U	5 U	250 U	100 U	NC	85/350	7400	NC
DIBENZO(A,H)ANTHRACENE	5 U	2.6 J	5 U	**9 J**	4.6 J	NC	5/5[a]	0.31	0.0029[b]
DIBENZOFURAN	5 U	50 U	5 U	250 U	100 U	NC	ID	ID	5.8
FLUORENE	5 U	50 U	5 U	250 U	100 U	NC	880/2000	2000	220
INDENO(1,2,3-CD)PYRENE	5 U	50 U	5 U	250 U	3.6 J	NC	5/5[a]	0.022	0.029[b]
NAPHTHALENE	26	33	0.97 J	250 U	100 U	520	520/1500	31000	0.14[b]
PHENANTHRENE	5 U	50 U	5 U	250 U	100 U	52	52/150	1000	NC
PHENOL	230 J	130	5 U	250 U	100 U	4400	4400/13000	29000000	4500

TABLE 3
ORGANICS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Notes:

All values expressed as micrograms per liter

All *italicized* values exceed MDEQ Residential Groundwater Criteria
All **bold** values exceed MDEQ Non-Residential Groundwater Criteria
All shaded values exceed both MDEQ Non-Residential Groundwater Criteria and EPA MCLs

[a] = Criteria listed are noncancer tapwater RSLs if no MCL listed
[b] = Criteria listed are cancer tapwater RSLs
DWC = Drinking water protection criteria
GCC = Groundwater contact criteria
ID = Insufficient data to develop criteria
J = The associated numerical value was an estimated quantity.
MCL = Maximum Contaminant Level
MDEQ = Michigan Department of Environmental Quality
NC = No criteria available
U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.
UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	BG-1-40	BG-1-79	BG-1-97	MW-1A-58	MW-1A-69	MW-1A-99	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/21/2011**	**6/21/2011**	**6/21/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	**14**	**94**	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	14	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	25 U	**81**	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	50	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	1.1 J	4.7 J	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	21	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	3.6 J	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	25 U	200	5 U	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	25 U	110	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	25 U	68	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	25 U	178	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	50 U	100 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	5 U	5 U	*500*	**8200**	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	50 U	13 J	5 U	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	9.6 J	210	5 U	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	380	17000	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	*389.6*	**17210**	5 U	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	50 U	100 U	5 U	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 U	50 U	100 U	5 U	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	5 U	**12**	5 U	50 U	100 U	0.6 J	NC	6/6	320	6
FLUORENE	5 U	5 U	5 U	50 U	100 U	5 U	NC	880/2000	2000	220
NAPHTHALENE	5 U	5 U	5 U	15 J	120	0.19 J	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 U	5 U	50 U	22 J	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	MW-1B-55	MW-1B-79	MW-1B-91	MW-1C-55	MW-1C-72	MW-1C-92	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/20/2011**	**6/21/2011**	**6/21/2011**	**6/20/2011**	**6/16/2011**	**6/15/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	0.21 J	5 U	5 U	0.22 J	5 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	5 U	5 U	5 U	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	25 U	25 U	25 U	25 U	25 U	5 U	NC	6/6	320	6
FLUORENE	0.18 J	5 U	5 U	5 U	5 U	5 U	NC	880/2000	2000	220
NAPHTHALENE	5 U	5 U	5 U	0.2 J	5 U	5 U	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 U	5 U	5 U	5 U	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	MW-2A-66	MW-2A-92	MW-2A-111	MW-2B-66	MW-2B-93	MW-2B-109	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/17/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	2.9 J	2.3 J	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	0.31 J	5 U	5 U	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	5 U	5 U	5 U	0.32 J	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 UJ	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 UJ	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	5 U	0.55 J	5 UJ	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	5 U	0.55	5 UJ	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	5 U	5 U	5 UJ	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 U	5 U	5 U	5 UJ	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	5 U	5 U	0.5 J	25 U	25 U	0.23 J	NC	6/6	320	6
FLUORENE	5 U	5 U	5 U	5 U	5 U	5 UJ	NC	880/2000	2000	220
NAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 UJ	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 U	5 U	5 U	5 U	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	MW-2C-72	MW-2C-84	MW-2C-114	MW-3A-72	MW-3A-92	MW-3A-121	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/17/2011**	**6/20/2011**	**6/20/2011**	**NA**	**6/20/2011**	**6/20/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	NS	20 U	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	NS	5 U	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	NS	10 U	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	NS	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	NS	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	NS	5 U	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	NS	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	NS	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	NS	5 U	5 U	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	NS	5 U	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	NS	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	NS	5 U	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	NS	5 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	5 U	5 U	NS	5 U	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	NS	5 U	5 U	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	NS	5 U	5 U	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	NS	5 U	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	NS	5 U	5 U	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	NS	5 U	5 U	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 U	NS	5 U	5 U	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	25 U	25 U	25 U	NS	0.2 J	5 U	NC	6/6	320	6
FLUORENE	5 U	5 U	5 U	NS	5 U	5 U	NC	880/2000	2000	220
NAPHTHALENE	0.2 J	5 U	5 U	NS	5 U	5 U	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 U	5 U	NS	5 U	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	MW-3B-75	MW-3B-98	MW-3B-119	MW-3C-75	MW-3C-83	MW-3C-119	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/20/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	5 U	5 U	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	5 U	5 U	5 U	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 U	5 U	5 U	5 U	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	25 U	25 U	25 U	25 U	25 U	0.43 J	NC	6/6	320	6
FLUORENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	880/2000	2000	220
NAPHTHALENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 U	5 U	5 U	5 U	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	PZ-1	PZ-2	PZ-3	SPW-1-65	SPW-4-64	SPW-9-67	2002 ROD Criteria	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/20/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**				
VOCs										
ACETONE	20 U	20 U	20 U	20 U	20 U	20 U	NC	730/2100	31000000	12000
BENZENE	5 U	5 U	5 U	4 J	1.5 J	5 U	5	5/5	11000	5
2-BUTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	13000/38000	240000000	4900
ETHYLBENZENE	5 U	5 U	5 U	0.27 J	5 U	5 U	NC	74/74	170000	700
2-HEXANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1000/2900	5200000	34
ISOPROPYLBENZENE	5 U	5 U	5 U	5 U	0.33 J	5 U	NC	800/2300	56000	390
4-METHYL-2-PENTANONE	10 U	10 U	10 U	10 U	10 U	10 U	NC	1800/5200	13000000	1000
STYRENE	5 U	5 U	5 U	5 U	5 U	5 U	NC	100/100	9700	100
TOLUENE	5 U	5 U	5 U	4.2 J	5 U	0.67 J	NC	790/790	530000	1000
M,P-XYLENES	5 U	5 U	5 U	3.7 J	5 U	5 U	NC	NC	NC	190
O-XYLENES	5 U	5 U	5 U	2.9 J	5 U	5 U	NC	NC	NC	190
TOTAL XYLENES	5 U	5 U	5 U	6.6	5 U	5 U	NC	280/280	190000	10000
SVOCs										
1,1"-BIPHENYL	5 U	5 U	5 U	5 U	0.34 J	5 U	NC	NC	NC	0.83
2,4-DIMETHYPHENOL	5 U	0.16 J	5 U	5 U	17	5 U	370	370/1000	520000	270
2-METHYLNAPHTHALENE	5 U	5 U	5 U	0.45 J	1.1 J	5 U	260	260/350	25000	27
2-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	720
4-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	370	NC	NC	72
TOTAL METHYLPHENOLS	5 U	5 U	5 U	5 U	5 U	5 U	370	370/1000	810000	670
ACENAPHTHENE	5 U	5 U	5 U	5 U	0.2 J	5 U	NC	1300/3800	4200	400
BENZALDEHYDE	5 U	5 U	5 UJ	1.1 J	5 U	5 U	NC	NC	NC	1500
BIS(2-ETHYLHEXYL)PHTHALATE	25 U	5 U	25 U	25 U	25 U	25 U	NC	6/6	320	6
FLUORENE	0.15 J	5 U	5 U	5 U	5 U	5 U	NC	880/2000	2000	220
NAPHTHALENE	5 U	5 U	5 U	5 U	5 U	0.17 J	NC	520/1500	31000	0.14[b]
PHENOL	5 U	5 UJ	5 U	5 U	5 U	5 U	4400	4400/13000	29000000	4500

TABLE 4
ORGANICS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Notes:

All values expressed as micrograms per liter

All *italicized* values exceed MDEQ Residential Groundwater Criteria

All **bold** values exceed MDEQ Non-Residential Groundwater Criteria

All shaded values exceed EPA MCLs

[a] = Criteria listed are noncancer tapwater RSLs if no MCL listed

[b] = Criteria listed are cancer tapwater RSLs

DWC = Drinking water protection criteria

J = The associated numerical value was an estimated quantity.

MCL = Maximum Contaminant Level

MDEQ = Michigan Department of Environmental Quality

NA = Not applicable

NC = No criteria available

NS = Not sampled - not enough water was present in the well to obtain a sample.

RSL = EPA Regional Screening Level

U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS01-0813**	**VAS01-2025**	**VAS02-1015**	**VAS03-0813**	**VAS04-1318**	**VAS05-1217**	**VAS06-1318**	**VAS07-1318**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/13/2011**	**6/13/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**			
Inroganics - Total											
ALUMINUM	*304*	*3410*	*868*	*1010*	*516*	*301*	*717*	*359*	300/4100	64000000	16000
ANTIMONY	**9.2 J+**	4.1 J+	2 U	**29.2**	2 U	2 U	3.2 J+	3.1 J+	6/6	68000	6
ARSENIC	3.8 J+	5.5	8.9	**13.7**	2	6	**10.6**	4.5	10/10	4300	10
BARIUM	45.8	200	39.1	46.8	52	26.3	31.5	125	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	1 U	1 U	1 U	1 U	1.7	1 U	5/5	190000	5
CALCIUM	137000	291000	153000	181000	161000	130000	132000	245000	NC	NC	NC
CHROMIUM	1.2 J	15.4	5	5.8	1.5 J	2.3	2.9	4.2	100/100	290000000	100
COBALT	2.5 J	5.1 J	3.3 J	9.4	1 UJ	1.9 J	2.4 J	4.4 J	40/100	2400000	4.7
COPPER	2.3	15.6	6.1	66.2	4.6	7.9	23.9	2.5	1400/4000	7400000	1300
IRON	**16600**	**20500**	**24900**	**30300**	**14600**	*3380*	*4620*	**15300**	2000/5600	58000000	11000
LEAD	1.1	**16.7**	3.5	2.5	**26.1**	1.5	**6.8**	0.99 J	4/4	ID	15
MAGNESIUM	19100	84800	13500	66400	56000	36400	29500	153000	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	*985*	694	580	*2340*	*1120*	136[b]	595	*1110*	860/2500	9100000	320
NICKEL	4	12.3	3.2	12.7	1.9	3.4	4	4.7	100/100	74000000	300
POTASSIUM	7930	20200	6230	8670	10200	5600	4190	22500	NC	NC	NC
SELENIUM	5 U	5 U	5 U	0.13	5 U	5 U	5 U	0.74 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1070	2600	1110	2370	1850	1680	1360	6590	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	*7.6*	*17.1*	*12.8*	5 U	*5.5*	*14.3*	*5.2*	4.5/62	970000	78
ZINC	7.4	103	6.4	20.1	13.3	5.7	23.9	5.6	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS01-0813**	**VAS01-2025**	**VAS02-1015**	**VAS03-0813**	**VAS04-1318**	**VAS05-1217**	**VAS06-1318**	**VAS07-1318**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/13/2011**	**6/13/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**	**6/14/2011**			
Inroganics - Dissolved											
ALUMINUM	116[b]	110[b]	*556*	*966*	92.6[b]	75.7[b]	81[b]	186[b]	300/4100	64000000	16000
ANTIMONY	**6.4 J+**	**7.7 J+**	10 U	**46.1**	2 U	2 U	3.5 J+	4.7	6/6	68000	6
ARSENIC	3.8	5.6	8.5	**13.9**	0.82 J	5.2	7	4.5	10/10	4300	10
BARIUM	44.5	123	36.1	47.1	47.7	25.8	29.2	121	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	138000	129000	149000	188000	160000	132000	132000	242000	NC	NC	NC
CHROMIUM	0.88 J	2.7	4.4	5.7	0.97 J	1.6 J	1.4 J	3.8	100/100	290000000	100
COBALT	2.2	2.4 J	3.8 J	9.4	1 UJ	1.8 J	1.9 J	4.1 J	40/100	2400000	4.7
COPPER	2 U	2 U	2 U	5.3	2 U	2 U	3.5	0.61 J	1400/4000	7400000	1300
IRON	**15700**	**12000**	**24200**	**31400**	**14300**	*3140*	*3850*	**14900**	2000/5600	58000000	11000
LEAD	1 U	1 U	0.2 J	0.73	0.63 J	1 U	1 U	1 U	4/4	ID	15
MAGNESIUM	19100	67600	13500	68800	55700	36700	29700	150000	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	*976*	437	581	*2300*	*1110*	135[b]	607	*1110*	860/2500	9100000	320
NICKEL	3.5	3.3	2.7	13.3	1.1	2.7	2.3	4.4	100/100	74000000	300
POTASSIUM	8050	20500	6200	8610	10200	5640	4240	22300	NC	NC	NC
SELENIUM	5 U	5 U	5 U	0.22	5 U	5 U	5 U	0.66 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1090	2580	1140	2520	1850	1710	1390	6500	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	*11.9*	*9*	5 U	5 U	5 U	5 U	4.5/62	970000	78
ZINC	2.1	3.2	3.5	16.3	0.75 J-	2.9	3.9	2 U	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS08-2328**	**VAS09-2530**	**VAS10-2631**	**VAS11-3338**	**VAS12-2934**	**VAS13-2934**	**VAS14-4146**	**VAS15-4247**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/14/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**			
Inroganics - Total											
ALUMINUM	59.9[b]	93.7[b]	96[b]	97.2[b]	118[b]	101[b]	30.9	61.7[b]	300/4100	64000000	16000
ANTIMONY	3 J+	2 U	2 U	2.2 J+	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	1 U	1 U	0.59 J	2.2	3.8	4.6	4.5	3.2	10/10	4300	10
BARIUM	33.5	28.1	49.3	33.1	17.5	38.8	32.7	58.9	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	0.069 J	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	139000	133000	154000	163000	96100	114000	114000	152000	NC	NC	NC
CHROMIUM	0.87 J	1.6 J	1.7 J	1.2 J	1.1 J	1.4 J	0.72 J	1.2 J	100/100	290000000	100
COBALT	2.9 J	1.9 J	2.5	2.8	1.2 J	1.8 J	1 UJ	1 UJ	40/100	2400000	4.7
COPPER	11.1	5.3	9.4	6.7	3.8	6.6	0.76 J	1.6 J	1400/4000	7400000	1300
IRON	451[b]	891[b]	821[b]	961[b]	*2480*	*3910*	**6520**	*5550*	2000/5600	58000000	11000
LEAD	0.26 J	0.28 J	0.47 J	0.82 J	1.1	1.8	1 U	0.25 J	4/4	ID	15
MAGNESIUM	29900	29400	26300	20900	19900	28200	16000	27700	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	66[b]	182[b]	131[b]	349	198[b]	370	257[b]	403	860/2500	9100000	320
NICKEL	5	3.7	7.7	7.1	2.1	3.1	0.84 J	1.8	100/100	74000000	300
POTASSIUM	4120	4180	7700	3730	2800	3820	2370	6570	NC	NC	NC
SELENIUM	0.79 J-	0.28	0.43 J-	0.46 J-	1.6 J	0.13 J-	0.57 J-	0.31 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1600	1410	1720	1400	1020	1660	1910	1920	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.5/62	970000	78
ZINC	6	3.5	5.7	8.1	3.7	6.8	2 U	5.7	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS08-2328**	**VAS09-2530**	**VAS10-2631**	**VAS11-3338**	**VAS12-2934**	**VAS13-2934**	**VAS14-4146**	**VAS15-4247**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/14/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**			
Inroganics - Dissolved											
ALUMINUM	16.9 J	33.4	39	18.4	25.3	20.2	6.6 J	35.9	300/4100	64000000	16000
ANTIMONY	2 U	2 U	2.8 J+	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	1 U	0.38 J	0.34 J	1.5	3.4	3.9	4.3	2.9	10/10	4300	10
BARIUM	32.7	27.8	49.8	32.1	16.5	36.9	31.4	57.2	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	0.17 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	138000	130000	154000	161000	97300	112000	113000 J	149000 J	NC	NC	NC
CHROMIUM	0.61 J	1.4 J	1.4 J	0.72 J	0.68 J	0.86 J	0.46 J	0.96 J	100/100	290000000	100
COBALT	2.9 J	1.8	2.4 J	2.4	1.1 J	1.6 J	1 UJ	1 UJ	40/100	2400000	4.7
COPPER	10.2	3.9	7	2.1	0.44 J	0.2 J	2 U	0.38 J	1400/4000	7400000	1300
IRON	334[b]	807[b]	709[b]	854[b]	*2280*	*3600*	**6260**	*5360*	2000/5600	58000000	11000
LEAD	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	ID	15
MAGNESIUM	29700	28500	26300	20100	20200	28100	15700	27000	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	64[b]	176[b]	127[b]	359	201[b]	358	253[b]	396	860/2500	9100000	320
NICKEL	4.7	3.4	7.3	5.7	1.5	2.4	0.65 J	1.7	100/100	74000000	300
POTASSIUM	4150	4090	7660	3690	2850	3740	2330	6440	NC	NC	NC
SELENIUM	0.86 J	0.49 J-	0.34 J-	0.35 J-	1.5 J	5 U	0.54 J-	0.29 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1620	1380	1730	1410	1040	1640	1880	1900	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.5/62	970000	78
ZINC	5.8	2.7	6.8	3.6	2 U	2 U	2 U	5.1	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS16-5257**	**VAS16-6974**	**VAS17-4853**	**VAS18-5560**	**VAS19-5560**	**VAS20-5055**	**VAS21-5560**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/16/2011**	**6/17/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**			
Inroganics - Total										
ALUMINUM	*422*	*1110*	45.1	49.9	10.4 J	134[b]	128[b]	300/4100	64000000	16000
ANTIMONY	2 U	2 U	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	4.3	4.3	2.4	2.8	1.3 J+	9.9	3.3	10/10	4300	10
BARIUM	149	131	62.9	50.1	68.1	89.6	56	2000/2000	14000000	2000
BERYLLIUM	1 U	0.2 J-	1 U	1 U	1 U	0.059 J	1 U	4/4	290000	16
CADMIUM	0.096 J-	0.22 J-	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	246000 J	351000 J	209000 J	174000	148000	204000	208000 J	NC	NC	NC
CHROMIUM	8.9	22.4	2.8	4.1	2 U	4.2	3.1	100/100	290000000	100
COBALT	6.7	7.2 J	6.3	4	1 U	1 U	1.2	40/100	2400000	4.7
COPPER	3.7	23.4	2 U	2 U	2 U	4.3	2 U	1400/4000	7400000	1300
IRON	**35900**	**42500**	**17400**	**16200**	*4260*	**25400**	**15100**	2000/5600	58000000	11000
LEAD	1.3	**5**	0.21 J	1 U	1 U	1.3	0.24 J	4/4	ID	15
MAGNESIUM	56500 J	78200 J	28900 J	31300 J	20400 J	43600	29100	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	736	830	842	*914*	373	*875*	539	860/2500	9100000	320
NICKEL	3.4	11.4	1 U	1 U	1 U	7	2.1	100/100	74000000	300
POTASSIUM	13600	11200	10100	10500	8030	9020	6660	NC	NC	NC
SELENIUM	0.35	5	5 U	0.13	1 J	5 U	5 U	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	9410	5690	2360	2500	2070	3830	3680	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	*25.2*	*19*	*10.2*	*10.8*	*5*	*19*	*8.1*	4.5/62	970000	78
ZINC	10.5	33.6	2.1	5	2	8	6.4	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**VAS16-5257**	**VAS16-6974**	**VAS17-4853**	**VAS18-5560**	**VAS19-5560**	**VAS20-5055**	**VAS21-5560**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/16/2011**	**6/17/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**			
Inroganics - Dissolved										
ALUMINUM	77.9[b]	85.1[b]	NA	36.3	6.5 J	77.1[b]	51.1[b]	300/4100	64000000	16000
ANTIMONY	2 U	2 U	NA	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	3.3	4	NA	2.6	1.7	8.2	3.4	10/10	4300	10
BARIUM	145	104	NA	50.2	68.1	88	55.6	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	NA	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	NA	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	248000 J	196000 J	NA	176000	145000	200000	223000	NC	NC	NC
CHROMIUM	5.2	9.2	NA	3.8	2 U	3.7	3.2	100/100	290000000	100
COBALT	6.6	7.5	NA	4	1 U	1 U	4.8	40/100	2400000	4.7
COPPER	2 U	2 U	NA	2 U	2 U	2 U	2 U	1400/4000	7400000	1300
IRON	**33600**	**37300**	NA	**16300**	*4210*	**24900**	**15100**	2000/5600	58000000	11000
LEAD	1 U	1 U	NA	1 U	1 U	1 U	1 U	4/4	ID	15
MAGNESIUM	56600 J	58100 J	NA	31800 J	20100 J	42500	31000	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	736	656	NA	*930*	369	*863*	554	860/2500	9100000	320
NICKEL	2.3	7.5	NA	1 U	1 U	5.5	1.9	100/100	74000000	300
POTASSIUM	13700	11400	NA	10800	7990	8870	7190	NC	NC	NC
SELENIUM	0.28	5	NA	5 U	0.91 J	5 U	0.26	50/50	970000	50
SILVER	1 U	1 U	NA	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	9540	5740	NA	2530	2070	3770	3730	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	NA	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	*8.7*	*12.4*	NA	*10.4*	5 U	*13.7*	*6.5*	4.5/62	970000	78
ZINC	2.6	10.4	NA	2 U	2 U	4.2	2.8	2400/5000	110000000	4700

TABLE 5
METALS DATA SUMMARY SHEETS FOR TEMPORARY MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Notes:

2002 Record of Decision (ROD) criteria did not include inorganics. Therefore, no comparison to 2002 ROD criteria is presented.

All values expressed as micrograms per liter

All *italicized* values exceed MDEQ Residential Drinking Water Criteria

All **bold** values exceed MDEQ Non-Residential Drinking Water Criteria

All shaded values exceed EPA MCLs

[a] = Criteria listed are EPA noncancer health-based RSLs if no MCL listed

[b] = Concentration exceeds only MDEQ aestheic criteria (Aluminum = 50 ug/L, Iron = 300 ug/L, and Manganese = 50 ug/L)

DWC = Drinking water criteria

GCC = Groundwater contact criteria

J = The associated numerical value was an estimated quantity.

J- = The result is an estimated quantity, but the result may be biased low.

J+ = The result is an estimated quantity, but the result may be biased high.

MDEQ = Michigan Department of Environmental Quality

NC = No criteria available

NE = Not established

U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 6
METALS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**BG-1-40**	**BG-1-79**	**BG-1-97**	**MW-1A-58**	**MW-1A-69**	**MW-1A-99**	**MW-1B-55**	**MW-1B-79**	**MW-1B-91**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/13/2011**	**6/13/2011**	**6/13/2011**	**6/21/2011**	**6/21/2011**	**6/21/2011**	**6/20/2011**	**6/21/2011**	**6/21/2011**			
Inroganics - Total												
ALUMINUM	10.1 J	2.8 J	5.4 J	57.5[b]	102[b]	20 U	4.7 J-	20 U	20 U	300/4100	64000000	16000
ANTIMONY	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	1	1	1	5.2	5.4	**10.8**	4.6	6.2	9.1	10/10	4300	10
BARIUM	10.7	10.5	9.5 J	122	94.8	10 U	12 J+	10 U	11 J+	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	47700	55300	52800	314000 J	215000 J	64100 J	66500 J	58900 J	57400 J	NC	NC	NC
CHROMIUM	0.15 J	0.8 J	0.83 J	2 U	4.4	2 U	2 U	2 U	2 U	100/100	290000000	100
COBALT	1 UJ	1 UJ	1 UJ	5.9	6.6	0.2 J-	0.31 J-	0.085 J-	0.091 J-	40/100	2400000	4.7
COPPER	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	1400/4000	7400000	1300
IRON	594[b]	200 U	200 U	**18000**	**20700**	*2040*	*2360*	1340[b]	1520[b]	2000/5600	58000000	11000
LEAD	1 U	1 U	0.39 J	1 U	1 U	1 U	0.21 J	1 U	1 U	4/4	ID	15
MAGNESIUM	7710	10900	10900	53700 J	47100 J	10200 J	11600 J	10200 J	9450 J	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	52.7[b]	0.88 J	1 J	837	542	84.5[b]	175[b]	103[b]	95[b]	860/2500	9100000	320
NICKEL	1 U	0.13 J-	0.82 J-	1.4	2.2	1 U	1 U	1 U	1 U	100/100	74000000	300
POTASSIUM	864	417 J	1200	17300	10600	563	655	404 J	481 J	NC	NC	NC
SELENIUM	5 U	5 U	5 U	0.25 J-	5 U	5 U	5 U	5 U	5 U	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	955	940	1500	12000	5500	1020	832	1120	977	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	5 U	*5.2*	*12.7*	3.3 J	0.94 J	1.2 J	1.6 J	4.5/62	970000	78
ZINC	2.8	1.7 J	5.4	2 U	5.4 J+	3.1 J+	2 U	4.8 J+	3.6 J+	2400/5000	110000000	4700

TABLE 6
METALS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**MW-1C-55**	**MW-1C-72**	**MW-1C-92**	**MW-2A-66**	**MW-2A-92**	**MW-2A-111**	**MW-2B-66**	**MW-2B-93**	**MW-2B-109**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/20/2011**	**6/16/2011**	**6/15/2011**	**6/15/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/16/2011**	**6/17/2011**			
Inroganics - Total												
ALUMINUM	11.7 J	5.6 J	20 U	20 U	20 U	20 U	20 U	20 U	20 U	300/4100	64000000	16000
ANTIMONY	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	3.7	2	9.5	1 U	1 U	1 U	0.25 J	1 U	1 U	10/10	4300	10
BARIUM	11.6	9.3 J	9.1 J	12.8 J+	11.7 J+	10 U	10.5 J+	11.1 J+	10 U	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	66900	56300	59700	72700 J	51800 J	51300 J	61600 J	53000 J	50400	NC	NC	NC
CHROMIUM	0.33 J	0.32 J	0.33 J	2 U	2 U	2 U	2 U	2 U	0.94 J	100/100	290000000	100
COBALT	1 U	1 UJ	1 UJ	0.2 J-	1 U	1 U	0.2 J-	1 U	1 U	40/100	2400000	4.7
COPPER	0.73 J	2	0.33 J	11.5	2 U	2 U	2 U	2 U	2 U	1400/4000	7400000	1300
IRON	*2640*	1260[b]	1540[b]	119 J	99.1 J	75.4 J	197 J	72.1 J	200 U	2000/5600	58000000	11000
LEAD	0.49 J	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	4/4	ID	15
MAGNESIUM	10700	8360	10200	12500 J	11100 J	11200 J	9130 J	11300 J	10800 J	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	213[b]	130[b]	78.5[b]	4.6	1.4 J+	1 U	48.4	1 U	0.46 J	860/2500	9100000	320
NICKEL	0.29 J	0.21 J	0.27 J	1 U	1 U	1 U	1 U	1 U	1 U	100/100	74000000	300
POTASSIUM	1020	593	440 J	1540	477 J	463 J	656	453 J	408 J	NC	NC	NC
SELENIUM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.23 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	675	625	1270	1190	996	1030	738	985	918	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.5/62	970000	78
ZINC	3.7	2 U	2.4	6.5 J+	2 U	2 U	2 U	2 U	2 U	2400/5000	110000000	4700

TABLE 6
METALS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	**MW-2C-72**	**MW-2C-84**	**MW-2C-114**	**MW-3A-72**	**MW-3A-92**	**MW-3A-121**	**MW-3B-75**	**MW-3B-98**	**MW-3B-119**	**MDEQ Residential/Non-Residential Groundwater Criteria (DWC)**	**MDEQ Groundwater Contact Criteria (GCC)**	**EPA MCLs[a]**
Sample Date:	**6/17/2011**	**6/20/2011**	**6/20/2011**	**NA**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/17/2011**	**6/20/2011**			
Inroganics - Total												
ALUMINUM	4 J	4.2 J	20 U	NS	20 U	20 U	20 U	13.6 J	20 U	300/4100	64000000	16000
ANTIMONY	2 U	2 U	2 U	NS	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	1 U	8.3	1 U	NS	1 U	2.4	1 U	1 U	1 U	10/10	4300	10
BARIUM	18.4	10 U	10 U	NS	10.1 J+	10.4 J+	17.2	11.2 J+	10 U	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	84500	58800	49000	NS	51700	51600	87600	52300	52400	NC	NC	NC
CHROMIUM	0.48 J	0.32 J	2 U	NS	2 U	2 U	2 U	2 U	2 U	100/100	290000000	100
COBALT	1.9	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	40/100	2400000	4.7
COPPER	2 U	2 U	2 U	NS	2 U	2 U	2 U	2 U	2 U	1400/4000	7400000	1300
IRON	313[b]	1210[b]	200 U	NS	200 U	1450[b]	423[b]	200 U	200 U	2000/5600	58000000	11000
LEAD	1 U	0.28 J	1 U	NS	1 U	1 U	1 U	0.31 J	1 U	4/4	ID	15
MAGNESIUM	12500 J	9250 J	10500 J	NS	10100	10200	12000 J	10700 J	10800 J	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	*1710*	85.2[b]	1 U	NS	1 U	10.4	47.2	2.7 J	1 U	860/2500	9100000	320
NICKEL	3.1	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	100/100	74000000	300
POTASSIUM	2150	471 J	459 J	NS	430 J	462 J	1690	468 J	468 J	NC	NC	NC
SELENIUM	5 U	5 U	0.18 J-	NS	5 U	5 U	5 U	5 U	0.13 J-	50/50	970000	50
SILVER	1 U	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1100	885	1650	NS	958	1120	1070	863	967	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	5 U	5 U	NS	5 U	0.61 J	5 U	5 U	5 U	4.5/62	970000	78
ZINC	3.4 J+	2 J+	2 U	NS	3.5 J+	2.1 J+	2 U	4 J+	2.2 J+	2400/5000	110000000	4700

TABLE 6
METALS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Sample ID:	MW-3C-75	MW-3C-83	MW-3C-119	PZ-1	PZ-2	PZ-3	SPW-1-65	SPW-4-64	SPW-9-67	MDEQ Residential/Non-Residential Groundwater Criteria (DWC)	MDEQ Groundwater Contact Criteria (GCC)	EPA MCLs[a]
Sample Date:	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/17/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**	**6/20/2011**			
Inroganics - Total												
ALUMINUM	20 U	20 U	NS	38.6	13 J-	8.9 J	37.6	8.7 J-	3.7 J	300/4100	64000000	16000
ANTIMONY	2 U	2 U	NS	2 U	2 U	2 U	2 U	2 U	2 U	6/6	68000	6
ARSENIC	1.7	3.3	NS	5.4	5.9	1.9	1.8	3	1.3	10/10	4300	10
BARIUM	30	10 U	NS	10	10	12.6 J+	26.8	7.4 U	10 U	2000/2000	14000000	2000
BERYLLIUM	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	4/4	290000	16
CADMIUM	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	5/5	190000	5
CALCIUM	117000	56300	NS	60300	58500	70700	147000	59200 J	52500	NC	NC	NC
CHROMIUM	2 U	2 U	NS	2 U	2 U	2 U	2 U	2 U	0.72 J	100/100	290000000	100
COBALT	1.1	1 U	NS	1 U	1 U	1 U	1 U	0.23 J-	1 U	40/100	2400000	4.7
COPPER	2 U	2 U	NS	2 U	2 U	2 U	2 U	2 U	2 U	1400/4000	7400000	1300
IRON	*2280*	478[b]	NS	*3580*	1510[b]	1650[b]	1380[b]	*3580*	219	2000/5600	58000000	11000
LEAD	1 U	1 U	NS	0.36 J	0.63 J	1 U	1 U	1 U	1 U	4/4	ID	15
MAGNESIUM	14200 J	9960 J	NS	10100 J	9090	10800 J	26200	9520 J	9100 J	4.0E+05/1.1E+06	1000000000	NC
MANGANESE	317[b]	41.1	NS	153[b]	210[b]	174[b]	335	182[b]	56.6[b]	860/2500	9100000	320
NICKEL	2.4	1 U	NS	0.096 J-	0.097 J-	1.9	2.6	1 U	1 U	100/100	74000000	300
POTASSIUM	3700	459 J	NS	625	509	628	6000	848	535	NC	NC	NC
SELENIUM	5.9	5 U	NS	5 U	5 U	5 U	5 U	5 U	5 U	50/50	970000	50
SILVER	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	34/98	1500000	71
SODIUM	1990	912	NS	821	843	760	2690	1120	1460	1.2E+05/3.5E+05	1000000000	NC
THALLIUM	1 U	1 U	NS	1 U	1 U	1 U	1 U	1 U	1 U	2/2	13000	2
VANADIUM	5 U	1.3 U	NS	1.4 J	2.3 J	5 U	3.3 J	1.9 J	5 U	4.5/62	970000	78
ZINC	2.6 J+	5.6 J+	NS	6 J+	4 J+	2.4 J+	2 U	3.2 J+	2 U	2400/5000	110000000	4700

TABLE 6
METALS DATA SUMMARY SHEETS FOR EXISTING MONITORING WELLS
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

Notes:

2002 Record of Decision (ROD) criteria did not include inorganics. Therefore, no comparison to 2002 ROD criteria is presented.

All values expressed as micrograms per liter

All *italicized* values exceed MDEQ Residential Drinking Water Criteria

All **bold** values exceed MDEQ Non-Residential Drinking Water Criteria

All shaded values exceed EPA RSLs

[a] = Criteria listed are EPA noncancer health-based RSLs if no MCL listed

[b] = Concentration exceeds only MDEQ aestheic criteria (Aluminum = 50 ug/L, Iron = 300 ug/L, and Manganese = 50 ug/L)

DWC = Drinking water criteria

GCC = Groundwater contact criteria

J = The associated numerical value was an estimated quantity.

J- = The result is an estimated quantity, but the result may be biased low.

J+ = The result is an estimated quantity, but the result may be biased high.

MDEQ = Michigan Department of Environmental Quality

NA = Not applicable

NC = No criteria available

NE = Not established

NS = Not sampled - not enough water was present in the well to obtain a sample from MW-3A-72. Laboratory re-assigned duplicate sample number for MW-3C-119 and was not analyzed for inorganics.

U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 7
ORGANICS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RES01**	**RES02**	**RES03**	**RES04**	**RES05**	**RES06**	**RES07**	**RES08**	**MDEQ Residential Soil Criteria (DWPC)**	**MDEQ Residential Direct Contact Criteria (DCC)**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/22/2011**			
VOCs											
ACETONE	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	15000	23000000	2400
TOLUENE	0.15 J	0.13 J	5.7 U	5.9 U	0.14 J	1.3 J	0.37 J	0.19 J	16000	250000	690[a]
TOTAL XYLENES	5.4 U	5.4 U	5.7 U	5.9 U	5.4 U	5.3 U	5.6 U	5.7 U	5600	150000	9800[a]
SVOCs											
2,4-DIMETHYPHENOL	190 U	9.4 J	190 U	190 U	1800 U	180 U	180 U	180 U	7400	11000000	320
2-METHYLNAPHTHALENE	8.5 J	180 U	190 U	190 U	1800 U	11 J	180 U	180 U	57000	8100000	140
4-CHLORO-3-METHYLPHENOL	190 U	180 U	190 U	190 U	1800 U	180 U	180 U	180 U	5800	4500000	1300
4-METHYLPHENOL	190 U	35 J	190 U	190 U	1800 U	5.6 J	180 U	180 U	7400	11000000	57
ACENAPHTHENE	190 U	180 U	190 U	190 U	1800 U	180 U	180 U	180 U	300000	41000000	4100
ACENAPHTHYLENE	11 J	8.9 J	190 U	190 U	1800 U	59 J	180 U	180 U	5900	1600000	NC
ANTHRACENE	9.7 J	10 J	190 U	190 U	1800 U	58 J	180 U	180 U	41000	230000000	42000
BENZALDEHYDE	11 J	180 U	190 U	6.4 J	1800 U	12 J	7 J	6.9 J	NC	NC	330
BENZO(A)ANTHRACENE	*65 J*	*65 J*	*45 J*	*12 J*	1800 U	*540*	*30 J*	*39 J*	NLL	20000	10
BENZO(A)PYRENE	*59 J*	*61 J*	190 U	*11 J*	1800 U	900 U	*27 J*	*46 J*	NLL	2000	3.5
BENZO(B)FLUORANTHEHE	*98 J*	*96 J*	*72 J*	18 J	1800 U	*780*	*40 J*	*75 J*	NLL	20000	35
BENZO(G,H,I)PERYLENE	40 J	37 J	190 U	8.2 J	1800 U	900 UJ	17 J	36 J	NLL	2500000	NC
BENZO(K)FLUORANTHENE	30 J	33 J	17 J	8.1 J	1800 U	190 J	15 J	22 J	NLL	2000000	350
BIS(2-ETHYLHEXYL)PHTHALATE	950 U	26 J	900 U	950 U	1800 U	900 U	900 U	900 U	NLL	2800000	1400[a]
BUTYLBENZYLPHTHALATE	190 U	180 U	190 U	13 J	1800 U	180 U	6.5 J	180 U	310000	310000	200
CAPROLACTAM	190 U	180 U	190 U	190 U	1800 U	180 U	180 U	180 U	120000	53000000	1900
CARBAZOLE	6.1 J	180 U	190 U	190 U	1800 U	70 J	180 U	180 U	9400	530000	NC
CHRYSENE	69 J	79 J	43 J	10 J	1800 U	480	30 J	52 J	NLL	2000000	1100
DIBENZO(A,H)ANTHRACENE	*15 J*	*12 J*	190 U	190 U	1800 U	180 U	180 U	10 J	NLL	2000	11
DIBENZOFURAN	190 U	180 U	190 U	190 U	1800 U	5.7 J	180 U	180 U	ID	ID	110
DI-N-BUTYL PHTHALATE	190 U	180 U	190 U	190 U	1800 U	180 U	180 U	180 U	760000	760000	1700
DI-N-OCTYLPHTHALATE	190 U	180 U	190 U	46 J	1800 U	180 U	180 U	180 U	100000000	6900000	NC
FLUORANTHENE	120 J	130 J	83 J	22 J	1800 U	1100	50 J	95 J	730000	46000000	70000
FLUORENE	190 U	180 U	190 U	190 U	1800 U	8.9 J	180 U	180 U	390000	27000000	4000
INDENO(1,2,3-CD)PYRENE	56 J	51 J	190 U	9.7 J	1800 U	900 U	24 J	47 J	NLL	20000	120
NAPHTHALENE	*13 J*	*6.4 J*	190 U	190 U	1800 U	*14 J*	180 U	180 U	35000	16000000	0.47
PHENANTHRENE	45 J	29 J	21 J	9.4 J	1800 U	280	18 J	30 J	56000	1600000	NC
PHENOL	190 U	180 U	190 U	190 U	1800 U	6.6 J	180 U	180 U	88000	12000000	2600
PYRENE	110 J	130 J	66 J	19 J	1800 U	770	53 J	82 J	480000	29000000	9500

TABLE 7
ORGANICS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	RES09	RES10	RES11	RES12	RES13	RES14	RES15	RES16	MDEQ Residential Soil Criteria (DWPC)	MDEQ Residential Direct Contact Criteria	EPA RSLs - Groundwater Protection
Sample Date:	**6/23/2011**	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**			
VOCs											
ACETONE	11 U	11 U	5.8 J	11 U	10 U	11 U	11 U	4.1 J	15000	23000000	2400
TOLUENE	5.3 U	0.2 J	4.1 J	5.6 U	5.2 U	0.34 J	5.3 U	5.4 U	16000	250000	690[a]
TOTAL XYLENES	5.3 U	5.5 U	0.33 J	5.6 U	5.2 U	5.5 U	5.3 U	5.4 U	5600	150000	9800[a]
SVOCs											
2,4-DIMETHYPHENOL	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	7400	11000000	320
2-METHYLNAPHTHALENE	8 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	57000	8100000	140
4-CHLORO-3-METHYLPHENOL	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	5800	4500000	1300
4-METHYLPHENOL	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	7400	11000000	57
ACENAPHTHENE	6 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	300000	41000000	4100
ACENAPHTHYLENE	41 J	180 U	180 U	180 U	180 U	180 U	180 U	5.7 J	5900	1600000	NC
ANTHRACENE	71 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	41000	230000000	42000
BENZALDEHYDE	11 J	5.6 J	6.1 J	6.5 J	5.6 J	180 U	8.1 J	12 J	NC	NC	330
BENZO(A)ANTHRACENE	*450*	*37 J*	*19 J*	*16 J*	*31 J*	180 UJ	*14 J*	180 U	NLL	20000	10
BENZO(A)PYRENE	*440*	*41 J*	*19 J*	180 U	*33 J*	180 UJ	*14 J*	180 U	NLL	2000	3.5
BENZO(B)FLUORANTHEHE	*750*	*63 J*	30 J	27 J	*48 J*	180 UJ	20 J	180 U	NLL	20000	35
BENZO(G,H,I)PERYLENE	330	30 J	12 J	180 UJ	23 J	180 UJ	8 J	12 J	NLL	2500000	NC
BENZO(K)FLUORANTHENE	210	21 J	9.6 J	6.4 J	16 J	180 UJ	7.1 J	180 U	NLL	2000000	350
BIS(2-ETHYLHEXYL)PHTHALATE	20 J	900 U	900 U	900 U	900 U	180 U	19 J	900 U	NLL	2800000	1400[a]
BUTYLBENZYLPHTHALATE	180 U	180 U	7 J	180 U	180 U	180 U	7.7 J	180 U	310000	310000	200
CAPROLACTAM	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	120000	53000000	1900
CARBAZOLE	50 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	9400	530000	NC
CHRYSENE	540	43 J	21 J	17 J	34 J	180 UJ	12 J	180 U	NLL	2000000	1100
DIBENZO(A,H)ANTHRACENE	*100 J*	8.7 J	180 U	180 U	6.7 J	180 U	180 U	180 U	NLL	2000	11
DIBENZOFURAN	6.9 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	ID	ID	110
DI-N-BUTYL PHTHALATE	12 J	180 U	180 U	180 U	180 U	180 U	5.6 J	180 U	760000	760000	1700
DI-N-OCTYLPHTHALATE	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	100000000	6900000	NC
FLUORANTHENE	970	78 J	35 J	29 J	63 J	9.2 J	23 J	66 J	730000	46000000	70000
FLUORENE	14 J	180 U	180 U	180 U	180 U	180 U	180 U	180 U	390000	27000000	4000
INDENO(1,2,3-CD)PYRENE	*430*	38 J	18 J	180 U	29 J	180 UJ	13 J	24 J	NLL	20000	120
NAPHTHALENE	180 U	180 U	180 U	180 U	180 U	180 U	*5.7 J*	*7.9 J*	35000	16000000	0.47
PHENANTHRENE	320	31 J	10 J	9.8 J	30 J	180 U	9 J	49 J	56000	1600000	NC
PHENOL	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	88000	12000000	2600
PYRENE	850	68 J	30 J	24 J	55 J	8.4 J	21 J	52 J	480000	29000000	9500

TABLE 7
ORGANICS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RES17**	**RES18**	**RES19**	**RES20**	**RES21**	**MDEQ Residential Soil Criteria (DWPC)**	**MDEQ Residential Direct Contact Criteria**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**			
VOCs								
ACETONE	6.4 J	13 U	11 U	13 U	3.1 J	15000	23000000	2400
TOLUENE	0.2 J	0.72 J	5.4 U	0.21 J	0.53 J	16000	250000	690[a]
TOTAL XYLENES	5.4 U	6.5 U	5.4 U	6.3 U	5.4 U	5600	150000	9800[a]
SVOCs								
2,4-DIMETHYPHENOL	190 U	200 U	180 U	190 U	180 U	7400	11000000	320
2-METHYLNAPHTHALENE	190 U	200 U	180 U	190 U	180 U	57000	8100000	140
4-CHLORO-3-METHYLPHENOL	190 U	5.9 J	180 U	190 U	180 U	5800	4500000	1300
4-METHYLPHENOL	190 U	200 U	180 U	190 U	180 U	7400	11000000	57
ACENAPHTHENE	190 U	7.2 J	180 U	190 U	180 U	300000	41000000	4100
ACENAPHTHYLENE	190 U	200 U	7 J	190 U	180 U	5900	1600000	NC
ANTHRACENE	190 U	200 U	5.7 J	190 U	180 U	41000	230000000	42000
BENZALDEHYDE	190 U	200 U	180 U	8.3 J	10 J	NC	NC	330
BENZO(A)ANTHRACENE	*13 J*	8.8 J	*31 J*	7.1 J	6.3 J	NLL	20000	10
BENZO(A)PYRENE	*12 J*	*8 J*	*29 J*	*8.3 J*	180 U	NLL	2000	3.5
BENZO(B)FLUORANTHEHE	18 J	13 J	180 U	11 U	7.4 J	NLL	20000	35
BENZO(G,H,I)PERYLENE	6.8 J	8.5 J	14 J	190 U	180 UJ	NLL	2500000	NC
BENZO(K)FLUORANTHENE	6.9 J	200 UJ	18 J	190 U	180 UJ	NLL	2000000	350
BIS(2-ETHYLHEXYL)PHTHALATE	950 U	1000 U	20 J	950 U	900 U	NLL	2800000	1400[a]
BUTYLBENZYLPHTHALATE	190 U	200 U	180 U	12 J	180 U	310000	310000	200
CAPROLACTAM	190 U	13 J	180 U	22 J	180 U	120000	53000000	1900
CARBAZOLE	190 U	200 U	6 J	190 U	180 U	9400	530000	NC
CHRYSENE	10 J	8.5 J	33 J	6.2 J	180 UJ	NLL	2000000	1100
DIBENZO(A,H)ANTHRACENE	190 U	200 U	180 U	190 U	180 U	NLL	2000	11
DIBENZOFURAN	190 U	200 U	180 U	190 U	180 U	ID	ID	110
DI-N-BUTYL PHTHALATE	190 U	200 U	6.7 J	190 U	180 U	760000	760000	1700
DI-N-OCTYLPHTHALATE	190 U	200 U	180 U	190 U	180 U	100000000	6900000	NC
FLUORANTHENE	19 J	18 J	74 J	13 J	12 J	730000	46000000	70000
FLUORENE	190 U	200 U	6.3 J	190 U	180 U	390000	27000000	4000
INDENO(1,2,3-CD)PYRENE	9.7 J	200 U	22 J	190 U	180 U	NLL	20000	120
NAPHTHALENE	190 U	200 U	180 U	190 U	*6 J*	35000	16000000	0.47
PHENANTHRENE	7.6 J	7.8 J	62 J	6.3 J	5.7 J	56000	1600000	NC
PHENOL	190 U	11 J	180 U	190 U	180 U	88000	12000000	2600
PYRENE	19 J	21 J	56 J	12 J	9.5 J	480000	29000000	9500

TABLE 7
ORGANICS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Notes:

All values expressed as milligrams per kilogram

All *italicized* values indicate the analyte was detected at a concentration that exceeds EPA RSLs

All **bold** values indicate the analyte was detected at a concentration that exceeds MDEQ Residential Soil Criteria

[a] = RSL is based on MCL. All other RSLs are risk-based.

DWPC = Drinking water protection criteria

EPA = U.S. Environmental Protection Agency

ID = Insufficient data to develop criteria

J = The associated numerical value was an estimated quantity.

MCL = Maximum Contaminant Level

MDEQ = Michigan Department of Environmental Quality

NC = No criteria available

RSL = Regional Screening Level

SVOC = Semivolatile organic compound

U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

VOC = Volatile organic compound

TABLE 8
METALS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RES01**	**RES02**	**RES03**	**RES04**	**RES05**	**RES06**	**RES07**	**RES08**	**MDEQ Residential Soil Criteria (DWPC)**	**Statewide Default Background Level**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/22/2011**			
Inroganics											
ALUMINUM	**3410**	**3080**	**3370**	**2410**	**3460**	**2740**	**2680**	**3120**	1	6900	23000
ANTIMONY	6.6 UJ	4.7 UJ	4.6 UJ	4.7 UJ	4.8 UJ	4.9 UJ	5.2 UJ	6.2 UJ	4.3	NE	0.27[a]
ARSENIC	*4.2 J*	*2.4 J*	*4.2 J*	*3 J*	*4.1 J*	*2.9*	*2.5 J*	*4.2 J*	4.6	5.8	0.29[a]
BARIUM	30.9	58.6	38.9	28.4	24.1	55.6	29.6	20.7	1300	75	82[a]
BERYLLIUM	0.55 U	0.39 U	0.38 U	0.39 U	0.4 U	0.41 U	0.43 U	0.51 U	51	NE	3.2[a]
CADMIUM	0.096 J-	0.043 J-	0.084 J-	0.038 J-	0.4 U	0.11 J	0.042 J-	0.51 U	6	1.2	0.38[a]
CALCIUM	1740 J	1750 J	1530 J	922 J	1250 J	3370 J	714 J	1230 J	NC	NE	NC
CHROMIUM	5.8	4	4.2	3.2	4.1	5.7	3.6	4.6	30	18	180000[a]
COBALT	***1.5 J***	***0.84 J***	***0.99 J***	*0.58 J*	***0.88 J***	***1.6 J***	*0.72 J*	***0.8 J***	0.8	6.8	0.21
COPPER	8.6	4.7	4.4	3.7	2.7	8.6	25.8	6.8	5800	32	46[a]
IRON	***6990***	***4760***	***4640***	***3950***	***4830***	***12500***	***4330***	***5450***	6	12000	270
LEAD	*18.3*	9.5	12.6	6.6	7.6	*77.2*	10.1	8.9	700	21	14[a]
MAGNESIUM	609	481	543	362 J	511	698	335 J	404 J	8000	NE	NC
MANGANESE	***238***	***288***	***328***	***227***	***181***	***327***	***239***	***174***	1	440	21
NICKEL	4.2 J	2.4 J	3.1 U	1.6 J	2.1 J	3.7	1.7 J	2.1 J	100	20	20
POTASSIUM	549 U	392 U	383 U	393 U	399 U	410 U	430 U	513 U	NC	NE	NC
SELENIUM	3.8 U	2.7 U	2.7 U	2.8 U	2.8 U	2.9 U	3.1 U	3.6 U	4	NE	0.26[a]
SILVER	1.1 U	0.78 U	0.77 U	0.79 U	0.81 U	0.82 U	0.86 U	1.1 U	4.5	1	0.6
SODIUM	549 U	392 U	383 U	393 U	399 U	410 U	430 U	513 U	2500	NE	NC
THALLIUM	2.7 U	2 U	1.9 U	2 U	2 U	2 U	2.1 U	2.6 U	2.3	NE	0.14[a]
VANADIUM	14.3	9	8.9	7.3	9.6	8.7	8.2	14.3	72	NE	78
ZINC	66	22.9	32.7	16.8	18.9	103	20.8	27.4	2400	47	290

TABLE 8
METALS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RES09**	**RES10**	**RES11**	**RES12**	**RES13**	**RES14**	**RES15**	**RES16**	**MDEQ Residential Soil Criteria (DWPC)**	**Statewide Default Background Level**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/23/2011**	**6/22/2011**	**6/22/2011**	**6/23/2011**	**6/22/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**			
Inroganics											
ALUMINUM	**3440**	**2630**	**2270**	**2160**	**2320**	**2630**	**2420**	**2260**	1	6900	23000
ANTIMONY	5.6 UJ	5.6 UJ	5.3 UJ	4.4 UJ	4.5 UJ	5.5 UJ	5.1 UJ	4.7 UJ	4.3	NE	0.27[a]
ARSENIC	***4.9***	*3.5 J*	*2.3 J+*	*1.5*	***6.1 J***	*2*	*1.5*	*5.4*	4.6	5.8	0.29[a]
BARIUM	77.7	25.8	25.2	24.8	21.1	21.6	24.4	18.9	1300	75	82[a]
BERYLLIUM	0.47 U	0.47 U	0.44 U	0.37 U	0.38 U	0.46 U	0.43 U	0.4 U	51	NE	3.2[a]
CADMIUM	0.24 J	0.031 J-	0.039 J-	0.065 J-	0.041 J-	0.015 J-	0.058 J-	0.018 J-	6	1.2	0.38[a]
CALCIUM	1730 J	1230 J	1390 J	1280 J	1440 J	715 J	730 J	798 J	NC	NE	NC
CHROMIUM	5.6	3.9	3.9	3.3	3.4	3.5	3.3	3.4	30	18	180000[a]
COBALT	***1.2 J***	*0.62 J*	*0.65 J*	*0.61 J*	*0.56 J*	*0.78 J*	***0.89 J***	*0.71 J*	0.8	6.8	0.21
COPPER	11.8	7.6	11.5	10	6.9	5.8	4.5	4.1	5800	32	46[a]
IRON	***5360***	***4030***	***4510***	***3710***	***3930***	***4650***	***3920***	***4210***	6	12000	270
LEAD	*41.7*	8.3	9.2	*19.5*	7.9	8.2	9.3	5.9	700	21	14[a]
MAGNESIUM	543	373 J	335 J	370 U	687	458 U	429 U	396 U	8000	NE	NC
MANGANESE	***326***	***193***	***206***	***140***	***148***	***183***	***207***	***130***	1	440	21
NICKEL	3.8 U	1.6 J	1.7 J	3 U	1.4 J	3.7 U	3.4 U	3.2 U	100	20	20
POTASSIUM	470 U	467 U	440 U	370 U	375 U	458 U	429 U	396 U	NC	NE	NC
SELENIUM	3.3 U	3.3 U	3.1 U	2.6 U	2.6 U	3.2 U	3 U	2.8 U	4	NE	0.26[a]
SILVER	0.94 U	0.93 U	0.88 U	0.74 U	0.75 U	0.92 U	0.86 U	0.79 U	4.5	1	0.6
SODIUM	470 U	467 U	440 U	370 U	375 U	458 U	429 U	396 U	2500	NE	NC
THALLIUM	2.4 U	*0.2 J-*	*0.24 J-*	1.8 U	1.9 U	2.3 U	2.1 U	2 U	2.3	NE	0.14[a]
VANADIUM	10.3	7.7	9.4	7.2	7.9	9.5	7.6	8.5	72	NE	78
ZINC	97.3	23.6	26.4	38.3	15.5	16.9	42.8	15.1	2400	47	290

TABLE 8
METALS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RES17**	**RES18**	**RES19**	**RES20**	**RES21**	**MDEQ Residential Soil Criteria (DWPC)**	**Statewide Default Background Level**	**EPA RSLs - Groundwater Protection**
Sample Date:	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**	**6/23/2011**			
Inroganics								
ALUMINUM	**2280**	**2290**	**3590**	**2900**	**2420**	1	6900	23000
ANTIMONY	5.5 UJ	6.1 UJ	5.3 UJ	6.1 UJ	5.6 UJ	4.3	NE	0.27[a]
ARSENIC	*1.6*	*2.1*	*2.9*	*1.9*	*2*	4.6	5.8	0.29[a]
BARIUM	19.8	18.8	21.6	19.3 J	19.5	1300	75	82[a]
BERYLLIUM	0.46 U	0.51 U	0.44 U	0.51 U	0.46 U	51	NE	3.2[a]
CADMIUM	0.46 U	0.51 U	0.44 U	0.51 U	0.017 J-	6	1.2	0.38[a]
CALCIUM METAL	722 J	1050 J	905 J	1220 J	870 J	NC	NE	NC
CHROMIUM	3.1	3.1	4.4	3.7	3.3	30	18	180000[a]
COBALT	*0.66 J*	5.1 U	***1.1 J***	***0.8 J***	*0.67 J*	0.8	6.8	0.21
COPPER	2.3 U	4.3	3.6	2.6 U	2.3 U	5800	32	46[a]
IRON	***4190***	***3670***	***5310***	***4540***	***4050***	6	12000	270
LEAD	5.8	5.6	6.5	6.6	6.1	700	21	14[a]
MAGNESIUM	462 U	506 U	507	537	463 U	8000	NE	NC
MANGANESE	***178***	***128***	***160***	***161***	***147***	1	440	21
NICKEL	3.7 U	4 U	3.5 U	4.1 U	3.7 U	100	20	20
POTASSIUM	462 U	506 U	438 U	510 U	463 U	NC	NE	NC
SELENIUM	3.2 U	3.5 U	3.1 U	3.6 U	*0.64 J*	4	NE	0.26[a]
SILVER	0.92 U	1 U	0.88 U	1 U	0.93 U	4.5	1	0.6
SODIUM	462 U	506 U	438 U	510 U	463 U	2500	NE	NC
THALLIUM	2.3 U	2.5 U	2.2 U	2.6 U	2.3 U	2.3	NE	0.14[a]
VANADIUM	8.2	7.6	9.8	9.1	8.2	72	NE	78
ZINC	13.8	13.2	17.1	16.3	13.9	2400	47	290

TABLE 8
METALS DATA SUMMARY SHEETS FOR SURFACE SOIL SAMPLES
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Notes:

All values expressed as milligrams per kilogram

All *italicized* values indicate the analyte was detected at a concentration that exceeds EPA RSLs

All **bold** values indicate the analyte was detected at a concentration that exceeds MDEQ Residential Soil Criteria

All shaded values indicate the analyte was detected at a concentration that exceeds MDEQ Residential Soil Criteria and statewide background default level

[a] = RSL is based on MCL. All other RSLs are risk-based.

DWPC = Drinking water protection criteria

EPA = U.S. Environmental Protection Agency

J- = The result is an estimated quantity, but the result may be biased low.

J+ = The result is an estimated quantity, but the result may be biased high.

MDEQ = Michigan Department of Environmental Quality

NC = No criteria available

NLL = Not likely to leach

NE = Not established

RSL = Regional Screening Level

U = The analyte was analyzed for, but not detected above the reported detection limit.

UJ = The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

TABLE 9
DATA SUMMARY SHEET FOR GROUNDWATER SAMPLE
3.48-ACRE RESIDENTIAL AREA
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Sample ID:	**RW01**	**MDEQ Residential Drinking**
Sample Date:	**6/23/2011**	**Water Criteria**
ALUMINUM	20 U	50
ANTIMONY	2 U	6
ARSENIC	1 U	10
BARIUM	10 U	2000
BERYLLIUM	1 U	4
CADMIUM	1 U	5
CALCIUM	57200	NC
CHROMIUM	2 U	100
COBALT	1 U	40
COPPER	4.2	1000
IRON	200 U	300
LEAD	0.39 J	4
MAGNESIUM	12300 J	400000
MANGANESE	1 U	50
NICKEL	1 U	100
POTASSIUM	547	NC
SELENIUM	5 U	50
SILVER	1 U	34
SODIUM	3930	120000
THALLIUM	1 U	2
VANADIUM	5 U	4.5
ZINC	17.9	2400

Notes:

All values expressed as micrograms per liter

J = The associated numerical value was an estimated quantity.
MDEQ = Michigan Department of Environmental Quality
NC = No criteria available
U = The analyte was analyzed for, but not detected above the reported detection limit. The associated numerical value is the sample quantitation limit.

TABLE 10
ORGANICS FIELD DUPLICATE DATA SUMMARY SHEETS - SOIL
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

ANALYTE	TL-RES16	TL-RES16D	RPD	TL-SB05-1416	TL-SB05-1416D	RPD	TL-SB16-5254	TL-SB16-5254D	RPD	TL-RES07	TL-RES07D	RPD	TL-RES15	TL-RES15D	RPD	TL-RES21	TL-RES21D	RPD
Organics																		
VOCs																		
ACETONE	4.1	2.7	41	9.4	9.4	0										---	3.1	**200**
BENZENE							3	2.7	11									
ETHYLBENZENE							16	10	46									
ISOPROPYLBENZENE				1.6	0.35	**130**	1.5	0.99	41									
METHYLENE CHLORIDE				---	0.75	**200**												
STYRENE							0.85	---	**200**									
TOLUENE	---	1.5	**200**							0.37	---	**200**				0.53	---	**200**
M,P-XYLENES							15	7.4	68									
O-XYLENES							16	8.3	58									
SVOCs																		
1,1"-BIPHENYL				13	---	**200**	150	75	67									
2,4-DIMETHYPHENOL				35	---	**200**	480	240	67									
2-METHYLNAPHTHALENE				19	---	**200**	550	250	**75**									
2-METHYLPHENOL							30	20	40									
4-METHYLPHENOL				13	---	**200**	200	95	**71**									
ACENAPHTHENE							60	30	67									
ACENAPHTHYLENE	---	5.7	**200**				24	14	53									
ANTHRACENE	---	5.8	**200**				63	27	**80**									
BENZALDEHYDE	---	12	**200**				19	---	**200**	5.9	7	17				8.6	10	15
BENZO(A)ANTHRACENE							19	13	38	30	22	31	14	11	24	---	6.3	**200**
BENZO(A)PYRENE										27	21	25	14	---	**200**			
BENZO(B)FLUORANTHEHE										40	33	19	20	18	11	9.5	7.4	25
BENZO(G,H,I)PERYLENE	---	12	**200**							17	14	19	8	---	**200**			
BENZO(K)FLUORANTHENE										15	11	31	7.1	6.1	15			
BIS(2-ETHYLHEXYL)PHTHALATE										6.5	---	**200**	19	---	**200**			
BUTYLBENZYLPHTHALATE													7.7	---	**200**			
CARBAZOLE							17	8.4	68									
CHRYSENE							17	7.9	**73**	30	24	22	12	11	9			
DIBENZOFURAN				23	12	63	240	110	**74**									
DI-N-BUTYL PHTHALATE													5.6	N	**200**			
2,6-DINITROTOLUENE				26	---	**200**												
FLUORANTHENE	36	66	59				59	26	**78**	50	40	22	23	21	18	12	9.2	
FLUORENE				28	16	55	200	96	70									
INDENO(1,2,3-CD)PYRENE	---	24	**200**							24	17	34	13	N	**200**			
NAPHTHALENE	---	7.9	**200**	28	---	**200**	510	250	68				---	5.7	**200**	---	6	**200**
PHENANTHRENE	20	49	**84**	20	9.6	70	280	120	**80**	18	15	18	---	8.6	**200**	5.7	5.5	
PHENOL							14	---	**200**									
PYRENE	30	52	54				64	28	**78**	53	37	36	21	16	27	9.5	8.2	

Notes:

All **bold** values exceed QC criteria

TABLE 11
METALS FIELD DUPLICATE DATA SUMMARY SHEETS - SOIL
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

ANALYTE	TL-RES16	TL-RES16D	RPD	TL-SB05-1416	TL-SB05-1416D	RPD	TL-SB16-5254	TL-SB16-5254D	RPD	TL-RES07	TL-RES07D	RPD	TL-RES15	TL-RES15D	RPD	TL-RES21	TL-RES21D	RPD
Inorganics																		
ALUMINUM	2260	2220	2	1070	558	63	616	825	29	2680	2480	8	2420	2310	5	2420	2240	8
ARSENIC	5.1	5.4	6	0.72	0.52	32		0.91	**200**	2.5	2.4	5	1.5	1.5	0	2	1.6	23
BARIUM	18.9	17.9	6				2.1	3	35	29.6	29.2	2	24.4	22.4	9	19.5	18.2	7
BERYLLIUM																		
CADMIUM	0.018	---	**200**							0.042	0.027	44	0.058	0.047	21	0.013	0.017	27
CALCIUM	798	704	13	2190	6070	**94**	5050	11200	**76**	714	684	5	730	723	1	870	773	12
CHROMIUM	3.4	3.1	10	2.9	1.4	70	1.9	1.9	0	3.6	3.2	12	3.3	3.2	4	3.3	2.9	13
COBALT	0.71		**200**							0.72	---	**200**	0.89	0.66	30	0.67	---	**200**
COPPER	4.1	3.5	16							6.5	25.8	**120**	4.5	4.3	5			
IRON	4210	4020	5	2030	1120	58	1410	1640	15	4330	4060	7	3920	3900	1	4050	3680	10
LEAD	5.9	5.7	4	1.1	0.66	50	0.78	0.74	5	10.1	10	1	9.3	8.5	9	6.1	5.5	11
MAGNESIUM				898	1210	30	1100	2210	67	335	301	11						
MANGANESE	128	130	2	18.9	12.9	38	15.8	20.5	26	235	239	2	207	171	20	147	132	11
NICKEL				2.2	1.3	51	1.4	1.7	19	1.7	1.5	13						
SELENIUM																0.64	---	**200**
THALLIUM				---	0.24	**200**	---	0.28	**200**									
VANADIUM	8.5	7.9	8	3.5	2.1	50				8.2	7.6	8	7.5	7.6	2	8.2	7	16
ZINC	15.1	14	8	5.2	4	26	5.3	6.3	17	19.7	20.8	6	42.3	42.8	2	13.9	12.7	10

Notes:

All **bold** values exceed QC criteria

TABLE 12
ORGANICS FIELD DUPLICATE DATA SUMMARY SHEETS - GROUNDWATER
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

ANALYTE	TL-VAS05	TL-VAS05D	RPD	TL-MW-3A-92	TL-MW-3A92D	RPD	TL-PZ-1	TL-PZ-1D	RPD	TL-MW-1A	TL-MW-1AD	RPD	TL-MW-3A-121	TL-MW-3A-121D	RPD
Organics															
VOCs															
ETHYLBENZENE	4.1	4.4	7												
ISOPROPYLBENZENE	1.1	1.1	0												
M,P-XYLENES	1.3	1.6	21												
O-XYLENES	1.9	2.2	15												
SVOCs															
1,1"-BIPHENYL	0.65	0.66	2												
2,4-DIMETHYPHENOL	1.6	1.3	21												
2-METHYLNAPHTHALENE	0.17	0.17	0												
2-METHYLPHENOL	0.74	0.47	45												
4-METHYLPHENOL	1.7	1.3	27												
ACENAPHTHENE	0.34	0.33	3												
BIS(2-ETHYLHEXYL)PHTHALATE	0.29	0.31	7	---	0.2	**200**				0.4	0.6	40			
DIBENZOFURAN	0.86	0.83	4												
FLUORENE	0.73	0.67	9				---	0.15	**200**						
NAPHTHALENE	0.56	0.55	2							---	0.19	**200**			
PHENANTHRENE	0.24	0.22	9												

Notes:

All **bold** values exceed QC criteria

TABLE 13
METALS FIELD DUPLICATE DATA SUMMARY SHEETS - GROUNDWATER
JUNE 2011
TAR LAKE
MANCELONA, MICHIGAN

ANALYTE	TL-VAS05	TL-VAS05D	RPD	TL-VAS05[F]	TL-VAS05D[F]	RPD	TL-MW-1A	TL-MW-1AD	RPD	TL-MW-3A-92	TL-MW-3A92D	RPD	TL-MW-3A-121	TL-MW-3A-121D	RPD
Inorganics															
ALUMINUM	290	301	4	73.4	75.7	4									
ARSENIC	6	6.1	2	4.8	5.2	8	10.8	10.3	5				1.4	2.4	**53**
BARIUM	26.3	25.7	3	24.4	25.8	6					10.1	**200**	10.4		**200**
CALCIUM	128000	130000	2	128000	132000	4	64100	63200	2	51700	51300	1	51600	51200	1
CHROMIUM	2.1	2.3	10	1.4	1.6	14									
COBALT	1.8	1.9	6	1.7	1.8	6	0.19	0.2	6						
COPPER	7.1	7.9	11												
IRON	3310	3380	3	3050	3140	3	2040	1820	12				689	1450	**72**
LEAD	1.4	1.5	7												
MAGNESIUM	35800	36400	2	35700	36700	3	10200	10100	1	10100	10000	1	10200	10200	0
MANGANESE	133	136	3	131	135	4	84.5	81.9	4				6.3	10.4	50
NICKEL	3.4	3.4	0	2.6	2.7	4									
POTASSIUM	5450	5600	3	5500	5640	3	538	563	5	430	424	2	462	455	2
SODIUM	1640	1680	3	1680	1710	2	1020	1010	1	958	953	1	1120	1120	0
VANADIUM	5.1	5.5	8					2.9	**200**					0.61	**200**
ZINC	4.5	5.7	24	2.9	2	37	3.1		**200**	3.5	3	16		2.1	**200**

Notes:

All **bold** values exceed QC criteria

TABLE 14
VERTICAL HYDRAULIC GRADIENT COMPARISON
EXISTING GROUNDWATER MONITORING WELLS
2009-2011
TAR LAKE, MANCELONA, MICHIGAN

	Depth to Water (feet)	Vertical Gradient			Depth to Water (feet)	Vertical Gradient		
Monitoring Well	2009	Shallow/Intermediate	Shallow/Deep	Intermediate/Deep	2011	Shallow/Intermediate	Shallow/Deep	Intermediate/Deep
MW1A-S	50.75	0.04818↓	0.01294↓	0 (no gradient)	51.68	0.06↓	0.01514↓	0.001336↑
MW1A-I	51.28				52.34			
MW1A-D	51.33				52.35			
MW1B-S	39.85	0.0008337↓	0.003891↓	0.01001↓	41.83	0.04085↑	0.02585↑	0.00417↓
MW1B-I	39.88				40.86			
MW1B-D	40.01				40.92			
MW1C-S	42.78	0.003456↓	0.004471↓	0.005299↓	43.78	0.002364↓	0.003632↓	0.004769↓
MW1C-I	42.92				43.9			
MW1C-D	43.15				44.12			
MW2A-S	54.13	0.02355↓	0.02336↓	0.0231↓	55.19	0.02355↓	0.02336↓	0.0231↓
MW2A-I	54.84				55.9			
MW2A-D	55.23				56.29			
MW2B-S	55.2	0.038↓	0.03863↓	0.03968↓	56.18	0.04434↓	0.0398↓	0.03224↓
MW2B-I	56.38				57.53			
MW2B-D	56.89				57.92			
MW2C-S	63.48	0.005025↓	0.04059↓	0.05478↓	64.28	0.01926↓	0.04489↓	0.05511↓
MW2C-I	63.6				64.57			
MW2C-D	65.3				66.28			
MW3A-S	66.45	0.01254↓	0.01492↓	0.01655↓	67.46	0.01573↓	0.01704↓	0.01793↓
MW3A-I	66.76				67.83			
MW3A-D	67.24				68.35			
MW3B-S	68.31	0.03226↓	0.03052↓	0.02863↓	69.36	0.03051↓	0.02916↓	0.02767↓
MW3B-I	69.11				70.12			
MW3B-D	69.75				70.74			
MW3C-S	67.96	0.1675↓	0.03956↓	0.01112↓	68.92	0.1737↓	0.04002↓	0.01028↓
MW3C-I	69.3				70.31			
MW3C-D	69.72				70.7			
BG-1-40	35.29	0.1076↓	0.06613↓	0.007649↓	35.83	0.134↓	0.06978↓	0.02013↑
BG-1-72	35.87				37.3			
BG-1-97	36.22				36.96			

Notes:

Shaded values indicate upward gradient

↑ = upward gradient

↓ = downward gradient

TABLE 15
SOIL BORING OBSERVATION SUMMARY
JUNE 2011
TAR LAKE, MANCELONA, MICHIGAN

Soil Boring ID	Total Depth (ft bgs)	Water Table Depth (ft bgs)	Bottom Elevation (ft amsl)	Visual Observation	Olfactory Observation	Other
SB01	30	8	1026.4	Tar present between 9.5 and 25 ft bgs	Wood tar odor begins at 6 ft bgs and is present throughout bo	FID/PID from 20-22 sample = 1600/100
SB02	20	8	1039.3	Minimal staining begins at 4 ft bgs, furnace glass present at surfa	None	FID/PID from 12-14 sample = 1900/10
SB03	20	9	1042.1	Stain present between 6 and 7 ft bgs, furnace glass present from surface to 6 ft bgs	Wood tar odor begins at 6 ft bgs and is present throughout bo	FID/PID from 8-10 sample = 600/65
SB04	20	9	1039.6	Black silty clay with heavy odor present between 7 and 7.5 ft bgs, furnace glass between 1.5 and 6 ft bgs	Wood tar odor present between 7 and 8 ft bgs	FID/PID from 14-16 sample = 580/2
SB05	20	12	1044.2	Furnace glass present between 4 and 6 ft bgs	None	FID/PID from 14-16 sample = 2/0
SB06	20	14	1041.1	None	None	FID/PID from 14-16 sample = 3500/3
SB07	20	12	1039	Furnace glass present between 2 and 4 ft bgs	None	FID/PID from 16-18 sample = 4300/4
SB08	28	23	1044.2	Furnace glass present between 0 and 2 ft bgs	None	FID/PID from 0-2 sample = 0/160
SB09	30	24	1042.3	None	None	FID/PID from 4-6 sample = 1/0
SB10	32	26	1049.6	None	None	FID/PID from 10-12 sample = 0.5/0.5
SB11	36	32	1051.4	None	None	FID/PID from 8-10 sample = 0.2/0.2
SB12	34	27	1046.3	Possible staining present at 31.5 ft bgs	None	FID/PID from 30-32 sample = 12/0
SB13	34	28	1046.7	None	None	FID/PID from 28-30 sample = 2/0
SB14	54	40	1039.1	Black sand present between 40 and 46 ft bgs, furnace glass between 3 and 4.5 ft bgs	None	FID/PID from 42-44 sample = 5/0
SB15	50	41	1036.1	Tar present between 3 and 5 ft bgs, staining between 45.5 and 46	Wood tar odor present between 3 and 5 ft bgs and 40 and 42	FID/PID from 3-5 sample = 38/99; from 44-46 sample = 421/0
SB16	74	51	1027.4	Reddish brown clay with heavy odor present between 25 and 28 ft bgs, furnace glass present between 4 and 17 ft bgs	Wood tar odor present between 25 and 28 ft bgs and at 41 ft	FID/PID from 25-27 sample = 26200/54; from 52-54 sample = 14100/0
SB17	67	48	1030.7	Stain present between 48 and 49 ft bgs	Fuel odor present between 30 and 32 ft bgs	FID/PID from 48-50 sample = 700/0
SB18	73	51	1029.9	None	None	FID/PID from 57-59 sample = 4300/0
SB19	65	55	1040.5	Furnace glass present between 1 and 2 ft bgs	None	FID/PID from 57-59 sample = 50/0
SB20	75	47	1024.6	Tar present between 7 and 12 ft bgs, staining present between 53 and 55 ft bgs	Wood tar odor present between 7 and 17 ft bgs	FID/PID from 10-12 sample = 20/0; from 53-55 sample = 8300/0
SB21	65	52	1044.5	Furnace glass present between 2 and 11 ft bgs	Fuel odor present between 11 and 12 ft bgs; wood tar odor present between 53 and 65 ft bgs	FID/PID from 55-57 sample = 19000/0

Notes:

amsl = above mean sea level
bgs = below ground surface
ft = feet

FIGURES

(7 Sheets)

ELDER ROAD

US 131

INDIAN TRAIL ROAD

SP-0 SPW-1-65 SP-1 SP-2 SP-3 SPW-4-64 SP-4 SP-5 SP-6 SP-7 SP-8 SPW-9-67 SP-9 SP-10 SP-11 SP-12 SP-13 SP-14 SP-15 SP-16 SP-17 SP-18 SP-19

MW-3A MW-2A MW-3B MW-1A PZ-3 MW-2B PZ-2 MW-3C MW-2C MW-1C MW-1B PZ-1

SB19 SB18 SB17 SB21 SB16 SB20 SB07 SB04 SB15 SB01 SB14 SB03 SB12 SB06 SB02 SB13 SB05 SB11 SB09 SB10 SB08

BG-1-40

A' B' C'

A B C

N W E S

LEGEND

- PHASE 1 MONITORING WELL LOCATION
- PHASE 1 SOIL BORING LOCATION
- EXISTING BIOSPARGE WELL
- CROSS SECTION LINES
- 1938 TAR LAKE BOUNDARY
- 1984 TAR LAKE BOUNDARY
- 1999 TAR LAKE EXCAVATION AREA
- 2010 TAR LAKE LOWER SURFACE
- 2010 TAR LAKE UPPER SURFACE
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY
- FENCELINE
- SITE BOUNDARY

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 1
TAR LAKE AREA PHASE 1
SAMPLE LOCATIONS

SulTRAC

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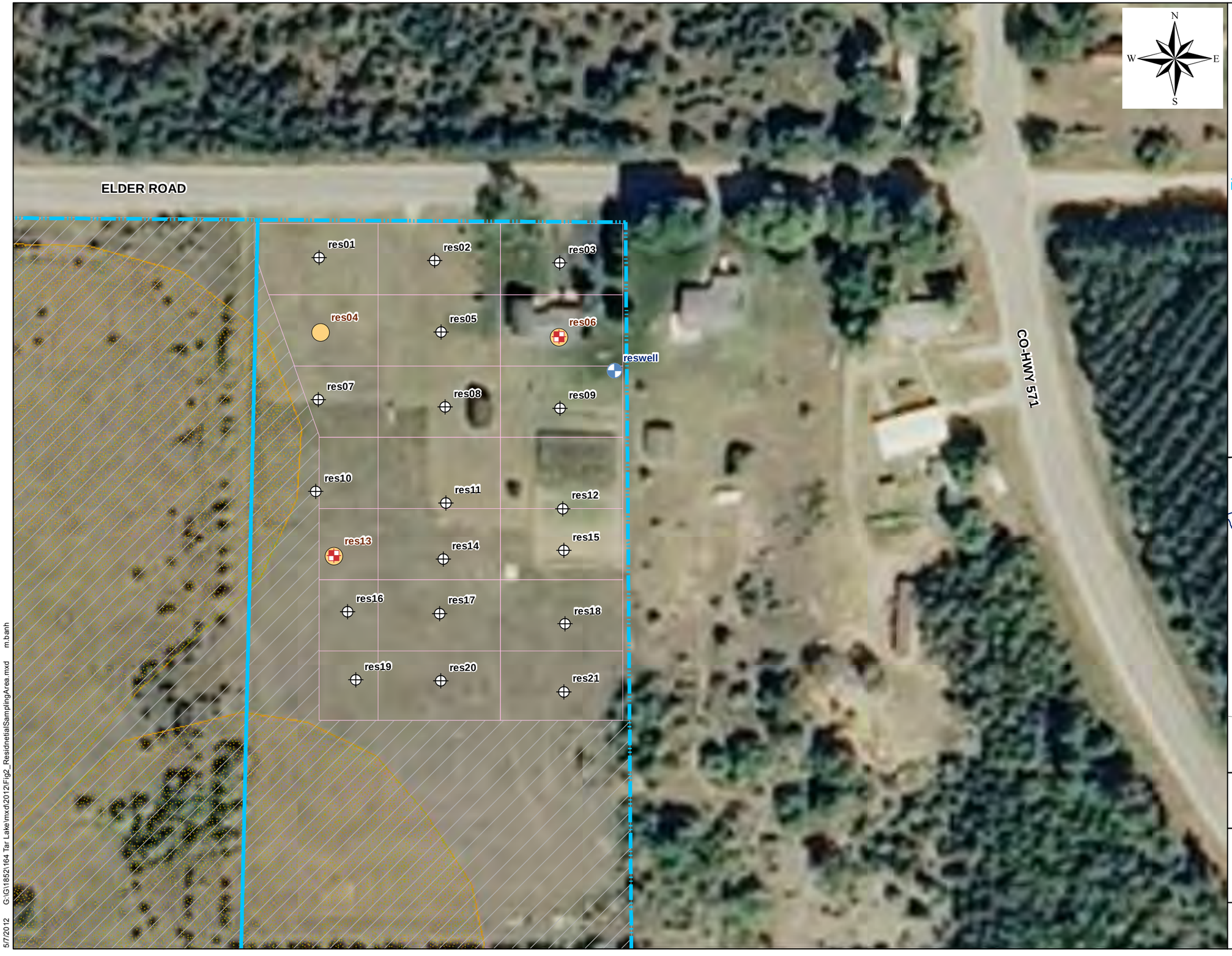

LEGEND

- SAMPLE CONCENTRATION EXCEEDS BOTH MDEQ RESIDENTIAL DWPC AND STATEWIDE DEFAULT BACKGROUND
- SAMPLE CONCENTRATIONS DO NOT EXCEED MDEQ RESIDENTIAL DWPC AND/OR STATEWIDE DEFAULT BACKGROUND
- PROPOSED PHASE 2 SOIL BORING LOCATION
- RESIDENTIAL WELL
- GRIDS
- FORMER TAILINGS PILE LOCATION
- EAST TAILINGS AREA – DLELTED BY EPA AND MDEQ FOR UNRESTRICTED USE/UNLIMITED EXPOSURE IN 2005
- PARCEL BOUNDARY

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 2
3.48-ACRE RESIDENTIAL AREA
PHASE 1 SAMPLE LOCATIONS

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5/7/2012 G:\G\1852\164 Tar Lake\mxd\2012\Fig2_ResidnetialSamplingArea.mxd m.banh

ELDER ROAD

SB18
Depth = 71'-73'
Benzene: 0.82J ug/kg
2,4-Dimethylphenol: 6.3J ug/kg
Naphthalene: 10J ug/kg

SB18
Depth = 57'-59'
Benzene: 19 ug/kg
2,4-Dimethylphenol: 780 ug/kg
Total Methylphenols: 1,123 ug/kg

SB19
Depth = 57'-59'
Naphthalene: 6.9J ug/kg

SB16
Depth = 72'-74'
Benzene: 4.3J ug/kg
2,4-Dimethylphenol: 870 ug/kg
Total Methylphenols: 139 ug/kg
Naphthalene: 380 ug/kg

SB16
Depth = 52'-54'
Benzene: 3.0J ug/kg
2,4-Dimethylphenol: 480 ug/kg
Total Methylphenols: 230 ug/kg
Naphthalene: 510 ug/kg

SB16
Depth = 25'-27'
2,4-Dimethylphenol: 31,000 ug/kg
Total Methylphenols: 31,400 ug/kg
Naphthalene: 160,000 ug/kg

SB21
Depth = 55'-57'
Benzene: 2.9J ug/kg
2,4-Dimethylphenol: 160J ug/kg
Naphthalene: 55J ug/kg

SB17
Depth = 48'-50'
Naphthalene: 22J ug/kg

SB17
Depth = 65'-67'
2,4-Dimethylphenol: 99J ug/kg
Total Methylphenols: 87J ug/kg
Naphthalene: 54J ug/kg

SB20
Depth = 73'-75'
2,4-Dimethylphenol: 56J ug/kg
Naphthalene: 30J ug/kg

SB20
Depth = 53'-55'
Benzene: 2.8J ug/kg
2,4-Dimethylphenol: 1,100 ug/kg
Total Methylphenols: 65 ug/kg

SB20
Depth = 10'-12'
Benzene: 450J ug/kg
2,4-Dimethylphenol: 130,000 ug/kg
Total Methylphenols: 244,000 ug/kg
Naphthalene: 20,000 ug/kg

SB07
Depth = 16'-18'
Benzene: 6.0J ug/kg
2,4-Dimethylphenol: 6,500 ug/kg
Total Methylphenols: 7,959 ug/kg
Naphthalene: 850J ug/kg

SB15
Depth = 44'-46'
2,4-Dimethylphenol: 28J ug/kg
Total Methylphenols: 13J ug/kg
Naphthalene: 8.4J ug/kg

SB15
Depth = 3'-5'
2,4-Dimethylphenol: 140,000 ug/kg
Total Methylphenols: 100,000 ug/kg
Naphthalene: 38,000 ug/kg

SB04
Depth = 14'-16'
Benzene: 3.6J ug/kg
2,4-Dimethylphenol: 2,800 ug/kg
Total Methylphenols: 1,320 ug/kg
Naphthalene: 2,400 ug/kg

SB14
Depth = 52'-54'
Naphthalene: 11J ug/kg

SB14
Depth = 41'-43'
Naphthalene: 21J ug/kg

SB01
Depth = 20'-22'
Benzene: 1,900J ug/kg
2,4-Dimethylphenol: 58,000 ug/kg
Total Methylphenols: 35,000 ug/kg
Naphthalene: 190,000 ug/kg

SB01
Depth = 28'-30'
Benzene: 54J ug/kg
2,4-Dimethylphenol: 5,300 ug/kg
Total Methylphenols: 8,800 ug/kg
Naphthalene: 5,200 ug/kg

SB03
Depth = 8'-10'
Benzene: 510J ug/kg
2,4-Dimethylphenol: 16,000 ug/kg
Total Methylphenols: 31,300 ug/kg
Naphthalene: 4,000 ug/kg

SB03
Depth = 14-16'
Benzene: 56 ug/kg
2,4-Dimethylphenol: 5,800 ug/kg
Total Methylphenols: 13,700 ug/kg
Naphthalene: 510J ug/kg

SB12

SB06
Depth = 14'-16'
2,4-Dimethylphenol: 89J ug/kg
Naphthalene: 95J ug/kg

SB02
Depth = 12'-14'
Benzene: 5.1J ug/kg
2,4-Dimethylphenol: 4,700 ug/kg
Total Methylphenols: 4,500 ug/kg
Naphthalene: 2,200 ug/kg

SB02
Depth = 18'-20'
2,4-Dimethylphenol: 610 ug/kg
Total Methylphenols: 540 ug/kg
Naphthalene: 360 ug/kg

SB13

SB05
Depth = 14'-16'
2,4-Dimethylphenol: 35J ug/kg
Total Methylphenols: 13J ug/kg
Naphthalene: 28J ug/kg

SB11

SB09
Depth = 4'-6'
2,4-Dimethylphenol: 130J ug/kg
Total Methylphenols: 179 ug/kg
Naphthalene: 75J ug/kg

SB10
Depth = 10'-12'
2,4-Dimethylphenol: 620 ug/kg
Total Methylphenols: 690 ug/kg
Naphthalene: 45J ug/kg

SB08
Depth = 0'-2'
Benzene: 2.0J
2,4-Dimethylphenol: 1,400 ug/kg
Total Methylphenols: 1,150 ug/kg
Naphthalene: 940J ug/kg

PECKHAM LAKE

N
W E
S

LEGEND

- SOIL BORING LOCATION
- ESTIMATED SOURCE MATERIAL
- FENCELINE
- SITE BOUNDARY
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY

0 100 200 Feet

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 3
IDENTIFIED SOURCE MATERIAL
ESTIMATE-PLAN VIEW

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FIGURE 4
CROSS SECTION A-A

CLIENT U.S. EPA

PROJECT NUMBER 164-TATA-0571

PROJECT NAME Tar Lake

PROJECT LOCATION Mancelona, MI

- USCS Poorly-graded Sand
- USCS Poorly-graded Sand with Silt
- USCS Clayey Sand
- USCS Low Plasticity Sandy Clay
- Fill (made ground)
- USCS Poorly-graded Gravelly Sand
- USCS Well-graded Sand
- Topsoil
- USCS Low Plasticity Silty Clay
- Groundwater Sample Interval
- Soil Sample Interval
- Multiple COC Exceed 2002 Rod Groundwater Criteria
- Multiple COC Exceed 2002 Rod Soil Criteria
- Proposed Soil Boring Location
- Identified Source Material
- Estimated Source Material

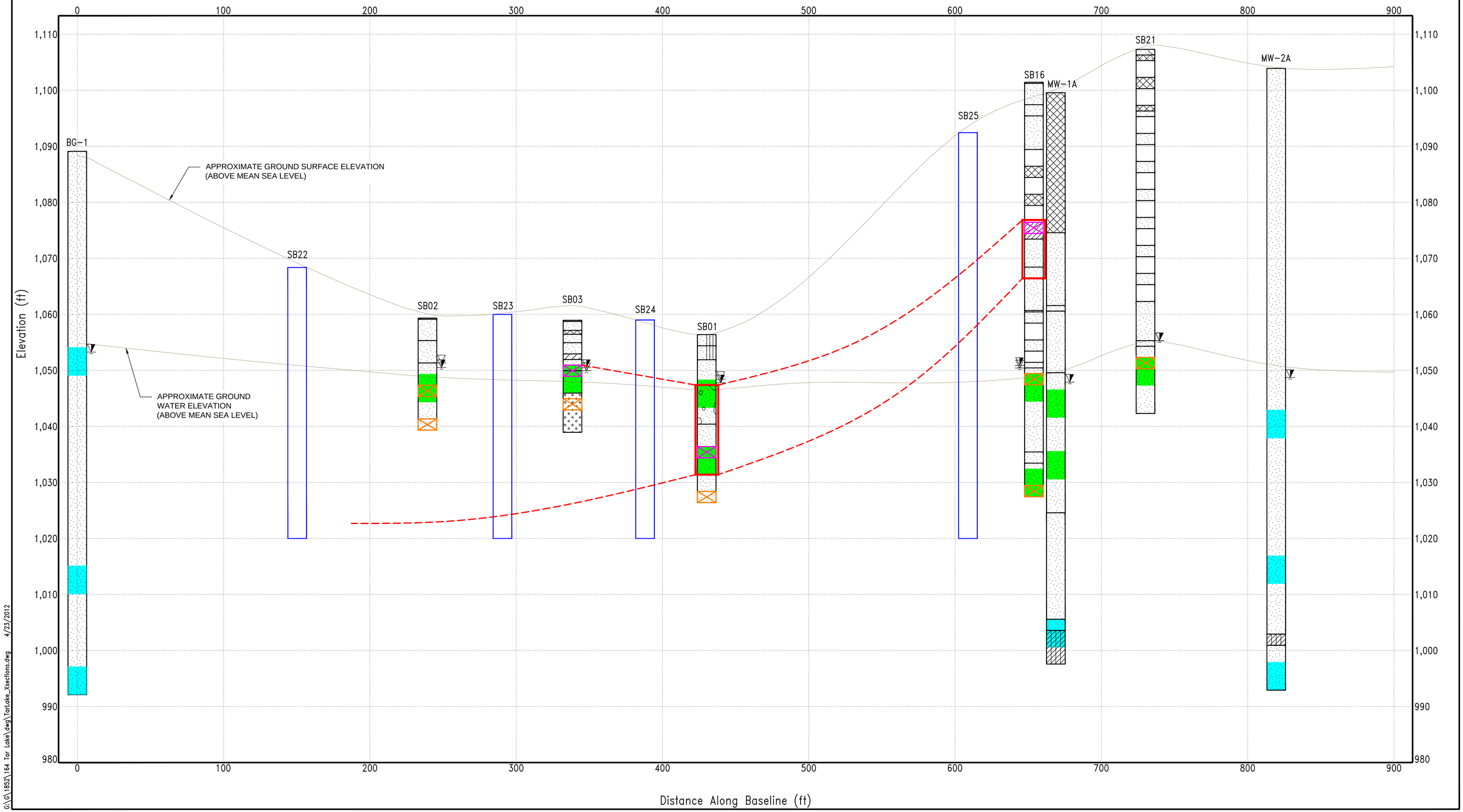

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FIGURE 5
CROSS SECTION B-B

CLIENT U.S. EPA

PROJECT NUMBER 164-TATA-0571

PROJECT NAME Tar Lake

PROJECT LOCATION Mancelona, MI

- USCS Poorly-graded Sand
- USCS Poorly-graded Sand with Silt
- USCS Clayey Sand
- USCS Low Plasticity Sandy Clay
- Fill (made ground)
- USCS Poorly-graded Gravelly Sand
- USCS Well-graded Sand
- Topsoil
- USCS Low Plasticity Silty Clay
- Groundwater Sample Interval
- Soil Sample Interval
- Multiple COC Exceed 2002 Rod Groundwater Criteria
- Multiple COC Exceed 2002 Rod Soil Criteria
- Proposed Soil Boring Location
- Identified Source Material
- Estimated Source Material

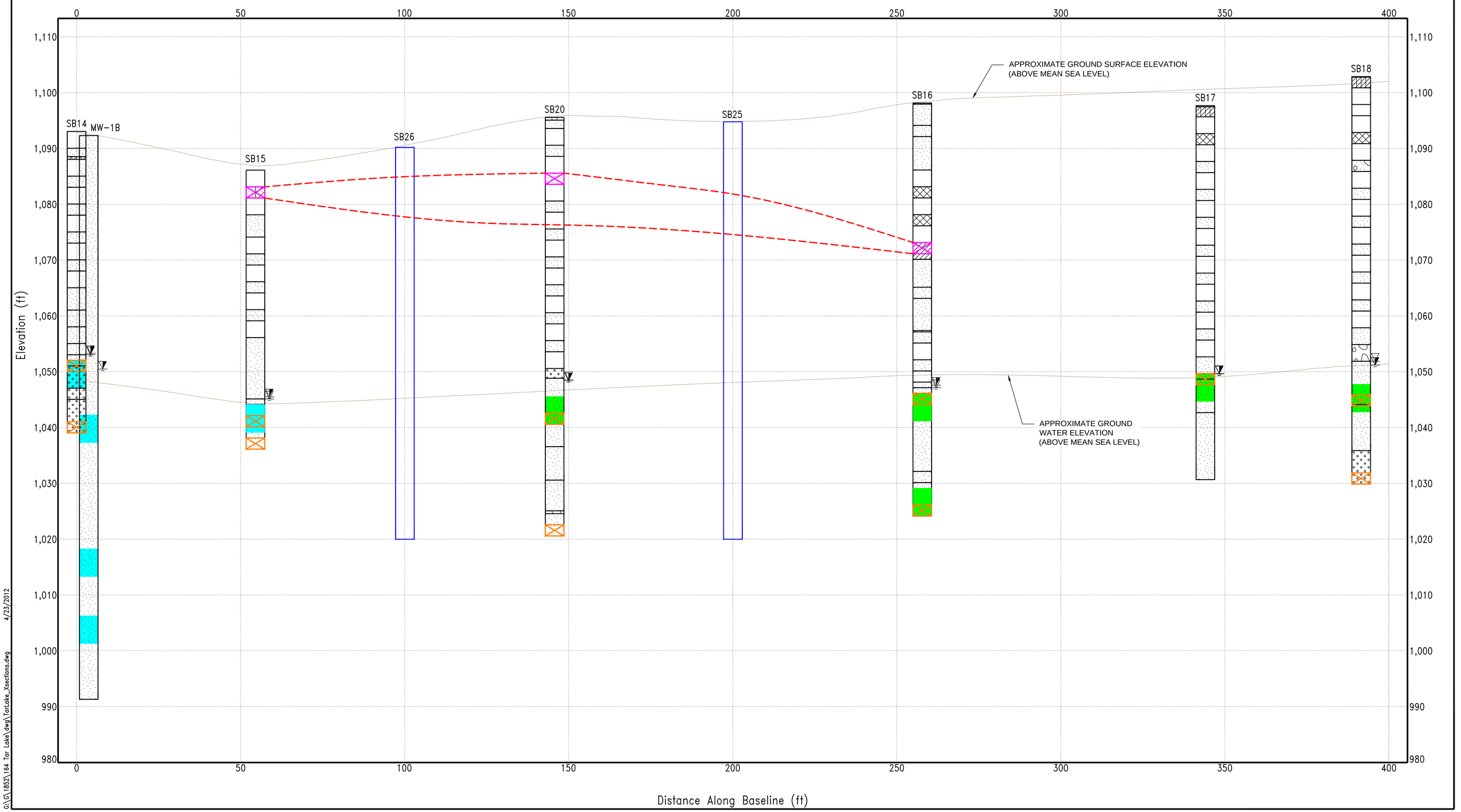

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FIGURE 6
CROSS SECTION C-C

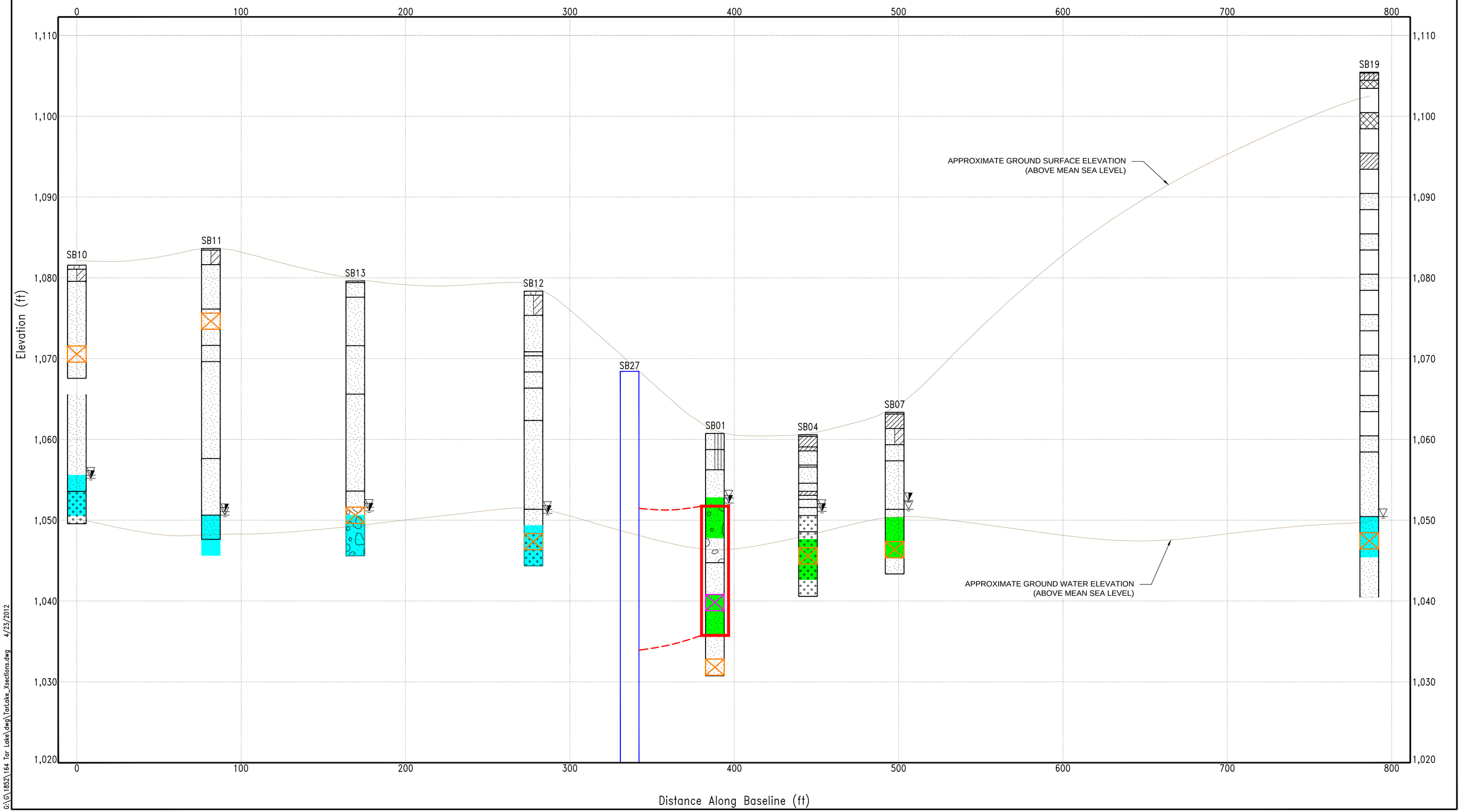
CLIENT U.S. EPA

PROJECT NUMBER 164-TATA-0571

PROJECT NAME Tar Lake

PROJECT LOCATION Mancelona, MI

- USCS Poorly-graded Sand
- USCS Poorly-graded Sand with Silt
- USCS Clayey Sand
- USCS Low Plasticity Sandy Clay
- Fill (made ground)
- USCS Poorly-graded Gravelly Sand
- USCS Well-graded Sand
- Topsoil
- USCS Low Plasticity Silty Clay
- Groundwater Sample Interval
- Soil Sample Interval
- Multiple COC Exceed 2002 Rod Groundwater Criteria
- Multiple COC Exceed 2002 Rod Soil Criteria
- Proposed Soil Boring Location
- Identified Source Material
- Estimated Source Material



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ELDER ROAD

US 131

INDIAN TRAIL ROAD

MW-3A SP-0 SRW-1-65 SP-1 SP-2 SP-3 SRW-4-64 MW-2A SP-4 MW-3B SP-5 MW-1A SP-6 PZ-3 MW-2B PZ-2 SP-7 SP-8 SRW-3-67 SP-9 MW-3C SP-10 SP-11 SP-12 MW-2C SP-13 SP-14 SP-15 SP-16 MW-1C SP-17 SP-18 SP-19

SB31 SB19 SB18 SB33 SB32 SB17 SB21 SB16 SB25 SB30 SB20 SB07 SB26 SB28 SB04 SB34 SB15 MW-1B SB01 SB24 SB29 SB14 SB27 P2-1 SB03 SB12 SB23 SB06 SB02 SB22 SB13 SB05 SB11 SB09 SB10 SB08 BG-1-40

0 100 200 Feet

LEGEND

- PROPOSED PHASE 2 SOIL BORING LOCATION
- PROPOSED DUPLICATED SOIL BORING LOCATION
- EXISTING MONITORING WELL LOCATION
- EXISTING SOIL BORING LOCATION
- EXISTING BIOSPARGE WELL
- ESTIMATED SOURCE MATERIAL
- 1938 TAR LAKE BOUNDARY
- 1984 TAR LAKE BOUNDARY
- 1999 TAR LAKE EXCAVATION AREA
- 2010 TAR LAKE LOWER SURFACE
- 2010 TAR LAKE UPPER SURFACE
- SPLIT PARCEL BOUNDARY
- PARCEL BOUNDARY
- FENCELINE
- SITE BOUNDARY

REFERENCE MAP

TAR LAKE SITE
ANTRIM COUNTY, MICHIGAN

FIGURE 7
PROPOSED TAR LAKE AREA
PHASE 2 SAMPLE LOCATIONS

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