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September 17, 2012

Reference No. 056393

Mr. Michael Berkoff
Remedial Project Manager
U.S. Environmental Protection Agency - Region V
Superfund Division, Remedial Response Section #2
77 West Jackson Boulevard (SR-6J)
Chicago, IL 60604-3590

US EPA RECORDS CENTER REGION 5
464722

Dear Mr. Berkoff:

Re: Revised Certification of Completion of the OU-4 Remedial Action
(Final Construction Completion Report)
12th Street Landfill Operable Unit No. 4
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Allegan and Kalamazoo County

On behalf of Weyerhaeuser NR Company, Conestoga-Rovers & Associates (CRA) has revised the enclosed Certification of Completion of Remedial Action Report (CRAR) for the 12th Street Landfill, Operable Unit No. 4 (OU-4) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site, located in Otsego, Michigan (Site). The CRAR also serves as the Final Construction Completion Report for the 12th Street Landfill. The revisions to the CRAR have been made to address the United States Environmental Protection Agency's (U.S. EPA's) April 30, 2012 comments on the June 5, 2012 version of the document.

In order to reduce the amount of paper generated for this project, CRA has enclosed an electronic (i.e., pdf) version of the entire report on the attached CD and provided hard copies of only those portions of report that have been revised to address U.S. EPA's comments. We ask that you please replace the appropriate sections of the original report with the attached hard copies. The sections of the report which have been revised include:

- Inside cover and main text
- Figures
- Tables
- As-Built Drawings

Please note that in most cases not all sections of the above referenced portions of the report have been modified, however, we have copied the entire portion for simplicity (e.g., not all figures and tables were modified, but we have included copies of them all with this letter).

CONESTOGA-ROVERS
& ASSOCIATES

September 17, 2012 Reference No. 056393

This CRAR has been prepared in fulfillment of Section XIV and paragraph 65, part (a) of the U.S. EPA Consent Decree (CD)(Civil Action No. 1:05-CV0003) dated January 3, 2005. In accordance with the CD, the CRAR documents the completion of the RA in full satisfaction of the requirements of the CD, while providing supporting documentation to support that the construction and implementation of the remedy set forth in the OU-4 Record of Decision (ROD) and OU4 Statement of Work (SOW), and for the achievement of the OU-4 Performance Standards, has been constructed in accordance with the U.S. EPA approved design and specifications.

Should you have any questions or require any additional information, please do not hesitate to contact the undersigned.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Gregory A. Carli, P. E.

GC/adh/15
Encl.

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CERTIFICATION OF COMPLETION OF THE OU-4 REMEDIAL ACTION REPORT (FINAL CONSTRUCTION COMPLETION REPORT)

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

VOLUME I: TEXT, FIGURES, TABLES, AND DRAWINGS

Prepared For:
Weyerhaeuser NR Company

PRINTED ON:

SEPTEMBER 17, 2012

CERTIFICATION OF COMPLETION OF THE OU-4 REMEDIAL ACTION REPORT (FINAL CONSTRUCTION COMPLETION REPORT)

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

VOLUME I: TEXT, FIGURES, TABLES, AND DRAWINGS

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms per liter
µg/kg	Micrograms per kilogram
AOC	Administrative Order on Consent
ARAR	Applicable, or Relevant and Appropriate Requirement
ASTM	American Society for Testing and Materials
bgs	Below Ground Surface
CAS	Colombia Analytical Services
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COPC	Constituent of Potential Concern
CRA	Conestoga-Rovers & Associates
CRAR	Certification of Completion of Remedial Action Report
CQAP	Construction Quality Assurance Plan
CY	Cubic Yards
DQO	Data Quality Objective
EDD	Electronic data deliverable
FS	Feasibility Study
FSP	Field Sampling Plan
GRCC	Generic Residential Cleanup Criteria
GSI	Groundwater Surface Water Interface
HASP	Health and Safety Plan
IDW	Investigation-derived waste
kg	Kilogram
KRSG	Kalamazoo River Study Group
l	Liter
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

mg/kg	Milligram per kilogram
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIST	National Institute of Standards and Technology
NREPA	Natural Resources and Environmental Protection Act
OMM	Operations, Maintenance and Monitoring
OU-4	Operable Unit No. 4 (12th Street Landfill)
PCB	Polychlorinated biphenyl
pH	Negative logarithm (base 10) of hydrogen ion activity
PQO	Project Quality Objective
POTW	Publicly-owned Treatment Works
PM	Project Manager
PRPs	Potentially Responsible Parties
PSVP	Performance Standards Verification Plan
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RL	Reporting limit
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SAS	Special Analytical Services
SOP	Standard Operating Procedure
SOW	Statement of Work

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

SRI/FS	Supplemental Remedial Investigation/Feasibility Study
SRM	Standard reference material
SSRL	Secondary Risk Screening Level
STM	Statistics Training Materials
SW846	Test Methods for Evaluating Solid Waste, 1996
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time-Critical Removal Action
U.S. EPA	United States Environmental Protection Agency
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound
WATS	Weyerhaeuser Analytical Testing Services

1.0 INTRODUCTION

On behalf of Weyerhaeuser NR Company (Weyerhaeuser), Conestoga-Rovers & Associates (CRA) has prepared this Certification of Completion of Remedial Action (RA) Report (herein referred to as "Completion Report" or CRAR) for the 12th Street Landfill, Operable Unit No. 4 (OU-4) of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site, located in Otsego, Michigan (Site). This CRAR has been prepared in fulfillment of one of the requirements of the United States Environmental Protection Agency (U.S. EPA) Consent Decree (CD)(Civil Action No. 1:05-CV0003) dated January 3, 2005. In accordance with the CD, the CRAR documents the completion of the RA in full satisfaction of the requirements of the CD, while providing supporting documentation to support that the construction and implementation of the remedy set forth in the OU-4 Record of Decision (ROD) and OU-4 Statement of Work (SOW), and for the achievement of the OU-4 Performance Standards, has been constructed in accordance with the U.S. EPA approved design and specifications. The CRAR also serves as the Final Construction Completion Report for the 12th Street Landfill. Figure 1.1 presents a Site location map. Figure 1.2 presents the Site Plan.

1.1 PURPOSE OF THE CERTIFICATION OF COMPLETION OF THE OU-4 REMEDIAL ACTION REPORT

The requirements of the CRAR, including the Certification of Completion Construction Report, are set out in Section XIV and paragraph 65, part (a) of the CD. The purpose of the CRAR is to document the implementation of the RA, which was completed pursuant to the requirements of paragraph 28, parts (d), (e), and (f) of the CD to meet the OU-4 performance standards included as part of the SOW included in the OU-4 ROD, and as outlined in detailed in the Final Design Report and associated project specifications. In accordance with these requirements, this CRAR includes the following:

- Chronology of events
- Summary of RA activities
- Synopsis of the construction work defined in the SOW and the certification that the construction work has been completed, including a demonstration in accordance with the Performance Standards Verification Plan and Performance Standards have been achieved.
- Summary of the Pre-Certification Inspection, including a brief description of how outstanding items noted in the Pre-Final Construction Completion Inspection were resolved

- As-built drawings signed and stamped by a professional engineer or architect for additional work completed since the Final Certification Inspection
- Explanation of any modifications to the RA to the approved RD and RA Work Plans and why the modifications were necessary for the project
- Presentation of performance standards along with explanation of any modifications to these criteria and why the modifications were necessary for the project
- Monitoring results indicating that the Site RA has met or exceeded the performance standards
- Summary of project costs
- A description of how Weyerhaeuser will implement any remaining part of the U.S. EPA approved Operation and Maintenance Plan

2.0 HISTORICAL SITE INFORMATION/SITE CHRONOLOGY

2.1 SITE SETTING AND FEATURES

The Site is located in Otsego Township, Allegan County Michigan, approximately a half mile northeast of the intersection of State highway M-89 and 12th Street, and 1½ miles northwest of the city of Plainwell in Allegan County, Michigan. The civic address for the Site is 481 12th Street North, Plainwell, Michigan (Figures 1.1 and 1.2).

The 12th Street Landfill is approximately 6.8 acres in size. The Landfill is bordered by the Kalamazoo River and associated wetlands to the north and northeast, a parcel owned by the Michigan Department of Natural Resources (MDNR) to the east, 12th Street to the south (which is also owned by MDNR), and Wyoming Asphalt to the west. A mix of commercial and residential properties is located south of 12th Street.

The Site is included as part of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site located along 80 miles of the Kalamazoo River in western Michigan. The Superfund Site is divided up into OUs. The 12th Street Landfill is considered OU-4 and is designated with U.S. EPA identification number MID0060077306.

2.2 OPERABLE UNIT NO. 4

The completed RA addressed OU-4, which consists of the closed 12th Street Landfill and areas outside the landfill where PCB-contaminated paper residual material has been observed (i.e., the wetland to the north of the landfill, the former powerhouse discharge channel, the "woodland" on the adjacent MDNR property, and certain areas of the adjacent asphalt plant property). The following sections include a summary of the OU-4 history, which was presented in documents prepared by/for others (B&B, 1992; G&M, 1994b; G&M, 1996a; G&M, 1996b; and Plainwell Paper, 1987).

2.2.1 12TH STREET LANDFILL OWNERSHIP

The 12th Street Landfill property is currently owned by Weyerhaeuser. Previously, the landfill had been owned and operated by various entities, including Weyerhaeuser, who owned the landfill and the associated Plainwell Mill, between 1961 and 1970. The ownership history of the mill and the landfill is summarized in Table 2.1.

Weyerhaeuser owns both the landfill property, including the 6.8 acre closed landfill, and the approximately 17 acres of wetland to the north/northwest of the landfill. There are no active operations or permanent buildings on the landfill or the adjacent 17 acre wetland property.

2.2.2 12TH STREET LANDFILL HISTORICAL OPERATIONS AND CURRENT CONDITION

The 12th Street Landfill was in active operation from approximately 1955 to 1981. It was closed in 1984 by placing a soil cover over the fill and seeding the cover. Historical aerial photographs showed that, prior to 1955, a portion of the property on which the 12th Street Landfill is located was a wetland. During this period of active operation, the landfill accepted paper residuals from the wastewater treatment plant at the nearby former Plainwell Mill located in Plainwell, Michigan. The wastewater treatment plant initially consisted of a primary clarifier (built in 1954), which was later upgraded to include secondary treatment. Settled paper-making sludge (also referred to as residuals) from the clarifier was dewatered for several months in unlined lagoons. In addition, the landfill reportedly also accepted construction debris waste from the Plainwell Mill during part of its period of active operation. Sanitary wastewater at the mill was discharged to the Plainwell publicly-owned treatment works.

In 1967, a full-scale secondary treatment system, consisting of an aerated lagoon and a clarifier was built at the Mill. Following construction of this treatment system, primary and secondary treatment system sludge, coal bottom ash, and coal fly ash were placed in the 12th Street Landfill until early 1981. The fly ash was also used to construct retaining berms within the landfill. In 1981, residuals remaining in some of the then-inactive lagoons at the mill were removed and placed in the landfill

The paper residuals, some of which contained polychlorinated biphenyls (PCBs), were disposed into a topographically low area of the 12th Street Landfill property, which had reportedly received limited Site preparation prior to disposal activities. The fill area was not lined and did not include a leachate collection system. The thickness of residuals within the landfill varies, with an estimated maximum thickness of approximately 25 feet. Between 1955 and 1967, a retaining berm composed of sand, fly ash, and residuals were reportedly constructed around all but the southern side of the landfill. Subsequent field investigations showed that residuals were present outside the retaining berm in some areas.

The Michigan Department of Environmental Quality (MDEQ) conducted investigations in the early 1970's that determined that PCBs were present in the sediments of the Kalamazoo River. This discovery led to the identification of potential responsible parties (PRPs). The PRPs signed an Administrative Order on Consent (AOC) with the State of Michigan in 1990. The Remedial Investigation (RI)/Feasibility Study (FS) was funded and conducted by the PRP group. The RI/FS for the 12th Street Landfill began in 1993 and was completed in 1997.

In September 2001, the State of Michigan signed the ROD for the 12th Street Landfill, with U.S. EPA concurrence. The ROD requires PCB-containing paper residuals that migrated from the landfill to be excavated and placed back within the landfill. The ROD further requires the landfill be closed in accordance with Part 115, Solid Waste Management of the Natural Resources and Environmental Protection Act 1994 PA 451, as amended. Long-term monitoring and maintenance at the Site is also required.

As part of a Time-Critical Removal Action (TCRA) to remove PCB-contaminated residuals in the former Plainwell Impoundment (a section of Operable Unit No. 5 of the Allied Paper/Portage Creek/Kalamazoo River Superfund Site), the U.S. EPA authorized Weyerhaeuser to conduct an emergency action at the former power-house channel to prevent downstream impacts from the TCRA. In 2007, visual paper residuals were excavated and relocated into the landfill. A clay barrier was installed between the Kalamazoo River and the landfill to insure that no hydraulic connection was present between the Kalamazoo River and the 12th Street Landfill. This area was also graded to an approximate 5 horizontal (H) to 1 vertical (V) (5H: 1V) slope and riprap was added to protect the clay barrier. The Emergency Response Plan Documentation Report (RMT, 2008a), which summarizes the TCRA activities is provided in Appendix A.

After the eastern slope of the landfill (along the river) was regraded in 2007 as part of the Emergency Action, temporary cover materials (6 inches of general fill, overlain by 6-inches of topsoil and a three-dimensional nylon turf reinforcement mat installed up to elevation 703.0 feet M.S.L.) were placed on this eastern slope to provide protection from erosion due to surface water runoff until the final cover was installed as part of the Remedial Action. The temporary cover in this area was reseeded in the spring of 2008. A more complete description of the Emergency Action conducted at OU-4 in 2007 is provided in a construction documentation report that was submitted to the U.S. EPA in July 2008 (RMT, 2008a) and Section 4.3 of the Design Report completed in March 2010.

It should be noted that the term 12th Street refers to the street itself, and the term 12th Street Landfill refers to the landfill or Site.

Prior to the implementation of the selected RA, the landfill rose up to an approximate elevation of 30 to 55 feet above the surrounding areas to the west, north, and east. The sideslopes of the landfill were steep, with slopes of up to approximately 2H:1V, except along the eastern extent of the landfill, along the Kalamazoo River, where the regrading activities that were conducted in 2007 as part of the U.S. EPA-authorized Emergency Action reduced the slope to approximately 5H:1V.

A 6-inch diameter carbon steel oil/natural gas pipeline managed by Major Pipeline, L.L.C., runs underneath a portion of the landfill and onto and/or from the asphalt plant property (Drawing C-01 of the Final Design Report). The Right-of-Way Agreement for this pipeline indicates that it was installed in approximately 1957. The pipeline was reportedly installed in a trench approximately 3 to 5 feet below the then-current ground surface and then backfilled with native soil. Historical aerial photographs show that residuals/fill material was placed over the pipeline after the pipeline was installed and backfilled.

Pursuant to the requirements of the CD, CRA submitted a Final Design Report, on behalf of Weyerhaeuser on January 11, 2010. Subsequently, the Final Design Report was conditionally approved by U.S. EPA on February 18, 2010. The Final Design Report was developed to address the implementation of the selected RA outlined in the SOW for the Site, which is included as part of the ROD and incorporated into the CD. The SOW outlines the conceptual approach to design and implement the individual components of the remedy. The implementation of the RA was completed pursuant to the requirements of paragraph 28, parts (d), (e), and (f) of the CD to meet the OU-4 performance standards included as part of the SOW included in the OU-4 ROD, and as outlined in detailed in the Final Design Report and associated project specifications. A copy of the CD and ROD, including SOW, are provided in Appendix A.

The Final Design Report was completed under the requirements of the CD and the associated OU-4 SOW. The conditionally approved Final Design Report included the following:

- Project Specifications
- Draft OU-4 Operation and Maintenance Plan
- Construction Quality Assurance Plan (CQAP)
- Remedial Action Health and Safety Plan (HASP)
- Contingency Plan
- Performance Standard Verification Plan (PSVP)

- Multi-Area Quality Assurance Project Plan (QAPP)
- Multi-Area Field Sampling Plan (FSP)

2.2.3 FORMER POWER-HOUSE DISCHARGE CHANNEL

The former Plainwell Dam (dam) in the Kalamazoo River was located adjacent to the woodland area to the southeast of the 12th Street Landfill. The dam was constructed in 1902 as part of a hydroelectric facility. Around 1965, the dam was decommissioned from power generation, and ownership of the dam was transferred from Consumers Power Company to the MDNR. The MDNR raised and jammed the spillway control gates in the open position in order to lower the water level in the upstream impoundment (located south of the dam). In 1986, the MDEQ removed the powerhouse structure, which had previously been located near the western end of the dam, and performed other modifications to the dam embankments and structure that further lowered the water levels in the upstream areas.

Pursuant to a U.S. EPA administrative settlement agreement (February 2007), other PRPs conducted a TCRA in the former Plainwell Impoundment (U.S. EPA, 2007b). The TCRA was completed in two phases: Phase I was completed in 2007 and Phase II was completed in 2008. Phase II of the TCRA included the redirection of the Kalamazoo River flow into the original river channels (including the former power-house channel) and complete removal of the temporary water control structures.

In August 2007, in consideration of the anticipated effects that removal of the Plainwell Dam could have on sediment mobilization in the former powerhouse channel and on the landfill slope that abuts the river, under the Consent Decree, U.S. EPA and Weyerhaeuser agreed that Weyerhaeuser should implement certain Emergency Actions at OU-4 (U.S. EPA, 2007a) to mitigate a potential release of paper residuals/sediment containing PCBs to the environment (the river). These included the removal of paper residuals in the former powerhouse discharge channel and placing them into the landfill and the installation of permanent erosion protection (riprap) along the landfill riverbank that was designed to withstand erosion forces from the rerouted river for a 500-year flood event.

The Emergency Actions resulted in a modification of the sequencing of the Remedial Action as described in the ROD for the 12th Street Landfill, including the expedited design and construction of several components of the remedy in, and adjacent to, the former powerhouse channel.

2.2.4 OTHER OFF-SITE AREAS

Woodland on the MDNR Property

The Woodland area to the south/southeast of the landfill is owned by the State of Michigan, under the management of the MDNR. The woodland area was significantly altered in 2007 by activities conducted by the KRSG as part of the TCRA in the former Plainwell Impoundment. Restoration of the portion of the woodland area affected by the TCRA was completed by the KRSG in 2008/2009. The spatial extent of paper residuals prior to implementation of the RA beyond the 12th Street Landfill property line onto the woodland area is shown on Figure 2.1 and is based on previous investigations and the findings from the pre-design studies (RMT, 2008b), presented as part of the Final Design Report.

Asphalt Plant Property

The asphalt plant southwest of the landfill is operated by Wyoming Asphalt and Paving Company, Inc., on property owned by Aggregate Industries. The spatial extent of paper residuals prior to the implementation of the RA beyond the landfill property line onto the asphalt plant property is shown on Figure 2.1 and is based on previous investigations and findings from the predesign studies (RMT, 2008b) , presented as part of the Final Design Report.

It is noted that during the implementation of the RA, the observed extent of paper residuals located on the asphalt plant property extended beyond the previously delineated extent. The final delineated extent of paper residuals located on the adjacent asphalt plant property is discussed in detail in Section 3.6.1.4 of this report.

2.3 SUMMARY OF THE SELECTED REMEDY

On the basis of the evaluations presented as part of the RI (G&M, 1996a) and the FS (G&M, 1997), the State of Michigan selected the remedy for OU-4, which is described in the ROD that was issued on September 28, 2001. The remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), as well as the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300). The remedy is consistent with the criteria

contained in Section 121 of CERCLA, as summarized in Section (J) (Statutory Determinations) of the ROD, including protection of human health and the environment, compliance with Applicable or Relevant and Appropriate Requirements (ARARs), and cost-effectiveness. The U.S. EPA concurred with the selected remedy.

2.3.1 REMEDIAL ACTION OBJECTIVES

The overall objectives of the selected remedy, as stated in the ROD, as follows:

- To eliminate the continued migration of PCBs from the 12th Street Landfill (OU-4) to the Kalamazoo River, as well as from the landfill to the woodland, wetland, adjacent property (asphalt plant), and the former powerhouse discharge channel.
- To reduce the unacceptable risk associated with the landfill from exposure to PCBs, including the following:
  - Human health risks for persons who trespass or work on the 12th Street Landfill
  - Human health and ecological risks owing to past and continuing releases of PCBs to the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River
  - Human health and ecological risks owing to the potential additional release of PCBs to the woodland, wetlands, adjacent property, former powerhouse discharge channel, and the Kalamazoo River caused by failure of the sides of the landfill

2.3.2 COMPONENTS OF THE SELECTED REMEDY

The major components of the selected remedy, as stated in the ROD (U.S. EPA, 2001), included the following:

1. Excavation and relocation into the landfill of contaminated residuals from the woodland, wetlands, and adjacent property, and the residuals in the former powerhouse discharge channel that is contiguous with the eastern side of the landfill. Following relocation into the landfill of the residual material, a containment system will be constructed that complies with the requirements of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA, as amended (NREPA).

2. Excavation and relocation into the landfill of the east side of the landfill along the former power-house discharge channel. The excavation will be extensive enough to create a buffer zone sufficient to ensure that, for the lifetime of the remedy, no hydraulic connection will exist between the PCB-contaminated wastes within the newly constructed landfill containment system and the Kalamazoo River or the former - discharge channel.

3. Restoration of areas that will be excavated, cleared and grubbed, or otherwise affected by the RA.

4. A sidewall containment system will be constructed around the outside of the landfill. The existing sides of the landfill are constructed of sand, fly ash, and PCB-contaminated residuals and were not designed to provide sideslope stability, flood protection, and erosion control, or to prevent releases of leachate. The existing sides will be completely covered by a new side wall containment system (SWCS) that is designed to prevent the release of PCBs and which provides the necessary sideslope stability, flood protection and erosion control. The containment system will be designed to meet the relevant portions of the Michigan Solid Waste Landfill closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. Disposal of the residuals with PCB contamination at or above 50 parts per million, which are PCB remediation wastes under the Toxic Substances Control Act (TSCA), took place pursuant to the risk-based disposal method set forth in 40 CFR Section 761.61(c). The erosion protection provided will be sufficient to protect the containment system from a 500-year flood event, which is 2 feet above the 100-year flood elevation.

5. A cover (cap) will be constructed over the landfill as part of the containment system to minimize infiltration of precipitation through the landfill, prevent migration of residuals or leachate from the landfill into adjacent areas, and eliminate direct contact hazards. The cap will be designed to meet relevant portions of the closure regulations pursuant to Part 115, Solid Waste Management, of the NREPA. The cap will consist of the following components from bottom to top:

   - A selected granular fill layer approximately six inches thick is to be placed on top of the landfill as a suitable subgrade for the cap. Clean granular fill from an off-site source, having a minimum hydraulic conductivity of 1×10^{-3} centimeters per second, will be used to construct the layer.
   - A geomembrane liner (barrier layer) of 30-mil-thick polyvinyl chloride (PVC) or its equivalent, as approved by the lead agency, will be placed over the granular fill. The PVC geomembrane liner will act as a barrier to minimize infiltration or precipitation into the residuals. The most appropriate liner

material shall be determined in the RD and must be approved by the lead agency.

- A general fill layer (protective layer) 24 inches thick will be placed above the 30-mil PVC geomembrane liner. The protective layer will be capable of sustaining the growth of non-woody plants and has adequate water-holding capacity. The water that accumulates within this layer will drain to a ditch or a sedimentation outlet structure and will be subsequently discharged into the Kalamazoo River.
- A vegetative layer six inches thick will be placed over the protective layer. This layer will be designed to promote vegetative growth, provide surface water runoff, and minimize erosion.

6. Following the completion of the RA, an appropriate groundwater monitoring network will be installed, and long-term groundwater monitoring will be performed in accordance with an approved monitoring plan. Wells no longer in use are to be properly abandoned. Monitoring of the groundwater aquifer under the landfill will be conducted in accordance with Part 201, Environmental Remediation, of the NREPA, and the TSCA (40 CFR Section 761.75(b)(6)).
7. Short-term surface water monitoring will be conducted during excavation activities in accordance with a lead agency-approved monitoring plan.
8. Deed restrictions, approved by the lead agency, that are necessary to appropriately restrict future land use pursuant to Section 20120(1)(i) of the NREPA will be imposed on the landfill portion of the 12th Street OU-4.
9. A fence will be constructed to enclose the landfill. Additionally, permanent markers and approved warning signs will be placed around the perimeter of the landfill as required by Part 201, Environmental Remediation, of the NREPA.

   The fence was constructed along the south portion of the landfill only to allow for future use of the property for recreational uses.
10. Provisions for long-term maintenance and post-closure care, approved by the lead agency, will be implemented.

2.3.3 FINAL LANDFILL COVER SYSTEM DESIGN MODIFICATION

During the development of the Final Design Report, several modifications were made to the design of the final cover system from the cover system components outlined in the ROD. These modifications were documented in the Final Design Report and approved by U.S. EPA as part of the final design approval prior to implementation of the RA. The

following presents a summary of the main components of the final cover system and any modifications that were made to the design in the Final Design Report.

- A 6-inch select granular fill layer placed on top of the landfill as a suitable subgrade material for the final cover and a gas venting layer for the passive gas venting system. This layer is capable of collecting landfill gas and conveying it to the passive venting system. Granular fill, from an off-Site source, having a minimum hydraulic conductivity of 1×10^{-2} centimeters per second (cm/s), and not containing gravel retained on the Number 4 sieve (for protection of the 40-mil linear low-density polyethylene [LLDPE] geomembrane above) was used to construct the fill layer.

  It should be noted that the design hydraulic conductivity of 1×10^{-2} cm/s for the gas venting layer does differ from the value of 1×10^{-3} cm/s provided in Consent Decree, Appendix A (Record of Decision), item 5, first bullet. This increase in hydraulic conductivity provides a factor of safety over that previously specified, as well as greater pore spacing for the free movement of potential gas generation.

- A 40-mil thick textured LLDPE geomembrane liner (barrier layer) was placed over the select granular fill. The geomembrane liner acts as a barrier to minimize infiltration of precipitation into the residuals.

  In lieu of the PVC liner specified in the ROD, use of the 40-mil thick textured LLDPE geomembrane was proposed, and preliminarily accepted by the U.S. EPA in 2008. LLDPE meets the relevant portions of the Michigan solid waste management closure regulations pursuant to Part 115 and has a hydraulic conductivity on the order of 4.0 x 10-13 cm/s (Giroud and Bonaparte, 1989; as presented in U.S. EPA, 1994). In comparison, the hydraulic conductivity of PVC is on the order of 2.0 x 10-11 cm/s.

  Because PVC geomembrane is only manufactured as a "smooth" material, it does not develop a high interface friction range or adhesion with soil or other synthetic materials (e.g., non-woven geotextile). This makes it difficult to create stable final slopes at the proposed 4H:1V to 5H:1V grades. Because an LLDPE geomembrane can be manufactured as a "textured" material, it is a more appropriate alternative for the steep side slopes of the 12th Street Landfill. Using a textured LLDPE geomembrane improves the interface friction angle and the adhesion between the geomembrane and the soil or synthetic material, while still providing an effective barrier to infiltration. This increases the factor of safety against slippage along the liner/soil interfaces and ultimately provides more stable final cover slopes.

  As part of the pre-design geotechnical investigation, direct shear box testing was performed to determine the factor of safety against slippage along the critical geosynthetic (geomembrane/soil, geomembrane/geotextile, and geotextile/soil) and soil interfaces. The shear box testing utilized specific soil and geosynthetic materials

that would be used for the 12th Street Landfill remedial action to represent the critical interfaces within the 12th Street Landfill final cover system. The resultant calculations determined the factors of safety above on the 4H:1V landfill side slopes for the modeled "worst-case" conditions. The factors of safety for generally accepted geotechnical practice are 1.5 for "normal conditions" and 1.3 for "worst-case conditions."

Direct shear testing was performed prior to construction to determine site-specific values for the paper sludge/geocomposite drainage net, paper sludge/40-mil LLDPE textured geomembrane, geocomposite drainage net/40-mil LLDPE textured geomembrane, 40-mil LLDPE textured geomembrane/12-ounce non-woven geotextile, and the 12-ounce non-woven geotextile/select aggregate fill interfaces. The resultant interface slope stability calculations incorporating the direct shear box testing results were submitted to the U.S. EPA.

- A geocomposite drainage material (geonet) was placed above the 40-mil thick textured LLDPE geomembrane liner. A geonet typically conveys infiltrating surface water off of the final cover system more effectively than aggregate material. Also, a geonet comes with geotextile fabric surrounding the plastic grid core, so a separate geotextile fabric was not required (with separate geotextile) or the alternative geonet.
- A 24-inch thick general fill layer was placed above the geonet. This protective layer is capable of sustaining the growth of non-woody plants and has adequate water-holding capacity.
- A 6-inch thick vegetative layer was placed over the protective layer. This layer promotes vegetative growth, promotes surface water runoff, and minimizes erosion.

3.0 SUMMARY OF THE COMPLETED RA/CONSTRUCTION ACTIVITIES

The following sections discuss the completion of the RA activities in accordance with the Final Design Report. The completion of the RA activities was conducted in general accordance with the project schedule included in the Final Design Report. The RA completion schedule is presented as Figure 3.1 in this report. Site activities began in April 2010, which include the Site preparation activities discussed below. The majority of the construction activities for the selected RA were completed by December 1, 2010. Based on field conditions, additional excavation of PCB impacted paper residuals from the adjacent asphalt plant were continued in December through to early January 2011. Additional Site maintenance, restoration, and monitoring activities were completed between January and May 2011.

The following major RA activities were completed by the remedial contractor, CRA Services, as part of the implementation of selected remedy in accordance to the Final Design Report and the CD:

1. Pre-Mobilization Items
    a. Shear Vane Field Testing of the Paper Residuals and Berm Material
    b. Slope Stability Evaluation
    c. Landfill Gas Evaluation
2. Site Preparation Activities
    a. Mobilization and Project Start-up
    b. Removal of Existing Groundwater and Landfill Gas Monitoring Wells and Leachate Wells
    c. Clearing and Grubbing the Site
    d. Disposal of Surface Debris Including Abandoned Drums
    e. Leachate Collection and Evaluation
3. Excavation of Paper Residuals Outside the Landfill Footprint
    a. Excavation of Paper Residuals from the MDNR Property
    b. Excavation of Paper Residuals in Wetland North of Landfill
    c. Excavation of Paper Residuals on the Asphalt Plant Property
    d. Verification Soil Sampling on the MDNR and Asphalt Plant Properties
    e. Restoration of Disturbed Areas

4. Landfill Grading
    a. Grading Plan
    b. Global Slope Stability Evaluation
    c. Existing Slope Stability Evaluation During Excavation
5. Equipment Decontamination
6. Installation of Final Landfill Cover System
7. Surface Water Management
8. Landfill Gas Management
    a. Passive Landfill Gas System
9. Access/Ditch Road
10. Institutional Controls
    a. Deed Restrictions
    b. Fencing and Gate
11. Installation of Groundwater Monitoring Well Network

The above noted RA activities were completed in accordance to the CD and the Final Design Report, which included the technical specifications, performance standards, and construction quality assurance plans. A detailed description of the completed RA activities, including any modifications is discussed throughout the following sections of the report.

Photographs were taken throughout the construction activities and are maintained in the Site/project files. An aerial photographic log of key milestones completed during the RA activities is included as Appendix B.

3.1 PRE-CONSTRUCTION MEETING

In accordance with the CD and RAWP, during the implementation of the Site preparation activities, a Pre-Construction Meeting was held on May 6, 2010. Attendees included members of U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, CRA, CRA Services, and InspecSol. The pre-construction meeting identified and established Site protocols for the following:

- Health and Safety Implementation, including a review of the Health and Safety Plan (HASP), and the Safety Protocols for Site visitors
- Site Security for each phase of the RA implementation and the establishment of a Site visitor daily log
- Progress of work completed to date
- Progress schedule and upcoming work tasks
- Methods for the documentation and reporting Site data
- Methods for distributing Site documents and reports
- Design modification, including an update on the Proctor testing results
- Quality Assurance Project Plan (QAPP) amendment

A Site walk-through with all attendees was then conducted.

3.2 SUMMARY OF PRE-CERTIFICATION INSPECTION

In accordance with the CD, a Pre-Certification meeting and Site inspection was held on November 16, 2010. Participants in the meeting included, U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, CRA, and CRA Services. The purpose of the Pre-Certification Inspection was to document with U.S. EPA and MDEQ the majority of completion of all phases of the OU-4 RA (excluding the Operations, Maintenance and Monitoring [OMM] activities), and ensure that all activities were fully performed and the OU-4 performance standards have been attained.

The meeting included a complete walk of the entire Site by all participants, including the top of the landfill, landfill perimeter, and storm water drainage systems. The following observations/areas requiring corrective measures were noted:

- Complete final dressing of topsoil over landfill.
- Installation of a staff gauge within the Kalamazoo River. The installation of a staff gauge was discussed and determined to be postponed until spring 2011. In the meantime, CRA took readings from the staff gauge currently installed within the Kalamazoo River at the southeast corner of the Site.
- Increase the stack height of each landfill gas vent by two feet, per the design specifications.

- Complete seeding of the entire landfill surface, followed by the installation of erosion control matting along the 4H:1V side slopes, drainage swales, and the storm water drainage ditches.
- Installation of a Site fence, including gates/pedestrian access points at the south and southeast entrances to the Site.
- Installation of silt fence as specified in the Final Design. CRA and MDEQ discussed the requirement of the silt fence along the east boundary of the Site, adjacent to the Kalamazoo River. It was determined that the silt fence would not be required for this portion of the Site.
- General housekeeping and Site clean-up prior to demobilization activities.
- Demobilization of U.S. EPA/CH2MHill Site trailer.
- Relocate CRA Engineering trailer to the Wyoming Asphalt Plant Property.
- Design permanent Site markers for review by U.S. EPA and MDEQ, prior to installation of Site signs.
- Installation of groundwater monitoring wells and gas probes.

Following the Site walk, all parties discussed the installation of the groundwater monitoring wells, and U.S. EPA and MDEQ requested that groundwater monitoring wells to be located within the north wetlands, be constructed on an elevated platform, due to the low-lying area and the season high water level within the wetlands. U.S. EPA stated that they would provide additional direction regarding the wetland platforms.

3.2.1 SUMMARY OF PRE-CERTIFICATION INSPECTION CORRECTIVE MEASURES

Subsequently, to address the observations made during the Pre-Certification Inspection, CRA completed the following corrective measures in the Spring of 2011:

- The final dressing of the topsoil over the landfill was completed.
- A staff gauge was installed within the Kalamazoo River.
- The stack height of each landfill gas vent was increased by 2 feet, per the design specifications.
- The landfill surface was seeded. Following the completion of the seeding activities, erosion control matting was installed along the 4H:1V side slopes, drainage swales, and the storm water drainage ditches.

- A Site fence was installed at the Site, including gates/pedestrian access points at the south and southeast entrances to the Site.
- General housekeeping and Site clean-up activities were conducted prior to demobilization activities.
- The U.S. EPA/CH2MHill Site trailer was demobilized.
- The CRA Engineering trailer was relocated to the Wyoming Asphalt Plant Property.
- Permanent Site markers have been designed for review by U.S. EPA and MDEQ.
- Groundwater monitoring wells and gas probes were installed at the Site.

3.3 SUMMARY OF FINAL-CERTIFICATION INSPECTION

In accordance with the CD, a Final Certification meeting and Site inspection was held on September 29, 2011. Participants in the meeting included, U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, CRA, and CRA Services. The purpose of the Final Certification Inspection was to document with U.S. EPA and MDEQ the completion of all phases of the OU-4 Remedial Action (excluding the OMM activities), and ensure that all activities were fully performed and the OU-4 performance standards have been attained.

The meeting included a complete walk of the entire Site by all participants, including the top of the landfill, landfill perimeter, and storm water drainage systems. In general, the landfill cover system and storm water drainage systems were observed to be in good condition after the first full growing season. However, some repairs/reseeding was required to ensure that the cover system continues to perform as designed. The top portion of the landfill has been cut once this past growing season to maintain the cover system. The following observations/areas requiring corrective measures were noted:

- North side toward Kalamazoo River, section of exposed soil requires reseeding. This area was a repair area from the spring, where seeding had not been established over the summer, and was reseeded following the Final-Certification Inspection.
- Undercutting of the geotextile was observed in some locations along the base of the landfill starting along the north side and continuing around the landfill to the west side. These areas required repair and reseeding.
- Exposed geotextile was observed in several locations of the landfill, particularly along edges of the drainage swales. These areas required additional cover and reseeding.
- The two piles of extra topsoil located on the top of the landfill should be spread out in the area near the gate and reseeded.

- It was noted that sufficient vegetative cover has been established such that the silt fencing around the landfill can be removed.
- Straw bales used as check-dams in drainage swales during construction should be removed, with the exception of the straw bales along the south side of the landfill (near 12th Street) can remain in place provided the rebar is removed.

Following the Site walk, all participants reconvened at the Plainwell Mill for further discussion of the actions items identified above. In addition, Site signage and permanent markers were discussed. Following the Final Certification Inspection, Weyerhaeuser will propose language and design the details to be included on Site signs to be installed every 200-ft around the perimeter of the landfill, for approval by U.S. EPA and MDEQ. In addition, U.S. EPA and MDEQ informed Weyerhaeuser that each party will consult internally and inform Weyerhaeuser of specific requirements for the permanent Site markers, previously approved on other projects and all other OUs related to the Site.

The final point of discussion included the submittal of the April 2011 Groundwater Data memorandum, the specific criteria to be used in the future groundwater data screening, and the implementation of the quarterly groundwater monitoring activities, included in the May 2011 version of the OMM Plan, until such time that the OMM Plan has been approved. During the Final Certification inspection, MDEQ stated that they have completed their review of the OMM Plan; however, U.S. EPA requires additional time to complete their review. As part of the April 2011 groundwater data memorandum, U.S. EPA and MDEQ requested to see further data for the Site and requested that a data validation memorandum be performed. CRA completed the data validation and provided a summary memorandum as an attachment of the Final Certification Meeting Minutes to all parties. A detailed discussion of the data validation and upcoming OMM activities is provided in Sections 4.2 and 7.4, respectively.

3.3.1 SUMMARY OF FINAL-CERTIFICATION INSPECTION CORRECTIVE MEASURES

Subsequently, to address the observations made during the Final-Certification Inspection, CRA completed the following corrective measures during October and November 2011:

- Additional reseeding was completed at the north side of the landfill, toward the Kalamazoo River, in a section of the landfill that was observed to have exposed soil.

- Repairs were made to areas located along the base of the landfill, specifically located along the north and west sides of the landfill, where geotextile was observed. Repairs included additional cover, grading, and reseeding.
- In addition CRA inspected the entire landfill area for areas with exposed geotextile, particularly along edges of the drainage swales. These areas were repaired by the addition of cover material, grading and were reseeded.
- The two piles of topsoil located on the top of the landfill have been partially spread out in the area near the gate and reseeded. The remaining soil will be spread out in the spring/summer and reseeded.
- Based on the sufficient vegetative cover established across the majority of the landfill, the silt fencing around the landfill was removed, in accordance with direction from U.S. EPA and MDEQ.
- Straw bales used as check-dams in all drainage swales including rebar, have been removed.

A photographic log documenting the final corrective measures taken to repair the above noted items is presented in Appendix C.

3.4 AS-BUILT DRAWINGS

A set of As-Built Drawings for the completion of the OU-4 RA were prepared based on the Final Design Drawings, recorded field observations and measurements, and survey information taken during the implementation of the RA activities. The As-Built Drawings, signed and stamped by a professional engineer are enclosed with this report and are as follows:

- Drawing C-01 Overall Site Plan
- Drawing C-02 Subgrade Contours
- Drawing C-03 Passive Gas Management System
- Drawing C-04 Liner Placement
- Drawing C-05 Final Contours
- Drawing C-06 Cross Sections I
- Drawing C-07 Cross Sections II
- Drawing C-08 Toe of Slope Details
- Drawing C-09 Erosion Control Measures

- Drawing C-10 Excavation Areas
- Drawing C-11 Typical Details I
- Drawing C-12 Typical Details II

The As-Built Drawings were prepared based on surveying conducted by a Michigan licensed surveyor and QC/QA field measurements and verifications. The As-Built Drawings were reviewed by professional engineers of record.

The As-Built Drawings included in this report represent the final construction and the final conditions following the implementation of the RA. They are not intended to document the changes made during the RA implementation but are rather a resource of the final configuration for future reference, and, therefore, the modifications have not been highlighted or referenced on the Drawings. Changes to the design are discussed through this report and, in particular, in Section 3.7. Given that the As-Built Drawings reflect documentation of final conditions and are not engineering designs, it is not necessary for the Drawings to be stamped by a Professional Engineer.

3.5 EXCAVATION OF PAPER RESIDUALS OUTSIDE THE LANDFILL FOOTPRINT

The areal limits of visible paper residuals outside the footprint of the landfill included the following areas:

- MDNR Property
- Wetlands to the north of the landfill
- Asphalt Plant Property

The areal limits of visible paper residuals outside the footprint of the landfill were previously delineated based on information obtained by Geraghty and Miller and the U.S. EPA in 1994 and 2003, respectively (G&M, 1994b and U.S. EPA, 2004), and were refined based on the findings of the pre-design investigation performed by Weyerhaeuser in 2008. The intent of the RA was to excavate the paper residuals with the actual limits of excavation based on a combination of visual evidence and confirmatory sampling. It was not necessary to verify the assumptions used to develop the volumes prior to conducting the RA. The actual extent was determined during the excavation activities.

The excavation of paper residuals located outside the landfill footprint began on May 20, 2010. As per the Final Design Report, excavation activities for the limits of visible paper residuals located on the MDNR property, the north wetland area, and the initial estimated extent of residuals located on the adjacent asphalt plant property were completed by August 27, 2010. Based on field observations and verification analytical results, additional delineation and excavation of paper residuals located on the asphalt plant property was required. Further details of this additional delineation and excavation are provided in the subsequent discussion of Section 3.6.1.4 regarding the excavation activities on the Asphalt Plant Property.

3.5.1 EXCAVATION OF PAPER RESIDUALS ON THE MDNR PROPERTY

Paper residuals on the MDNR property were excavated and relocated within the proposed limits of the landfill. Initially the delineation of the paper residuals was based on visual confirmation, followed by verification soil sampling as described in the Final Design Report and the RAWP. The paper residuals were placed within the landfill in lifts not exceeding 12 inches. The excavation activities on the MDNR property were completed on June 29 and June 30, 2010.

Drawing C-10 (and Figure 4.1) shows the final limits of the excavation of the paper residuals on the MDNR property. Figure 3.2 shows the surveyed excavated area on the MDNR property. As shown on Figure 3.2, the surveyed excavation area on the MDNR property is represented as Area 7. Table 3.1 shows the amount of paper residuals removed from each distinct area, as provided by the surveyor. Based on the previous investigations and the more recent topographic and property survey information, the approximate quantity of paper residuals located on the MDNR property was estimated to be 400 to 500 cubic yards (CY). As shown on Table 3.1, the total volume of excavated paper residuals from the MDNR property was approximately 581 CY. This includes the initial excavation of paper residuals, as well as the excavation activities due to inclement weather, as described in Section 3.6.1.2. Based on field observations, an estimated 75 percent of the total volume of paper residuals excavated from the MDNR property was removed during the initial excavation activities at the MDNR property. Given a total volume of 581 CY, an estimated 435.5 CY of material were removed during the initial excavation activities over a surveyed area of 5,002 square feet.

As documented in the pre-design studies included in the Final Design Report, paper residuals on the MDNR property were visible on the ground surface, or covered with a thin (less than approximately 1-inch thick) layer of vegetated debris (e.g., decaying leaves and branches mixed with occasional topsoil). The paper residuals were light gray

and overlaid poorly graded yellowish-brown sand, and were less than 6 to 8 inches thick. Paper residuals were easily distinguishable from the native soil (grayish-brown topsoil and yellowish-brown sand) based on color and consistency. The water table on the MDNR property is more than 6 feet below ground surface (bgs), and was not encountered during the excavation activities.

Based on field observations and verification soil sample results, the final delineated limit of paper residuals did not significantly encroach into the landfill slope to the north. Therefore, no significant removal of the landfill slope to the north or west was required.

As part of the Final Design Report, the requirements for verification sampling were in accordance with Michigan Part 201 Generic Residential Cleanup Criteria (GRCC) pursuant to the MDEQ's Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (STM; MDEQ-2002). Based on the MDEQ STM guidance, a total of 10 verification soil samples (nine investigative verification soil samples and one duplicate soil sample) were collected from the MDNR property. Verification soil samples were containerized in laboratory supplied containers and shipped under chain of custody protocols to Colombia Analytical Services Laboratories (CAS), an approved laboratory identified in the QAPP, for chemical analysis for PCBs. Based on the analytical results, the visible paper residuals located on the MDNR property were adequately removed and relocated in the landfill. No further action would be required on the MDNR property. The verification soil sampling results are discussed in detail in Section 4.1 of this report.

3.5.2 EXCAVATION OF PAPER RESIDUALS ON MDNR PROPERTY DUE TO INCLEMENT WEATHER

Following heavy rainfall events in early August 2010, additional excavation and cleanup of graded paper residuals from the MDNR property was required. In one instance, previously excavated MDNR paper residuals were washed down the grubbed and re-graded landfill side slope onto the MDNR property as a result of a sudden heavy rain event (approximately 1.75 inches of rain within 30 minutes). Soils washed over two rows of silt fence. The wash-out area was removed and graded. Following the repair activities, the area was surveyed to verify the total number of additional verification soil samples that were collected. Based on the survey information the wash-out area was 1,671 square feet in size. Drawing C-10 (and Figure 4.1) shows the final limits of the additional excavation of the paper residuals on the MDNR property due to inclement weather. The residuals from the wash-out area were not surveyed to determine a volume. The extent of the additional excavation was based on visual observations, and

the number of verification soil locations was determined based on the total area. The total volume of paper residuals removed from the MDNR property was 581 CY, as stated in Section 3.6.1.1. Based on field observations, an estimated 25 percent of the total volume of paper residuals excavated from the MDNR property was removed during the additional excavation activities at the MDNR property due to inclement weather. Given a total volume of 581 CY, an estimated 145.5 CY of material were removed during the additional excavation activities due to inclement weather over a surveyed area of 1,671 square feet.

It should be noted that work was temporarily stopped at the Site for three days due to this single storm event. Site activities were limited to inspection and maintenance of soil erosion and sedimentation controls. A detailed discussion of the verification soil sampling activities is included in Section 4.1 of this report.

3.5.3 EXCAVATION OF PAPER RESIDUALS IN WETLAND NORTH OF THE LANDFILL

Paper residuals on the 12th Street Landfill property located in the wetland north of the landfill property were excavated and relocated within the proposed limits of the landfill. The delineation of the paper residuals was based on visual confirmation as described in the Final Design Report and the RAWP. The paper residuals were placed within the landfill in lifts not exceeding 12 inches. The excavation activities in the north wetlands were completed from May 20, 2010 through to July 10, 2010. In accordance to the Final Design Report and the RAWP, no soil verification sampling was performed on the 12th Street Landfill property.

The surveyed areas where paper residuals were excavated from the wetlands to the north of the landfill are shown on Drawing C-10. The wetland was surveyed in eight distinct areas as shown on Figure 3.2. Areas 1, 2, 3, 4, 5, 6, 8, and 9 comprise the surveyed area in the wetland to the north of the landfill. Table 3.1 shows the amount of paper residuals removed from each distinct area, as provided by the surveyor. Based on the previous investigations and the more recent topographic and property survey information, the approximate quantity of visible paper residuals located on the wetland north of the landfill was estimated to be 2,000 to 2,500 CY. The actual quantity of paper residuals removed from the wetland to the north of the landfill and relocated in the proposed limits of the landfill was 1,255 CY over a surveyed area of 18,828 square feet.

As documented in the Final Design Report, including the pre-design studies report (RMT, 2008b), on the eastern half of the excavation areas, where present, paper residuals

were visible on the ground surface, or covered by a thin (less than approximately 1 inch thick) layer of vegetative debris (i.e., decaying leaves and branches mixed with occasional topsoil). Paper residuals were observed to be light gray, overlying topsoil or poorly graded yellowish-brown sand, and a maximum of approximately 8 inches thick. Paper residuals were easily distinguishable from the native soil (dark-gray topsoil and yellowish-brown sand) based on color and consistency. Groundwater was found to be at or slightly below the ground surface in this area. Therefore, during the excavation activities in the eastern portion of the north wetlands, a sump was created within the excavation to divert water from the visible paper residuals.

The underground oil/natural gas pipeline described in the Final Design Report was located in the northeast wetland, where paper residuals were excavated. Historical aerial photographs suggest that paper residuals were placed over the pipeline. Major Pipeline was contacted to mark the location of the pipeline in the field prior to work near the pipeline. CRA Services excavated a test pit to locate the pipeline prior to starting the excavation of visible paper residuals in the wetland north of the landfill. The pipeline was located at a depth of approximately 5 feet below ground surface (bgs), within a native layer of peat below the visible paper residuals. Paper residuals in the vicinity of the pipeline were observed to be approximately three feet thick. Although the pipeline was buried below (not within) the paper residuals, work in the vicinity of the pipeline proceeded cautiously using hand-shoveling to locate the pipe, as needed.

Paper residuals in the western half of the excavation area were either at the ground surface or covered with approximately 0.5 to 1.0 feet of organic topsoil and wetland vegetation. The paper residuals were observed to be gray, they overlaid a yellowish-brown clayey organic soil or dark brown peat, and they were approximately three feet thick adjacent to the landfill and became thinner (less than 1/2-inch) near the limits of identified extent of visible paper residuals. In general, paper residuals were easily distinguishable from the native soil based on color and consistency. However, at certain locations in the western portion of the north wetlands, paper residuals were found to be present in 0.25 inch diameter grey fibrous balls, which were intermixed with the native topsoil or peat layer. The overall extent of the visible paper residuals delineated in the north wetland varied in portions of the wetland, compared to the original approximate delineation that was estimated in the Final Design Report. However, the overall quantity of material removed from the wetland to the north of the landfill was less than originally estimated.

The sidewalls of the excavation along the landfill were shallow (less than four feet) and graded to a slope of 4H:1V to maintain the stability of the excavation and the landfill.

The excavation of the wetlands to the north of the landfill, proceeded from east to west. Groundwater was encountered at approximately one to two feet bgs within the majority of the wetland excavations. In order to address the presence of groundwater within the excavation, CRA Services completed the excavation in a step-wise manner, excavating only small portions of the wetland at one-time, leaving small soil berms between portions of the wetlands to containerize infiltrating groundwater. This process ensured that groundwater did not flow from an active (dirty) excavation area into a completed (clean) excavation area, potentially re-contaminating completed areas. As the excavation progressed westward, the containerized groundwater was pumped from the remaining excavations areas at the northwest corner of the landfill, to the on-Site wastewater treatment plant. A detailed description of the wastewater treatment plant and subsequent off-Site disposal of treated effluent is included in Section 3.7.2 of this report.

In addition, saturated paper residuals excavated from below the water table were temporarily stockpiled immediately adjacent to the excavation area (within the silt fencing and along the toe of the landfill side slope), where the material was allowed to dewater (excess water drained, via gravity-drain, back into the excavation) prior to being transported to the proposed placement area on the landfill. After being transported to the landfill, to ensure the paper residuals were dry enough to adequately support additional fill, the paper residuals were spread in thin lifts (not exceeding 12 inches), mechanically tilled with an agricultural tiller, and allowed to air-dry.

3.5.4 EXCAVATION OF PAPER RESIDUALS ON THE ASPHALT PLANT PROPERTY

Paper residuals on the asphalt plant property were excavated and relocated within the proposed limits of the landfill. Initially the delineation of the paper residuals was based on visual confirmation, followed by verification soil sampling as described in the Final Design Report and the RAWP. The paper residuals were placed within the landfill in lifts not exceeding 12 inches. The excavation activities on the asphalt plant property began on July 10, 2010 and continued through to August 27, 2010, with the excavation of the initial estimated extent of residuals. Based on field observations and verification analytical results, additional excavation of paper residuals located on the asphalt plant property was required. A portion of this additional excavation was completed from August 30, 2010 through to September 13, 2010. Due to the extent of the additional excavation and the close proximity to the active asphalt plant property operations, excavation activities were suspended until the asphalt plant's operations were shut down for the winter season. The remaining excavation activities were completed

between December 15, 2010 and January 18, 2011, which are discussed in Section 3.7.2. Drawing C-10 (and Figure 4.2) shows the final limits of the excavation of the paper residuals on the asphalt plant property during the summer excavation activities. Due to the project schedule and temperature effects on the liner, the landfill cap construction was continued during the excavation hiatus on the Asphalt Plant Property.

Based on the previous investigations and the more recent topographic and property survey information, the approximate quantity of paper residuals located on the asphalt plant property was estimated to be approximately 7,500 CY. Initially, the area on the asphalt plant property that required excavation was divided into two areas based on site features. The northern portion of the excavation area was located in the wetland that extends north of both the asphalt property and the landfill. The southern excavation area included a portion of the western landfill sideslope, the flatter area directly west of the landfill sideslope, a paved area, and the asphalt berm area.

Based on the inclement weather and field conditions encountered, which resulted in the presence of standing water during the asphalt plant excavation activities, a topographic survey of the floor of the actual asphalt plant excavation area was not possible; however, the top of each excavation area was surveyed. The asphalt plant was surveyed in four distinct areas, as shown on Figure 3.2. Areas 10, 11, 12, and 13 comprise the surveyed area in the asphalt plant. Table 3.1 presents the square footage of each area. In total, the initial portion of the asphalt plant property excavation was surveyed and determined to be approximately 26,240 square feet. Based on the field observation that the excavation depths in the asphalt plant averaged approximately 7-8 feet, an estimated 196,800 cubic feet of material (approximately 7,300 CY) were excavated from the asphalt plant during initial excavation activities at the asphalt plant, which is consistent with the estimated quantity of 7,500 CY.

During the course of the asphalt plant excavation activities, no unexpected materials were found. However, as the excavation progressed south from the wetlands located to the north of the landfill, towards the active asphalt plant operations, the visible paper residuals characteristics changed from a grey fibrous material to a grey/blue/green silty material. As the visible paper residuals were observed to change in characteristics, the silty material was sampled, as part of the verification soil sampling activities, in order to determine the presence of PCBs. Based on the analytical results, the presence of PCBs was confirmed and excavation activities continued westward from the landfill. As the excavation progressed westward, the silty paper residuals were found at varying depths below the asphalt layer. In some cases near the asphalt plant trailers, silty paper residuals were found between the surface asphalt and a secondary subsurface layer of asphalt. The thickness of the silty material varied between less than 0.25 inches and

3.5 feet, in various areas of the asphalt plant property. The source of the silty material was not determined during the course of the RA. However, due to the presence of PCBs and in accordance with the CD, the material was removed and either incorporated into the landfill or transported off-Site for disposal.

As part of the Final Design Report, the requirements for verification sampling were in accordance with Michigan Part 201 GRCC, pursuant to STM; MDEQ-2002. Based on the MDEQ STM guidance, a total of 22 verification soil samples were collected from the asphalt plant property during the summer excavation activities. Verification soil samples were containerized in laboratory supplied containers and shipped under chain of custody protocols to CAS for chemical analysis for PCBs and volatile organic compounds (VOCs). Based on the analytical results the visible paper residuals located on the asphalt plant property were adequately removed and relocated in the landfill or disposed of off-Site at a certified landfill. No further action would be required on the asphalt plant property. The verification soil sampling results are discussed in detail in Section 4.1 of this report.

3.5.5 RESTORATION OF DISTURBED AREAS

Once it was determined that the data quality objectives from the verification soil sampling had been met on the MDNR property, the wetlands located to the north of the landfill, and the asphalt plant property, the disturbed areas were restored to a condition agreed upon between Weyerhaeuser and the MDNR and Wyoming Asphalt, as appropriate. For all excavated areas this included the placement of clean backfill, as needed, and new asphalt, as appropriate, to promote positive drainage from the disturbed areas and the establishment of vegetation, where required. The wetlands were restored in accordance with the design specs. The excavation areas were backfilled with engineered wetland fill material and the wetland vegetation was allowed to reestablish itself. Annual rye was planted to establish erosion control vegetation while allowing nature wetland vegetation to reestablish.

The approved backfill materials met the design specifications, in order to sustain similar vegetation to what exists adjacent to the excavation areas. All areas were seeded and revegetated, in accordance with the Final Design Report. Based on the pre-construction Site conditions, MDNR did not require the replacement or addition of any trees along the MDNR property.

3.6 FINAL LANDFILL COVER SYSTEM CONSTRUCTION

Prior to constructing the final cover over the 5H:1V eastern sideslope, the existing 6-inch thick layer of topsoil along with the turf reinforcement mat (Enkamat®) that was installed during the Emergency Action in 2007, were removed. The topsoil and Enkamat® were installed as an interim measure until the final cover was constructed.

The riprap and the clay barrier layer installed during the Emergency Action in 2007 remained in place. The riprap and the clay barrier layer are permanent measures that were not removed during the Remedial Action. Installation of these measures as part of the Emergency Action allowed for the rest of the final cover system to be installed above the elevation of the 2-year flood event (approximately 702.5 feet M.S.L.)

The final cover was installed over approximately 6.8 acres of the 12th Street Landfill as shown on As-Built Drawings C-02 through C-08. The final cover components were placed in accordance with the requirements of the CQAP and the Specifications as discussed in Section 5.0, and consisted of the following components from bottom to top:

- A 6-inch select granular fill layer placed on top of the landfill as a suitable subgrade material for the final cover and a gas venting layer for the passive gas venting system. This layer is capable of collecting landfill gas and conveying it to the passive venting system.
- A 40-mil thick textured LLDPE geomembrane liner (barrier layer) placed over the select granular fill. The geomembrane liner acts as a barrier to minimize infiltration of precipitation into the residuals.
- A geocomposite drainage material (geonet) placed above the 40-mil thick textured LLDPE geomembrane liner. The geonet has geotextile fabric surrounding the plastic grid core, so a separate geotextile fabric was not required.
- A 24-inch thick general fill layer placed above the geonet. This protective layer is capable of sustaining the growth of non-woody plants and has adequate water-holding capacity.
- A 6-inch thick vegetative layer placed over the protective layer. This layer promotes vegetative growth, surface water runoff, and minimizes erosion. The vegetative growth consists of a mix of grasses and forbes (flowering plants) native to the area.

The final cover along the Kalamazoo River was tied into the clay barrier layer. The portion of the clay barrier layer that was disturbed as a result of tying the geomembrane barrier layer into the clay barrier layer was reconstructed and tested in accordance with the CQAP and the Specifications. Prior to the connection of the final cover to the clay barrier layer along the Kalamazoo River, the portion of the north slope extending

beyond the north limit of the previously constructed 5H:1V eastern sideslope (part of Emergency Action in 2007) was relocated back on to the 12th Street Landfill during the other off-Site material (paper residuals) relocation activities.

On October 25 and 26, 2010, during the cover system construction activities, significant storm events occurred which caused the erosion of clean general fill material into the constructed swale along the MDNR property and ultimately releasing a small amount of clean fill material into the Kalamazoo River. Following consultation with U.S. EPA and MDEQ, it was agreed that as much of the material as possible would be removed from the bank of the Kalamazoo River. It was noted during a Site inspection by MDEQ on October 28, 2010 that it was not necessary to install a silt curtain or other control device in the river to prevent discharge of turbidity because such devises would have limited effectiveness at this locations. CRA proceeded to remove as much of the material as possible from the area of impact, however, the existing riprap was not removed as part of the work so as to avoid encountering any sediment material so some fine materials in the void spaces remained. The general fill material was placed back on the landfill as part of the grading activities. A photographic log of the removal activities is provided in Appendix P.

3.6.2 EROSION PROTECTION AND CONTAINMENT SYSTEM

In accordance with the Final Design Report and Construction Specifications, erosion protection was installed over portions of the final cover system to provide erosion protection while the vegetative cover system is fully established as shown in As-Built Drawing C-09. North American Green SC-150 was installed in all approved locations. In addition, based on the project delays encountered and due to inclement weather conditions, additional erosion control matting was installed at the Site, as a proactive approach to ensure minimal erosion damage throughout the fall, winter, and spring thaw.

The area adjacent to the TCRA area was previously covered with Enkamat. This material was removed during the grading activities and replaced with North American Green SC-250 erosion control blanket upon final completion of the project.

As previously discussed in the design modifications section, CRA Services installed the following additional erosion control matting at the Site:

- North America Green DS-150 blanket was installed on the identified 4H:1V side slopes
- North American Green S-150 blanket was installed from the top of outer berm of the drainage swale to the wetland area on the north side of the Site
- North American Green SC-250 was installed within the drainage swales on the north side of the Site
- North American Green SC-250 was installed in place of the Enkamat that was removed during the grading activities

Details on the installation of the erosion protection measures are provided in Section 5.12.

Surface water runoff on the west side of the landfill is directed by a combined access road/ditch that discharges into the on-Site wetland to the north. On the southern landfill slope, surface water is diverted to the east through a shallow ditch that directs surface water around the MDNR property, discharging to the Kalamazoo River. For the northern portion of the 12th Street Landfill, surface water is allowed to sheet flow off the cover system into a combined shallow ditch/access road, with several V-notches in the outside of the ditch to allow discharge of the collected surface water into the wetlands to the north. The geocomposite drainage net that is part of the final cover facilitates drainage of any infiltrating precipitation through the upper layers of the final cover soil to the perimeter ditches.

The storm water ditches were designed to convey the 24-hour/25-year storm event, with additional modeling completed for the 24-hour/100-year storm events. For efficiency, the access road and perimeter ditches have been integrated, which resulted in the dimensions of the road/ditch with a five-foot bottom width and 4H:1V side slopes. The bottoms of the ditches were modeled to include a stone bottom to protect from damage associated with vehicular traffic (ATVs for sampling, etc.) To ensure that the stone material remains in place and does not erode under high flow conditions, a perforated Geoweb® material was incorporated into the granular surface, holding the stone within its "honeycomb" structure.

The ditch outlets consist of depressions approximately every 200 feet along the outside edge of the ditch(es) with the complete outside perimeter along the northern section of the landfill armored with SC-250 to protect against erosion. The ditch outlets discharge to the wetland, with the extreme east end of the perimeter ditches discharging to the Kalamazoo River.

3.7 ADDITIONAL TASKS AND CHANGES TO COMPLETED SCOPE OF WORK RELATED TO THE RA

The following subsections identify additions and/or changes to the scope of work that were completed during the implementation of the RA activities, including design modifications and notifications. The additions and/or changes to the scope were completed following review and received approval from U.S. EPA prior to implementation. The additions and/or changes to the scope are summarized in Table 3.2. Further discussion of the most significant scope modifications is provided below. Related design notifications, design modifications, and associated approval letters are provided in Appendix M.

3.7.1 INSTALLATION OF TEMPORARY LEACHATE EXTRACTION WELLS AND RELATED TEST TRENCHES

As part of the remedial activities conducted at the Site, CRA installed four temporary leachate extraction wells for the purpose of investigating and removing the potential perched leachate in areas of the landfill that historically received construction debris. The leachate extraction wells were installed in lieu of the specified test pits required in Section 6.3.2 of the Final Design Report for the Site, as agreed upon with the U.S. EPA prior to installation. The locations of the leachate extraction wells are identified on Figure 3.2.

The four temporary leachate extraction wells were installed within the identified locations of construction debris, and near the top of the current northwest and southeast side slopes, upgradient of observed leachate seeps emanating from these two side slope areas.

The following includes a summary of the leachate extraction production activities, the leachate seeps characteristics, the installation of the leachate extraction trenches, and provide a secondary review of the slope stability and uplift potential for the landfill. The following was provided to U.S. EPA in a memorandum, dated September 10, 2010, a copy of which is provided in Appendix N.

3.7.1.1 LEACHATE EXTRACTION/COLLECTION ACTIVITIES

The temporary leachate extraction wells (LEW-1 through LEW-4, as shown on Figure 3.3) consisted of 4-inch diameter well screens and risers and were installed to a depth ranging between 15 and 22 feet bgs, with the depths being based on observed subsurface soil conditions. Each leachate well was installed and screened at a depth interval observed to be saturated during the borehole advancement. Since the leachate extraction wells were a temporary installation and the wells were removed prior to construction of the final cover, well details are not included on the As-Built drawings.

Following the installation of the four temporary extraction wells, each well was pumped at various times between August 2, 2010 and August 30, 2010. During the pumping activities, both the hydraulic water levels and the daily quantity of leachate removed were recorded. At the commencement of the pumping activities initial water levels indicated the presence of leachate at three of the four extraction wells (LEW-1, LEW-3, and LEW-4). LEW-2 was determined to be dry, although during the installation of the well, the subsurface soil conditions were noted as being saturated. LEW-2 was inspected daily for the presence of water throughout the pumping activities and continued to remain dry.

Pumping activities commenced at the three active leachate extraction wells. During the ongoing pumping activities, water levels at the three locations were regularly measured. Based on the hydraulic water level data, no appreciable influence or hydraulic conductivity between wells was observed.

During the course of the leachate extraction activities, a total of approximately 1,300 gallons of leachate was removed, treated on Site at the temporary water treatment facility and shipped off-Site to the City of Plainwell Water Renewal Plant.

CRA obtained a Special Use Discharge Permit (Discharge Permit) from the City of Plainwell Water Renewal Plant prior to shipping treated water from the Site. The Discharge Permit was issued on May 26, 2010. The Discharge Permit is included in Appendix F. Prior to the shipment of treated water to the City of Plainwell Water Renewal Plant, each batch of treated water was tested to ensure that the water quality was suitable for discharge. The results of the treated effluent samples are provided in Appendix E. Valley City Environmental hauled the treated water from the Site to the City of Plainwell Water Renewal Plant.

During the first one to two weeks of pumping activities the recharge rate at each active leachate extraction well was not determined, however the total quantity of leachate

removed from each well was noticeably decreasing. During the pumping activities conducted between August 18, 2010 and August 30, 2010, the approximate rates of recharge at each of the three active extraction wells were determined, and these recharge rates are discussed below.

LEW-1:

Between August 2, 2010 and August 16, 2010, leachate was extracted from LEW-1 for a total of six days. Each pumping day during this period, LEW-1 was pumped for approximately 4 hours, generating an average of approximately 45 gallons each day for a total of approximately 275 gallons for the six pumping days. The daily rate of leachate generation at LEW-1 gradually increased each day during this period, however, this was assumed to be related to well maintenance that was conducted at LEW-1 and initial development and clearing of the well screen.

Between August 18, 2010 and August 30, 2010, LEW-1 was pumped for a total of four days. During each day, LEW-1 was pumped for approximately 1.5 hours, initially generating approximately 35 gallons on the first day and gradually decreasing to approximately 10 gallons on the fourth day, for a total of 85 gallons collected during the course of the four pumping days. The time required for LEW-1 to recharge after each pumping event increased during this period of time. Initially, this well recharged in approximately 2 hours, but following these four days of pumping, the recharge time at LEW-1 increased to approximately 8.0 hours.

LEW-3:

Between August 2, 2010 and August 16, 2010, leachate was extracted from LEW-3 for a total of six days. Each pumping day during this period, LEW-3 was pumped for approximately 4.0 hours, generating an average of approximately 55 gallons each day for a total of approximately 275 gallons for the six pumping days. The quantity of leachate extracted each day at LEW-3 fluctuated throughout the first three days of pumping, generating between 40 and 80 gallons per day. By the end of the six days of pumping, the average quantity of leachate extracted was approximately 40 gallons per day.

Between August 17, 2010 and August 30, 2010, LEW-3 was pumped for a total of eight days. During each day, LEW-3 was pumped for approximately 1.5 hours, generating approximately 10 to 15 gallons per day, for a total of approximately 85 gallons during the course of the eight days of pumping. The time required for LEW-3 to recharge after each pumping event increased during this period of time. Initially, the well recharged in

approximately 3.0 hours, but following this eight days of pumping, the recharge time at LEW-3 increased to approximately 6.0 hours. It should be noted that the level of leachate at LEW-3 did not recover entirely to the initial elevation prior to pumping, during most of the pumping events.

LEW-4:

Between August 2, 2010 and August 16, 2010, leachate was extracted from LEW-4 for a total of six days. Each pumping day during this period, LEW-4 was pumped for approximately 4.0 hours, generating approximately 30 gallons each day for a total of approximately 185 gallons for the first six pumping days. The daily rate of leachate generation at LEW-4 remained relatively constant during this pumping period.

Between August 17, 2010 and August 30, 2010, LEW-4 was pumped for a total of six days. During each day, LEW-4 was pumped for approximately 1.5 hours, generating approximately 50 gallons per day, for a total of approximately 300 gallons during the course of the six days of pumping. The time required for LEW-4 to recharge after each pumping event fluctuated, however increased during this period of time. Initially, the well recharged in approximately 1 hour, but following this six days of pumping, the recharge time at LEW-4 increased to approximately 7.0 hours, with noted fluctuations. It should be noted that the level of leachate at LEW-4 also did not recover entirely to the initial elevation prior to pumping, during each pumping event.

3.7.1.2 SITE OBSERVATIONS – LEACHATE SEEP CHARACTERISTICS

During the course of the pumping activities between August 2, 2010 and August 30, 2010, observed seeps in the vicinity of the leachate extraction wells, along the northwest and southeast side slopes, were inspected daily as part of the pumping activities.

Prior to the start of pumping activities, the leachate seep along the northwest side slope of the landfill appeared to have some appreciable generation and noticeable flow. Immediately following rain events, this seep was observed to trickle and flow down the northwest side slope of the landfill. At no time was the leachate emanating from this northwestern seep a concern, as leachate did not migrate off-Site or cause appreciable erosion issues requiring regrading of the slope or the installation of additional soil erosion and sedimentation controls.

The leachate seep along the southeast side slope was observed to have very minimal flow or leachate generation. The leachate emanating from this seep appeared to trickle

immediately following rain events. At no time was the southeastern seep a concern, as the leachate emanating from the seep ceased a few feet downgradient and did not migrate off-Site.

In general, during the active pumping activities, leachate seeps were observed to decrease in overall size and the quantity of leachate emanating from each seep also visually decreased. The northwest leachate seep was bisected by LEW-4. The portion of the northwest seep located to the north of LEW-4 virtually dried up, with virtually no observable leachate emanating from this portion. The remaining portion located to the south of LEW-4 continued to have some residual flow. This active portion of the northwest seep was addressed with an interim action discussed in Section 3.7.1.3.

Similarly, residual leachate had been observed to be emanating from the southeast leachate seep at the end of the observation period. The overall length of the seep decreased; however along the southern end of the seep, leachate was still observed to be seeping and pooling on the southeast side slope of the landfill. It should be noted that virtually no visual flow was observed at the southeast seep, but the presence of pooled leachate was observed.

3.7.1.3 INTERIM RESPONSE ACTIONS – LEACHATE EXTRACTION TRENCHES

To address the residual leachate emanating from the northwest and southeast side slopes, CRA implemented an interim action at each seep location to address leachate. Based on visual observations, small leachate extraction trenches were excavated directly upgradient of the observed leachate seeps. The extraction trenches were excavated along the lateral extent of each seep. Each trench was approximately 2 to 3 feet in depth and 2 feet in width. The base of the trenches was sloped in order to direct leachate to a low point or sump within each trench. The excavated material was staged directly upslope of the trench, in order to prevent potential storm water from entering the trench.

Leachate was collected from each trench at various times during September 1 through September 3, 2010. On September 3, 2010, the extraction trenches were backfilled and compacted in preparation for construction of the landfill cover system. Since the leachate extraction trenches were a temporary installation and the trenches were backfilled prior to the final cover construction, details of the trenches are not included on the As-Built drawings.

During the interim measures, approximately 1,800 gallons of leachate was removed from the northeast leachate extraction trench and approximately 2,200 gallons was removed from the southeast leachate extraction trench. During the leachate extraction activities, each trench was observed to have some minor leachate recharge. At no time did the recharge flow rate cause leachate to overtop the trenches and migrate down the slope or off-Site.

Based on the quantity of leachate removed, the consistent location and elevation of the leachate seeps and the continually observed leachate emanating from each extraction trench, leachate appears to be more representative of a groundwater mound within the landfill rather than "perched" groundwater present in isolated locations. As such, it was determined that construction of the landfill cover system could be completed without further leachate removal.

3.7.1.4 SLOPE STABILITY/UPLIFT ASSESSMENT

The stability of the final design of the landfill was based on standard modeling methods using a number of conservative assumptions (included in the Final Design Report). The modeling evaluated both the global stability of the landfill and the factor of safety against a catastrophic slope failure, as well as the stability of the cover system and the factor of safety against liner system failure. During construction, and as a result of the observed leachate seeps from the presumed groundwater mounding, CRA reviewed the modeling assumptions in comparison to the observed conditions at the landfill and in general, the current condition of the leachate in the landfill was more favorable than the modeled conditions. Therefore the presence of leachate in the landfill, whether the leachate was perched or mounded, did not pose a slope stability concern as discussed in the following paragraphs.

Global stability of the landfill was evaluated by assessing the slope stability along several sections of the landfill. As part of this evaluation, the condition where the landfill was assumed to be fully saturated was evaluated and determined to have an acceptable factor of safety against failure. Leachate levels observed at the Site collected during the RA showed that the landfill was in a condition which was substantially less than fully saturated, which would represent a more favorable condition than the assumed fully saturated condition. Therefore, global stability of the landfill is not a concern with respect to the observed leachate levels (i.e., if the global slope stability model was to be re-run actual current leachate levels, the factor of safety against failure would be higher than what was presented in the Final Design Report).

The stability of the final cover system was evaluated by assuming an uplift pressure on the landfill liner of two inches (i.e., the level of leachate in the landfill is such that it is causing two inches of upward pressure on the under side of the liner). The minimum factor of safety against failure determined in the cover stability evaluation in the Final Design Report for this condition was 3.5 inches (i.e., the upward pressure on the liner would need to be significantly greater than two inches to get to a factor of safety which may have the potential to result in a slope failure condition). The observed quantity of leachate emanating from leachate seeps visible prior to liner placement was minimal in comparison to the final design assumptions for upward pressure, and may cause a slight pressure on the liner if the liner were to be placed directly on the paper residuals. However, the 6-inch sand layer, which was placed between the paper residuals and the liner, provides relief of any pressure caused by the leachate preventing any uplift pressure to from beneath the liner, and minimize, if not virtually eliminate, the accumulation of leachate. In addition, the small amount of observed leachate in the leachate seeps suggested that the 6-inch sand layer would still be entirely available for gas venting, as the observed quantity of leachate within the seeps would not block or saturate this sand layer.

3.7.1.5 LEACHATE CONCLUSIONS AND RECOMMENDATIONS

Based on Site conditions at the time of the leachate extraction and the information generated from the leachate collection activities, the leachate presence within the landfill does not impact or change the original design and the associated slope stability evaluation of the landfill, for the following reasons:

1. The leachate present in the landfill appeared to be more representative of a groundwater mound within the landfill rather than "perched" groundwater present in isolated locations based on the observed leachate removal and recovery rates and the relatively consistent locations of the seeps that were observed prior to liner placement. If the leachate observed in the leachate extraction wells was representative of "perched" groundwater, it would be expected that greater dewatering of each area would have occurred which would have been evidenced by a more significant drop in the water level at each location, which did not occur. In addition, after the completion of the leachate extraction trenches, the quantity of leachate extracted and the observed recharge rate of the leachate within each seep confirmed that the leachate at the landfill was likely representative of a mounded groundwater condition due to the relatively constant recharge rate. Although the overall leachate level within the landfill was not significantly reduced as a result of the extraction activities, the

removal activities that were completed did reduce the amount and quantity of seeps present.

2. As stated in the Final Design Report, even if the groundwater mound is much more significant than what has been observed (i.e., fully saturated), the factor of safety against global slope failure is acceptable. Moreover, following completion of the landfill cover system, the groundwater mound continues to decrease, further improving the groundwater conditions beneath the Site.

3. The ongoing presence and quantity of leachate emanating from the seeps observed at the Site prior to liner placement will not impact global or slope stability of the landfill. Following the installation of the landfill cover system, residual leachate emanating from the landfill, if any, will be able to percolate along the landfill slopes via the six inch gas venting layer, but will not impact the performance of this sand layer.

4. Based on information generated during the leachate collection activities, "perched" leachate was not encountered at the landfill. In addition, the observed Site conditions pertaining to the presence of leachate will likely provide a higher factor of safety than the factor of safety determined in the final design. Therefore, assumptions included as part of the final design for global stability and cap stability remain valid.

Based on the above noted conclusions, the temporary leachate extraction wells were abandoned in-place and the construction of the landfill cover system continued in accordance with the final design specifications.

3.7.2 ASPHALT PLANT PROPERTY WINTER EXCAVATION/ OFF-SITE DISPOSAL AND RESTORATION ACTIVITIES

Due to the extent of the observed paper residuals and their close proximity to the active asphalt plant property operations, excavation activities were suspended until the asphalt plant's operations were shut down for the winter season. The remaining excavation activities were completed between December 15, 2010 and January 18, 2011. For the additional excavation activities completed between December 15, 2010 and January 18, 2011, the excavated paper residuals were transported off-Site for disposal, since the cover system of the landfill had been fully installed by that time. A total of 8,348 tons of paper residuals and related silty PCB impacted material were removed and transported off-site for disposal at the Waste Management Autumn Hills Landfill, a certified non-hazardous landfill, located in Zeeland, Michigan. The total volume of removed waste was not generated using survey information, but rather was tabulated from the

disposal documentation. The weight tickets for each load of waste delivered to the Waste Management Autumn Hills landfill are provided in Appendix D.

Prior to transporting the paper residuals and related silty PCB impacted material off Site, CRA submitted a waste profile to Waste Management. The profile included waste characterization results, indicating that the paper residuals had PCB impacts below 50 parts per million (ppm) from a non-TSCA source. On this basis, Waste Management Autumn Hills Landfill was able to accept the waste.

Waste disposal documentation is provided in Appendix D. The additional excavation area extended along the paved area of the asphalt plant property, which included areas surrounding the asphalt plant process equipment and buildings, located to the west and southwest of the landfill. Drawing C-10 (and Figure 4.3) shows the final limits of the excavation of the paper residuals on the Asphalt Plant Property during the winter excavation activities. It should be noted that the two trailer/office structures were temporarily relocated, and the impact material from these areas was removed.

As outlined in the Final Design Report, the requirements for verification sampling were in accordance with Michigan Part 201 GRCC, pursuant to STM; MDEQ-2002. Based on the MDEQ STM guidance, a total of 87 additional verification soil samples were collected from the asphalt plant property during the winter excavation activities. Verification soil samples were containerized in laboratory supplied containers and shipped under chain of custody protocols to CAS for chemical analysis for VOCs and PCBs. Based on the analytical results, the visible paper residuals located on the asphalt plant property were adequately removed and relocated in the landfill or disposed of off Site at a certified landfill. No further action would be required on the asphalt plant property. The verification soil sampling results are discussed in detail in Section 4.1 of this report.

Following the winter excavation activities, additional restoration activities to the asphalt plant property were required due to the extent of excavation. At the completion of the excavation activities, the area of the asphalt plant trailers and the majority of the asphalt paved area between the trailers and process equipment was excavated. The excavated area was restored with appropriate clean backfill, compacted to the required technical specifications and paved. Vegetative areas were covered with clean fill (topsoil) and seeded. No additional planting was required.

3.7.3 INSTALLATION OF GROUNDWATER MONITORING WETLAND PLATFORMS

Following the completion of the RA activities, the ROD required the installation of an appropriate groundwater monitoring well network and the performance of long-term groundwater monitoring, in accordance with an approved OMM Plan. As part of the long-term groundwater monitoring activities to be completed at the Site, a series of 15 groundwater monitoring wells were installed around the perimeter of the landfill, as discussed in detail in Section 7.4. As part of the groundwater well installation activities, MDEQ requested that the monitoring wells located to the north of the landfill footprint and within the north wetland (MW-3D, MW-4S, MW-4D, MW-5S, MW-5D), installed at a higher elevation to account for seasonal groundwater elevations changes in the vicinity of the Site.

To address this request, CRA Services constructed three soil platforms, which extended outward from the south berm of the drainage swale into the north wetlands, upon which the groundwater monitoring wells were installed. The platforms were constructed of approved general fill and top soil, consistent with the final vegetative layer of the landfill cover system. The soil platforms were constructed to the following dimensions, in order to accommodate a drilling rig for initial installation and future sampling equipment:

- Length: 10 ft to 15 ft
- Width: 15 ft to 20 ft
- Side slopes: 2H : 1V

Based on these final dimensions, each of the three platforms occupies between 300 to 600 square feet, for a combine total of 900 to 1,800 square feet. As such, the three wetland platforms combined occupy less than 5 percent of an acre (0.04 acres). The construction of each typical groundwater monitoring well wetland platform is included as Figure 3.4.

3.7.4 MODIFICATIONS TO FINAL DESIGN CONTOURS

On August 11 and 12, 2010, CRA submitted revised final sub-grade drawings to the U.S. EPA, outlining modifications to the final sub-grade contours at the Site. The drawings indicated that the final sub-grade contours would be approximately 2 feet lower than what was proposed in the Final Design Report on the south end of the

landfill and approximately 4 feet lower on the north end. During the weekly progress meeting held on August 18, 2010, the U.S. EPA and the MDEQ responded that they had no comments on the sub-grade modifications, and that a formal acceptance letter was not needed because there were no changes to the specifications, and that the revised sub-grade plan was viewed as a field design change based on the amount of material encountered.

3.8 SHORT- AND LONG-TERM MONITORING

During implementation of the RA, short term monitoring activities were completed in accordance with the ROD. Section 6.0 discusses the details of the Health and Safety and Construction Monitoring that was completed during the RA, which included fugitive dust monitoring and surface water monitoring.

An OMM Plan has also been developed outlining the long-term monitoring requirements for the Site. Section 7.3 provides a summary of the OMM Plan.

3.9 FENCING AND PERMANENT MARKERS

Fencing and a gate were installed along 12th Street to deter pedestrians and vehicular traffic from entering the landfill and are discussed in Section 7.2. Section 7.2 also discusses the permanent markers required by the ROD.

3.10 DEED RESTRICTIONS

The ROD requires that deed restrictions be imposed on the 12th Street Landfill property and are further discussed in Section 7.1.

3.11 LONG-TERM MAINTENANCE

As part of the OMM activities, regular inspection and required maintenance of the above noted components of the RA would be performed. The OMM Plan includes proposed scheduling for conducting inspections and implementing corrective actions to repair and maintain the above noted components, as discussed in Section 7.3.

3.12 OTHER PROVISIONS

During the remedy construction, measures were taken to minimize the noise and dust impacts of construction upon the surrounding community. Fugitive dust emissions were monitored throughout the activities as discussed in Section 6.0.

4.0 PERFORMANCE STANDARDS

In accordance with the Final Design Report, including the PSVP and CQAP, a number of data collection activities were completed to demonstrate that the implementation of the RA met or exceeded the performance standards identified in the CD and ROD. The CD and ROD identified both monitoring activities to be completed during the implementation of the RA and long-term environmental monitoring activities, to be completed as part of the OMM Plan for the Site.

The short-term monitoring activities during construction included the following:

1. Health and Safety and Construction monitoring
   - Ambient air monitoring for fugitive dust
   - Ambient air monitoring for volatile organic compounds (VOCs)
   - Surface water monitoring
2. Verification soil sampling

The future long-term environmental monitoring includes the following:

1. Landfill gas monitoring
2. Groundwater monitoring

The health and safety and construction monitoring activities were comprised of air monitoring for fugitive dust, air monitoring for VOCs, and surface water monitoring. The health and safety and construction monitoring activities were completed in accordance with the Final Design Report and the HASP to demonstrate that the implementation of the RA did not have an adverse impact on workers, adjacent property users, or the environment. These monitoring activities are discussed in detail in Section 6.0 of this report.

The long-term environmental monitoring activities have been captured under the OMM Plan, which is summarized in Section 7.4 of this report.

The following subsections discuss the verification soil sampling completed at the Site. The intent of the RA was to excavate the paper residuals with the limits of excavation based on a combination of visual evidence and confirmatory sampling. Therefore, the excavation proceeded until visual evidence of paper residuals indicated that the limits of

the excavation had been met. At this point, verification soil sample, as required, was completed.

4.1 VERIFICATION SOIL SAMPLING ACTIVITIES – MDNR AND ASPHALT PLANT PROPERTIES

Upon completion of the excavation activities on the MDNR property and the asphalt plant property, to the visual extent of the distinguishable paper residuals, samples of the native soil at the base and along the sidewalls of the excavation were collected and analyzed to confirm the adequacy of the excavation activities, in accordance with the Verification Sampling Plan for the 12th Street Landfill – Operable Unit No. 4 of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site.

The Final Design Report required verification sampling to be conducted in accordance with Michigan Part 201 GRCC, pursuant to the MDEQ Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria (STM; MDEQ-2002). Based on the MDEQ STM guidance, the following verification sampling for each off-Site excavation area was completed.

4.1.1 MDNR PROPERTY

Based on field survey information, the total approximate area of the paper residuals MDNR property is 3,350 square feet (ft^2) (0.08 acre). Therefore, consistent with the MDEQ STM guidance, the MDNR property sampling grid was calculated using the following formula (for excavations less than 0.25 acre):

$$GI = \frac{\sqrt{A/\pi}}{2}$$

Where, GI = Grid Interval (feet), and
A = Surface Area (ft2)

Based on the total approximate MDEQ surface area, the grid interval for the verification sampling was determined to be 16 feet by 16 feet. Therefore, in accordance with the MDEQ STM guidance, the initial number of verification soil samples estimated for the MDNR property was determined to be seven, as shown on Figure 4.1. The grid interval sampling locations were selected randomly, and CRA performed biased based sampling, which was dependent of field observations.

4.1.2 ASPHALT PLANT PROPERTY

The total approximate area of the paper residuals on the asphalt plant property was 31,900 square feet (0.73 acres). Therefore, consistent with the MDEQ STM guidance, the asphalt plant property sampling grid was calculated using the following formula (for excavations between 0.25 acres and 3.0 acres):

$$GI = \frac{\sqrt{A/\pi}}{4}$$

Where, GI = Grid Interval (feet), and
A = Surface Area (ft^2).

Based on the approximate asphalt plant property surface area, the grid interval for the verification sampling was determined to be 25 feet by 25 feet. Therefore, in accordance with the MDEQ STM guidance the initial number of verification soil sample estimated for the asphalt plant property was determined to be 19; however due to the potential for increases in sidewall surface area, CRA included one additional sample, for a total of 20. A copy of the memorandum discussing the original proposed grid sampling approach and related correspondence is provided in Appendix E. The grid interval sampling locations were selected randomly and CRA performed biased based sampling, which was dependent on field observations, as shown on Figure 4.2.

Following the completion of the originally anticipated asphalt plant excavation area, additional verification soil samples were collected as the excavation expanded westward. For the majority of the excavation, CRA completed verification sampling on an approximate 25 feet by 25 feet grid pattern, which was based on size of the initial excavation because the additional excavation was an extension of original excavation (i.e., the additional excavation on its own was less than 0.25 acres and would have utilized a different approach under MDEQ guidance). However, at the final limits of the excavation, the sampling interval increased due to the nature of the silty paper residuals, which were observed to be inconsistently visible and appeared intermittently throughout the final excavation area. Because it was difficult to determine if the limits had been reached, a higher number of samples than required by the guidance were collected to ensure that sufficient sampling had been completed. The final size of the entire asphalt plant excavation (i.e., original and additional) was 35,937 square feet (0.82 acres). Therefore, the 25-foot grid internal remained appropriate for the excavation. Using the 25 feet by 25 feet grid pattern, a total of 78 additional grid points

were added, which would have resulted in a minimum of 20 additional verification samples to complete the asphalt plant excavations (for a total of 40). In total, 100 verification samples were collected from the asphalt plant excavation, including 53 sidewall samples and 47 floor/base samples, which is more than twice the required number of samples.

4.2 VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS

Verification soil samples were containerized in laboratory supplied containers, packed with ice and shipped under chain of custody protocols to Colombia Analytical Services (CAS) laboratories, an approved laboratory identified in the QAPP. In addition, due to sample submittal volume, and the requirements for expedited turn-around-times for analytical analyses, CRA collected split samples from certain areas of the asphalt plant property and submitted them to the alternative approved laboratory owned and operated by Weyerhaeuser, Weyerhaeuser Analytical Testing Services (WATS). Upon receipt of the WATs results, excavation activities progressed to another location at the Site. Following the receipt of the spilt analytical results from CAS and a comparison to the WATS results, backfilling activities were completed in each excavated area.

The applicable criteria in comparing the verification soil sampling analytical results are the lowest of the Part 201 GRCC in *Table 2. Soil: Residential and Commercial 1*, of the MDEQ's Remediation and Redevelopment Division's Operational Memorandum No. 1 (January 23, 2006), which are the criteria used for defining a facility under Section 324.20101(1)(o) of Part 201. For PCBs, the applicable criterion is 4 mg/kg, which is the criterion for direct contact.

The following sections present the analytical results for the verification soil sampling completed on both the MDNR and the asphalt plant properties. A field sample key for samples collected at the MDNR property and the asphalt plant property is presented in Table 4.1. Analytical laboratory reports and data validation memorandums are provided in Appendix E.

4.2.1 MDNR PROPERTY

Based on visual observations, the visible paper residuals located on the MDNR property appeared to be consistent with the previously delineated areas, which were based on the historical investigations completed at the Site. Therefore, a total of nine verification soil samples were collected on the excavated MDNR property.

In addition, based on inclement weather conditions at the Site, a subsequent area of MDNR property was impacted with paper residuals that were washed off the east landfill side slope during a 30-minute storm event that dropped a total of 1.75 inches of rain. Following the excavation, the washout area was surveyed to determine the required number of verification soil samples to be collected. Based on the surveyed area, an additional five verification soil samples were collected.

A summary of the analytical results for the verification soil sampling completed on the MDNR property is presented in Table 4.4. Based on verification soil analytical results, paper residuals present on the MDNR property have been adequately removed from the original MDNR area and the washout area.

4.2.2 ASPHALT PLANT PROPERTY

Based on the previous investigations conducted at the Site, paper residuals located on the asphalt plant property were approximated and identified in the Final Design Report. However, based on field observations and verification soil sampling analytical results during the RA activities, paper residuals were located further west of the original delineation. The following summarizes the excavation paper residuals on the asphalt plant property.

Over the course of the excavation activities for the initial delineated area, a total of 22 (20 investigative samples and two duplicate) verification soil samples (VS-001 through VS-022) were collected. A summary of the analytical results are included in Table 4.2.

Following a review of the analytical data of the initial delineated area, it was determined that additional paper residual material was present beyond the initial delineated area on the asphalt plant property. For the course of the additional excavation activities, CRA collected additional verification soil samples in a similar manner, following an approximate 25 ft by 25 ft grid. At the completion of the excavation activities, an additional 87 verification soil samples (80 investigative samples and seven duplicates) were collected. In total, 100 investigative soil samples and nine duplicate soil samples were collected from the asphalt plant property. Table 4.3 presents the additional analytical results of the verification soil samples collected outside the initial delineated area on the asphalt plant property. Figure 4.3 presents the locations of the additional verification soil samples collected from the asphalt plant property.

Based on the analytical results, the extent of the paper residuals and related silty PCB impacted materials were delineated, with the exception of two areas located between verification soil sample locations VS-113/VS-114 and VS-105, as shown on Figure 4.3. According to field observations, visible paper residuals were noted along the sidewall of the excavation in these two areas. The seam of paper residuals appeared to be dispersed in small areas or in inconsistent seams along these portions of the sidewalls. Further excavation of this remaining material could not be completed due to field conditions, the presence of multiple utility lines in the area, and the close proximity to the permanent asphalt plant processing equipment and scale house foundations. Therefore, samples of the material containing visual paper residuals were collected for verification purposes. The concentrations of PCBs in associated verification samples, which contain visual paper residuals were below the Michigan Act 451, Part 201 Residential Direct Contact Criteria for 4 mg/kg.

4.3 IN-PLACE DENSITY TESTING

During the RA activities, compaction testing was conducted as the paper residuals, fly ash, and wetlands materials were installed in the landfill. In accordance with the Final Design Report and design specification, Section 02320 – FILL, compaction testing was performed at a frequency of one test per acre, with a minimum of three tests per day or lift of material. The results of the in-place density testing are presented in Appendix J. Table 5.3 presents a summary of the in-place density testing at the landfill. Table 5.3 includes the location of each test, which is presented as a coordinate in a grid pattern. The grid pattern is displayed along with the results of the density testing in Appendix J. Table 5.3 also includes the elevations of each test. The first 12 tests only listed the lift number, while the remaining tests listed the elevations. A total of 48 in-place density tests were conducted over the course of the RA.

5.0 CONSTRUCTION QUALITY CONTROL/QUALITY ASSURANCE

The implementation of the RA activities was conducted in accordance with the CD, and the Final Design Report, which include the technical (construction) specifications, the PVSP and the CQAP. The purpose of the CQAP was to ensure that the implementation of each RA component was conducted in a manner that will maximize their performance requirements and that will safeguard components from damage during construction. Conformance with the CQAP ensured that the landfill's final cover system was constructed and documented in accordance with the design criteria and regulatory requirements.

The following subsections present the implementation of the CQAP, which includes identifying the parties involved in the implementation of the RA, and their associated roles and responsibilities, the pre-construction activities, and the general inspection and documentation procedures. The CQAP also includes the specific requirements for construction procedures and observations, field and laboratory testing methods and frequencies, and acceptance criteria for each component of the project. It is noted that the testing and acceptance criteria were primarily based on Part 115 of Michigan Act 451 of the MDEQ Waste and Hazardous Materials Division requirements, where applicable.

Material specifications were submitted by CRA Services for all material imported to the Site for the purposes of Site operations, construction, and completion of the RA. The material specifications were compared and tracked against the design specifications. A summary of the submittals is included in Table 5.1, with hard copies of each submittal included as Appendix F.

5.1 CQA ROLES, RESPONSIBILITIES AND QUALIFICATIONS

Weyerhaeuser/CRA representatives provided the overall management of the project and were the principal contacts to the federal, state, and local government officials. The remedial construction activities were managed and oversaw by CRA, under the direction of Weyerhaeuser. CRA provided construction management and associated construction Quality Assurance/Quality Control (QA/QC) management. CRA Services had been selected as the Remedial Construction Contractor and provided construction services associated with the RA. It should be noted that CRA and CRA Services are two different divisions within the same company and that the typical engineer/contractor relationship existed during the implementation of the RA. A brief description of the duties of the key personnel is presented below.

CRA Project Manager - Gregory A. Carli, P.E.

- Provided overall construction project oversight
- Ensured construction management and professional services by CRA were cost-effective and of high quality
- Ensured all resources of CRA were available on an as-required basis
- Participated in key technical discussions with U.S. EPA
- Provided managerial and technical guidance to CRA Project Coordinator

CRA Project Coordinator – Aaron Stadnyk

- Responsible for contractor compliance with technical specifications and construction contract
- Provided day-to-day project management
- Provided managerial and technical guidance to Field Engineer
- Provided technical representation at project meetings as appropriate
- Retained QA/QC services, including testing laboratories, to perform quality control and field/laboratory tests
- Reviewed construction documentation and reports

CRA Field Engineer – Renee Pionk

- Responsible for field compliance with the project specifications
- Reported to Project Coordinator
- Provided immediate supervision of all on-Site construction activities
- Ensured that regular calibration of testing equipment was conducted and recorded
- Ensured that all Site activities were recorded daily and maintained
- Identified work that should be accepted, rejected, or uncovered for observation, or that may have required special testing, inspection, or approval
- Rejected defective work and verified that corrective measures were implemented
- Conducted sampling necessary to confirm that the performance standards had been achieved
- Interacted daily with the remedial construction contractor to provide assistance in modifying the materials and worked to comply with the specified design
- Maintained copies of applicable referenced standards

CRA QA/QC Officer, Analytical Activities - Paul Wiseman, B.S.

- Reported to CRA Project Manager
- Reviewed laboratory QA/QC
- Performed data validation and assessment
- Advised on data corrective action procedures
- Prepared and reviews quality assurance reports
- Prepared QA/QC representation of project activities

Remedial Construction Contractor – CRA Services Project Manager – Jodie Dembowske

- Submitted samples and/or materials for testing to determine if samples/materials met specified requirements, and submitted results directly to the Field Engineer
- Documented the labor, materials, and equipment utilized during construction activities and submitted this information to the Field Engineer
- Provided daily field reports to the Field Engineer
- Responsible for work activities completed by subcontractors of the remedial construction contractor
- Carried out construction activities according to design specifications
- Immediate supervision of construction activities and personnel
- Performed all measurements and surveying to ensure the RA met the specified design

Additional CRA Services personnel include:

- CRA Services Superintendent – Pete Lewis

CRA Services employed subcontractors and suppliers for RA activities. The major subcontractors and suppliers for QC activities were as follows:

- Soil Testing Laboratory/On-Site Staff – InspecSol – Hassan Gilani
- Geosynthetics Testing Laboratory– TRI Environmental Inc. – Dr. Mansukh Patel
- Geosynthetics Installer – Mid-America Lining Company – Eric Robertson

5.2 PRE-CONSTRUCTION ACTIVITIES

Prior to the implementation of each major construction phase, a pre-construction meeting was held between all parties, including U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, CRA and CRA Services. For the implementation of the RA, two main preconstruction meetings were held. The first at the initiation of the RA activities, and the second took place prior to installation of the landfill liner. The following discusses the topics of discussion for each meeting.

5.2.1 PRE-CONSTRUCTION MEETING

In accordance with the CD and RAWP, during the implementation of the Site preparation activities, a Pre-Construction Meeting was held on May 6, 2010 as discussed in Section 3.5. A Site inspection with all attendees was then conducted.

5.2.2 PRE-INSTALLATION MEETING

In accordance with the CD and RAWP, prior to the commencement of the liner installation activities, a Pre-installation Meeting was held on August 30, 2010. Attendees included members of U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, via telephone conference call CRA, CRA Services, and InspecSol. The pre-installation meeting identified and established Site protocols for the following:

- Introduction of all Parties (Consultant/Contractor/Regulator)
- Definition of Roles and Responsibilities
- Lines of Authority and Lines of Communication
- Review of Site-Specific QC Monitoring Procedures
- Establish (or Review of) Installation Procedures
- Define Methods of Acceptance
- Review Time Schedules
- Review PPE and Applicable Regulations
- Review Safety Plan and Procedures
- Review Panel Layout and Numbering System
- Methods of Measuring Production and Incremental Acceptance

- Examine Site to Review Surface Preparation and Site Access
- Examine Site to Review Surface Preparation and Site Access
- Review Critical Design Issues

A Site inspection with all attendees was then conducted.

5.3 GENERAL CONSTRUCTION OBSERVATIONS AND DOCUMENTATION

As part of the CRA project management and oversight of the RA activities, daily, weekly and monthly reporting was complete to accurately and thoroughly document the project's progress. The following sections discuss the forms of documentation that were completed by CRA during the RA.

5.3.1 PROGRESS MEETINGS

Progress meetings were held on a weekly basis, occurring every Wednesday at 10:30 am Eastern Standard Time. Participants in the weekly progress meetings included U.S. EPA, MDEQ, CH2MHill, Weyerhaeuser, CRA, and CRA Services. Members of InspecSol and Mid-America Lining Company participated in weekly progress meetings, as required. Each progress meeting followed a standard agenda, which included the following:

- Health and Safety
- Site Security
- Progress of Work
- Progress Schedule
- Project Issues
- Action Items
- Administrative Issues

Weekly progress meetings were held between the weeks of May 12, 2010 and November 3, 2010. During this period of time, the RA activities were implemented and completed, with the exception of the additional excavation activities on the asphalt plant property and minor follow-up spring maintenance and repairs to the landfill. During each progress meeting, CRA prepared meeting minutes, which documented the weekly

discussion of the above noted agenda. The weekly meeting minutes were submitted to all attendees on a weekly basis. A complete inventory of the weekly progress meeting minutes are provided in Appendix G.

5.3.2 DAILY REPORTS

As part of the CQAP, the CRA Field Engineer prepared a daily report during the each day of the implementation of the RA activities. The daily report included the names of all representatives on-Site each day, and the time work started and ended and times of any work stoppages. The daily reports documented the morning safety tailgate meetings that were conducted to disuses the daily health and safety issues, weather conditions, active construction equipment in use each day, a chronological description of the work in progress, including locations and types of work, any problems or deficiencies identified from the previous working day and the corrective actions taken, daily calibrations of field equipment, and a summary of any analytical received.

With the submittal of the weekly progress reports, CRA included a copy of the daily reports for that corresponding week. A complete inventory of the daily reports is presented as Appendix G.

5.3.3 FORMS, CHECKLISTS, AND DATA SHEETS

During the course of the RA activities, additional forms, field sketches, and field notes were prepared to assist in documenting daily events and Site activities. Following the daily activities, the CRA Field Engineer, transferred this data to the daily records. For environmental sampling and geotechnical analyses, additional forms were used to record these activities. Theses specific daily records and forms are discussed in detail in the following sections of this report.

In accordance with the requirements of the CD, monthly progress reports were prepared to document the RA activities completed during each month and to summarize any problems/deficiencies encountered during that month, as well as identifying the planned RA activities for the upcoming month. As part of the monthly progress report, a summary of any design modifications were included. A copy of each monthly progress report completed through to the date of this report is presented in Appendix H.

5.3.4 PROBLEMS /DEFICIENCY IDENTIFICATION AND CORRECTIVE ACTION

During the course of the RA implementation, any problems and/or deficiencies which were identified as not meeting or exceeding the criteria set forth in the CQAP, were recorded in the daily reports. In addition, each daily report would include supporting documentation of the potential problem and/or deficiency, including photograph references and additional notes. In the event that a problem and/or deficiency was identified during the course of the RA, a recommended corrective action for resolving the problem or deficiency was provided on the same day and discussed in the daily report. In the event that the recommended corrective action had already been implemented, documentation supporting the corrective action taken to resolve the potential problem and/or deficiency was included as part of the daily reporting.

During the implementation of the RA, there were no additional problems or significant deficiencies encountered during the course of the RA, which required potential redesigning a component of the RA, or revisions of one of the RA implementation plans. The only minor exceptions were the inconsistent grey paper residual particulate encountered in the north wetlands, the additional silty paper residual materials located on the western asphalt plant property, and the additional excavation activities required to address the washout of the eastern landfill sideslopes toward the MDNR property, which was a result of a flash precipitation event.

5.3.5 PHOTOGRAPHIC DOCUMENTATION

During the course of the RA activities, photographs were taken to document observations, problems, deficiencies, corrective actions, and work in progress. Electronic copies of the Site photographs are filed in chronological order in the permanent protective file, located within CRA. Each photo includes a date and time stamp, and additional information including a description of the subject matter. Select Site photographs, documenting key milestones of the RA activities are presented in Appendix B.

5.3.6 SURVEYING

In accordance with the documentation requirements identified in the CQAP, surveying of the Site documenting certain components of the RA was performed by Prein & Newhof, a multi-disciplinary environmental engineering and laboratory firm, which is

also a certified licensed surveyor in the State of Michigan. Surveying was conducted at various points throughout the RA activities. Surveying activities were based off of previously established control points at the Site. Elevations of all surveying activities were based on mean sea level (MSL) datum and coordinates based on the pre-existing Site-specific horizontal control. A complete inventory of the survey data collected by Prein & Newhof during the RA is included in a set of certified survey drawings presented in Appendix I. Based on the survey data collected from Prein & Newhof, CRA was able to confirm that the RA was completed in accordance with the approved design. Survey data was utilized in the preparation of the As-Built Drawings.

5.4 COMPACTED SELECT CLAY FILL

Compacted select clay fill was utilized during the implementation of the emergency actions conducted along the east bank of the Kalamazoo River, which is described in detail in Section 2.4 of this report (but was not completed as part of the 2010/2011 construction activities). For the completion of the RA activities to address the remainder of the 12th Street Landfill Site, compacted select clay fill was not required as a component of the final landfill cover system.

5.5 GENERAL FILL

General fill was utilized as a component in the final landfill cover system and access roads, as indicated in the As-Built Drawings (C-11). The final landfill cover system was comprised of a three-foot thick multi-layer cap. Of that three-foot thick multi-layer cap, general fill was placed at a thickness of 2 ft (24 inches) directly above the drainage geocomposite material. In addition, the general fill was also utilized for grading and backfill activities during the excavation of paper residuals located both on and off-site and the preparation of access roads.

In accordance with the Final Design Report and design specification, Section 02320 – FILL, CRA located a source of general fill from R Smith and Sons – Sand and Gravel, Trucking, located in Allegan, Michigan.

5.5.1 FIELD TESTING

In accordance with the CQAP, no field testing was required for general fill of the construction of the final cover system or the access roads. However, the on-Site field

engineer frequently performed visual inspections of the general fill as it was shipped, stockpiled and graded throughout the Site. The visual inspections were conducted to ensure conformance with the material specifications and to randomly collect samples of deliveries for analytical analysis.

5.5.2 LABORATORY TESTING

Representative grab samples were obtained from the general fill, prior to approving the supplier as a viable source for the RA activities. Throughout the RA activities, the approved general fill was sampled for grain size (to #200 sieve) – following ASTM D422, at a frequency of 1 sample per 1,000 CY of material shipped to the Site. A total of 36 samples of general fill were collected for grain size analysis during the RA activities, between May and November 2010. Sieve analyses were conducted by InspecSol and SME. A complete inventory of the sieve analysis results are provided with the approved submittals for the RA, as presented in Appendix F. All 36 sieve samples of general fill were acceptable.

Constant head hydraulic conductivity testing was not performed for the general fill because it was determined by the Engineer that the hydraulic conductivity would not affect the performance of the general fill material in its intended purpose at the Site.

5.5.3 THICKNESS DOCUMENTATION

As part of the surveying activities completed during the RA, the top of general fill under the access roads was surveyed at specific locations every 50 feet around the perimeter of the landfill. In addition, the top of general fill within the landfill cover system was documented on a maximum 50-foot grid, and at other key locations, including breaks in grade, toes of slopes, tops of slope, and at the limits of general fill placement by surveying or by hand-shoveling and measuring the observed thickness of general fill. The minimum acceptable thickness of general fill was 2 foot (+0.1 foot), which was verified in the field by CRA's Field Engineer and documented in the field notes. The minimum acceptable thickness data was also confirmed by comparing the contours of the general fill prior to and following placement in the form of an isopatch drawing provided on Figure 5.1. It should be noted that the isopatch drawing compares the top of the sand venting layer to the final contours and therefore shows a minimum thickness of 25 feet for the general fill and topsoil. The minimum acceptable thickness was achieved during the completion of the RA.

5.6 GRANULAR SOIL

Granular soil includes selected granular and aggregate fill. Select granular fill refers to sandy material used in the gas venting and protective layers placed immediately below the geomembrane material within the multi-layer landfill cover system. Select aggregate fill refers to gravelly material used for gas pipe bedding, and for the surface course of the access road.

During the course of the RA activities, the CRA field engineer observed the granular soil placement activities and documented any relevant observations to support certification of the following requirements:

- Periodically observed loads of granular soil for general conformance to material specifications and to randomly collect samples for chemical and/or sieve analysis
- In the event that granular fill was stockpiled on-Site prior to use, the field engineer observed and took appropriate measures to minimize any potential contamination by fines such as windblown particles and surface soil during the loading operations

In accordance with the Final Design Report and design specification, Section-02320 – FILL, CRA located a source of select granular and aggregate fill from Aggregate Industries, located in Wayland/Middleville, Michigan.

5.6.1 FIELD TESTING

In accordance with the CQAP, no field testing was required for select granular or aggregate fill for the construction of the final landfill cover system and the access roads. However, as stated above, the on-Site field engineer frequently performed visual inspections of the select granular or aggregate fill, as it was shipped, stockpiled, and graded throughout the Site. The visual inspections were conducted to ensure conformance with the material specifications and to randomly collect samples of deliveries for analytical analysis.

5.6.2 LABORATORY TESTING

Representative grab samples were obtained from the select granular and aggregate fill sources, prior to approving the supplier(s) as a viable source for the RA activities.

Throughout the RA activities, the approved select granular and aggregate fill was sampled in accordance with the sampling frequency identified below:

Soil Type	Frequency	Parameter	Test Method
Select granular fill	1 per 1,000 CY [a]	Grain Size	ASTM D422 [b]
Select granular fill Select aggregate fill	1 per 2,500 CY [c]	Constant head hydraulic conductivity	ASTM D2434
Select granular fill	1 per 2,500 CY [c]	Direct shear test	ASTM D3080
Select granular fill	1 total	Direct shear test – select granular fill/geomembrane interface	ASTM D6243/ ASTM D5321

Notes:

(a) For lesser volumes, a minimum of four samples were tested

(b) Testing was required only to the #200 sieve

(c) For lesser volumes, a minimum of two samples were tested

Geotechnical analyses were conducted by SME, while direct shear testing was conducted by TRI Environmental, Inc. A complete inventory of the completed analytical and geotechnical analysis results are provided with the approved submittals for the RA, as presented in Appendix F.

A total of four samples of granular fill were collected for grain size analysis during the RA activities in September 2010. Five constant head hydraulic conductivity tests and four direct shear tests of granular fill were also conducted. All grain size, constant head hydraulic conductivity, and direct shear tests were acceptable. The direct shear results were compared to the design report. The friction angles determined through laboratory testing (as provided in Appendix F) were acceptable when compared to the Final Design requirements.

Two interface friction tests were conducted at the interface of the granular fill and the geomembrane surface. The results of the interface friction tests are provided in Appendix F. The slope stability analysis in the Final Design Report indicated that an interface friction angle of 30 degrees for the granular fill versus geomembrane interface was used. The design was based on the peak friction angle. Therefore, the friction angles presented in Appendix F met the 30-degree requirement.

5.6.3 THICKNESS DOCUMENTATION

As part of the surveying activities completed during the RA, the top of select granular and aggregate fill for the access roads/drainage swales was surveyed at specific locations every 50 feet around the perimeter of the landfill. The minimum acceptable thickness of select aggregate on top of the access roads was 1 foot (+0.1 foot). The minimum elevation of the top of the access roads along the northern wetlands was 703.0 ft AMSL.

The thickness of the select granular fill for the final cover gas venting and protective soil layers was documented on a minimum 50-foot grid, and at other key locations, including changes in slope and at the limits of granular fill placement by surveying or by hand-shoveling and measuring the observed thickness of select granular fill. The minimum acceptable thickness of the select granular fill gas venting layer below the geomembrane was 6 inches (+0.1 foot), which was achieved during the completion of the RA.

5.7 TOPSOIL

In accordance with the approved Final Design Report and Construction Specifications, the CRA Field Engineer observed topsoil placement activities and documented relevant observations to support certification of the following requirements:

- Confirmation of the source and uniformity of the topsoil used. Soil excavation and placement was monitored for minimization of inorganic soil, which would not be compatible for the establishment of vegetation.
- Grading and preparation of the topsoil to prepare it for suitable seeding.
- Seeding, fertilizing, and mulching were performed in a timely manner.

For the restoration and final layer of the multi-layer landfill cover system, CRA located a source of clean topsoil from R Smith and Sons – Sand and Gravel, Trucking, located in Allegan, Michigan and Aggregate Industries, located in Pullman, Michigan, in accordance with the Final Design Report and design specification, Section-02320 – FILL. A complete inventory of the completed analytical and geotechnical analysis results are provided with the approved submittals for the RA, as presented in Appendix J.

5.7.2 THICKNESS DOCUMENTATION

As part of the surveying activities completed during the RA, the thickness of topsoil placement was documented on a 50-foot grid by surveying or by hand-shoveling and measuring the observed thickness of topsoil. The minimal acceptable thickness of topsoil was 6 inches (+/- 0.1 foot), which was which was verified in the field by CRA's Field Engineer and documented in the field notes. The minimum acceptable thickness data was also confirmed by comparing the contours of the top soil prior to and following placement. It should be noted that the isopatch drawing compares the top of the sand venting layer to the final contours and therefore shows a minimum thickness of 25 feet for the general fill and topsoil. The minimum acceptable thickness was achieved during the completion of the RA.

5.8 RIP RAP

In accordance with the approved Final Design and Construction Specifications, the CRA Field Engineer observed rip rap placement activities and documented relevant observations to support certification of rip-rap placement for erosion protection along the river bank.

In accordance with the Final Design Report and design specifications, Section 02372 RIPRAP, CRA located a source of riprap from R. Smith and Sons - Sand and Gravel, Trucking, located in Allegan, Michigan.

5.8.1 FIELD TESTING

No field testing was required for rip rap in the CQAP. However, as stated above, the Field Engineer performed visual inspection of the rip-rap for conformance to material specifications.

5.8.2 LABORATORY TESTING

The approved rip-rap was inspected by InspecSol, in order to confirm that the approved source of rip-rap had a D50 of approximately nine inches and consisted of round (not angular) stones. In addition, no stones were allowed to be less than three inches in diameter or greater than 15 inches in diameter.

5.8.3 THICKNESS DOCUMENTATION

The top of the rip rap was surveyed every 50 feet along the eastern side of the landfill at the same locations surveyed for the subbase grades. The rip rap thickness was determined at surveyed locations and reported in a tabular fashion. The minimal acceptable thickness was 2 feet, which was which was verified in the field by CRA's Field Engineer and documented in the field notes. The minimum acceptable thickness was achieved during the completion of the RA.

5.9 GEOMEMBRANE

In accordance with the Final Design Report and Construction Specifications, the selected and approved source of linear low-density polyethylene (LLDPE) geomembrane, Spec 02072 – LLDPE Geomembrane, was supplied by Mid-America Lining, the approved liner installer. The manufacturer of the selected textured LLDPE was Agru-America Inc. The manufacturer supplied a quality control certificate for the textured LLDPE geomembrane used at the Site, in accordance with the pre-installation requirements included in the CQAP. The engineered approval for the use of the selected textured LLDPE is provided in Appendix F. As required by the Final Design, the liner material was supplied to the Site in factory sealed rolls.

The ROD called for implementation of the final cover system using a 30-mil PVC geomembrane liner, but the approved final design made equivalent switch to a 40-mil LLDPE geomembrane liner. The reasons for the switch to the 40-mil LLDPE liner are explained in detail in Section 6.4 of the Final Design Report.

5.9.1 PRE-INSTALLATION

Prior to installation of the LLDPE geomembrane and final approval of the LLDPE geomembrane material to be used at the Site and included as part of the final landfill cover system, CRA reviewed the liner related submittals as outlined in Table 5.1 and pre-installation submittals submitted related to the liner installation that were reviewed and approved by CRA include the following:

- Raw materials submittals
- Manufacturer's quality control certificate

- Geomembrane manufacturer/production information
- Proposed installation panel layout diagram

The pre-installation submittals are discussed below, or within the following subsections as appropriate.

The certificate of analysis completed by Chevron-Phillips Chemical Company, LP was included with the manufacturer's control certificate confirmed that the LLDPE geomembrane, which is referred to as MICROSPIKE LLDPE, met and exceeded the pre-installation requirements identified in the CQAP. Based on the certificate of analysis, the selected LLDPE has a density ranging between 0.919 g/mL and 0.935 g/mL and a melt index (ASTM D1238) of 0.35 g/10 min.

Prior to the use of the geomembrane material, two samples were submitted to TRI Environmental, Inc., a geosynthetics laboratory for destructive seam testing as described in the field testing requirements of the CQAP. The geosynthetic analysis results were reviewed, compared against the requirements included in the CQAP, and approved by CRA, prior to the shipment of the geomembrane LLDPE material.

Prior to installation of the geomembrane , a pre-installation meeting was held at the Site, as discussed in Section 5.2.2.

5.9.2 INSTALLATION

Prior to the installation of the geomembrane material, CRA Services had completed the placement of the select granular gas venting layer. During the pre-installation meeting, Mid-America inspected the Site and issued written approval that the proposed surface for liner installation was acceptable, copies of which are provided in Appendix F. During the course of the installation both Mid-America and the CRA Field Engineer routinely inspected the Site for any unacceptable areas requiring repair prior to geomembrane installation. The CRA Field Engineer also inspected any areas softened by precipitation and documented daily observations in the daily reports. In the event that any unacceptable areas were identified, CRA Services performed the required repair activities. Following the repairs, Mid-America re-inspected and approved the area for geomembrane installation.

During the installation of the geomembrane material, the CRA Field Engineer documented various aspects of the installation process in their field note book. The

CRA Field Engineer's notes were routinely checked with Mid-America (a least daily) to ensure all relevant information was captured within Mid-America's documentation. Therefore, only Mid-America's field notes are provided in Appendix J to eliminate duplication.

Based on the Site characteristics, Site-specific proposed and final panel layout drawings for the geomembrane installation were prepared and submitted by Mid-America. The approved panel layout drawings are included in Appendix F. CRA incorporated this information into As-Built Drawing C-04, which presents the panel layout as it was constructed. The panel layout drawing included a numbering scheme that identified the order of panel placement. During the installation of the geomembrane material, the CRA Field Engineer recorded the roll number, location, and date of each geomembrane panel installed. During the installation, the weather forecast was monitored frequently. Geomembrane panels were not installed during precipitation events, in the presence of excessive winds, or over ponding water. During the course of the installation there were several areas located along the north side slope of the landfill, where moist conditions were noted on various dates, due to the lower elevation of this area. For areas where there was moisture presence, the contractor placed a scrap piece of liner beneath the two panels of liner being seamed to prevent moisture from the subgrade from affecting the current seam construction. This was not an altered technique; however, the piece of scrap liner was added to support the welder when traveling over softer areas.

5.9.2.1 DEFECTS/REPAIRS/EXAMINATION OF REPAIRS

During the installation of the geomembrane material, all seamed and non-seamed areas were examined and documented by the CRA Field Engineer, for the identification of any defects, holes, blisters, undispersed raw materials, and any signs of contamination of any foreign matter, which was recorded in the daily reports.

Each suspected area identified was non-destructively tested using the vacuum box test method described in the CQAP. Any areas found to fail the non-destructive testing were flagged or marked by the CRA Field Engineer for repair. For any identified areas failing a non-destructive field test, or for those areas identified during seaming that failed a destructive field test, repairs were made following the identified procedures included in the CQAP. The repair procedures, materials, and techniques were previously approved with the approval of Mid-America as the liner installer. Logs of all destructive tests, non-destructive tests, and repairs are presented in Appendix J. The repair log in Appendix J included four repairs on seams where there was no corresponding non-destructive test. For these instances, repairs had been made on an

adjacent seam where a non-destructive test was conducted and the repair overlapped onto the non-tested seam, resulting in any discrepancies.

Each repaired areas was numbered and recorded by the CRA Field Engineer. Each repair area was then non-destructively tested according to the techniques included in the CQAP. Repaired areas passing the non-destructive field testing were considered adequately repaired. Areas which failed the non-destructive field test were redone following the above noted process and re-tested.

The CRA Field Engineer conducted oversight of the entire geomembrane installation procedures and ensured that during seaming or the placement of the geomembrane panels did not create any large wrinkles.

CRA Services excavated and secured the geomembrane LLDPE liner material within the anchor trench as specified in the Final Design Report and Construction specifications.

5.9.3 FIELD SEAMING

Field seaming was conducted in accordance with the CQAP. During the RA activities, a total of 15,445.5 linear feet of panels were field seamed from September through October 2010. The panel seaming forms for each seam are included in Appendix J. It should be noted that while the panel seaming forms do not include Panel Seam 57/59 as being seamed, the seam is listed in the non-destructive field test log as being successfully tested. The CRA Field Engineer observed the field seaming and field testing procedures of all seams installed at the Site. In general, the installation of all geomembrane LLDPE panels forming one continuous layer over the 12th Street Landfill Site was tested for 100 percent of the covered area by non-destructive field seam testing of all adjacent panels of geomembrane (i.e., all seams were non-destructively seam tested). This non-destructive testing was conducted to document that no opening or gaps between any two panels occurred during the installation. In addition, destructive seam testing was performed at a routine interval, as specified in the CQAP, for determining the strength and mode of failure of field seams in both the shear and the peel modes.

During the installation of the geomembrane, trial welds were typically performed at the beginning of the work day, and in the early afternoon. In accordance with the Final Design Report and Construction specifications, Section 02072 – Linear Low Density Polyethylene (LLDPE) Geomembrane, trial welds on non-deployed geomembrane seams were to be made at the beginning of each seaming period and at least every five hours

during continuous operation with each welding device in use. In accordance with the specification, all seaming was conducted within 5 hours of the last trial weld each day. Summaries of the trial welds and panel seaming are presented in Appendix J.

In accordance with the CQAP, the seam layout, seaming equipment, seaming personnel qualifications, and the overlapping and temporary bond between geomembrane panels, were inspected and approved by the CRA Field Engineer, in accordance with the specification included in the CQAP. In addition, the CRA Field engineer monitored the weather conditions during the installation of the geomembrane layer, to ensure that Site weather was consistent with the requirements established in the CQAP. The non-destructive and destructive seam testing indicated that seaming was adequately performed for all seams.

The CRA Field Engineer conducted oversight of all seaming activities completed on-Site, including test seaming. In addition, the CRA Field engineer observed and recorded the results of the non-destructive testing, including Air Pressure Testing, and Vacuum Box Testing completed at the Site.

For the destructive testing completed, the CRA Field Engineer selected locations throughout Site at their discretion at a minimum frequency of one sample location per 500 linear feet of cumulative seam length. At total of 36 destructive tests were performed along the seams. With a total seam length of 15,445.5 linear feet, the frequency of destructive testing was one test per 429 linear feet of cumulative seam length. The results of the destructive testing are included in Appendix J. A summary of the destructive testing, including the seam where each test was conducted, is provided in Table 5.2. For each destructive seam testing location, the CRA Field Engineer conducted oversight of the sample collection, which included the cutting and removal of a 12-inch wide by 40-inch long, running in the direction of the seam. The sample was then cut into the following segments for the following distribution and analysis:

- A sample, 12 inches by 12 inches, was kept by the installer for on-Site peel and sheer destructive testing
- A sample, 16 inches by 12 inches, was submitted for geosynthetic testing
- A sample, 12 inches by 12 inches, was kept by CRA for record storage

Following the selection of the destructive field tests, each hole was immediately repaired following the procedures identified in the CQAP.

A complete inventory of the destructive field testing and laboratory testing results are included in the approved submittals, included in Appendix F. During the installation of the geomembrane layer at the 12th Street Landfill Site, all seams were determined to meet or exceed the seam acceptance criteria, identified in Table 10-2 of the CQAP.

5.9.4 POST-INSTALLATION

Following the installation of the geomembrane LLDPE layer, it was surveyed at key locations, including the limits of geomembrane installation, the corners of every panel, and the location of every repair.

During the course of the geomembrane (and drainage geocomposite) installation, once geosynthetic results were received from the geosynthetic laboratory, CRA Services began placing the appropriate general fill over the geomembrane and drainage geocomposite to provide protection against ultraviolet degradation, provide thermal installation, and protect against any form of physical damage. A 24-inch (2-foot) layer of general fill was graded over the geomembrane and drainage geocomposite layers, in order to protect these materials from the tracks of the heavy grading equipment.

5.10 DRAINAGE GEOCOMPOSITE

Following completion of the geomembrane installation, a drainage geocomposite material was placed over the entire top of the landfill and the side slopes. This drainage material was placed in order to direct any accumulated water toward the perimeter drainage swales. In accordance with the Final Design Report and Construction specifications, the selected and approved source of geocomposite was supplied by SKAPS Industries. The engineer's approval for the use of the selected geocomposite is provided in Appendix F.

5.10.1 PRE-INSTALLATION

The geocomposite was supplied in factory sealed rolls to the Site. The CQAP identifies the testing that was required for the drainage geocomposite material. Testing completed by the manufacturer prior to delivery to the Site included mass per unit area; thickness; density; tensile strength; ply adhesion; and transmissivity. These testing results were provided by the contractor as a submittal. CRA reviewed all submittals and approved

the use of the geocomposite for the Site. The submittals for the drainage geocomposite are provided in Appendix F.

As each roll of geocomposite was delivered to the Site, the CRA Field Engineer inspected each roll and recorded the supplier, style, length and width, batch or lot number, nominal product thickness, a date of manufacture, and roll number, and recorded this information in the daily reports.

All geocomposite rolls were tarped during storage and stockpiled on-Site to ensure protection from precipitation, ultraviolet radiation, strong oxidizing chemicals, acids or bases, flames, temperature and soiling.

5.10.2 INSTALLATION

The installation of the geocomposite materials was completed in accordance with the CQAP. The CRA Field Engineer inspected the placement of all geocomposite materials, in order to ensure that no potentially harmful foreign objects were present below the geocomposite.

During placement of the drainage geocomposite, the material was visually inspected and the product tags removed from each individual roll to cross-check against the submittal (and material unloaded at the Site upon delivery).

5.10.3 POST-INSTALLATION

Following the installation of the geocomposite materials, the CRA Field Engineer performed a final visual inspection of the areas requiring geocomposite installation. The CRA Field Engineer identified any areas requiring repair or replacement, prior to the placement of soil cover materials.

5.11 GEOTEXTILE

In accordance with the Final Design Report and Construction specifications, the selected and approved source of geotextile, Section 02376 – Geotextiles, was supplied by Price and Company. The engineer's approval for the use of the selected geotextile is provided in Appendix F. The geotextile was utilized on-Site between the selected aggregate fill and the general fill of the access roadway and underneath any placed rip rap, while the

non-woven geotextile was used between the passive gas vent pipe backfill and the geomembrane. Geotextile was used in the cover system design to separate stone and rip rap material from finer grained material at various locations. Geotextile was not used in the liner construction (i.e., as a protective layer for the geomembrane) because a geocomposite with the geotextile attached was used as the drainage layer.

5.11.1 PRE-INSTALLATION

The geotextiles were supplied in factory sealed rolls to the Site. Prior to receiving the rolls of geotextiles, the supplier submitted a manufacturer's quality control plan to ensure that the geotextile was free of holes or any signs of contamination from foreign matter, and that no needles used for punching were present. In addition, the manufacturer also supplied a certification report documenting the performance of the geotextiles in accordance with the testing methods and material specifications identified in the Final Design Report and CQAP. CRA reviewed these submittals and approved the use of the geotextiles for the Site.

As each roll of geotextile was delivered to the Site, the CRA Field Engineer inspected each roll and recorded the supplier, style, length and width, batch or lot number, nominal product thickness, a date of manufacture, and roll number, and recorded this information in the daily reports.

All geotextile rolls were tarped during storage and stockpiled on-Site to ensure protection from precipitation, ultraviolet radiation, strong oxidizing chemicals, acids or bases, flames, temperature and soiling.

5.11.2 INSTALLATION

The installation of the geotextile materials was completed in accordance with the CQAP. The CRA Field Engineer inspected the surface soil materials and placement of all geotextile materials, in order to ensure that no potentially harmful foreign objects were present below the geotextile.

5.11.3 FIELD SEAMING

The geotextile was placed continuously across the landfill, with approximately 6 inches of overlap occurring between panels throughout the Site. The seams were continuously

sewn with a similar geotextile material. The CRA Field Engineer ensured that the placement and seaming of the geotextile were conducted in accordance with the CQAP.

5.11.4 POST-INSTALLATION

Following the installation of the geotextile materials, the CRA Field Engineer performed a final visual inspection of the areas requiring geotextile installation. The CRA Field Engineer identified any areas requiring repair or replacement, prior to the placement of soil cover materials. Following the inspection, CRA Services graded soil cover materials over the geotextile in a manner to ensure no damage was caused to the geotextile, there was no slippage of the geotextile on underlying layers, and to ensure that no excessive tensile stresses were imposed on the geotextile.

5.12 EROSION CONTROL MATTING

In accordance with the Final Design Report and Construction Specifications, North American Green supplied approved erosion control matting materials to the Site. Based on the final design drawings, North American Green SC-150 was installed in all approved locations. In addition, based on the project delays encountered and due to inclement weather conditions, additional erosion control matting was installed at the Site, as a proactive approach to ensure minimal erosion damage throughout the fall, winter and spring thaw.

The area adjacent to the TCRA area was previously covered with Enkamat. This material was removed during the grading activities and replaced with North American Green SC-250 erosion control blanket upon final completion of the project.

As previously discussed in the design modifications section, CRA Services installed the following additional erosion control matting at the Site:

- North America Green DS-150 blanket was installed on the identified 4H:1V side slopes
- North American Green S-150 blanket was installed from the top of outer berm of the drainage swale to the wetland area on the north side of the Site
- North American Green SC-250 was installed within the drainage swales on the north side of the Site

- North American Green SC-250 was installed in place of the Enkamat that was removed during the grading activities

Approved material specifications for erosion control matting utilized at the Site, are included in Appendix F. In addition, a memorandum documenting the additional erosion control matting installed throughout the Site, is included as part of monthly Progress Report No. 9 for the month of November 2010, included in Appendix H.

5.12.1 PRE-INSTALLATION

During delivery, the CRA Field Engineer performed an inspection of the delivered erosion control materials for the Site to ensure that the rolls were individually wrapped and free from any damages potentially caused from shipment. In addition, the CRA Field Engineer ensured that the unloading and storage of the erosion control matting was conducted in accordance with the CQAP. All materials were stored in a manner to protect the material from precipitation, ultraviolet radiation, including sunlight, strong oxidizing chemicals, acids and bases, flames, and temperatures above 160 degrees Fahrenheit. The CRA Field Engineer also documented the roll and batch number of the erosions control materials utilized at the Site.

Prior to the installation of erosion control matting at the Site, the CRA Field Engineer inspected all installation areas to ensure that the graded areas were free of any loose objects or rills and/or ruts in the Site fill that could damage the erosion control matting.

5.12.2 INSTALLATION

Installation of erosion control materials were conducted in accordance to the CQAP, which references installation methods consistent with the erosion control matting Manufacturer's specifications. The CRA Field Engineer inspected the installation of the erosion control matting materials, to ensure that installation was conducted in accordance with the CQAP. Each roll of the erosion control matting was overlapped by at least 4 inches and was installed in a shingled pattern across the Site. Final pinning (staking) of the erosion control matting was conducted in accordance with the Manufacturer's specifications, with an approximate 3-foot to 5-foot spacing interval.

5.12.3 POST-INSTALLATION

Following the installation of erosion control matting, the CRA Field Engineer and CRA Services, conducted a thorough inspection of the entire area to look for any areas of damage or defects in the erosion control matting and to ensure that the installation, including overlapping and pinning, were conducted in accordance with the CQAP and/or Manufacturer's specifications. There were no areas of damage observed during this inspection. In addition, the installation of the erosion control matting was observed to have been correctly installed.

5.13 PIPING

Piping materials used for the construction of the passive landfill gas vents were consistent with the Final Design Report and Construction Specifications, Section 02506 – Landfill Gas Vents. Materials used met the reference standards, ASTM D1785. Installation of the passive landfill gas vents were completed in accordance with the Design drawings.

The below-ground vent pipes and above-ground riser pipes and pipe fittings were constructed of 4-inch diameter, ASTM D1785 Schedule 40 PVC pipe. Below-ground bent pipes were drilled with 1/4-inch holes, in 4 rows, spaced at 4 inches and staggered along pipe. Section 6.6.1 of the Final Design Report and the design drawings called for Schedule 40 piping, while Section 02506 called for Schedule 80 piping. It was decided that Schedule 40 piping would be acceptable and was used for the installation of the gas vents. The annular space between boreholes and vent pipes were filled with ¾-inch pea gravel and sealed with a bentonite seal. Bentonite grout and a concrete collar were installed to complete each vent.

6.0 HEALTH AND SAFETY AND CONSTRUCTION MONITORING

6.1 FUGITIVE DUST MONITORING

During Implementation of the RA construction, the ROD for the 12th Street Landfill required compliance with the administrative rules promogulated pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act (NREPA). Specifically, total emissions from the Site needed to comply with the secondary risk screening level (SSRL) for PCBs of 0.02 micrograms/cubic meter ($\mu g/m^3$), at the OU-4 perimeters not adjacent to an industrial property or public roadway. At the OU-4 perimeters adjacent to an industrial property or public roadway, total emissions needed to comply with a concentration that were 10 times the SSRL (0.2 $\mu g/m^3$). In addition, fugitive dust emissions must have complied with the National Ambient Air Quality Standard (NAAQS) for particulate matter of 150 $\mu g/m^3$, over a 24-hour period of exposure.

Although the potential for dust generation was low due to the moist condition of paper residuals and sandy native soil, preventative measures were used to control fugitive dust during construction activities, including watering frequently traveled unpaved roads and soil, as well as working surfaces, as needed. These proactive measures minimized fugitive dust and reduced the potential for Part 55 SSRL or NAAQS exceedances. In addition, real-time measurements of particulate concentrations in the air were used to demonstrate compliance with both 150 $\mu g/m^3$ NAAQS for particulate matter and with the Part 55 SSRLs for PCBs.

During the implementation of the RA, real-time air monitoring was performed around the perimeter of the landfill Site and in the vicinity of active Site operations, including excavation, grading, tilling, and material placement of the landfill cover system. Real-time air monitoring was conducted on a daily basis of the RA, until the gas venting layer had been completely installed across the entire landfill. The exact location of the monitoring stations changed daily and the locations were documented on the Daily Air Monitoring Log Sheets.

During the course of the RA, no exceedances of the above noted air quality standard were encountered at the perimeter of the landfill. For the air monitoring conducted in the vicinity of the of the active excavation areas, the presence of elevated VOCs were noted during the excavation of test pits to locate the pipeline, in the northeast portion of the wetlands. No other elevated air monitoring readings were encountered during the course of the active Site activities. PCBs were not detected above the applicable standards throughout the course of the RA activities. The health and safety air

monitoring logs, in the form of the Daily Air-Monitoring Log Sheets, are provided in Appendix K, which include the air monitoring results and locations for each day monitoring was conducted. The air monitoring program did not require air monitoring program samples to be sent to an off-Site laboratory.

6.2 SURFACE WATER MONITORING

The selected remedy for OU-4 included the removal of residuals from the former powerhouse channel and the construction of an erosion control system along the river. The removal of the residuals from the former powerhouse channel was completed in 2007 and is documented in the Emergency Response Plan Documentation Report (RMT, 2008a), included in Appendix A. As part of the work in 2007, a portion of the permanent erosion control system was installed that consisted of the placement of rip rap at the base of the eastern slope of the landfill.

As part of the RA activities completed in 2010, a drainage swale was constructed at the southeast extent of the landfill footprint. The drainage swale was designed and constructed to discharge surface water runoff from the southern portion of the landfill to discharge to the Kalamazoo River. During the construction of the drainage swale, grading of a portion of the Kalamazoo River bank was required. This involved the removal of some of the existing rip rap installed in 2007. Following the construction of the drainage swale, CRA installed additional riprap along the bank of the river.

The scope of the 2010 RA activities did not include surface water monitoring during the construction of the cover system since the construction activities did not directly affect the river. However, during the removal of materials that washed out into the Kalamazoo River (as discussed in Section 3.6), field observations of surface water turbidity in the Kalamazoo River were made upstream and downstream of the work zone (i.e., the southern drainage swale discharge to the Kalamazoo River located adjacent to the MDNR property) to assess potential adverse impacts on water quality. No observances of changes in turbidity from the downstream station exceeded twice the measured turbidity at the upstream sampling location. The turbidity data was also supplemented by visual inspections of water quality during the construction activities. During the removal of washed out material from the drainage swale along the Kalamazoo River on November 10, 2010, CRA conducted field turbidity measurements of the surface water, both upstream and downstream of the southern-most outlet. Turbid conditions were only observed for approximately 30 minutes during the construction work of the drainage swale.

The upstream and downstream locations were approximately 150 to 200 feet from the work area. The surface water samples were collected using a plastic container attached to a telescopic extension pole, such that the samples could be obtained from shore. The samples were collected from approximately the same depth below the water surface at both the upstream and downstream locations. The samples were measured using a hand-held turbidity meter in the field.

Turbidity readings were taken from the upstream and downstream locations at these times:

- Prior to the placement of any equipment or materials directly adjacent to the Kalamazoo River
- Every hour during the installation of the riprap along the river's edge

Additional readings were collected, as required, based on field conditions and visual observations. Due to Site conditions during the construction activities of the drainage swale, an initial plume of silt and fines from the existing rip rap was created at the start of the excavation activities. At no time were the native soils along the bank and sediments along the bed of the Kalamazoo River excavated or disturbed. Due to the observed high water level and flow rate of the Kalamazoo River during the drainage swale construction, the turbidity plume dispersed entirely prior to passing the downstream sampling location and the Site limits. No elevated turbidity readings were observed during the drainage swale construction activities. The recorded turbidity readings on November 11, 2010 were as follows:

Time	Upstream Turbidity (NTU)	Downstream Turbidity (NTU)
14:12	2.31	1.65
14:36	3.03	1.84
16:03	2.20	1.92

In addition to the surface water monitoring conducted in the Kalamazoo River, the temporary erosion control structures (e.g., silt fence) were visually inspected daily and after rain events greater than 0.5 inches in a 24-hour period. Necessary repairs were performed as soon as practicable, given the site conditions and weather.

7.0 INSTITUTIONAL CONTROLS

7.1 DEED RESTRICTIONS

The ROD required that deed restrictions be imposed on the 12th Street Landfill property as necessary to appropriately restrict future land use pursuant to Section 20120a (1)(i) of the NREPA (i.e., for "limited industrial" land use). The SOW stated that Weyerhaeuser was to rely upon the Restrictive Covenant for the 12th Street Landfill property that was filed on April 23, 2004, and that, if any deed restrictions were needed on adjacent properties, Weyerhaeuser shall attempt to obtain such deed restrictions in accordance with Section IX of the Consent Decree. Although the SOW states that the Restrictive Covenant for the 12th Street Landfill was filed on April 23, 2004, the *Declaration of Restrictive Covenants and Environmental Protection Easement* was found to have been recorded by the Allegan County Registrar of Deeds on March 25, 2005.

The March 25, 2005, *Declaration of Restrictive Covenants and Environmental Protection Easement* (Deed Restrictions) granted certain land use or resource use restrictions for the 12th Street Landfill property. These Deed Restrictions were granted by and between Plainwell, Inc., the MDNR; and the U.S. EPA as a third-party beneficiary. Weyerhaeuser Company, as a subsequent title holder of the property, was subject to the requirements of the Owner in the Deed Restrictions. A copy of the Deed Restrictions is provided in Appendix A.

In general, the Deed Restrictions prohibit uses of the property that are not compatible with the property's zoned industrial land use designation, the limited industrial land use category under Section 20120a(1)(i) of the NREPA, or other use that is consistent with the assumptions and basis for the cleanup criteria developed pursuant to Section 20120a(1)(i) of the NREPA. Specifically, the Deed Restrictions prohibit the following uses of the landfill property:

a. A residence, including any mobile home or factory-built housing, constructed or installed for use as residential human habitation

b. A hospital for humans

c. A public or private school for persons under 21 years of age

d. A daycare center for children

e. Any purpose involving residential occupancy on a 24-hour basis

f. Any other use that would disturb or penetrate the landfill cover or erosion control system as set forth in the ROD

The Deed Restrictions also prohibit the following activities on the landfill property:

- Any excavation, drilling, penetration, or other disturbance of the surface or subsurface soil on the property, except as necessary for compliance with the O&M Plan, or conducted in accordance with any work plan approved or modified by the U.S. EPA, with MDEQ concurrence.
- Any construction of building on the property unless plans are submitted to, and approved by, the MDEQ and the U.S. EPA.
- Any activity that may interfere with any element of the ROD, including the performance of the operation and maintenance activities, monitoring or other measures necessary to ensure the effectiveness and integrity of the remedy.

The Deed Restrictions also require that vegetation and other materials be kept clear of the permanent markers, and that all soil, media, and debris on the property be managed in accordance with the applicable requirements of Section 20120c of the NREPA; Part 111, *Hazardous Waste Management*, of the NREPA; Subtitle C of the RCRA; and other relevant state and federal laws.

7.2 FENCING AND GATES

Fencing and a gate was installed along 12th Street. The MDNR had established a perimeter fence between 12th Street and a small square section of property adjacent to the landfill. The two fences deter pedestrians and vehicular traffic from entering the landfill. The locations of the fencing and swing gate installed as part of the project are shown on Drawings C-01 and C-05.

In accordance with the ROD, permanent markers will be placed along the property boundaries describing the area of the OU-4 and the nature of any restrictions. Warning signs will also be posted on the fence every 200 feet and on all entry gates. The number, content, and location of the permanent markers and warning signs will be presented to the U.S. EPA for approval prior to their installation.

7.3 SUMMARY OF OMM PLAN

On May 6, 2011, a version of the OMM Plan was submitted to U.S. EPA and MDEQ for the implementation of long-term monitoring, discussed below, for the 12th Street

Landfill Site. As of the date of this CRAR, the OMM Plan has not been approved by U.S. EPA. During the Final certification Inspection, U.S. EPA indicated that additional time is required to complete their review. However, based on a request of both U.S. EPA and MDEQ, groundwater monitoring activities have been conducted in October/November 2011, February 2012, April 2012, and June 2012, in accordance with the following OMM Plan summary.

In accordance with the Final Design Report and PSVP, CRA developed an OMM Plan, which includes the objectives of the OMM program, which are to ensure the effective operation and maintenance of the following in a manner that ensures their long-term reliability toward meeting the objectives of the remedial design and the ROD:

- Landfill cover
- Erosion control system
- Site access controls
- Passive gas venting system
- Gas monitoring system
- Groundwater monitoring system
- Staff gauge measurements

As part of the OMM activities, regular inspection and required maintenance of the above noted components of the RA would be performed. The OMM Plan includes proposed scheduling for conducting inspections and implementing corrective actions to repair and maintain the above noted components.

In addition, the OMM Plan includes protocols for implementing long-term groundwater and landfill gas monitoring at the Site. The following provides a summary of the long term groundwater and landfill gas monitoring program. In addition, the following includes a summary of the vertical aquifer sampling (VAS) activities completed at the Site, as part of the RA, prior to the installation of the groundwater monitoring well network.

7.3.1 SUMMARY OF VAS/FOLLOW-UP GROUNDWATER SAMPLING ACTIVITIES

As part of the Final Design Report and the requirements identified in the CD and ROD, a series of groundwater monitoring points were required to be installed around the

perimeter of the landfill, to monitor groundwater quality and the long-term reliability of the RA. In order to ensure the reliability of the RA, the Final Design Report and ROD required that groundwater collected from the Site be compared against Michigan Act 451 – Part 201 Groundwater Surface Water Interface (GSI) criteria, therefore, well screen are required to be located at a depth interval that is representative of the highest concentrations of potential Site constituents present in groundwater, in accordance with Michigan Administrative Rule R 299.5716. To accomplish this requirement to screen wells in the zone of highest potential impact, Vertical Aquifer Sampling (VAS) was performed at the Site, prior to the installation of the long-term groundwater monitoring well network. The following discusses the VAS sampling completed by CRA at the Site, which was conducted in November 2010 and summarized in a memorandum submitted to U.S. EPA and MDEQ, dated January 11, 2011.

VAS was performed at a total of 10 proposed groundwater monitoring locations (MW-101 to MW-110). VAS sampling was conducted at each proposed monitoring well location in order to determine the depth interval that is representative of the highest concentrations of potential Site constituents present in groundwater, in accordance with the Final Design. Vertical profiling was performed at 5-foot intervals from the water table to a depth of 40 feet below the water table. VAS was performed using a Geoprobe groundwater sampler and low-flow sampling techniques, in accordance with the Final Design Report.

Groundwater samples were analyzed in the field for pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), conductivity, temperature, and turbidity. Samples were collected and submitted for laboratory analysis of volatile organic compounds (VOCs), PCBs, and total analyte list (TAL) metals. The VAS analytical results are presented in Table 7.1 through Table 7.10 and were compared to Michigan Act 451, Part 201 Groundwater: Residential and Industrial Commercial Generic Cleanup Criteria identified by MDEQ RRD Operations Memorandum No. 1, updated January 23, 2006, pursuant to 1994 PA 451 as amended.

Based in general on the VAS analytical results, proposed well screen depth intervals at each groundwater monitoring well location were identified and submitted to U.S. EPA and MDEQ for review and approval. The proposed depth of each well screen interval was selected based on an evaluation of the analytical data, which determined the VAS results that best represented the highest concentrations of potential landfill constituents present in groundwater at each location.

At each monitoring well location, the selection of each proposed screen interval was based on the presence of following parameters:

- Highest concentration of PCBs
- Presence of mercury
- Highest concentration of VOCs
- Highest concentration of TAL Metals

Based on U.S. EPA and MDEQ review and comments on the evaluation of the VAS analytical data, a total of 15 groundwater monitoring wells were approved and installed at the Site, as identified in Figure 7.1. The groundwater monitoring well network includes seven shallow monitoring wells and eight monitoring wells installed to various deeper depths. The installation of the well screen at each monitoring well location was completed in accordance with the Final Design Report. It should be noted that the VAS sampling included a location along the northern property boundary of the MDNR property, however, upon review of the data and groundwater flow directions, it was determined that a permanent monitoring well location was not needed in this area. Therefore, the final configuration of the monitoring network includes nine locations (i.e., MW-101 through MW-109). A copy of the memorandum presenting the VAS data, including the original ten VAS locations, is provided in Appendix O.

Following the installation of the monitoring well network, MDEQ requested that a follow-up round of groundwater sampling to the November 2010 VAS be completed at the Site, prior to implementing the OMM Plan. The purpose of the follow-up groundwater sampling was to determine whether addition groundwater monitoring wells or deeper sampling intervals should be installed or investigated, respectively.

In March/April 2011, CRA performed a round of groundwater sampling of the monitoring well network at the Site. CRA summarized the findings of this additional round of sampling in a memorandum, submitted to U.S. EPA and MDEQ, dated August 12, 2011. Groundwater samples were analyzed in the field for pH, ORP, DO, conductivity, temperature, and turbidity. Samples were collected and submitted for laboratory analysis of TCL VOCs, PCBs, and TAL metals. The April 2011 analytical results are presented in Table 7.11. Both the April 2011 and November 2010 VAS analytical results were compared to Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria, identified by MDEQ RRD Operations Memorandum No. 1, updated March 25, 2011, pursuant to 1994 PA 451 as amended.

Based on a comparison of the April 2010 analytical results against the VAS analytical results, the following observations can be made:

- In both the April 2011 and November 2010 analytical results, PCBs were not detected at or above the applicable criteria. Only two detections of PCBs were noted in the in April 2011 analytical results (i.e., MW-106D and MW-108S), at concentrations which were an order of magnitude lower than those detected during the VAS sampling and below the detection limit for PCBs in groundwater.
- Mercury was previously detected in the November 2010 VAS analytical results at 10 of 15 VAS intervals, at concentrations above the GSI. During the April 2011 sampling event, mercury was not detected in any of the groundwater samples. It should be noted that the low level sampling protocol for mercury was not used during the follow up sampling event so that a true comparison could be made to the November 2010 VAS analytical results. Therefore, the detection limit for mercury is above the GSI criteria. Low level mercury sampling method will be used during the OMM sampling to evaluate compliance with Part 201 GSI criteria.
- In both the April 2011 and VAS analytical results, very few VOCs were detected in the groundwater samples. For those parameters that were detected, all detections were well below the applicable criteria.
- Various TAL metals (aluminum, chromium, copper, iron, lead, manganese, and vanadium) were consistently detected throughout the VAS samples at concentrations exceeding both the residential and non-residential generic criteria. Fewer detections were noted in the April 2011 analytical results. Of the TAL metals detected in the April 2011 analytical results, only aluminum, iron, and manganese were detected at concentrations exceeding the residential and non-residential generic criteria.
- A comparison of the results for the deep sampling interval locations (i.e., VAS versus April 2011 groundwater sampling), presented in the below table, show that the parameters which were driving the well screen placement at these locations were not detect or not present at levels which are of significant concern and therefore further evaluation at lower elevations is not warranted.

Location	*VAS Driver*	*Follow Up Results*
MW-101D	TAL Metals	All TAL Metals < GSI
MW-102D	PCBs, Hg	PCB and Hg: ND
MW-104D	PCBs, Hg	PCB and Hg: ND
MW-105D	PCBs, Hg	PCB and Hg: ND
MW-106D	PCBs, Hg	PCB and Hg: ND
MW-108D	VOCs	VOCs < Part 201 Criteria

In addition, based on a review of the recorded field parameters, there was a significant decrease in the observed turbidity levels collected during the April 2011 sampling event versus the VAS sampling event. Previous turbidity readings collected during the VAS sampling activities frequently exceeded the recordable limits of the field equipment. However, during the April 2011 sampling event, turbidity in all samples did not exceed 60 Nephelometric Turbidity Units (NTU), with the majority of turbidity readings being recorded below 15 NTU.

Observed groundwater quality, as expected, was observed to have drastically improved between the VAS sampling and the April 2011 sampling events. Moreover, the monitoring well network installed appeared to be providing a complete characterization of the groundwater quality in the vicinity of the 12th Street Landfill and was suitable (interim period pending the final approval of the OMM Plan) for the OMM purposes. Therefore, based on the analytical results for the April 2011 event, no further groundwater investigation or additional groundwater monitoring well installation was recommended at that time. Table 7.12 summarizes the final well screen intervals and final well depths for the groundwater monitoring well network installed at the Site. Well completion logs are included as Appendix L.

7.3.2 SUMMARY OF LONG-TERM GROUNDWATER MONITORING ACTIVITIES

In accordance with the Final Design Report and the PSVP, the OMM Plan includes the following groundwater monitoring program.

Groundwater monitoring is to be conducted in accordance with the FSP and the results compared to the State of Michigan Part 201 GSI criteria (included in Table 4.1 in the PSVP of the Final Design Report) and the Toxic Substances Control Act (TSCA) (40 CFR Section 761.75[b] [6], which describes the monitoring system requirements for chemical waste landfills). The long-term groundwater monitoring program requires groundwater monitoring on a quarterly basis for the first 2 years following installation

of the groundwater monitoring wells. Each year of monitoring is to include two semi-annual monitoring events and two quarterly monitoring events. Each monitoring event will include confirmatory monitoring the day of the event to verify water levels are indicative of flow towards the Kalamazoo River. Groundwater sampling will begin with samples taken from wells that are closest to the river to reduce the influence on flow across the landfill footprint. Sampling order may change based on the results from the first sampling event. To prevent cross-contamination, wells that exhibit the highest concentrations of laboratory analytes will be sampled last. The proximity of each well to the river will be incorporated into this protocol. The field procedures that will be used for groundwater monitoring will be performed in accordance with SOP F-11 in the FSP (included in the Final Design Report).

7.3.2.1 GROUNDWATER MONITORING NETWORK AND SCHEDULE

A proposed monitoring schedule for the first five years of the OMM activities was provided in with the draft OMM Plan submitted to U.S. EPA for review and approval.

In accordance with the ROD, the continued requirement for groundwater monitoring will be evaluated on a 5-year interval and reviewed by the U.S. EPA, in consultation with the support Agency, to determine if continued groundwater monitoring is no longer needed.

7.3.3 LANDFILL GAS MONITORING PROGRAM

Three landfill gas probes have been installed along the southern sides of the landfill footprint. The locations of the gas probes are shown on Figure 7.1 and are located to be consistent with Section 6.6.2 of the Final Design Report, which states that the landfill gas probes would be spaced approximately every 500 feet, at the locations shown on Drawing C-06 of the Final Design Report. Each probe riser was constructed of ½-inch diameter threaded ASTM D1785 Schedule 40 pipe. The perforated screens for each probe included four rows of 1/8-inch diameter holes, with a total of 24 holes per foot of riser pipe. All fittings and end caps were also threaded, and no solvent glues or cement were used. The gas probe stopcocks were composed of a threaded, ½-inch PVC valve, with a permanent handle. After each borehole was drilled, the gas probes were placed in the center of each hole. Pea gravel (comprised of washed ¾-inch washed stone) was then installed in the annular space between the boreholes and the gas probes. A bentonite pellet seal was installed over the pea gravel as the drill casing was withdrawn

from the borehole. A protective surface casing and concrete surface seal were then installed to complete each gas probe.

The landfill gas monitoring probes will be monitored for combustible gas, carbon dioxide, oxygen, and pressure on a quarterly basis for the first 2 years. Section 3 of the PSVP (contained in the Final Design Report) provides the details regarding how the landfill gas monitoring will be performed and a description of contingency actions that may be taken if the performance standard is exceeded. Gas probe detail completion logs are included in Appendix L.

8.0 SUMMARY OF PROJECT COSTS

The following summarizes the approximate costs for the completion and final construction of the selected RA at the Site:

RA TASK DESCRIPTION	TASK SUBTOTAL	
Mobilization, Startup and Demobilization	$	45,000
Health and Safety	$	83,000
Project Administration	$	259,000
Full Time Equipment, Site Facilities, Security	$	160,000
Temporary Erosion Control Materials	$	21,000
Abandonment of Wells, Gas Vents/Test Wells and Staff Gauges	$	8,000
Clearing/Grubbing Off-Site Disposal	$	97,000
Test Pits and Trenches	$	1,000
Site Survey	$	45,000
Slope Stability Tests	$	1,000
On-Site Water Treatment /Off-Site Transport/Discharge	$	108,000
Relocation of Paper Residuals	$	396,000
Wyoming Asphalt Plant Excavation Activities	$	588,000
Landfill Grading Activities	$	67,000
Landfill Cover System	$	1,023,000
Restoration Activities	$	96,000
Soil Erosion Sedimentation Control Inspections (Spring 2011)	$	2,000
APPROXIMATE RA TOTAL COST	**$**	**3,000,000**

9.0 CERTIFICATION STATEMENT OF COMPLETION OF THE OU-4 REMEDIAL ACTION

In accordance with the CD requirements, the following includes a certification statement, signed by the CRA Project Coordinator, acknowledging that the RA has been implemented and completed to meet or exceed the performance standards identified in the CD and ROD.

"To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Mr. Gregory A. Carli, P.E.
CRA Project Manager-Conestoga-Rovers & Associates

for Mr. Aaron B. Stadnyk, B.A. Sc
CRA Project Coordinator-Conestoga-Rovers & Associates

10.0 REFERENCES

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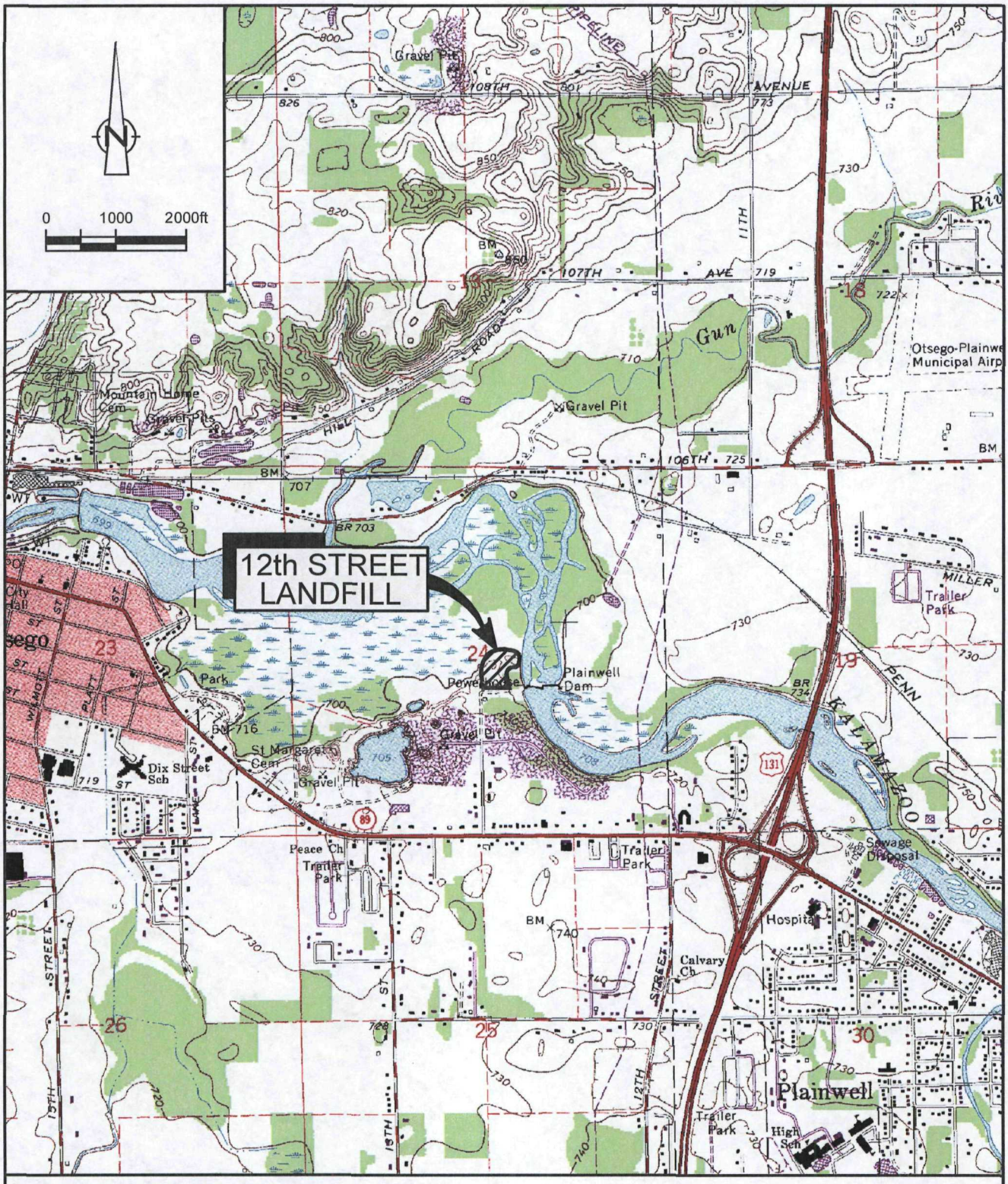
FIGURES



SOURCE: USGS QUADRANGLE MAP;
OTSEGO, MICHIGAN
1967, REVISED 1973

figure 1.1
SITE LOCATION MAP
CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
12th STREET LANDFILL SITE
Otsego Township, Michigan

56393-07(008)GN-WA001 DEC 12/2011

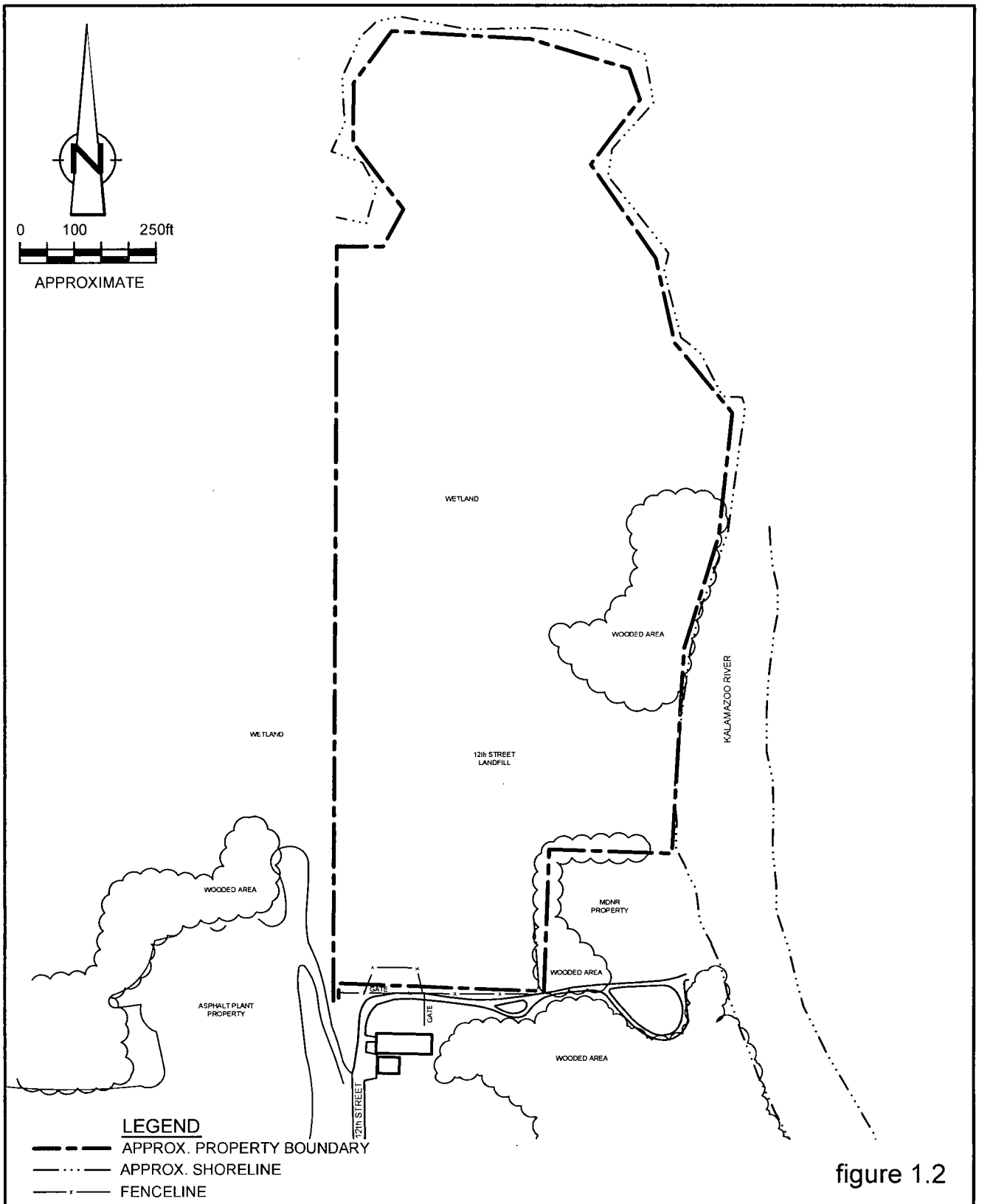
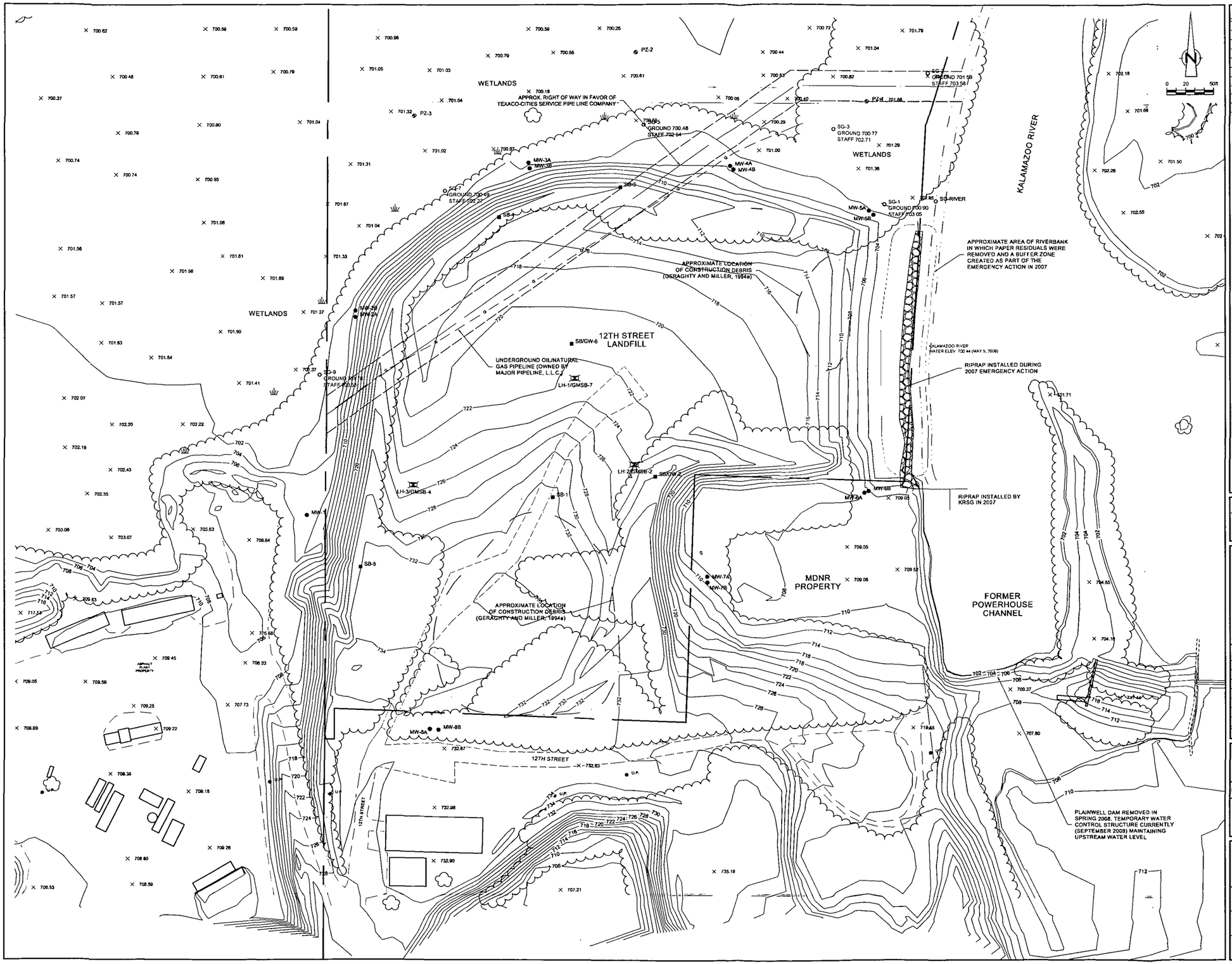


figure 1.2

CURRENT SITE PLAN
CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
12th STREET LANDFILL SITE
Otsego Township, Michigan

56393-07(008)GN-WA002 JUN 1/2012



NO	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING GROUND CONTOUR ELEVATION
- EXISTING SPOT ELEVATION
- EXISTING TREES AND/OR BRUSH
- EXISTING WET AREA AND WETLAND
- EXISTING EDGE OF WATER
- APPROXIMATE LIMITS OF CONSTRUCTION DEBRIS
- MW-1 EXISTING MONITORING WELL LOCATION
- PZ-2 EXISTING PIEZOMETER LOCATION
- LH-1/GMSB-7 EXISTING LEACHATE HEAD WELL LOCATION
- SG-1 EXISTING STAFF GAUGE
- EXISTING VANE SHEAR TEST LOCATION
- SB-5 EXISTING INSPEC-SOL SOIL BORING LOCATION
- SB/GW-6 EXISTING INSPEC-SOL SOIL BORING LOCATION/GAS WELL

NOTE:
BOUNDARY AND TOPOGRAPHIC SURVEY COMPLETED BY PREIN & NEWHOFF ON MAY 19, 2009

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
Otsego Township, Michigan

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

PRE-RA SITE CONDITIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date	
G CARLI	R HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project N°: 56393-07	Report N°: 008	Drawing N°: figure 2.1

56393-07(008)GN-WA019 SEP 12/2012

CONESTOGA-ROVERS & ASSOCIATES

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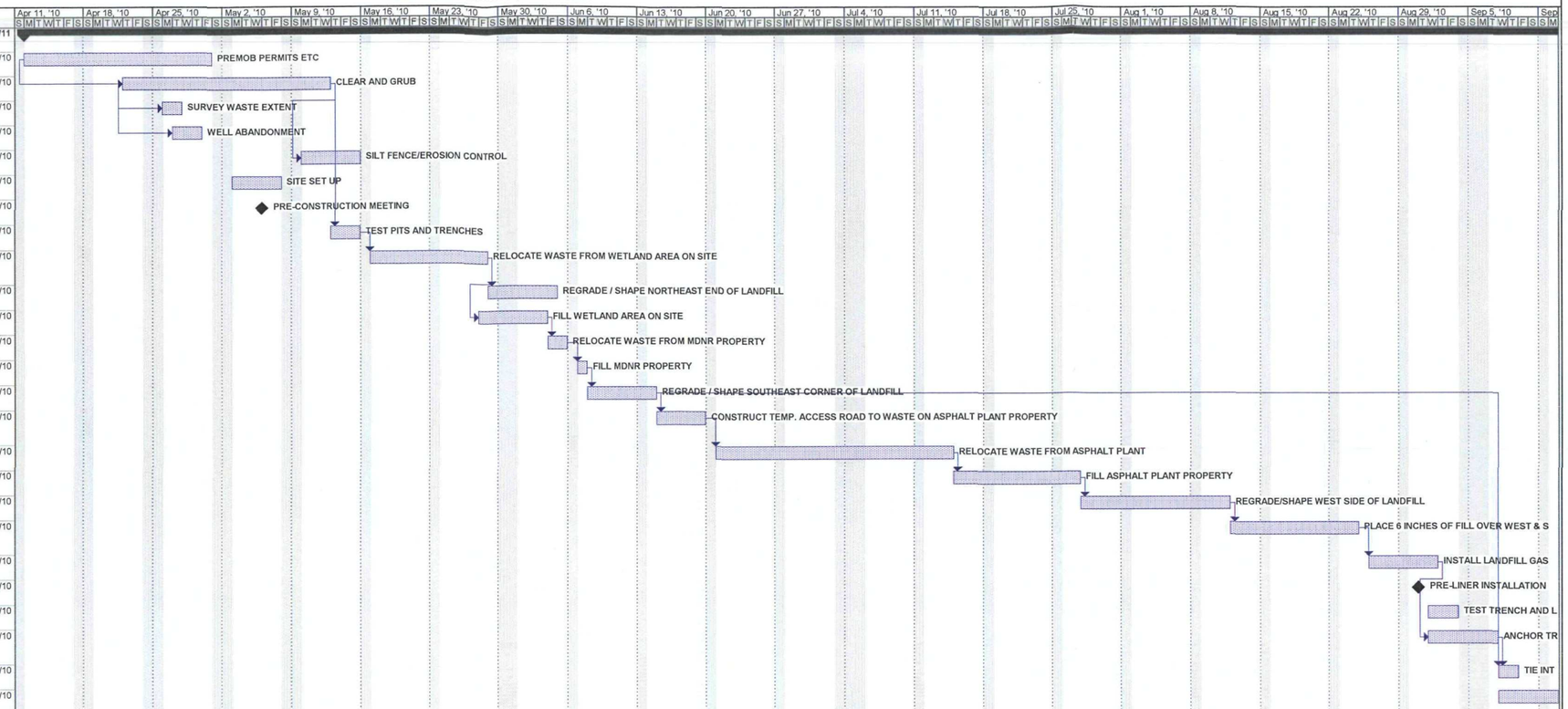
FIGURE 3.1

RA COMPLETION CONSTRUCTION SCHEDULE
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

ID	Task Name	Duration	Start	Finish
1	2010	300 days?	Mon 4/12/10	Thu 4/14/11
2	PREMOB PERMITS ETC	15 days	Mon 4/12/10	Fri 4/30/10
3	CLEAR AND GRUB	15 days	Thu 4/22/10	Wed 5/12/10
4	SURVEY WASTE EXTENT	2 days	Mon 4/26/10	Tue 4/27/10
5	WELL ABANDONMENT	3 days	Tue 4/27/10	Thu 4/29/10
6	SILT FENCE/EROSION CONTROL	6 days	Mon 5/10/10	Sat 5/15/10
7	SITE SET UP	5 days	Mon 5/3/10	Fri 5/7/10
8	PRE-CONSTRUCTION MEETING	1 day	Thu 5/6/10	Thu 5/6/10
9	TEST PITS AND TRENCHES	3 days	Thu 5/13/10	Sat 5/15/10
10	RELOCATE WASTE FROM WETLAND AREA ON SITE (4,500 CY - 400 CY per Day)	11 days	Mon 5/17/10	Fri 5/28/10
11	REGRADE / SHAPE NORTHEAST END OF LANDFILL	5 days	Sat 5/29/10	Fri 6/4/10
12	FILL WETLAND AREA ON SITE	5 days	Fri 5/28/10	Thu 6/3/10
13	RELOCATE WASTE FROM MDNR PROPERTY (200 CY)	2 days	Fri 6/4/10	Sat 6/5/10
14	FILL MDNR PROPERTY	1 day	Mon 6/7/10	Mon 6/7/10
15	REGRADE / SHAPE SOUTHEAST CORNER OF LANDFILL	6 days	Tue 6/8/10	Mon 6/14/10
16	CONSTRUCT TEMP. ACCESS ROAD TO WASTE ON ASPHALT PLANT PROPERTY	5 days	Tue 6/15/10	Sat 6/19/10
17	RELOCATE WASTE FROM ASPHALT PLANT (7,500 CY up to 10 foot deep)	19 days	Mon 6/21/10	Wed 7/14/10
18	FILL ASPHALT PLANT PROPERTY	11 days	Thu 7/15/10	Tue 7/27/10
19	REGRADE/SHAPE WEST SIDE OF LANDFILL	13 days	Wed 7/28/10	Wed 8/11/10
20	PLACE 6 INCHES OF FILL OVER LANDFILL (7,000 CY - estimated at 650 CY per Day)	11 days	Thu 8/12/10	Tue 8/24/10
21	INSTALL LANDFILL GAS VENTS	6 days	Thu 8/26/10	Wed 9/1/10
22	PRE-LINER INSTALLATION MEETING	0 days	Tue 8/31/10	Tue 8/31/10
23	TEST TRENCH AND LEACHATE EXTRATION	3 days?	Wed 9/1/10	Fri 9/3/10
24	ANCHOR TRENCH (300-400 LF per Day) ON WEST & SW PORTION OF LANDFILL	4 days	Wed 9/1/10	Tue 9/7/10
25	TIE INTO CLAY	2 days	Wed 9/8/10	Thu 9/9/10
26	RELOCATE ADDITIONAL MATERIAL FROM ASPHALT PLANT	5 days?	Wed 9/8/10	Mon 9/13/10
27	LEACHATE EXTRACTION WELL ABANDONMENT	1 day	Tue 9/14/10	Tue 9/14/10
28	LINER OVER ON NORTH AND EAST PORTIONS OF LANDFILL	6 days	Wed 9/15/10	Tue 9/21/10
29	TOE DRAIN WEST & SW OF LANDFILL	2 days	Wed 9/22/10	Thu 9/23/10
30	1 FOOT GRANULAR FILL COVER OVER LINER (750 CY per Day - assume 1775 CY per Acre x 3.5 Acres = 6250 CY)	10 days	Mon 9/27/10	Thu 10/7/10
31	1 FOOT COVER OVER GRANULAR FILL (750-800 CY per Day)	9 days	Fri 10/8/10	Mon 10/18/10
32	ANCHOR TRENCH NORTH AND EAST PORTIONS OF LANDFILL	3 days	Tue 10/19/10	Thu 10/21/10
33	PLACE LINER WEST & SW PORTION OF LANDFILL	3 days	Fri 10/8/10	Mon 10/11/10
34	TOE DRAIN NORTH AND EAST PORTION OF LANDFILL	3 days	Tue 10/12/10	Thu 10/14/10
35	1 FOOT GRANULAR FILL COVER OVER LINER (650 CY per Day - assume 1775 CY per Acre x 3 Acres = 5325 CY)	7 days	Fri 10/15/10	Fri 10/22/10
36	1 FOOT COVER OVER GRANULAR FILL (700 CY per Day)	7 days	Sat 10/23/10	Sat 10/30/10
37	ROAD DRAINAGE SWALE (Geoweb and reinforcement mat)	6 days	Mon 11/1/10	Sat 11/6/10
38	SC250 INSTALLATION NEAR RIVER	2 days?	Tue 11/2/10	Wed 11/3/10
39	6 INCHES OF TOPSOIL OVER LANDFILL CAP	9 days	Thu 11/4/10	Sat 11/13/10
40	REINSTALL SILT FENCE AT TOE OF LANDFILL	3 days	Mon 11/15/10	Wed 11/17/10
41	SEEDIEROSION CONTROL BLANKET INSTALLATION	4 days	Mon 11/15/10	Thu 11/18/10
42	DEMOBILIZATION OF CONSTRUCTION CREW	5 days	Fri 11/19/10	Wed 11/24/10
43	RESEED SITE AS NECESSARY	4 days	Mon 4/11/11	Thu 4/14/11
44	INSTALL GAS PROBES	1 day	Wed 11/17/10	Wed 11/17/10
45	INSTALL MONITORING WELLS	2 days	Thu 11/18/10	Fri 11/19/10



Project: 056393-8 - FIGURE 3-1
Date: Wed 12/14/11

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

CONESTOGA-ROVERS & ASSOCIATES
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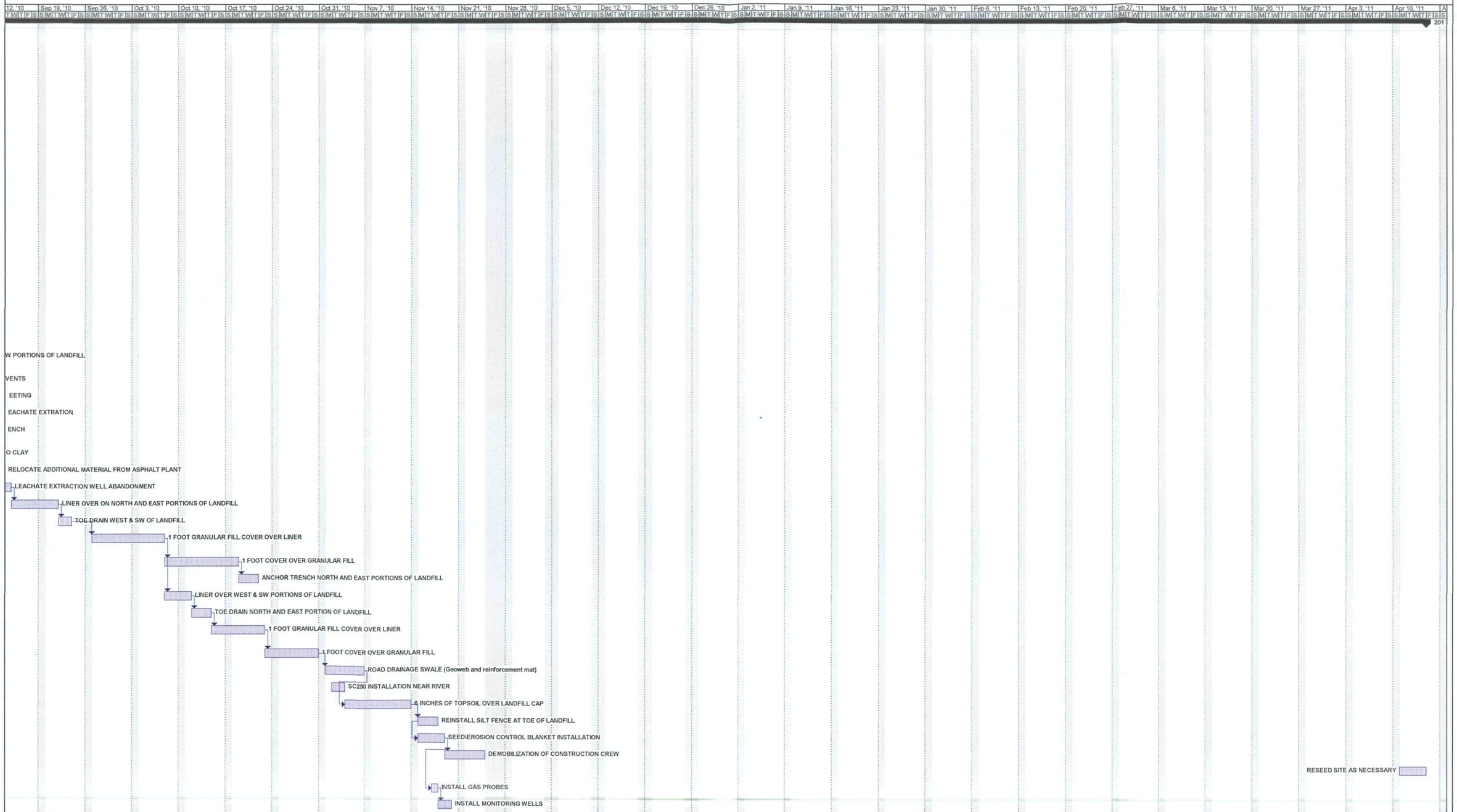
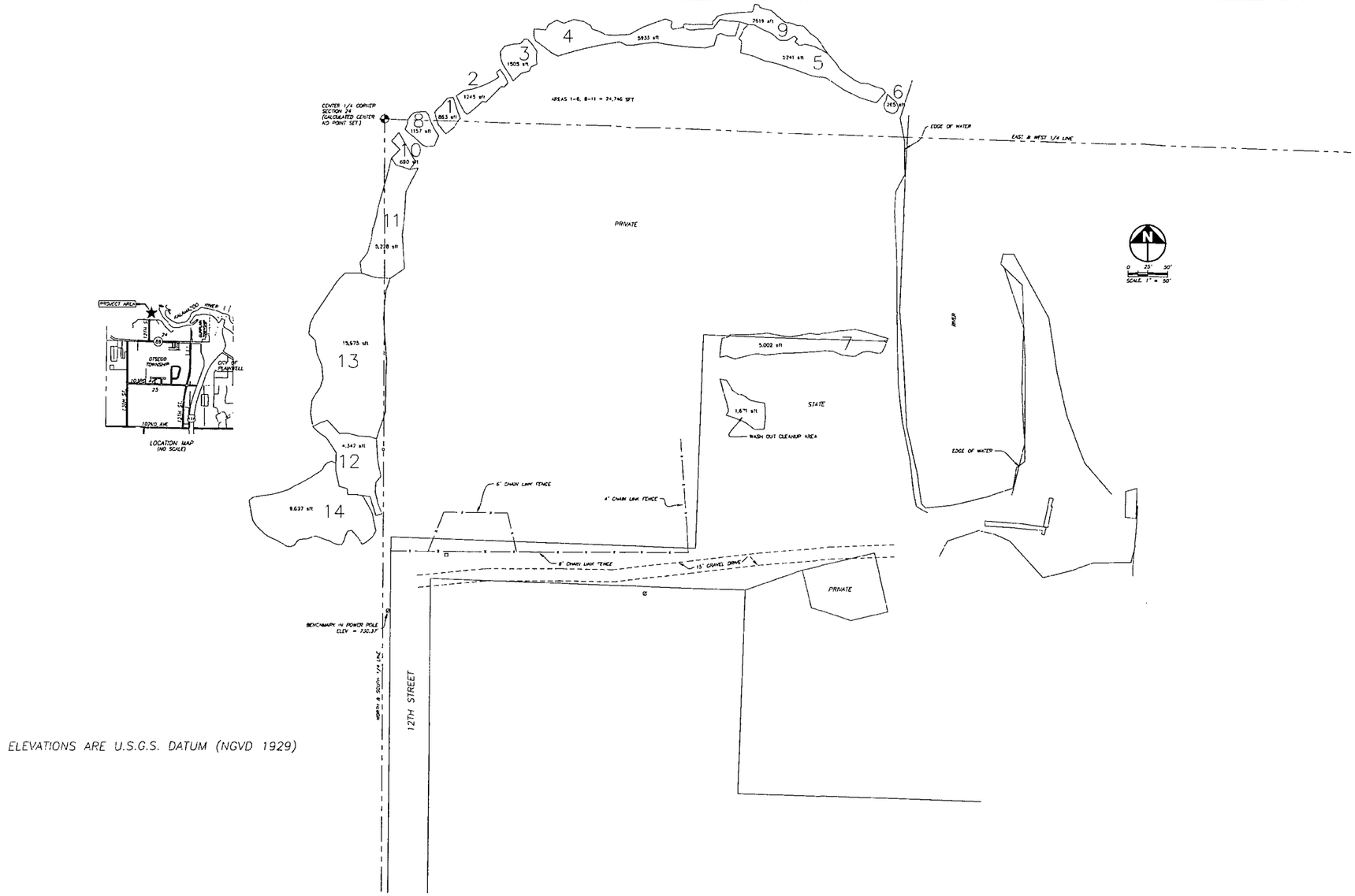
FIGURE 3.1

RA COMPLETION CONSTRUCTION SCHEDULE
12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN



Project: 056393-8 - FIGURE 3-1
Date: Wed 12/14/11

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline



ELEVATIONS ARE U.S.G.S. DATUM (NGVD 1929)

SOURCE: SURVEY COMPLETED BY PREIN & NEWHOF.

figure 3.2

SURVEY OF PAPER RESIDUAL EXCAVATIONS, AUGUST 2010
CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
12TH STREET LANDFILL SITE
Otsego Township, Michigan

56393-07(008)GN-WA020 SEP 17/2012

NO	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- 700 EXISTING GROUND ELEVATION CONTOUR
- EXISTING TREES AND/OR BRUSH
- EXISTING WET AREA AND WETLAND
- EXISTING EDGE OF WATER
- 718 FINAL ELEVATION CONTOURS
- LEW-1 TEMPORARY LEACHATE EXTRACTION WELL
- SOIL BORING ATTEMPT
- LEACHATE SEEP/EXTRACTION TRENCH LOCATION
- MW-106B MONITORING WELL LOCATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

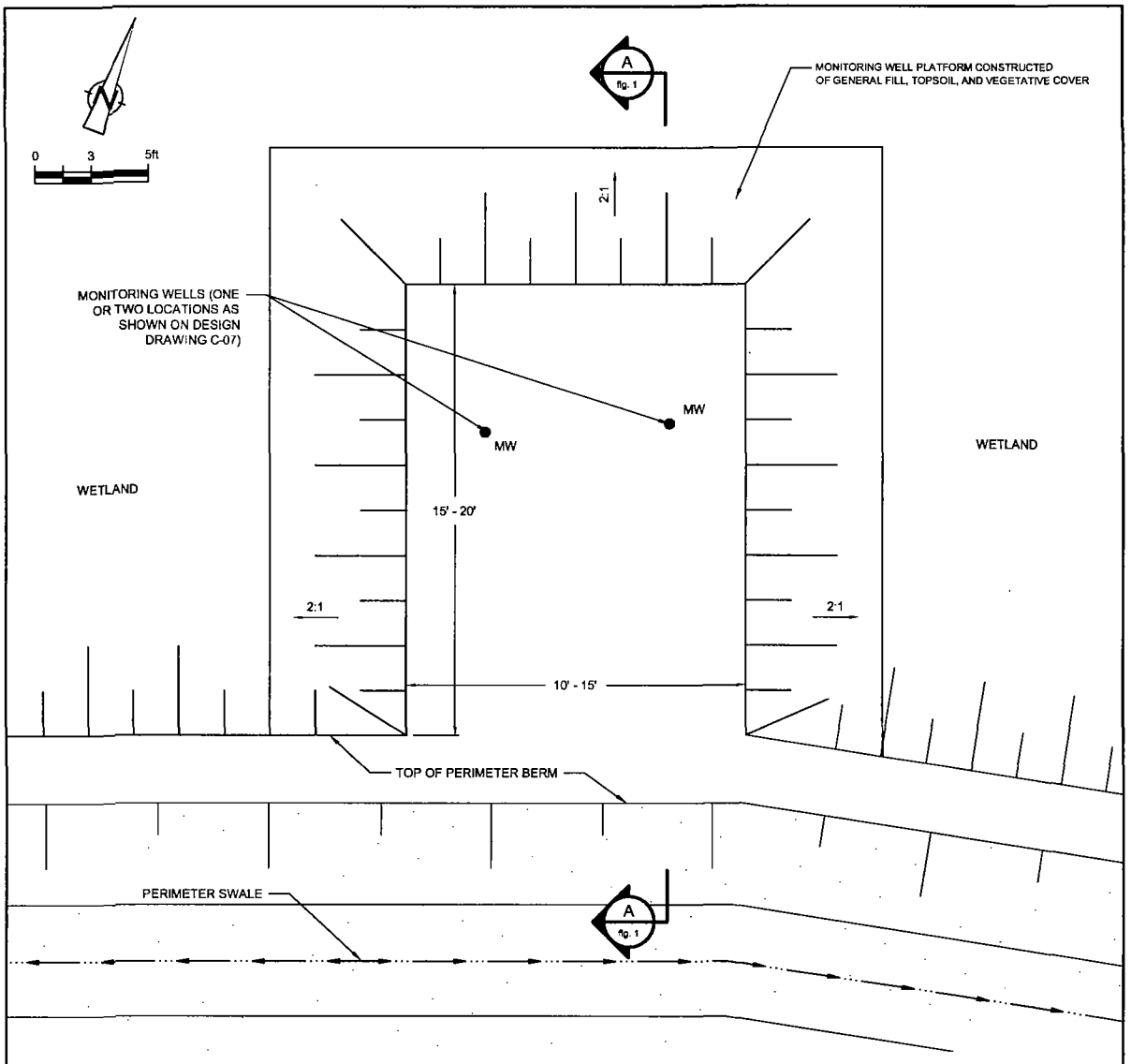
DESIGN MODIFICATION LEACHATE EXTRACTION WELL/TRENCH LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

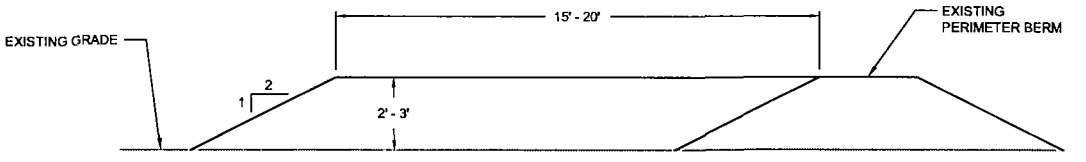
Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	OCTOBER 2011	
Scale: AS SHOWN	Project N°: 56393-07	Report N°: 008	Drawing N°: figure 3.3

56393-07(008)GN-WA003 JUN 1/2012



PLAN



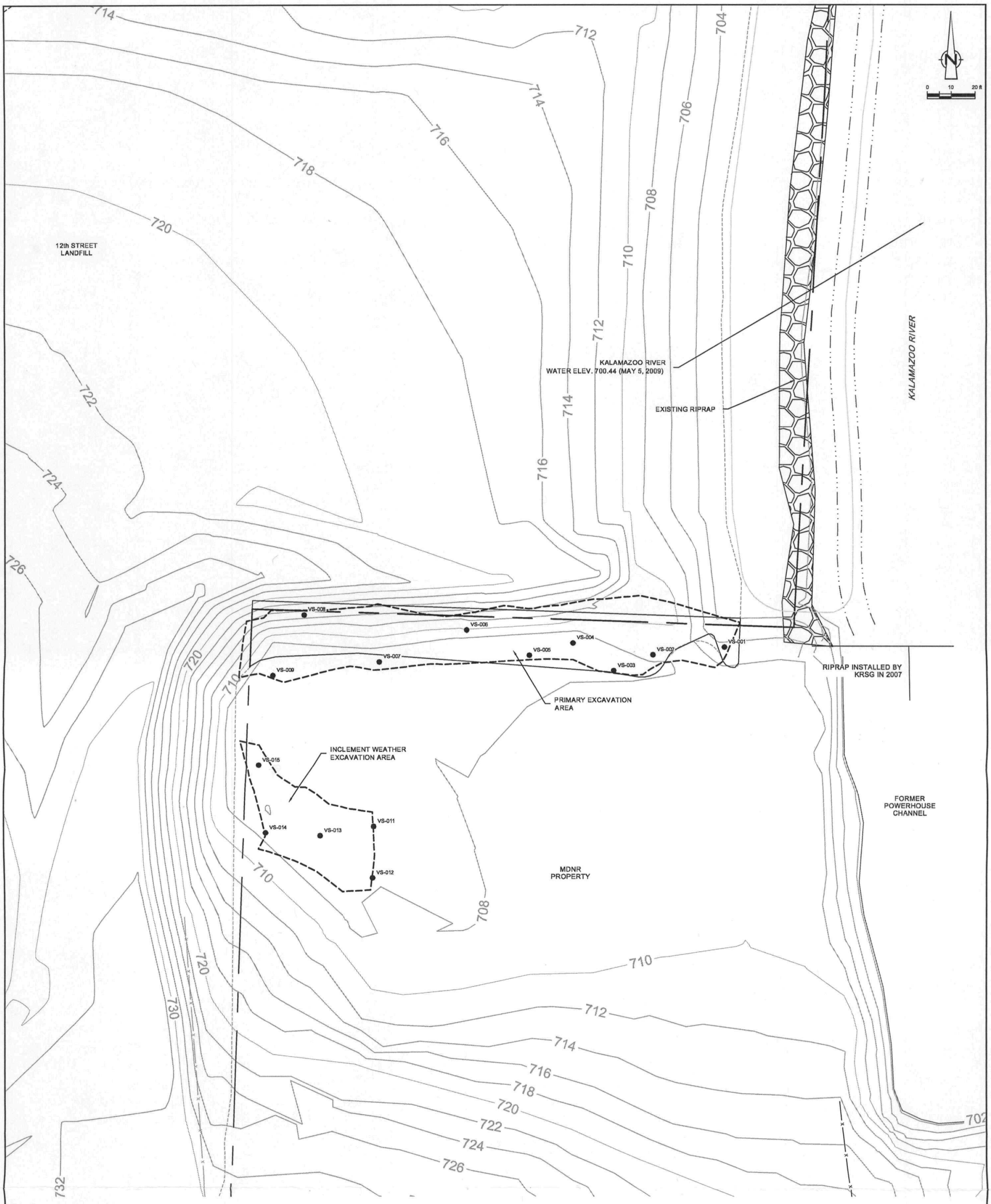
SECTION A fig. 1

N.T.S

figure 3.4

DESIGN MODIFICATION TYPICAL GROUNDWATER MONITORING WELL WETLAND PLATFORM
CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
12th STREET LANDFILL SITE
Otsego Township, Michigan

56393-07(008)GN-WA004 JUN 1/2012



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- 700 PRE-RA GROUND CONTOUR ELEVATION
- PREVIOUSLY DELINEATED LIMITS OF PAPER RESIDUALS
- FINAL LIMITS OF EXCAVATION/PAPER RESIDUALS IN 2010
- VS-001 VERIFICATION SOIL SAMPLE LOCATION AND ID

NOTES:

1. BOUNDARY AND TOPOGRAPHIC SURVEY COMPLETED BY PREIN & NEWHOFF ON MAY 19, 2009.
2. THE APPROXIMATE LIMITS OF VISIBLE PAPER RESIDUALS WERE DERIVED FROM THE ALLIED PAPER, INC./PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE REMEDIAL INVESTIGATION, TECHNICAL MEMORANDUM 8, (G & M 1994b) AND REVISED BASED ON THE U.S.EPA'S 2003 PREDESIGN INVESTIGATION (U.S. EPA, 2004), THE EMERGENCY ACTIONS PERFORMED ALONG THE RIVERBANK IN 2007 (RMT, 2008b), AND THE PREDESIGN INVESTIGATION CONDUCTED IN JUNE 2008.

№	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

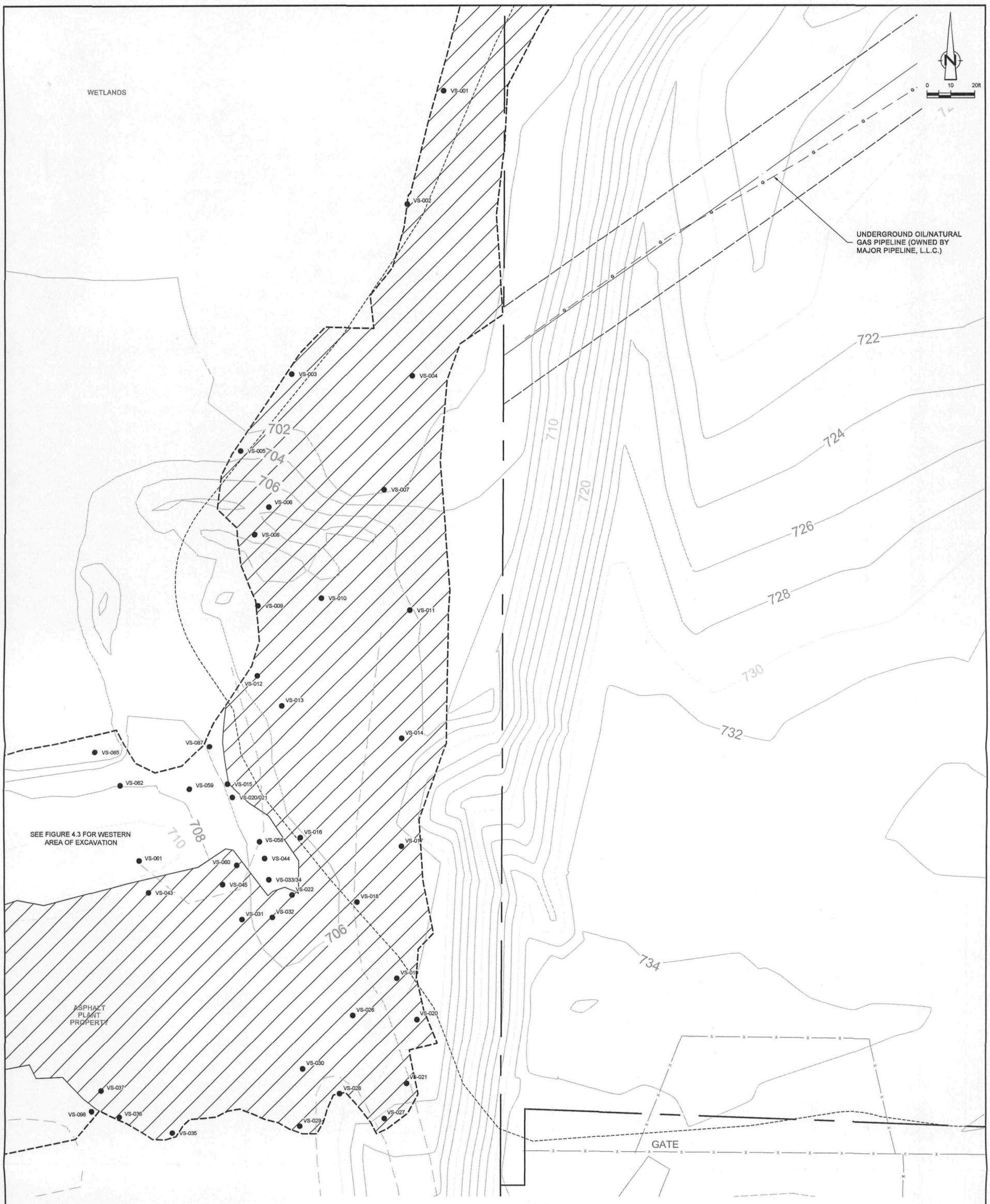
VERIFICATION SAMPLING PLAN
- MDNR PROPERTY

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
A.STADNYK	A.STADNYK	OCTOBER 2011	
Scale: AS SHOWN	Project N#: 56393-07	Report N#: 008	Drawing N#: figure 4.1

56393-07(008)GN-WA009 JUN 1/2012



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING BUILDING
- PRE-RA GROUND CONTOUR ELEVATION
- PREVIOUSLY DELINEATED LIMITS OF PAPER RESIDUALS
- FINAL LIMITS OF EXCAVATION/PAPER RESIDUALS IN 2010
- VS-001 VERIFICATION SOIL SAMPLE LOCATION AND ID
- EXTENT OF EXCAVATION - AUGUST 2010

NOTES:

1. BOUNDARY AND TOPOGRAPHIC SURVEY COMPLETED BY PREIN & NEWHOFF ON MAY 19, 2009.
2. THE APPROXIMATE LIMITS OF VISIBLE PAPER RESIDUALS WERE DERIVED FROM THE ALLIED PAPER, INC./PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE REMEDIAL INVESTIGATION, TECHNICAL MEMORANDUM 8, (G & M 1994b) AND REVISED BASED ON THE U.S.EPA'S 2003 PREDESIGN INVESTIGATION (U.S. EPA, 2004), THE EMERGENCY ACTIONS PERFORMED ALONG THE RIVERBANK IN 2007 (RMT, 2008b), AND THE PREDESIGN INVESTIGATION CONDUCTED IN JUNE 2008.

Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

VERIFICATION SAMPLING PLAN
- ASPHALT PLANT PROPERTY,
EASTERN PORTION

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
A.STADNYK	A.STADNYK	OCTOBER 2011	
Scale:	Project Nº:	Report Nº:	Drawing Nº:
AS SHOWN	56393-07	008	figure 4.2

56393-07(008)GN-WA008 JUN 1/2012

Nº	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING SPOT ELEVATION
- EXISTING LIMITS OF PAPER RESIDUALS
- APPROXIMATE LIMITS OF CONSTRUCTION DEBRIS
- VS-061 VERIFICATION SOIL SAMPLE LOCATION AND ID
- BH-120 SOIL BORING LOCATION (NOT SAMPLED)
- EXTENT OF EXCAVATION - AUGUST 2010
- EXTENT OF EXCAVATION (JANUARY 2011)
- AREAS WITH REMAINING VISUAL IMPACT
- FINAL LIMITS OF EXCAVATION/PAPER RESIDUALS IN 2010
- 718 FINAL ELEVATION CONTOURS
- U.P. UTILITY POLE

NOTES:

1. BOUNDARY AND TOPOGRAPHIC SURVEY COMPLETED BY PREIN & NEWHOFF ON MAY 19, 2009.

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

ADDITIONAL VERIFICATION SAMPLING PLAN - ASPHALT PLANT PROPERTY, WESTERN PORTION

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	OCTOBER 2011	
Scale: AS SHOWN	Project Nº: 56393-07	Report Nº: 008	Drawing Nº: figure 4.3

56393-07(008)GN-WA005 JUN 1/2012

N°	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING TREES AND/OR BRUSH
- EXISTING WET AREA AND WETLAND
- EXISTING EDGE OF WATER
- MW-1 EXISTING MONITORING WELL LOCATION
- SG-1 EXISTING STAFF GAUGE
- 3.0 COVER SYSTEM THICKNESS CONTOUR (FEET)

NOTE:
BOUNDARY AND TOPOGRAPHIC SURVEY COMPLETED BY PREIN & NEWHOFF ON MAY 19, 2009.

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
Otsego Township, Michigan

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

COVER SYSTEM
THICKNESS ISOPACH

CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTEMBER 2012	
Scale: 1" = 50'-0"	Project N°: 56393-07	Report N°: 008	Drawing N°: figure 5.1

56393-07(008)GN-WA021 SEP 17/2012

Nº	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING EDGE OF WATER
- EXISTING TREES AND/OR BRUSH
- LIMIT OF ACTUAL EXCAVATION
- 718 — FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- △ GV-1 — GAS VENT LOCATION
- ● MW-106B — MONITORING WELL LOCATION
- ▲ GP-1 — GAS PROBE LOCATION

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial

12th STREET LANDFILL
OTSEGO TOWNSHIP, MICHIGAN

CERTIFICATION OF COMPLETION OF OU-4 RA REPORT

GROUNDWATER MONITORING WELL, LANDFILL GAS PROBE/VENT LOCATIONS

CONESTOGA-ROVERS & ASSOCIATES

Source Reference: BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	OCTOBER 2011	
Scale: AS SHOWN	Project Nº: 56393-07	Report Nº: 008	Drawing Nº: figure 7.1

56393-07(008)GN-WA007 DEC 16/2011

TABLES

TABLE 2.1

HISTORICAL SITE OWNERSHIP
FORMER PLAINWELL MILL AND 12TH STREET LANDFILL
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Time Period	*Owner*
1886 - 1956	The Michigan Paper Company (possibly owned the Mill until approximately 1954)
1954 - 1956	Purchased by W.C. Hamilton and Sons Paper Manufacturers
1956 - 1961	The Michigan Paper Company of Plainwell - Integrated into a division of Hamilton Paper
1961 - 1971	Weyerhaeuser Company
1971 - 1975	Nicolet Paper Company, a division of Phillip Morris Inc., also known as Plainwell Paper Company
1975 - 1985	Plainwell Paper Company, under ownership by Phillip Morris, Inc., and Philip Morris Industrial, Inc.
1985 - 1987	Chesapeake Corporation
1987 - 1998	Simpson Plainwell Paper Company
1998 - 2008	Plainwell, Inc.
November 2000	Plainwell, Inc., ends operations at the Mill (bankrupt)
August 2006	City of Plainwell acquires the former Plainwell Mill Property from Allegan County out of Plainwell, Inc. bankruptcy proceedings
October 2006	Weyerhaeuser NR Company purchases 12th Street Landfill property from Plainwell, Inc.

Notes:
Source of historical information provided in the ROD.

TABLE 3.1

VOLUME OF EXCAVATED PAPER RESIDUALS
(SUMMER 2010 EXCAVATION ACTIVITIES)
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Area Designation	*Surveyed Area (square feet)*	*Volume of Paper Residuals Removed (cubic yards)*
MDNR Property		
7	5,002	580.60
Wetlands North of the 12th Street Landfill		
1	863	86.33
2	1,245	114.08
3	1,505	125.66
4	5,933	388.20
5	5,241	302.09
6	265	21.52
8	1,157	96.26
9	2,619	120.89
Total volume excavated from wetlands north of landfill:	18,828	1,255.03
Asphalt Plant Property (Summer 2010 Excavation Activities)		
10	690	N/A
11	5,228	N/A
12	15,975	N/A
13	4,347	N/A
Total volume excavated from wetlands north of landfill:	26,240	7,300 (1)

Note: N/A indicates that the volumes of residuals were unable to be determined via survey due to inclement weather and field conditions.

(1) The bottom of the excavation in the Asphalt Plant Property could not be surveyed due to standing water, therefore, the volume has been estimated.

TABLE 3.2

DESIGN MODIFICATIONS MADE DURING THE REMEDIAL ACTION
12th STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Design Modifications / Description	*Submission/Notification Date*	*U.S. EPA Approval Date*
Modification of silt fence design for sedimentation control	5/12/10	6/17/10
Modification of Geotextiles - Use of 8 oz. Geotextile under Geoweb stabilized swales and under the riprap apron for discharge of surface water	6/11/10	6/22/10
Installation of Temporary Leachate Extraction Wells (LEWs) and Related Test Trenches	7/16/10	LEW installation approved on 7/21/10 Installation of test trench approved on 8/31/10 (Not required)
Asphalt Plant Property Winter Excavation/Off-Site Disposal and Restoration Activities	9/15/10	Not required (Schedule change)
Revised Subgrade Plan	8/11/10	Not required
Modification of the Design of Passive Gas Vents to Add an Additional Piece of Geotextile at the Base of Each Vent.	9/28/10	10/5/10 (Communicated)
Modification to Erosion Control Measures - Placement of Erosion Control Matting on 4H:1V Slopes	11/22/10	Not required
Installation of Groundwater Monitoring Wetland Platforms	11/23/10	11/29/10 (Not required)

Not required: Indicates that modification was discussed during weekly meetings or on site and formal written approval was determined to be unnecessary.

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
Verification Soil Samples						
SO-056393-062910-RP-VSRDNRE-001	06/29/10	VS-001	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (0, 0)
SO-056393-062910-RP-VSRDNRE-002	06/29/10	VS-002	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (32, 0)
SO-056393-062910-RP-VSRDNRE-003	06/29/10	VS-003	-	Soil	PCBs/VOCs	MDNR Property sidewall sample - grid location (48, 16)
SO-056393-062910-RP-VSRDNRE-004	06/29/10	VS-004	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (64, 0)
SO-056393-062910-RP-VSRDNRE-005	06/29/10	VS-005	-	Soil	PCBs/VOCs	MDNR Property sidewall sample - grid location (80, 16)
SO-056393-062910-RP-VSRDNRE-006	06/29/10	VS-006	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (112, 0)
SO-056393-063010-RP-VSRDNRE-007	06/30/10	VS-007	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (144, 0)
SO-056393-063010-RP-VSRDNRE-008	06/30/10	VS-008	-	Soil	PCBs/VOCs	MDNR Property base sample - grid location (176, 0)
SO-056393-063010-RP-VSRDNRE-009	06/30/10	VS-009	-	Soil	PCBs/VOCs	MDNR Property sidewall sample - grid location (192, 16)
SO-056393-063010-RP-VSRDNRE-010	06/30/10	VS-008 Dup	-	Soil	PCBs/VOCs	Duplicate for VS-008 - grid location (176, 0)
SO-056393-082410-RP-VSRDNRE-011	08/24/10	VS-011	-	Soil	PCBs	MDNR wash-out sample
SO-056393-082410-RP-VSRDNRE-012	08/24/10	VS-012	-	Soil	PCBs	MDNR wash-out sample
SO-056393-082410-RP-VSRDNRE-013	08/24/10	VS-013	-	Soil	PCBs	MDNR wash-out sample
SO-056393-082410-RP-VSRDNRE-014	08/24/10	VS-014	-	Soil	PCBs	MDNR wash-out sample
SO-056393-082410-RP-VSRDNRE-015	08/24/10	VS-015	-	Soil	PCBs	MDNR wash-out sample
SO-056393-071010-CB-VSRAP-001	07/10/10	VS-001	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (25, 25)
SO-056393-071010-CB-VSRAP-002	07/10/10	VS-002	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (50, 75)
SO-056393-071210-RP-VSRAP-003	07/12/10	VS-003	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (75, 125)
SO-056393-071210-RP-VSRAP-004	07/12/10	VS-005	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (125, 175)
SO-056393-071210-RP-VSRAP-005	07/12/10	VS-008	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (100, 200)
SO-056393-071310-RP-VSRAP-006	07/13/10	VS-009	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (125, 225)
SO-056393-071310-RP-VSRAP-007	07/13/10	VS-012	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (100, 250)

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
SO-056393-071310-RP-VSRAP-008	07/13/10	VS-012 Dup	-	Soil	PCBs/VOCs	Duplicate for VS-012 - grid location (100, 250)
SO-056393-071410-RP-VSRAP-009	07/14/10	VS-015	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (100, 300)
SO-056393-071610-CB-VSRAP-010	07/16/10	VS-004	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (25, 125)
SO-056393-071910-RP-VSRAP-011	07/19/10	VS-018	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (50, 350)
SO-056393-072010-RP-VSRAP-012	07/20/10	VS-019	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (25, 375)
SO-056393-072010-RP-VSRAP-013	07/20/10	VS-016	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (75, 325)
SO-056393-072010-RP-VSRAP-014	07/20/10	VS-021	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (100, 325)
SO-056393-072010-RP-VSRAP-015	07/20/10	VS-020	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (0, 425)
SO-056393-072010-RP-VSRAP-016	07/20/10	VS-017	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (75, 325)
SO-056393-072010-RP-VSRAP-017	07/20/10	VS-022	-	Soil	PCBs/VOCs	Wyoming Asphalt Property sidewall sample - grid location (75, 350)
SO-056393-072810-RP-VSRAP-018	07/28/10	VS-014	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (25, 275)
SO-056393-072810-RP-VSRAP-019	07/28/10	VS-013	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (75, 275)
SO-056393-080610-RP-VSRAP-020	08/06/10	VS-010	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (75, 225)
SO-056393-080610-RP-VSRAP-021	08/06/10	VS-010 Dup	-	Soil	PCBs/VOCs	Duplicate for VS-010 - grid location (75, 225)
SO-056393-080610-RP-VSRAP-022	08/06/10	VS-011	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (25, 225)
SO-056393-081010-RP-VSRAP-023	08/10/10	VS-006	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (75, 175)
SO-056393-081010-RP-VSRAP-024	08/10/10	VS-007	-	Soil	PCBs/VOCs	Wyoming Asphalt Property base sample - grid location (25, 175)
SO-056393-081310-RP-VSRAP-025	08/13/10	VS-007	-	Soil	PCBs/VOCs	Resample of VS-007 location after additional material removed due to exceedance of VOCs
SO-056393-060610-RP-001	06/06/10	NA	-	Soil	PCBs/VOCs	Sample of gray balls of material w/ peat observed in peat material near northwest wetland area
SO-056393-071910-RP-002	07/19/10	NA	-	Soil	PCBs/VOCs	Sample of bluish/grayish material observed underneath asphalt at southwest corner of asphalt property
SO-056393-081310-RP-VSRAP-026	08/13/10	VS-023	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-081410-RP-VSRAP-027	08/14/10	VS-024	-	Soil	PCBs/VOCs	Southeast sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-081410-RP-VSRAP-028	08/14/10	VS-025	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
SO-056393-081410-RP-VSRAP-029	08/14/10	VS-026	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-081410-RP-VSRAP-030	08/14/10	VS-027	-	Soil	PCBs/VOCs	Intermediate west sidewall sample in southern portion of Wyoming Asphalt Property
SO-056393-081410-RP-VSRAP-031	08/14/10	VS-028	-	Soil	PCBs/VOCs	Intermediate west sidewall sample in southern portion of Wyoming Asphalt Property
SO-056393-081410-RP-VSRAP-032	08/14/10	VS-029	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-081410-RP-VSRAP-033	08/14/10	VS-030	-	Soil	PCBs/VOCs	North sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-081410-RP-VSRAP-034	08/14/10	VS-030	-	Soil	PCBs/VOCs	Duplicate for sample VSRAP-033
SO-056393-082610-RP-VSRAP-035	08/26/10	VS-031	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-082610-RP-VSRAP-036	08/26/10	VS-032	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-082610-RP-VSRAP-037	08/26/10	VS-033	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-082710-CB-VSRAP-038	08/27/10	VS-038	-	Soil	PCBs	Floor - PCB's only
SO-056393-082710-CB-VSRAP-039	08/27/10	VS-039	-	Soil	PCBs	Floor
SO-056393-082710-CB-VSRAP-040	08/27/10	VS-040	-	Soil	PCBs	Sidewall - PCBs only
SO-056393-082710-CB-VSRAP-041	08/27/10	VS-041	-	Soil	PCBs	Sidewall - PCBs only
SO-056393-082710-CB-VSRAP-042	08/27/10	VS-042	-	Soil	PCBs	Sidewall - PCBs only
SO-056393-082710-CB-VSRAP-043	08/27/10	VS-043	-	Soil	PCBs	North sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-082710-CB-VSRAP-044	08/27/10	VS-044	-	Soil	PCBs	East sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-082710-CB-VSRAP-045	08/27/10	VS-045	-	Soil	PCBs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-090810-RP-VSRAP-046	09/08/10	VS-046	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-090810-RP-VSRAP-047	09/08/10	VS-047	-	Soil	PCBs/VOCs	Duplicate for VSRAP-046
SO-056393-090910-RP-VSRAP-048	09/09/10	VS-048	-	Soil	PCBs/VOCs	West sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-090910-RP-VSRAP-049	09/09/10	VS-049	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-050	09/10/10	VS-050	-	Soil	PCBs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-051	09/10/10	VS-051	-	Soil	PCBs/VOCs	Duplicate for VSRAP-051

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
SO-056393-091010-RP-VSRAP-052	09/10/10	VS-052	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-053	09/10/10	VS-053	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-054	09/10/10	VS-054	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-055	09/10/10	VS-055	-	Soil	PCBs	South sidewall sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-091010-RP-VSRAP-057	09/10/10	VS-057	-	Soil	PCBs/VOCs	Southeast sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-091310-RP-VSRAP-056	09/13/10	VS-056	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-121610-RP-058	12/16/10	VS-058	-	Soil	PCBs/VOCs	East sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-121610-RP-059	12/16/10	VS-059	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-121610-RP-060	12/16/10	VS-060	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property August 2010 excavation area
SO-056393-122110-AS-061	12/21/10	VS-061	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-062	12/21/10	VS-062	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-063	12/21/10	VS-063	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-064	12/21/10	VS-064	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-065	12/21/10	VS-065	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-066	12/21/10	VS-066	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122110-AS-067	12/21/10	VS-067	-	Soil	PCBs/VOCs	Duplicate for sample AS-066
SO-056393-122910-RP-068	12/29/10	VS-068	-	Soil	PCBs/VOCs	North sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-069	12/29/10	VS-069	-	Soil	PCBs/VOCs	North sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-070	12/29/10	VS-070	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-071	12/29/10	VS-071	-	Soil	PCBs/VOCs	North sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-072	12/29/10	VS-072	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-073	12/29/10	VS-073	-	Soil	PCBs/VOCs	West sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-074	12/29/10	VS-074	-	Soil	PCBs/VOCs	Southwest sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-075	12/29/10	VS-075	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-076	12/29/10	VS-076	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-122910-RP-077	12/29/10	VS-077	-	Soil	PCBs/VOCs	Southwest sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
SO-056393-122910-RP-078	12/29/10	VS-078	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010311-RP-079	01/03/11	VS-079	-	Soil	PCBs/VOCs	Northeast sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010311-RP-080	01/03/11	VS-080	-	Soil	PCBs/VOCs	Duplicate for sample RP-079
SO-056393-010311-RP-081	01/03/11	VS-081	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010311-RP-082	01/03/11	VS-082	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010311-RP-083	01/03/11	VS-083	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010411-RP-084	01/04/11	VS-084	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010411-RP-085	01/04/11	VS-085	-	Soil	PCBs/VOCs	North sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010511-RP-086	01/05/11	VS-086	-	Soil	PCBs/VOCs	Sidewall (was on hold because there was the potential that this area would get excavated out due to grey/blue material observed under second layer of asphalt.)
SO-056393-010511-RP-087	01/05/11	VS-087	-	Soil	PCBs/VOCs	Northeast sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010611-RP-088	01/06/11	VS-088	-	Soil	PCBs/VOCs	Floor, MS/MSD (sample was on hold because there was the potential that this area would get excavated out due to grey/blue material observed under second layer of
SO-056393-010611-RP-089	01/06/11	VS-089	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010611-RP-090	01/06/11	VS-090	-	Soil	PCBs/VOCs	Duplicate for RP-089
SO-056393-010711-RP-091	01/07/11	VS-091	-	Soil	PCBs/VOCs	Northeast sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-010711-RP-092	01/07/11	VS-092	-	Soil	PCBs/VOCs	Northeast sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011011-RP-093	01/10/11	VS-093	-	Soil	PCBs/VOCs	Northeast sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011011-RP-094	01/10/11	VS-094	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011011-RP-095	01/10/11	VS-095	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011011-RP-096	01/10/11	VS-096	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011111-RP-097	01/11/11	VS-097	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011111-RP-098	01/11/11	VS-098	-	Soil	PCBs/VOCs	Southeast sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011111-RP-099	01/11/11	VS-099	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011111-RP-100	01/11/11	VS-100	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011311-BW-101	01/13/11	VS-101	-	Soil	PCBs/VOCs	South sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011311-BW-102	01/13/11	VS-102	-	Soil	PCBs/VOCs	Duplicate for RP-101

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
SO-056393-011311-BW-103	01/13/11	VS-103	-	Soil	PCBs/VOCs	Southwest sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011311-BW-104	01/13/11	VS-104	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011311-BW-105	01/13/11	VS-105	-	Soil	PCBs/VOCs	East sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011411-BW-106	01/14/11	VS-106	-	Soil	PCBs/VOCs	Northwest sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011411-BW-107	01/14/11	VS-107	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011411-BW-108	01/14/11	VS-108	-	Soil	PCBs/VOCs	Base sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011811-EV-109	:et below ground surfac	VS-109	-	Soil	PCBs/VOCs	South sidewall sample in northern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011811-EV-111	01/18/11	VS-111	-	Soil	PCBs/VOCs	Base sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011811-EV-112	01/18/11	VS-112	-	Soil	PCBs/VOCs	Northwest sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011811-EV-113	:et below ground surfac	VS-113	-	Soil	PCBs/VOCs	West sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
SO-056393-011811-EV-114	01/18/11	VS-114	-	Soil	PCBs/VOCs	West sidewall sample in southern portion of Wyoming Asphalt Property January 2011 excavation area
Vertical Aquifer Sampling						
VAS-56393-110910-DD-003	11/09/10	MW 101	(44-49) ft BGS	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-110910-DD-002	11/09/10	MW 101	*(64-69) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-110910-DD-001	11/09/10	MW 101	*(69-74) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
feet AMSL - Feet above mean sea level.	11/10/10	MW 101	*(39-44) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
feet bgs - Feet below ground surface.	11/10/10	MW 101	*(49-54) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111010-DD-007	11/10/10	MW 101	*(54-59) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111010-DD-008	11/10/10	MW 101	*(54-58) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111010-DD-006	11/10/10	MW 101	*(59-64) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111110-DD-012	11/11/10	MW 101	*(34-39) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-107	11/22/10	MW 102	*(5-10) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-105	11/22/10	MW 102	*(10-15) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-106	11/22/10	MW 102	*(15-20) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-104	11/22/10	MW 102	*(20-25) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-103	11/22/10	MW 102	*(25-30) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
VAS-56393-112210-DD-102	11/22/10	MW 102	*(30-35) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-101	11/22/10	MW 102	*(35-40) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-098	11/22/10	MW 102	*(40-45) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-112210-DD-099	11/22/10	MW 102	*(40-45) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-084	11/18/10	MW 103	*(34-39) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-081	11/18/10	MW 103	*(39-44) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-079	11/18/10	MW 103	*(44-49) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-095	11/19/10	MW 103	*(9-14) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-093	11/19/10	MW 103	*(14-19) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-091	11/19/10	MW 103	*(19-24) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-089	11/19/10	MW 103	*(24-29) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-087	11/19/10	MW 103	*(29-34) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-042	11/15/10	MW 104	*(30-35) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-040	11/15/10	MW 104	*(35-40) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-036	11/15/10	MW 104	*(40-45) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-053	11/16/10	MW 104	*(5-10) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-051	11/16/10	MW 104	*(10-15) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-049	11/16/10	MW 104	*(15-20) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-047	11/16/10	MW 104	*(20-25) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-046	11/16/10	MW 104	*(25-30) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-041	11/15/10	MW 105	*(32-37) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-039	11/15/10	MW 105	*(37-42) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-034	11/15/10	MW 105	*(42-47) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-035	11/15/10	MW 105	*(42-47) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-054	11/16/10	MW 105	*(7-12) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-052	11/16/10	MW 105	*(12-17) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
VAS-56393-111610-DD-050	11/16/10	MW 105	*(17-22) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-048	11/16/10	MW 105	*(22-27) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-044	11/16/10	MW 105	*(27-32) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111610-DD-045	11/16/10	MW 105	*(27-32) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111110-DD-016	11/11/10	MW 106	*(34-39) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111110-DD-014	11/11/10	MW 106	*(39-44) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-030	11/12/10	MW 106	*(9-14) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-028	11/12/10	MW 106	*(14-19) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-024	11/12/10	MW 106	*(19-24) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-021	11/12/10	MW 106	*(24-29) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-019	11/12/10	MW 106	*(29-34) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-033	11/15/10	MW 106	*(4-9) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111110-DD-015	11/11/10	MW 107	*(34-39) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111110-DD-013	11/11/10	MW 107	*(39-44) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-029	11/12/10	MW 107	*(9-14) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-025	11/12/10	MW 107	*(14-19) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-022	11/12/10	MW 107	*(19-24) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-023	11/12/10	MW 107	*(19-24) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-020	11/12/10	MW 107	*(24-29) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111210-DD-018	11/12/10	MW 107	*(29-34) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111510-DD-032	11/15/10	MW 107	*(4-9) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-068	11/17/10	MW 108	*(14-19) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-069	11/17/10	MW 108	*(14-19) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-066	11/17/10	MW 108	*(19-24) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-064	11/17/10	MW 108	*(24-29) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-062	11/17/10	MW 108	*(29-34) ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
VAS-56393-111710-DD-060	11/17/10	MW 108	(34-39) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-056	11/17/10	MW 108	(39-44) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-076	11/18/10	MW 108	(4-9) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-075	11/18/10	MW 108	(9-14) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-070	11/17/10	MW 109	(17-22) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-067	11/17/10	MW 109	(22-27) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-065	11/17/10	MW 109	(27-32) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-063	11/17/10	MW 109	(32-37) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-061	11/17/10	MW 109	(37-42) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-057	11/17/10	MW 109	(42-47) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111710-DD-058	11/17/10	MW 109	(42-47) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-077	11/18/10	MW 109	(7-12) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-074	11/18/10	MW 109	(12-17) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-082	11/18/10	MW 110	(42-47) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-083	11/18/10	MW 110	(42-47) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-080	11/18/10	MW 110	(47-52) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111810-DD-078	11/18/10	MW 110	(52-57) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-096	11/19/10	MW 110	(17-22) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-094	11/19/10	MW 110	(22-27) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-092	11/19/10	MW 110	(27-32) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-090	11/19/10	MW 110	(32-37) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
VAS-56393-111910-DD-088	11/19/10	MW 110	(37-42) *ft BGS*	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
April 2011 Groundwater Sampling						
GW-56393-040611-EV-001	04/06/11	101D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040611-EV-002	04/06/11	101S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040611-EV-003	04/06/11	101S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-

TABLE 4.1

FIELD SAMPLE KEY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Identification	*Date Sampled*	*Sample Location*	*Sample Depth*	*Matrix*	*Parameters*	*Sample Location Description*
GW-56393-040711-EV-004	04/07/11	109D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-005	04/07/11	108S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-006	04/07/11	108D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-007	04/07/11	107S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-008	04/07/11	106S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-009	04/07/11	106D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-010	04/07/11	105S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-011	04/07/11	105D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-012	04/07/11	104S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-013	04/07/11	104D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040711-EV-014	04/07/11	103D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040811-EV-015	04/08/11	102D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040811-EV-016	04/08/11	102D	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-
GW-56393-040811-EV-017	04/08/11	102S	-	Water	Total VOCs/PCBs/ TAL metals/ dissolved metals	-

Notes:
PCBs - Polychlorinated biphenyls
TAL - Total Analyte List
VOCs - Volatile Organic Compounds

TABLE 4.2

VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS - MDNR PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-001*	*VS-002*	*VS-003*
Sample Identification		*Direct*	*SO-056393-062910-RP-VSRDNRE-001*	*SO-056393-062910-RP-VSRDNRE-002*	*SO-056393-062910-RP-VSRDNRE-003*
Sample Date		*Contact*	*6/29/2010*	*6/29/2010*	*6/29/2010*
Sample Type					
	Units				
		a			
PCBs					
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0069 U	0.0071 U	0.0078 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.014 U	0.015 U	0.016 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0069 UJ	0.0071 UJ	0.0078 UJ
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0069 U	0.0071 U	0.0078 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0069 U	0.046	0.11 J
Aroclor-1254 (PCB-1254)	mg/kg	-	0.016 J	0.0071 UJ	0.11 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0069 U	0.0071 U	0.0078 U
Total PCBs	mg/kg	4	0.016 J	0.046 J	0.22 J

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.

(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.2

VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS - MDNR PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-004*	*VS-005*	*VS-006*
Sample Identification		*Direct*	*SO-056393-062910-RP-VSRDNRE-004*	*SO-056393-062910-RP-VSRDNRE-005*	*SO-056393-062910-RP-VSRDNRE-006*
Sample Date		*Contact*	*6/29/2010*	*6/29/2010*	*6/29/2010*
Sample Type					
	Units				
		a			
PCBs					
Aroclor-1016 (PCB-1016)	mg/kg	-	0.007 U	0.0075 U	0.0064 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.014 U	0.015 U	0.013 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.007 UJ	0.0075 UJ	0.0064 UJ
Aroclor-1242 (PCB-1242)	mg/kg	-	0.007 U	0.0075 U	0.0064 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.007 U	0.11 J	0.01 J
Aroclor-1254 (PCB-1254)	mg/kg	-	0.014 J	0.091 J	0.0068 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.007 U	0.0075 U	0.0064 U
Total PCBs	mg/kg	4	0.014 J	0.201 J	0.0168 J

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.

(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.2

VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS - MDNR PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-007*	*VS-008*	*VS-008*
Sample Identification		*Direct*	*SO-056393-063010-RP-VSRDNRE-007*	*SO-056393-063010-RP-VSRDNRE-008*	*SO-056393-063010-RP-VSRDNRE-010*
Sample Date		*Contact*	*6/30/2010*	*6/30/2010*	*6/30/2010*
Sample Type					*Duplicate*
	Units				
		a			
PCBs					
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0054 U	0.0054 U	0.0054 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.011 U	0.011 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0054 U	0.0054 U	0.0054 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0054 U	0.0054 U	0.0054 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0081 J	0.0051 J	0.0086 J
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0055 J	0.0047 J	0.0062 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0054 U	0.0054 U	0.0054 U
Total PCBs	mg/kg	4	0.0136 J	0.0098 J	0.0148 J

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.

(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.2

VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS - MDNR PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-009*	*VS-011*	*VS-012*
Sample Identification		*Direct*	*SO-056393-063010-RP-VSRDNRE-009*	*SO-056393-082410-RP-VSRDNRE-011*	*SO-056393-082410-RP-VSRDNRE-012*
Sample Date		*Contact*	*6/30/2010*	*40414*	*40414*
Sample Type					
	Units				
		a			
PCBs					
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0057 U	0.0065 U	0.0072 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.012 U	0.0065 U	0.0072 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0057 U	0.0065 U	0.0072 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0057 U	0.0065 U	0.0072 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.018 J	0.0065 U	0.0072 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.015 J	0.014	0.1
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0057 U	0.0065 U	0.028 P
Total PCBs	mg/kg	4	0.033 J	0.014	0.128 P

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.

(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.2

VERIFICATION SOIL SAMPLING ANALYTICAL RESULTS - MDNR PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-013*	*VS-014*	*VS-015*
Sample Identification		*Direct*	*SO-056393-082410-RP-VSRDNRE-013*	*SO-056393-082410-RP-VSRDNRE-014*	*SO-056393-082410-RP-VSRDNRE-015*
Sample Date		*Contact*	*40414*	*40414*	*40414*
Sample Type					
	Units				
		a			
PCBs					
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0068 U	0.0092	0.01
Aroclor-1221 (PCB-1221)	mg/kg	-	0.0068 U	0.0078 U	0.0065 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0068 U	0.0078 U	0.0065 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0068 U	0.0078 U	0.0065 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0068 U	0.0078 U	0.0065 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.14	0.12	0.091
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0068 U	0.087	0.012 P
Total PCBs	mg/kg	4	0.14	0.2162	0.133 P

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.

(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-001*	*VS-002*	*VS-003*	*VS-004*
Sample Identification		*Direct*	*SO-056393-071010-CB-VSRAP-001*	*SO-056393-071010-CB-VSRAP-002*	*SO-056393-071210-RP-VSRAP-003*	*SO-056393-071610-CB-VSRAP-010*
Sample Date		*Contact*	*7/10/2010*	*7/10/2010*	*7/12/2010*	*7/16/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.012 U	0.016 U	0.024 U	0.033 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.023 U	0.031 U	0.047 U	0.065 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.012 U	0.016 U	0.024 U	0.033 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.012 U	0.016 U	0.024 U	0.033 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.27	0.68	1.7	0.033 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.012 U	0.016 U	0.024 U	0.033 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.012 U	0.016 U	0.024 U	0.033 U
Total PCBs	mg/kg	4	0.27	0.68	1.7	ND
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.16 U	0.31 U	0.54 U	0.70 U
Bromobenzene	mg/kg	540	0.63 U	1.3 U	2.2 U	2.8 U
Bromodichloromethane	mg/kg	110	0.16 U	0.31 U	0.54 U	0.70 U
Bromoform	mg/kg	820	0.16 U	0.31 U	0.54 U	0.70 U
Bromomethane (Methyl bromide)	mg/kg	320	0.16 U	0.31 U	0.54 U	0.70 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.63 U	1.3 U	2.2 U	2.8 U
Carbon disulfide	mg/kg	280	0.16 U	0.072 J	0.54 U	0.70 U
Carbon tetrachloride	mg/kg	96	0.16 U	0.31 U	0.54 U	0.70 U
Chlorobenzene	mg/kg	260	0.16 U	0.31 U	0.54 U	0.70 U
Chlorobromomethane	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U
Chloroethane	mg/kg	950	0.16 U	0.31 U	0.54 U	0.70 U
Chloroform (Trichloromethane)	mg/kg	1200	0.16 U	0.31 U	0.54 U	0.70 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.16 U	0.31 U	0.54 U	0.70 U
2-Chlorotoluene	mg/kg	500	0.63 U	1.3 U	2.2 U	2.8 U
4-Chlorotoluene	mg/kg	-	0.63 U	1.3 U	2.2 U	2.8 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.63 U	1.3 U	2.2 U	2.8 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.63 U	1.3 U	2.2 U	2.8 U
Dibromochloromethane	mg/kg	110	0.16 U	0.31 U	0.54 U	0.70 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.63 U	1.3 U	2.2 U	2.8 U
Dibromomethane	mg/kg	2000	0.16 U	0.31 U	0.54 U	0.70 U
1,2-Dichlorobenzene	mg/kg	210	0.16 U	0.31 U	0.54 U	0.70 U
1,3-Dichlorobenzene	mg/kg	170	0.16 U	0.31 U	0.54 U	0.70 U
1,4-Dichlorobenzene	mg/kg	400	0.16 U	0.31 U	0.54 U	0.70 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.16 U	0.31 U	0.54 U	0.70 U
1,1-Dichloroethane	mg/kg	890	0.16 U	0.31 U	0.54 U	0.70 U
1,2-Dichloroethane	mg/kg	91	0.16 U	0.31 U	0.54 U	0.70 U
1,1-Dichloroethene	mg/kg	200	0.16 U	0.31 U	0.54 U	0.70 U
cis-1,2-Dichloroethene	mg/kg	640	0.16 U	0.31 U	0.54 U	0.70 U
trans-1,2-Dichloroethene	mg/kg	1400	0.16 U	0.31 U	0.54 U	0.70 U
1,3-Dichloropropane	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U
1,2-Dichloropropane	mg/kg	140	0.16 U	0.31 U	0.54 U	0.70 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-001*	*VS-002*	*VS-003*	*VS-004*
Sample Identification		*Direct*	*SO-056393-071010-CB-VSRAP-001*	*SO-056393-071010-CB-VSRAP-002*	*SO-056393-071210-RP-VSRAP-003*	*SO-056393-071610-CB-VSRAP-010*
Sample Date		*Contact*	*7/10/2010*	*7/10/2010*	*7/12/2010*	*7/16/2010*
Sample Type						
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U
1,1-Dichloropropene	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U
cis-1,3-Dichloropropene	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U
trans-1,3-Dichloropropene	mg/kg		0.16 U	0.31 U	0.54 U	0.70 U
Ethylbenzene	mg/kg	140	0.16 U	0.31 U	0.54 U	0.70 U
Hexachlorobutadiene	mg/kg	100	0.63 U	1.3 U	2.2 U	2.8 U
2-Hexanone	mg/kg	2500	6.3 U	13 U	22 U	28 U
Isopropyl benzene	mg/kg	390	0.63 U	1.3 U	2.2 U	2.8 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.63 U	0.22 J	0.38 J	2.8 U
Naphthalene	mg/kg	16000	0.63 U	1.3 U	2.2 U	2.8 UJ
N-Propylbenzene	mg/kg	2500	0.63 U	1.3 U	2.2 U	2.8 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.63 U	1.3 U	2.2 U	2.8 U
Styrene	mg/kg	400	0.16 U	0.31 U	0.54 U	0.70 U
tert-Butylbenzene	mg/kg	2500	0.63 U	1.3 U	2.2 U	2.8 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.16 U	0.31 U	0.54 U	0.70 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.16 U	0.31 U	0.54 U	0.70 U
Tetrachloroethene	mg/kg	88	0.16 U	0.31 U	0.54 U	0.70 U
Toluene	mg/kg	250	0.16 U	0.31 U	0.54 U	0.70 U
1,2,4-Trichlorobenzene	mg/kg	990	0.63 U	1.3 U	2.2 U	2.8 U
1,2,3-Trichlorobenzene	mg/kg	-	0.63 U	1.3 U	2.2 U	2.8 U
1,1,1-Trichloroethane	mg/kg	460	0.16 U	0.31 U	0.54 U	0.70 U
1,1,2-Trichloroethane	mg/kg	180	0.16 U	0.31 U	0.54 U	0.70 U
Trichloroethene	mg/kg	500	0.16 U	0.31 U	0.54 U	0.70 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.16 U	0.31 U	0.54 U	0.70 U
1,2,3-Trichloropropane	mg/kg	830	0.16 U	0.31 U	0.54 U	0.70 U
1,2,4-Trimethylbenzene	mg/kg	110	0.63 U	1.3 U	2.2 U	2.8 U
1,3,5-Trimethylbenzene	mg/kg	94	0.63 U	1.3 U	2.2 U	2.8 U
Vinyl chloride	mg/kg	3.8	0.16 U	0.31 U	0.54 U	0.70 U
o-Xylene	mg/kg	150	0.16 U	0.31 U	0.54 U	0.70 U
m&p-Xylenes	mg/kg	-	0.16 U	0.31 U	0.54 U	0.70 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-005*	*VS-006*	*VS-007*	*VS-008*
Sample Identification		*Direct*	*SO-056393-071210-RP-VSRAP-004*	*SO-056393-081010-RP-VSRAP-023*	*SO-056393-081010-RP-VSRAP-024*	*SO-056393-071210-RP-VSRAP-005*
Sample Date		*Contact*	*7/12/2010*	*8/10/2010*	*8/10/2010*	*7/12/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.024 U	0.03 U	0.097 U	0.024 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.047 U	0.06 U	0.2 U	0.047 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.024 U	0.03 U	0.097 U	0.024 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.024 U	0.03 U	0.097 U	0.024 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.63	0.03 U	1.8	0.027 J
Aroclor-1254 (PCB-1254)	mg/kg	-	0.024 U	0.03 U	0.097 U	0.024 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.024 U	0.03 U	0.097 U	0.024 U
Total PCBs	mg/kg	4	0.63	ND	1.8	0.027 J
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.51 U	0.69 U	0.46 U	0.52 U
Bromobenzene	mg/kg	540	2.1 U	2.8 U	1.9 U	2.1 U
Bromodichloromethane	mg/kg	110	0.51 U	0.69 U	0.46 U	0.52 U
Bromoform	mg/kg	820	0.51 U	0.69 U	0.46 U	0.52 U
Bromomethane (Methyl bromide)	mg/kg	320	0.51 U	0.69 U	0.46 U	0.52 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	3.4 J	2.2 J	R
N-Butylbenzene	mg/kg	2500	2.1 U	2.8 U	0.56 J	2.1 U
Carbon disulfide	mg/kg	280	0.51 U	0.69 U	0.46 U	0.52 U
Carbon tetrachloride	mg/kg	96	0.51 U	0.69 U	0.46 U	0.52 U
Chlorobenzene	mg/kg	260	0.51 U	0.69 U	0.46 U	0.52 U
Chlorobromomethane	mg/kg	-	0.51 U	0.69 U	0.46 U	0.52 U
Chloroethane	mg/kg	950	0.51 U	0.69 U	0.46 U	0.52 U
Chloroform (Trichloromethane)	mg/kg	1200	0.51 U	0.69 U	0.46 U	0.52 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.51 U	0.69 U	0.46 U	0.52 U
2-Chlorotoluene	mg/kg	500	2.1 U	2.8 U	1.9 U	2.1 U
4-Chlorotoluene	mg/kg	-	2.1 U	2.8 U	1.9 U	2.1 U
Cymene (p-Isopropyltoluene)	mg/kg	-	2.1 U	2.8 U	0.22 J	2.1 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	2.1 U	R	R	2.1 U
Dibromochloromethane	mg/kg	110	0.51 U	0.69 U	0.46 U	0.52 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	2.1 U	2.8 U	1.9 U	2.1 U
Dibromomethane	mg/kg	2000	0.51 U	0.69 U	0.46 U	0.52 U
1,2-Dichlorobenzene	mg/kg	210	0.51 U	0.69 U	0.46 U	0.52 U
1,3-Dichlorobenzene	mg/kg	170	0.51 U	0.69 U	0.46 U	0.52 U
1,4-Dichlorobenzene	mg/kg	400	0.51 U	0.69 U	0.46 U	0.52 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.51 U	0.69 U	0.46 U	0.52 U
1,1-Dichloroethane	mg/kg	890	0.51 U	0.69 U	0.46 U	0.52 U
1,2-Dichloroethane	mg/kg	91	0.51 U	0.69 U	0.46 U	0.52 U
1,1-Dichloroethene	mg/kg	200	0.51 U	0.69 U	0.46 U	0.52 U
cis-1,2-Dichloroethene	mg/kg	640	0.51 U	0.69 U	0.46 U	0.52 U
trans-1,2-Dichloroethene	mg/kg	1400	0.51 U	0.69 U	0.46 U	0.52 U
1,3-Dichloropropane	mg/kg	-	0.51 U	0.69 U	0.46 U	0.52 U
1,2-Dichloropropane	mg/kg	140	0.51 U	0.69 U	0.46 U	0.52 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-005*	*VS-006*	*VS-007*	*VS-008*
Sample Identification		*Direct*	*SO-056393-071210-RP-VSRAP-004*	*SO-056393-081010-RP-VSRAP-023*	*SO-056393-081010-RP-VSRAP-024*	*SO-056393-071210-RP-VSRAP-005*
Sample Date		*Contact*	*7/12/2010*	*8/10/2010*	*8/10/2010*	*7/12/2010*
Sample Type						
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.51 U	0.69 U	0.46 U	0.52 U
1,1-Dichloropropene	mg/kg	-	0.51 U	0.69 U	0.46 U	0.52 U
cis-1,3-Dichloropropene	mg/kg	-	0.51 U	0.69 U	0.46 U	0.52 U
trans-1,3-Dichloropropene	mg/kg		0.51 U	0.69 U	0.46 U	0.52 U
Ethylbenzene	mg/kg	140	0.51 U	0.69 U	0.081 J	0.52 U
Hexachlorobutadiene	mg/kg	100	2.1 U	2.8 U	1.9 U	2.1 U
2-Hexanone	mg/kg	2500	21 U	R	R	21 U
Isopropyl benzene	mg/kg	390	2.1 U	2.8 U	1.9 U	2.1 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.34 J	2.8 U	1.9 U	0.36 J
Naphthalene	mg/kg	16000	2.1 U	2.8 U	1.9 U	2.1 U
N-Propylbenzene	mg/kg	2500	2.1 U	2.8 U	1.9 U	2.1 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	2.1 U	2.8 U	0.22 J	2.1 U
Styrene	mg/kg	400	0.51 U	0.69 U	0.46 U	0.52 U
tert-Butylbenzene	mg/kg	2500	2.1 U	2.8 U	1.9 U	2.1 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.51 U	0.69 U	0.46 U	0.52 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.51 U	0.69 U	0.46 U	0.52 U
Tetrachloroethene	mg/kg	88	0.51 U	0.69 U	0.46 U	0.52 U
Toluene	mg/kg	250	0.51 U	0.69 U	0.46 U	0.52 U
1,2,4-Trichlorobenzene	mg/kg	990	2.1 U	2.8 U	1.9 U	2.1 U
1,2,3-Trichlorobenzene	mg/kg	-	2.1 U	2.8 U	1.9 U	2.1 U
1,1,1-Trichloroethane	mg/kg	460	0.51 U	0.69 U	0.46 U	0.52 U
1,1,2-Trichloroethane	mg/kg	180	0.51 U	0.69 U	0.46 U	0.52 U
Trichloroethene	mg/kg	500	0.51 U	0.69 U	0.46 U	0.52 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.51 U	0.69 U	0.46 U	0.52 U
1,2,3-Trichloropropane	mg/kg	830	0.51 U	0.69 U	0.46 U	0.52 U
1,2,4-Trimethylbenzene	mg/kg	110	2.1 U	2.8 U	1.9	2.1 U
1,3,5-Trimethylbenzene	mg/kg	94	2.1 U	2.8 U	0.40 J	2.1 U
Vinyl chloride	mg/kg	3.8	0.51 U	0.69 U	0.46 U	0.52 U
o-Xylene	mg/kg	150	0.51 U	0.69 U	0.14 J	0.52 U
m&p-Xylenes	mg/kg	-	0.51 U	0.69 U	0.22 J	0.52 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-009*	*VS-010*	*VS-010*	*VS-011*
Sample Identification		*Direct*	*SO-056393-071310-RP-VSRAP-006*	*SO-056393-080610-RP-VSRAP-020*	*SO-056393-080610-RP-VSRAP-021*	*SO-056393-080610-RP-VSRAP-022*
Sample Date		*Contact*	*7/13/2010*	*8/6/2010*	*8/6/2010*	*8/6/2010*
Sample Type					*Duplicate*	
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.019 U	0.022 U	0.023 U	0.017 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.037 U	0.081 U	0.045 U	0.057 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.019 U	0.036 U	0.023 U	0.017 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.019 U	0.029 U	0.023 U	0.017 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.019 U	0.022 U	0.023 U	0.017 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.019 U	0.032 U	0.023 U	0.017 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.019 U	0.045 U	0.023 U	0.017 U
Total PCBs	mg/kg	4	ND	ND	ND	ND
Volatile Organic Compounds						
Acetone	mg/kg	23000	7.0 J	R	R	R
Benzene	mg/kg	180	0.53 U	0.55 U	0.52 U	0.35 U
Bromobenzene	mg/kg	540	2.2 U	2.2 U	2.1 U	1.4 U
Bromodichloromethane	mg/kg	110	0.53 U	0.55 U	0.52 U	0.35 U
Bromoform	mg/kg	820	0.53 U	0.55 U	0.52 U	0.35 U
Bromomethane (Methyl bromide)	mg/kg	320	0.53 U	0.55 UJ	0.52 UJ	0.35 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	22 UJ	R	R	R
N-Butylbenzene	mg/kg	2500	2.2 U	2.2 U	2.1 U	1.4 U
Carbon disulfide	mg/kg	280	0.53 U	0.55 U	0.52 U	0.35 U
Carbon tetrachloride	mg/kg	96	0.53 U	0.55 U	0.52 U	0.35 U
Chlorobenzene	mg/kg	260	0.53 U	0.55 U	0.52 U	0.35 U
Chlorobromomethane	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U
Chloroethane	mg/kg	950	0.53 U	0.55 U	0.52 U	0.35 U
Chloroform (Trichloromethane)	mg/kg	1200	0.53 U	0.55 U	0.52 U	0.35 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.53 U	0.55 U	0.52 U	0.35 U
2-Chlorotoluene	mg/kg	500	2.2 U	2.2 U	2.1 U	1.4 U
4-Chlorotoluene	mg/kg	-	2.2 U	2.2 U	2.1 U	1.4 U
Cymene (p-Isopropyltoluene)	mg/kg	-	2.2 U	2.2 U	2.1 U	1.4 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	2.2 U	2.2 U	2.1 U	1.4 U
Dibromochloromethane	mg/kg	110	0.53 U	0.55 U	0.52 U	0.35 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	2.2 U	2.2 U	2.1 U	1.4 U
Dibromomethane	mg/kg	2000	0.53 U	0.55 U	0.52 U	0.35 U
1,2-Dichlorobenzene	mg/kg	210	0.53 U	0.55 U	0.52 U	0.35 U
1,3-Dichlorobenzene	mg/kg	170	0.53 U	0.55 U	0.52 U	0.35 U
1,4-Dichlorobenzene	mg/kg	400	0.53 U	0.55 U	0.52 U	0.35 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.53 U	0.55 U	0.52 U	0.35 U
1,1-Dichloroethane	mg/kg	890	0.53 U	0.55 U	0.52 U	0.35 U
1,2-Dichloroethane	mg/kg	91	0.53 U	0.55 U	0.52 U	0.35 U
1,1-Dichloroethene	mg/kg	200	0.53 U	0.55 U	0.52 U	0.35 U
cis-1,2-Dichloroethene	mg/kg	640	0.53 U	0.55 U	0.52 U	0.35 U
trans-1,2-Dichloroethene	mg/kg	1400	0.53 U	0.55 U	0.52 U	0.35 U
1,3-Dichloropropane	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U
1,2-Dichloropropane	mg/kg	140	0.53 U	0.55 U	0.52 U	0.35 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-009*	*VS-010*	*VS-010*	*VS-011*
Sample Identification		*Direct*	*SO-056393-071310-RP-VSRAP-006*	*SO-056393-080610-RP-VSRAP-020*	*SO-056393-080610-RP-VSRAP-021*	*SO-056393-080610-RP-VSRAP-022*
Sample Date		*Contact*	*7/13/2010*	*8/6/2010*	*8/6/2010*	*8/6/2010*
Sample Type					*Duplicate*	
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U
1,1-Dichloropropene	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U
cis-1,3-Dichloropropene	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U
trans-1,3-Dichloropropene	mg/kg		0.53 U	0.55 U	0.52 U	0.35 U
Ethylbenzene	mg/kg	140	0.53 U	0.55 U	0.52 U	0.35 U
Hexachlorobutadiene	mg/kg	100	2.2 UJ	2.2 U	2.1 U	1.4 U
2-Hexanone	mg/kg	2500	22 U	22 U	21 U	14 U
Isopropyl benzene	mg/kg	390	2.2 U	2.2 U	2.1 U	1.4 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.25 J	2.2 U	2.1 U	1.4 U
Naphthalene	mg/kg	16000	2.2 U	2.2 U	2.1 U	1.4 U
N-Propylbenzene	mg/kg	2500	2.2 U	2.2 U	2.1 U	1.4 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	2.2 U	2.2 U	2.1 U	1.4 U
Styrene	mg/kg	400	0.53 U	0.55 U	0.52 U	0.35 U
tert-Butylbenzene	mg/kg	2500	2.2 U	2.2 U	2.1 U	1.4 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.53 U	0.55 U	0.52 U	0.35 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.53 U	0.55 U	0.52 U	0.35 U
Tetrachloroethene	mg/kg	88	0.53 U	0.55 U	0.52 U	0.35 U
Toluene	mg/kg	250	0.53 U	0.55 U	0.52 U	0.35 U
1,2,4-Trichlorobenzene	mg/kg	990	2.2 U	2.2 U	2.1 U	1.4 U
1,2,3-Trichlorobenzene	mg/kg	-	2.2 U	2.2 U	2.1 U	1.4 U
1,1,1-Trichloroethane	mg/kg	460	0.53 U	0.55 U	0.52 U	0.35 U
1,1,2-Trichloroethane	mg/kg	180	0.53 U	0.55 U	0.52 U	0.35 U
Trichloroethene	mg/kg	500	0.53 U	0.55 U	0.52 U	0.35 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.53 U	0.55 U	0.52 U	0.35 U
1,2,3-Trichloropropane	mg/kg	830	0.53 U	0.55 U	0.52 U	0.35 U
1,2,4-Trimethylbenzene	mg/kg	110	2.2 U	2.2 U	2.1 U	0.15 J
1,3,5-Trimethylbenzene	mg/kg	94	2.2 U	2.2 U	2.1 U	0.062 J
Vinyl chloride	mg/kg	3.8	0.53 U	0.55 U	0.52 U	0.35 U
o-Xylene	mg/kg	150	0.53 U	0.55 U	0.52 U	0.35 U
m&p-Xylenes	mg/kg	-	0.53 U	0.55 U	0.52 U	0.35 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-012*	*VS-012*	*VS-013*	*VS-014*
Sample Identification		*Direct*	*SO-056393-071310-RP-VSRAP-007*	*SO-056393-071310-RP-VSRAP-008*	*SO-056393-072810-RP-VSRAP-019*	*SO-056393-072810-RP-VSRAP-018*
Sample Date		*Contact*	*7/13/2010*	*7/13/2010*	*7/28/2010*	*7/28/2010*
Sample Type				*Duplicate*		
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.022 U	0.021 U	0.019 U	0.0056 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.044 U	0.041 U	0.037 U	0.012 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.022 U	0.021 U	0.019 U	0.0056 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.022 U	0.021 U	0.019 U	0.0056 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.022 U	0.021 U	0.12	0.0056 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.022 U	0.021 U	0.019 U	0.0014 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.022 U	0.021 U	0.019 U	0.0056 U
Total PCBs	mg/kg	4	ND	ND	0.12	0.0014 J
Volatile Organic Compounds						
Acetone	mg/kg	23000	4.0 J	4.5 J	R	R
Benzene	mg/kg	180	0.50 U	0.56 U	0.41 U	0.060 U
Bromobenzene	mg/kg	540	2.0 U	2.3 U	1.7 U	0.24 U
Bromodichloromethane	mg/kg	110	0.50 U	0.56 U	0.41 U	0.060 U
Bromoform	mg/kg	820	0.50 U	0.56 U	0.41 U	0.060 U
Bromomethane (Methyl bromide)	mg/kg	320	0.50 U	0.56 U	0.41 U	0.060 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	20 UJ	23 UJ	R	R
N-Butylbenzene	mg/kg	2500	2.0 U	2.3 U	1.7 U	0.24 U
Carbon disulfide	mg/kg	280	0.50 U	0.56 U	0.41 U	0.060 U
Carbon tetrachloride	mg/kg	96	0.50 U	0.56 U	0.41 U	0.060 U
Chlorobenzene	mg/kg	260	0.50 U	0.56 U	0.41 U	0.060 U
Chlorobromomethane	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U
Chloroethane	mg/kg	950	0.50 U	0.56 U	0.41 U	0.060 U
Chloroform (Trichloromethane)	mg/kg	1200	0.50 U	0.56 U	0.41 U	0.060 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.50 U	0.56 U	0.41 U	0.060 U
2-Chlorotoluene	mg/kg	500	2.0 U	2.3 U	1.7 U	0.24 U
4-Chlorotoluene	mg/kg	-	2.0 U	2.3 U	1.7 U	0.24 U
Cymene (p-Isopropyltoluene)	mg/kg	-	2.0 U	2.3 U	1.7 U	0.24 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	2.0 U	2.3 U	1.7 U	0.24 U
Dibromochloromethane	mg/kg	110	0.50 U	0.56 U	0.41 U	0.060 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	2.0 U	2.3 U	1.7 U	0.24 U
Dibromomethane	mg/kg	2000	0.50 U	0.56 U	0.41 U	0.060 U
1,2-Dichlorobenzene	mg/kg	210	0.50 U	0.56 U	0.41 U	0.060 U
1,3-Dichlorobenzene	mg/kg	170	0.50 U	0.56 U	0.41 U	0.060 U
1,4-Dichlorobenzene	mg/kg	400	0.50 U	0.56 U	0.41 U	0.060 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.50 U	0.56 U	0.41 U	0.060 U
1,1-Dichloroethane	mg/kg	890	0.50 U	0.56 U	0.41 U	0.060 U
1,2-Dichloroethane	mg/kg	91	0.50 U	0.56 U	0.41 U	0.060 U
1,1-Dichloroethene	mg/kg	200	0.50 U	0.56 U	0.41 U	0.060 U
cis-1,2-Dichloroethene	mg/kg	640	0.50 U	0.56 U	0.41 U	0.060 U
trans-1,2-Dichloroethene	mg/kg	1400	0.50 U	0.56 U	0.41 U	0.060 U
1,3-Dichloropropane	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U
1,2-Dichloropropane	mg/kg	140	0.50 U	0.56 U	0.41 U	0.060 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-012*	*VS-012*	*VS-013*	*VS-014*
Sample Identification		*Direct*	*SO-056393-071310-RP-VSRAP-007*	*SO-056393-071310-RP-VSRAP-008*	*SO-056393-072810-RP-VSRAP-019*	*SO-056393-072810-RP-VSRAP-018*
Sample Date		*Contact*	*7/13/2010*	*7/13/2010*	*7/28/2010*	*7/28/2010*
Sample Type				*Duplicate*		
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U
1,1-Dichloropropene	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U
cis-1,3-Dichloropropene	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U
trans-1,3-Dichloropropene	mg/kg		0.50 U	0.56 U	0.41 U	0.060 U
Ethylbenzene	mg/kg	140	0.50 U	0.56 U	0.41 U	0.060 U
Hexachlorobutadiene	mg/kg	100	2.0 UJ	2.3 UJ	1.7 U	0.24 U
2-Hexanone	mg/kg	2500	20 U	23 U	17 U	2.4 U
Isopropyl benzene	mg/kg	390	2.0 U	2.3 U	1.7 U	0.24 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.22 J	0.25 J	1.7 U	0.24 U
Naphthalene	mg/kg	16000	2.0 U	2.3 U	1.7 U	0.24 U
N-Propylbenzene	mg/kg	2500	2.0 U	2.3 U	1.7 U	0.24 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	2.0 U	2.3 U	1.7 U	0.24 U
Styrene	mg/kg	400	0.50 U	0.56 U	0.41 U	0.060 U
tert-Butylbenzene	mg/kg	2500	2.0 U	2.3 U	1.7 U	0.24 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.50 U	0.56 U	0.41 U	0.060 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.50 U	0.56 U	0.41 U	0.060 U
Tetrachloroethene	mg/kg	88	0.50 U	0.56 U	0.41 U	0.060 U
Toluene	mg/kg	250	0.50 U	0.56 U	0.41 U	0.060 U
1,2,4-Trichlorobenzene	mg/kg	990	2.0 U	2.3 U	1.7 U	0.24 U
1,2,3-Trichlorobenzene	mg/kg	-	2.0 U	2.3 U	1.7 U	0.24 U
1,1,1-Trichloroethane	mg/kg	460	0.50 U	0.56 U	0.41 U	0.060 U
1,1,2-Trichloroethane	mg/kg	180	0.50 U	0.56 U	0.41 U	0.060 U
Trichloroethene	mg/kg	500	0.50 U	0.56 U	0.41 U	0.060 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.50 U	0.56 U	0.41 U	0.060 U
1,2,3-Trichloropropane	mg/kg	830	0.50 U	0.56 U	0.41 U	0.060 U
1,2,4-Trimethylbenzene	mg/kg	110	2.0 U	2.3 U	1.7 U	0.24 U
1,3,5-Trimethylbenzene	mg/kg	94	2.0 U	2.3 U	1.7 U	0.24 U
Vinyl chloride	mg/kg	3.8	0.50 U	0.56 U	0.41 U	0.060 U
o-Xylene	mg/kg	150	0.50 U	0.56 U	0.41 U	0.060 U
m&p-Xylenes	mg/kg	-	0.50 U	0.56 U	0.41 U	0.060 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-015*	*VS-016*	*VS-017*	*VS-018*
Sample Identification		*Direct*	*SO-056393-071410-RP-VSRAP-009*	*SO-056393-072010-RP-VSRAP-013*	*SO-056393-072010-RP-VSRAP-016*	*SO056393-071910-RP-VSRAP-011*
Sample Date		*Contact*	*7/14/2010*	*7/20/2010*	*7/20/2010*	*7/19/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.047 U	0.011 U	0.011 U	0.012 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.024 U	0.0055 U	0.0054 U	0.006 U
Total PCBs	mg/kg	4	ND	ND	ND	ND
Volatile Organic Compounds						
Acetone	mg/kg	23000	9.3 J	R	R	R
Benzene	mg/kg	180	0.84 U	0.051 U	0.045 U	0.060 U
Bromobenzene	mg/kg	540	3.4 U	0.21 U	0.18 U	0.24 U
Bromodichloromethane	mg/kg	110	0.84 U	0.051 U	0.045 U	0.060 U
Bromoform	mg/kg	820	0.84 U	0.051 U	0.045 U	0.060 U
Bromomethane (Methyl bromide)	mg/kg	320	0.84 U	0.051 UJ	0.045 UJ	0.060 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	34 UJ	R	R	R
N-Butylbenzene	mg/kg	2500	3.4 U	0.21 U	0.18 U	0.24 U
Carbon disulfide	mg/kg	280	0.84 U	0.051 U	0.045 U	0.060 U
Carbon tetrachloride	mg/kg	96	0.84 U	0.051 U	0.045 U	0.060 U
Chlorobenzene	mg/kg	260	0.84 U	0.051 U	0.045 U	0.060 U
Chlorobromomethane	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U
Chloroethane	mg/kg	950	0.84 U	0.051 U	0.045 U	0.060 U
Chloroform (Trichloromethane)	mg/kg	1200	0.84 U	0.051 U	0.045 U	0.060 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.84 U	0.051 U	0.045 U	0.060 U
2-Chlorotoluene	mg/kg	500	3.4 U	0.21 U	0.18 U	0.24 U
4-Chlorotoluene	mg/kg	-	3.4 U	0.21 U	0.18 U	0.24 U
Cymene (p-Isopropyltoluene)	mg/kg	-	3.4 U	0.21 U	0.18 U	0.24 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	3.4 U	0.21 U	0.18 U	0.24 U
Dibromochloromethane	mg/kg	110	0.84 U	0.051 U	0.045 U	0.060 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	3.4 U	0.21 U	0.18 U	0.24 U
Dibromomethane	mg/kg	2000	0.84 U	0.051 U	0.045 U	0.060 U
1,2-Dichlorobenzene	mg/kg	210	0.84 U	0.051 U	0.045 U	0.060 U
1,3-Dichlorobenzene	mg/kg	170	0.84 U	0.051 U	0.045 U	0.060 U
1,4-Dichlorobenzene	mg/kg	400	0.84 U	0.051 U	0.045 U	0.060 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.84 U	0.051 U	0.045 U	0.060 U
1,1-Dichloroethane	mg/kg	890	0.84 U	0.051 U	0.045 U	0.060 U
1,2-Dichloroethane	mg/kg	91	0.84 U	0.051 U	0.045 U	0.060 U
1,1-Dichloroethene	mg/kg	200	0.84 U	0.051 U	0.045 U	0.060 U
cis-1,2-Dichloroethene	mg/kg	640	0.84 U	0.051 U	0.045 U	0.060 U
trans-1,2-Dichloroethene	mg/kg	1400	0.84 U	0.051 U	0.045 U	0.060 U
1,3-Dichloropropane	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U
1,2-Dichloropropane	mg/kg	140	0.84 U	0.051 U	0.045 U	0.060 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-015*	*VS-016*	*VS-017*	*VS-018*
Sample Identification		*Direct*	*SO-056393-071410-RP-VSRAP-009*	*SO-056393-072010-RP-VSRAP-013*	*SO-056393-072010-RP-VSRAP-016*	*SO056393-071910-RP-VSRAP-011*
Sample Date		*Contact*	*7/14/2010*	*7/20/2010*	*7/20/2010*	*7/19/2010*
Sample Type						
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U
1,1-Dichloropropene	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U
cis-1,3-Dichloropropene	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U
trans-1,3-Dichloropropene	mg/kg		0.84 U	0.051 U	0.045 U	0.060 U
Ethylbenzene	mg/kg	140	0.84 U	0.051 U	0.045 U	0.060 U
Hexachlorobutadiene	mg/kg	100	3.4 U	0.21 U	0.18 U	0.24 U
2-Hexanone	mg/kg	2500	34 U	2.1 U	1.8 U	2.4 U
Isopropyl benzene	mg/kg	390	3.4 U	0.21 U	0.18 U	0.24 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	3.4 U	0.21 U	0.18 U	0.24 U
Naphthalene	mg/kg	16000	3.4 U	0.21 UJ	0.18 UJ	0.24 UJ
N-Propylbenzene	mg/kg	2500	3.4 U	0.21 U	0.18 U	0.24 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	3.4 U	0.21 U	0.18 U	0.24 U
Styrene	mg/kg	400	0.84 U	0.051 U	0.045 U	0.060 U
tert-Butylbenzene	mg/kg	2500	3.4 U	0.21 U	0.18 U	0.24 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.84 U	0.051 U	0.045 U	0.060 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.84 U	0.051 U	0.045 U	0.060 U
Tetrachloroethene	mg/kg	88	0.84 U	0.051 U	0.045 U	0.060 U
Toluene	mg/kg	250	0.84 U	0.051 U	0.045 U	0.060 U
1,2,4-Trichlorobenzene	mg/kg	990	3.4 U	0.21 U	0.18 U	0.24 U
1,2,3-Trichlorobenzene	mg/kg	-	3.4 U	0.21 U	0.18 U	0.24 U
1,1,1-Trichloroethane	mg/kg	460	0.84 U	0.051 U	0.045 U	0.060 U
1,1,2-Trichloroethane	mg/kg	180	0.84 U	0.051 U	0.045 U	0.060 U
Trichloroethene	mg/kg	500	0.84 U	0.051 U	0.045 U	0.060 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.84 U	0.051 U	0.045 U	0.060 U
1,2,3-Trichloropropane	mg/kg	830	0.84 U	0.051 U	0.045 U	0.060 U
1,2,4-Trimethylbenzene	mg/kg	110	3.4 U	0.21 U	0.18 U	0.24 U
1,3,5-Trimethylbenzene	mg/kg	94	3.4 U	0.21 U	0.18 U	0.24 U
Vinyl chloride	mg/kg	3.8	0.84 U	0.051 U	0.045 U	0.060 U
o-Xylene	mg/kg	150	0.84 U	0.051 U	0.045 U	0.060 U
m&p-Xylenes	mg/kg	-	0.84 U	0.051 U	0.045 U	0.060 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-019*	*VS-020*	*VS-021*	*VS-022*
Sample Identification		*Direct*	*SO-056393-072010-RP-VSRAP-012*	*SO-056393-072010-RP-VSRAP-015*	*SO-056393-072010-RP-VSRAP-014*	*SO-056393-072010-RP-VSRAP-017*
Sample Date		*Contact*	*7/20/2010*	*7/20/2010*	*7/20/2010*	*7/20/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.054 U	0.054 U	0.006 U	0.0051 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.11 U	0.11 U	0.012 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.054 U	0.054 U	0.006 U	0.0051 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.054 U	0.054 U	0.006 U	0.0051 U
Aroclor-1248 (PCB-1248)	mg/kg	-	1.6	2.2	0.035	0.055
Aroclor-1254 (PCB-1254)	mg/kg	-	0.054 U	0.054 U	0.006 U	0.0051 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.054 U	0.054 U	0.006 U	0.0051 U
Total PCBs	mg/kg	4	1.6	2.2	0.035	0.055
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.052 U	0.061 U	0.092 U	0.068 U
Bromobenzene	mg/kg	540	0.21 U	0.25 U	0.37 U	0.28 U
Bromodichloromethane	mg/kg	110	0.052 U	0.061 U	0.092 U	0.068 U
Bromoform	mg/kg	820	0.052 U	0.061 U	0.092 U	0.068 U
Bromomethane (Methyl bromide)	mg/kg	320	0.052 UJ	0.061 UJ	0.092 UJ	0.068 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.21 U	0.25 U	0.37 U	0.28 U
Carbon disulfide	mg/kg	280	0.052 U	0.061 U	0.092 U	0.068 U
Carbon tetrachloride	mg/kg	96	0.052 U	0.061 U	0.092 U	0.068 U
Chlorobenzene	mg/kg	260	0.052 U	0.061 U	0.092 U	0.068 U
Chlorobromomethane	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U
Chloroethane	mg/kg	950	0.052 U	0.061 U	0.092 U	0.068 U
Chloroform (Trichloromethane)	mg/kg	1200	0.052 U	0.061 U	0.092 U	0.068 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.052 U	0.061 U	0.092 U	0.068 U
2-Chlorotoluene	mg/kg	500	0.21 U	0.25 U	0.37 U	0.28 U
4-Chlorotoluene	mg/kg	-	0.21 U	0.25 U	0.37 U	0.28 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.21 U	0.25 U	0.37 U	0.28 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.21 U	0.25 U	0.37 U	0.28 U
Dibromochloromethane	mg/kg	110	0.052 U	0.061 U	0.092 U	0.068 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.21 U	0.25 U	0.37 U	0.28 U
Dibromomethane	mg/kg	2000	0.052 U	0.061 U	0.092 U	0.068 U
1,2-Dichlorobenzene	mg/kg	210	0.052 U	0.061 U	0.092 U	0.068 U
1,3-Dichlorobenzene	mg/kg	170	0.052 U	0.061 U	0.092 U	0.068 U
1,4-Dichlorobenzene	mg/kg	400	0.052 U	0.061 U	0.092 U	0.068 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.052 U	0.061 U	0.092 U	0.068 U
1,1-Dichloroethane	mg/kg	890	0.052 U	0.061 U	0.092 U	0.068 U
1,2-Dichloroethane	mg/kg	91	0.052 U	0.061 U	0.092 U	0.068 U
1,1-Dichloroethene	mg/kg	200	0.052 U	0.061 U	0.092 U	0.068 U
cis-1,2-Dichloroethene	mg/kg	640	0.052 U	0.061 U	0.092 U	0.068 U
trans-1,2-Dichloroethene	mg/kg	1400	0.052 U	0.061 U	0.092 U	0.068 U
1,3-Dichloropropane	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U
1,2-Dichloropropane	mg/kg	140	0.052 U	0.061 U	0.092 U	0.068 U

TABLE 4.3

VERIFICATION SAMPLING ANALYTICAL RESULTS - INITIAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-019*	*VS-020*	*VS-021*	*VS-022*
Sample Identification		*Direct*	*SO-056393-072010-RP-VSRAP-012*	*SO-056393-072010-RP-VSRAP-015*	*SO-056393-072010-RP-VSRAP-014*	*SO-056393-072010-RP-VSRAP-017*
Sample Date		*Contact*	*7/20/2010*	*7/20/2010*	*7/20/2010*	*7/20/2010*
Sample Type						
	Units					
		a				
Volatile Organic Compounds - Continued						
2,2-Dichloropropane	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U
1,1-Dichloropropene	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U
cis-1,3-Dichloropropene	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U
trans-1,3-Dichloropropene	mg/kg		0.052 U	0.061 U	0.092 U	0.068 U
Ethylbenzene	mg/kg	140	0.052 U	0.061 U	0.092 U	0.068 U
Hexachlorobutadiene	mg/kg	100	0.21 U	0.25 U	0.37 U	0.28 U
2-Hexanone	mg/kg	2500	2.1 U	2.5 U	3.7 U	2.8 U
Isopropyl benzene	mg/kg	390	0.21 U	0.25 U	0.37 U	0.28 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.21 U	0.25 U	0.37 U	0.28 U
Naphthalene	mg/kg	16000	0.21 UJ	0.25 UJ	0.37 UJ	0.28 UJ
N-Propylbenzene	mg/kg	2500	0.21 U	0.25 U	0.37 U	0.28 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.21 U	0.25 U	0.37 U	0.28 U
Styrene	mg/kg	400	0.052 U	0.061 U	0.092 U	0.068 U
tert-Butylbenzene	mg/kg	2500	0.21 U	0.25 U	0.37 U	0.28 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.052 U	0.061 U	0.092 U	0.068 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.052 U	0.061 U	0.092 U	0.068 U
Tetrachloroethene	mg/kg	88	0.052 U	0.061 U	0.092 U	0.068 U
Toluene	mg/kg	250	0.052 U	0.061 U	0.092 U	0.068 U
1,2,4-Trichlorobenzene	mg/kg	990	0.21 U	0.25 U	0.37 U	0.28 U
1,2,3-Trichlorobenzene	mg/kg	-	0.21 U	0.25 U	0.37 U	0.28 U
1,1,1-Trichloroethane	mg/kg	460	0.052 U	0.061 U	0.092 U	0.068 U
1,1,2-Trichloroethane	mg/kg	180	0.052 U	0.061 U	0.092 U	0.068 U
Trichloroethene	mg/kg	500	0.052 U	0.061 U	0.092 U	0.068 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.052 U	0.061 U	0.092 U	0.068 U
1,2,3-Trichloropropane	mg/kg	830	0.052 U	0.061 U	0.092 U	0.068 U
1,2,4-Trimethylbenzene	mg/kg	110	0.21 U	0.25 U	0.37 U	0.28 U
1,3,5-Trimethylbenzene	mg/kg	94	0.21 U	0.25 U	0.37 U	0.28 U
Vinyl chloride	mg/kg	3.8	0.052 U	0.061 U	0.092 U	0.068 U
o-Xylene	mg/kg	150	0.052 U	0.061 U	0.092 U	0.068 U
m&p-Xylenes	mg/kg	-	0.052 U	0.061 U	0.092 U	0.068 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-026*	*VS-027*	*VS-028*	*VS-029*
Sample Identification		*Direct*	*SO-056393-081310-RP-VSRAP-026*	*SO-056393-081410-RP-VSRAP-027*	*SO-056393-081410-RP-VSRAP-028*	*SO-056393-081410-RP-VSRAP-029*
Sample Date		*Contact*	*8/13/2010*	*8/14/2010*	*8/14/2010*	*8/14/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.011 U	0.01 U	0.01 U	0.01 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.021 U	0.02 U	0.02 U	0.02 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.011 U	0.01 U	0.01 U	0.01 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.011 U	0.01 U	0.01 U	0.01 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.011 U	0.01 U	0.095	0.46 J
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0054 J	0.01 U	0.01 U	0.01 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.011 U	0.01 U	0.01 U	0.11 J
Total PCBs	mg/kg	4	0.0054 J	ND	0.095	0.57 J
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.067 U	0.051 U	0.078 U	0.047 U
Bromobenzene	mg/kg	540	0.27 U	0.21 U	0.31 U	0.19 U
Bromodichloromethane	mg/kg	110	0.067 U	0.051 U	0.078 U	0.047 U
Bromoform	mg/kg	820	0.067 U	0.051 U	0.078 U	0.047 U
Bromomethane (Methyl bromide)	mg/kg	320	0.067 U	0.051 U	0.078 U	0.047 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	0.33 J	R	R	R
N-Butylbenzene	mg/kg	2500	0.27 U	0.21 U	0.31 U	0.19 U
Carbon disulfide	mg/kg	280	0.067 U	0.051 U	0.078 U	0.047 U
Carbon tetrachloride	mg/kg	96	0.067 U	0.051 U	0.078 U	0.047 U
Chlorobenzene	mg/kg	260	0.067 U	0.051 U	0.078 U	0.047 U
Chlorobromomethane	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U
Chloroethane	mg/kg	950	0.067 U	0.051 U	0.078 U	0.047 U
Chloroform (Trichloromethane)	mg/kg	1200	0.067 U	0.051 U	0.078 U	0.047 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.067 U	0.051 U	0.078 U	0.047 U
2-Chlorotoluene	mg/kg	500	0.27 U	0.21 U	0.31 U	0.19 U
4-Chlorotoluene	mg/kg	-	0.27 U	0.21 U	0.31 U	0.19 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.27 U	0.21 U	0.31 U	0.19 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	R	R
Dibromochloromethane	mg/kg	110	0.067 U	0.051 U	0.078 U	0.047 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.27 U	0.21 U	0.31 U	0.19 U
Dibromomethane	mg/kg	2000	0.067 U	0.051 U	0.078 U	0.047 U
1,2-Dichlorobenzene	mg/kg	210	0.067 U	0.051 U	0.078 U	0.047 U
1,3-Dichlorobenzene	mg/kg	170	0.067 U	0.051 U	0.078 U	0.047 U
1,4-Dichlorobenzene	mg/kg	400	0.067 U	0.051 U	0.078 U	0.047 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.067 U	0.051 U	0.078 U	0.047 U
1,1-Dichloroethane	mg/kg	890	0.067 U	0.051 U	0.078 U	0.047 U
1,2-Dichloroethane	mg/kg	91	0.067 U	0.051 U	0.078 U	0.047 U
1,1-Dichloroethene	mg/kg	200	0.067 U	0.051 U	0.078 U	0.047 U
cis-1,2-Dichloroethene	mg/kg	640	0.067 U	0.051 U	0.078 U	0.047 U
trans-1,2-Dichloroethene	mg/kg	1400	0.067 U	0.051 U	0.078 U	0.047 U
1,3-Dichloropropane	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	0.067 U	0.051 U	0.078 U	0.047 U
2,2-Dichloropropane	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-026*	*VS-027*	*VS-028*	*VS-029*
Sample Identification		*Direct*	*SO-056393-081310-RP-VSRAP-026*	*SO-056393-081410-RP-VSRAP-027*	*SO-056393-081410-RP-VSRAP-028*	*SO-056393-081410-RP-VSRAP-029*
Sample Date		*Contact*	*8/13/2010*	*8/14/2010*	*8/14/2010*	*8/14/2010*
Sample Type						
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U
cis-1,3-Dichloropropene	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U
trans-1,3-Dichloropropene	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U
Ethylbenzene	mg/kg	140	0.067 U	0.051 U	0.078 U	0.047 U
Hexachlorobutadiene	mg/kg	100	0.27 U	0.21 U	0.31 U	0.19 U
2-Hexanone	mg/kg	2500	R	R	R	R
Isopropyl benzene	mg/kg	390	0.27 U	0.21 U	0.31 U	0.19 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.27 U	0.21 U	0.31 U	0.19 U
Naphthalene	mg/kg	16000	0.27 U	0.21 U	0.31 U	0.19 U
N-Propylbenzene	mg/kg	2500	0.27 U	0.21 U	0.31 U	0.19 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.27 U	0.21 U	0.31 U	0.19 U
Styrene	mg/kg	400	0.067 U	0.051 U	0.078 U	0.047 U
tert-Butylbenzene	mg/kg	2500	0.27 U	0.21 U	0.31 U	0.19 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.067 U	0.051 U	0.078 U	0.047 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.067 U	0.051 U	0.078 U	0.047 U
Tetrachloroethene	mg/kg	88	0.067 U	0.051 U	0.078 U	0.047 U
Toluene	mg/kg	250	0.067 U	0.051 U	0.078 U	0.047 U
1,2,4-Trichlorobenzene	mg/kg	990	0.27 U	0.21 U	0.31 U	0.19 U
1,2,3-Trichlorobenzene	mg/kg	-	0.27 U	0.21 U	0.31 U	0.19 U
1,1,1-Trichloroethane	mg/kg	460	0.067 U	0.051 U	0.078 U	0.047 U
1,1,2-Trichloroethane	mg/kg	180	0.067 U	0.051 U	0.078 U	0.047 U
Trichloroethene	mg/kg	500	0.067 U	0.051 U	0.078 U	0.047 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.067 U	0.051 U	0.078 U	0.047 U
1,2,3-Trichloropropane	mg/kg	830	0.067 U	0.051 U	0.078 U	0.047 U
1,2,4-Trimethylbenzene	mg/kg	110	0.27 U	0.21 U	0.31 U	0.19 U
1,3,5-Trimethylbenzene	mg/kg	94	0.27 U	0.21 U	0.31 U	0.19 U
Vinyl chloride	mg/kg	3.8	0.067 U	0.051 U	0.078 U	0.047 U
o-Xylene	mg/kg	150	0.067 U	0.051 U	0.078 U	0.047 U
m&p-Xylenes	mg/kg	-	0.067 U	0.051 U	0.078 U	0.047 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-030*	*VS-031*	*VS-032*	*VS-033*
Sample Identification		*Direct*	*SO-056393-081410-RP-VSRAP-030*	*SO-056393-081410-RP-VSRAP-031*	*SO-056393-081410-RP-VSRAP-032*	*SO-056393-081410-RP-VSRAP-033*
Sample Date		*Contact*	*8/14/2010*	*8/14/2010*	*8/14/2010*	*8/14/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.71 U	0.064 U	0.01 U	0.073 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.71 U	0.064 U	0.02 U	0.073 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.71 U	0.064 U	0.01 U	0.073 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.71 U	0.064 U	0.01 U	0.073 U
Aroclor-1248 (PCB-1248)	mg/kg	-	5.4	0.064 U	0.01 U	0.073 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.71 U	0.4 J	0.1	1.1
Aroclor-1260 (PCB-1260)	mg/kg	-	0.71 U	0.064 U	0.01 U	0.073 U
Total PCBs	mg/kg	4	**5.4**[a,b]	0.4 J	0.1	1.1
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.058 U	0.052 U	0.057 U	0.062 U
Bromobenzene	mg/kg	540	0.24 U	0.21 U	0.23 U	0.25 U
Bromodichloromethane	mg/kg	110	0.058 U	0.052 U	0.057 U	0.062 U
Bromoform	mg/kg	820	0.058 U	0.052 U	0.057 U	0.062 U
Bromomethane (Methyl bromide)	mg/kg	320	0.058 U	0.052 U	0.057 U	0.062 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.24 U	0.21 U	0.23 U	0.25 U
Carbon disulfide	mg/kg	280	0.058 U	0.052 U	0.057 U	0.062 U
Carbon tetrachloride	mg/kg	96	0.058 U	0.052 U	0.057 U	0.062 U
Chlorobenzene	mg/kg	260	0.058 U	0.052 U	0.057 U	0.062 U
Chlorobromomethane	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U
Chloroethane	mg/kg	950	0.058 U	0.052 U	0.057 U	0.062 U
Chloroform (Trichloromethane)	mg/kg	1200	0.058 U	0.052 U	0.057 U	0.062 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.058 U	0.052 U	0.057 U	0.062 U
2-Chlorotoluene	mg/kg	500	0.24 U	0.21 U	0.23 U	0.25 U
4-Chlorotoluene	mg/kg	-	0.24 U	0.21 U	0.23 U	0.25 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.24 U	0.21 U	0.23 U	0.25 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	R	R
Dibromochloromethane	mg/kg	110	0.058 U	0.052 U	0.057 U	0.062 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.24 U	0.21 U	0.23 U	0.25 U
Dibromomethane	mg/kg	2000	0.058 U	0.052 U	0.057 U	0.062 U
1,2-Dichlorobenzene	mg/kg	210	0.058 U	0.052 U	0.057 U	0.062 U
1,3-Dichlorobenzene	mg/kg	170	0.058 U	0.052 U	0.057 U	0.062 U
1,4-Dichlorobenzene	mg/kg	400	0.058 U	0.052 U	0.057 U	0.062 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.058 U	0.052 U	0.057 U	0.062 U
1,1-Dichloroethane	mg/kg	890	0.058 U	0.052 U	0.057 U	0.062 U
1,2-Dichloroethane	mg/kg	91	0.058 U	0.052 U	0.057 U	0.062 U
1,1-Dichloroethene	mg/kg	200	0.058 U	0.052 U	0.057 U	0.062 U
cis-1,2-Dichloroethene	mg/kg	640	0.058 U	0.052 U	0.057 U	0.062 U
trans-1,2-Dichloroethene	mg/kg	1400	0.058 U	0.052 U	0.057 U	0.062 U
1,3-Dichloropropane	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	0.058 U	0.052 U	0.057 U	0.062 U
2,2-Dichloropropane	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-030*	*VS-031*	*VS-032*	*VS-033*
Sample Identification		*Direct*	*SO-056393-081410-RP-VSRAP-030*	*SO-056393-081410-RP-VSRAP-031*	*SO-056393-081410-RP-VSRAP-032*	*SO-056393-081410-RP-VSRAP-033*
Sample Date		*Contact*	*8/14/2010*	*8/14/2010*	*8/14/2010*	*8/14/2010*
Sample Type						
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U
cis-1,3-Dichloropropene	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U
trans-1,3-Dichloropropene	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U
Ethylbenzene	mg/kg	140	0.058 U	0.052 U	0.057 U	0.062 U
Hexachlorobutadiene	mg/kg	100	0.24 U	0.21 U	0.23 U	0.25 U
2-Hexanone	mg/kg	2500	R	R	R	R
Isopropyl benzene	mg/kg	390	0.24 U	0.21 U	0.23 U	0.25 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.24 U	0.21 U	0.23 U	0.25 U
Naphthalene	mg/kg	16000	0.24 U	0.21 U	0.23 U	0.25 U
N-Propylbenzene	mg/kg	2500	0.24 U	0.21 U	0.23 U	0.25 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.24 U	0.21 U	0.23 U	0.25 U
Styrene	mg/kg	400	0.058 U	0.052 U	0.057 U	0.062 U
tert-Butylbenzene	mg/kg	2500	0.24 U	0.21 U	0.23 U	0.25 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.058 U	0.052 U	0.057 U	0.062 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.058 U	0.052 U	0.057 U	0.062 U
Tetrachloroethene	mg/kg	88	0.058 U	0.052 U	0.057 U	0.062 U
Toluene	mg/kg	250	0.058 U	0.052 U	0.057 U	0.062 U
1,2,4-Trichlorobenzene	mg/kg	990	0.24 U	0.21 U	0.23 U	0.25 U
1,2,3-Trichlorobenzene	mg/kg	-	0.24 U	0.21 U	0.23 U	0.25 U
1,1,1-Trichloroethane	mg/kg	460	0.058 U	0.052 U	0.057 U	0.062 U
1,1,2-Trichloroethane	mg/kg	180	0.058 U	0.052 U	0.057 U	0.062 U
Trichloroethene	mg/kg	500	0.058 U	0.052 U	0.057 U	0.062 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.058 U	0.052 U	0.057 U	0.062 U
1,2,3-Trichloropropane	mg/kg	830	0.058 U	0.052 U	0.057 U	0.062 U
1,2,4-Trimethylbenzene	mg/kg	110	0.24 U	0.21 U	0.23 U	0.25 U
1,3,5-Trimethylbenzene	mg/kg	94	0.24 U	0.21 U	0.23 U	0.25 U
Vinyl chloride	mg/kg	3.8	0.058 U	0.052 U	0.057 U	0.062 U
o-Xylene	mg/kg	150	0.058 U	0.052 U	0.057 U	0.062 U
m&p-Xylenes	mg/kg	-	0.058 U	0.052 U	0.057 U	0.062 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-033*	*VS-035*	*VS-036*	*VS-037*
Sample Identification		*Direct*	*SO-056393-081410-RP-VSRAP-034*	*SO-056393-082610-RP-VSRAP-035*	*SO-056393-082610-RP-VSRAP-036*	*SO-056393-082610-RP-VSRAP-037*
Sample Date		*Contact*	*8/14/2010*	*8/26/2010*	*8/26/2010*	*8/26/2010*
Sample Type			*Duplicate*			
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.064 U	0.0063 U	0.006 U	0.0059 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.064 U	0.0063 U	0.006 U	0.0059 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.064 U	0.0063 U	0.006 U	0.0059 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.064 U	0.0063 U	0.006 U	0.0059 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.064 U	0.0063 U	0.006 U	0.0059 U
Aroclor-1254 (PCB-1254)	mg/kg	-	1.3	0.24 J	0.26 J	0.023
Aroclor-1260 (PCB-1260)	mg/kg	-	0.064 U	0.046 J	0.064 J	0.0059 U
Total PCBs	mg/kg	4	1.3	0.286 J	0.324 J	0.023
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	R
Benzene	mg/kg	180	0.062 U	0.046 U	0.050 U	0.056 U
Bromobenzene	mg/kg	540	0.25 U	0.19 U	0.20 U	0.23 U
Bromodichloromethane	mg/kg	110	0.062 U	0.046 U	0.050 U	0.056 U
Bromoform	mg/kg	820	0.062 U	0.046 U	0.050 U	0.056 U
Bromomethane (Methyl bromide)	mg/kg	320	0.062 U	0.046 U	0.050 U	0.056 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.25 U	0.19 U	0.20 U	0.23 U
Carbon disulfide	mg/kg	280	0.062 U	0.046 U	0.050 U	0.056 U
Carbon tetrachloride	mg/kg	96	0.062 U	0.046 U	0.050 U	0.056 U
Chlorobenzene	mg/kg	260	0.062 U	0.046 U	0.050 U	0.056 U
Chlorobromomethane	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U
Chloroethane	mg/kg	950	0.062 U	0.046 U	0.050 U	0.056 U
Chloroform (Trichloromethane)	mg/kg	1200	0.062 U	0.046 U	0.050 U	0.056 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.062 U	0.046 U	0.050 U	0.056 U
2-Chlorotoluene	mg/kg	500	0.25 U	0.19 U	0.20 U	0.23 U
4-Chlorotoluene	mg/kg	-	0.25 U	0.19 U	0.20 U	0.23 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.25 U	0.19 U	0.20 U	0.23 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	R	R
Dibromochloromethane	mg/kg	110	0.062 U	0.046 U	0.050 U	0.056 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.25 U	0.19 U	0.20 U	0.23 U
Dibromomethane	mg/kg	2000	0.062 U	0.046 U	0.050 U	0.056 U
1,2-Dichlorobenzene	mg/kg	210	0.062 U	0.046 U	0.050 U	0.056 U
1,3-Dichlorobenzene	mg/kg	170	0.062 U	0.046 U	0.050 U	0.056 U
1,4-Dichlorobenzene	mg/kg	400	0.062 U	0.046 U	0.050 U	0.056 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.062 U	0.046 U	0.050 U	0.056 U
1,1-Dichloroethane	mg/kg	890	0.062 U	0.046 U	0.050 U	0.056 U
1,2-Dichloroethane	mg/kg	91	0.062 U	0.046 U	0.050 U	0.056 U
1,1-Dichloroethene	mg/kg	200	0.062 U	0.046 U	0.050 U	0.056 U
cis-1,2-Dichloroethene	mg/kg	640	0.062 U	0.046 U	0.050 U	0.056 U
trans-1,2-Dichloroethene	mg/kg	1400	0.062 U	0.046 U	0.050 U	0.056 U
1,3-Dichloropropane	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	0.062 U	0.046 U	0.050 U	0.056 U
2,2-Dichloropropane	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-033*	*VS-035*	*VS-036*	*VS-037*
Sample Identification		*Direct*	*SO-056393-081410-RP-VSRAP-034*	*SO-056393-082610-RP-VSRAP-035*	*SO-056393-082610-RP-VSRAP-036*	*SO-056393-082610-RP-VSRAP-037*
Sample Date		*Contact*	*8/14/2010*	*8/26/2010*	*8/26/2010*	*8/26/2010*
Sample Type			*Duplicate*			
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U
cis-1,3-Dichloropropene	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U
trans-1,3-Dichloropropene	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U
Ethylbenzene	mg/kg	140	0.062 U	0.046 U	0.050 U	0.056 U
Hexachlorobutadiene	mg/kg	100	0.25 U	0.19 U	0.20 U	0.23 U
2-Hexanone	mg/kg	2500	R	R	R	R
Isopropyl benzene	mg/kg	390	0.25 U	0.19 U	0.20 U	0.23 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R
Methylene chloride	mg/kg	1300	0.25 U	0.029 J	0.029 J	0.039 J
Naphthalene	mg/kg	16000	0.25 U	0.19 U	0.20 U	0.23 U
N-Propylbenzene	mg/kg	2500	0.25 U	0.19 U	0.20 U	0.23 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.25 U	0.19 U	0.20 U	0.23 U
Styrene	mg/kg	400	0.062 U	0.046 U	0.050 U	0.056 U
tert-Butylbenzene	mg/kg	2500	0.25 U	0.19 U	0.20 U	0.23 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.062 U	0.046 U	0.050 U	0.056 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.062 U	0.046 U	0.050 U	0.056 U
Tetrachloroethene	mg/kg	88	0.062 U	0.046 U	0.050 U	0.056 U
Toluene	mg/kg	250	0.062 U	0.0082 J	0.0079 J	0.012 J
1,2,4-Trichlorobenzene	mg/kg	990	0.25 U	0.19 U	0.20 U	0.23 U
1,2,3-Trichlorobenzene	mg/kg	-	0.25 U	0.19 U	0.20 U	0.23 U
1,1,1-Trichloroethane	mg/kg	460	0.062 U	0.046 U	0.050 U	0.056 U
1,1,2-Trichloroethane	mg/kg	180	0.062 U	0.046 U	0.050 U	0.056 U
Trichloroethene	mg/kg	500	0.062 U	0.046 U	0.050 U	0.056 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.062 U	0.046 U	0.050 U	0.056 U
1,2,3-Trichloropropane	mg/kg	830	0.062 U	0.046 U	0.050 U	0.056 U
1,2,4-Trimethylbenzene	mg/kg	110	0.25 U	0.19 U	0.20 U	0.23 U
1,3,5-Trimethylbenzene	mg/kg	94	0.25 U	0.19 U	0.20 U	0.23 U
Vinyl chloride	mg/kg	3.8	0.062 U	0.046 U	0.050 U	0.056 U
o-Xylene	mg/kg	150	0.062 U	0.046 U	0.050 U	0.056 U
m&p-Xylenes	mg/kg	-	0.062 U	0.046 U	0.050 U	0.056 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-038*	*VS-039*	*VS-040*	*VS-041*
Sample Identification		*Direct*	*SO-056393-082710-CB-VSRAP-038*	*SO-056393-082710-CB-VSRAP-039*	*SO-056393-082710-CB-VSRAP-040*	*SO-056393-082710-CB-VSRAP-041*
Sample Date		*Contact*	*8/27/2010*	*8/27/2010*	*8/27/2010*	*8/27/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.007 U	0.87 U	0.09 U	0.074 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.007 U	0.87 U	0.09 U	0.074 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.007 U	0.87 U	0.09 U	0.074 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.007 U	0.87 U	0.09 U	0.074 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.007 U	0.87 U	0.09 U	0.074 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.077 J	16 J	5.6 J	2.8 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.014 J	3 J	1.1 J	0.52 J
Total PCBs	mg/kg	4	0.091 J	19 J[ab]	6.7 J[ab]	3.32 J
Volatile Organic Compounds						
Acetone	mg/kg	23000	--	R	--	--
Benzene	mg/kg	180	--	0.079 U	--	--
Bromobenzene	mg/kg	540	--	0.32 U	--	--
Bromodichloromethane	mg/kg	110	--	0.079 U	--	--
Bromoform	mg/kg	820	--	0.079 U	--	--
Bromomethane (Methyl bromide)	mg/kg	320	--	0.079 U	--	--
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	--	R	--	--
N-Butylbenzene	mg/kg	2500	--	0.32 U	--	--
Carbon disulfide	mg/kg	280	--	0.079 U	--	--
Carbon tetrachloride	mg/kg	96	--	0.079 U	--	--
Chlorobenzene	mg/kg	260	--	0.079 U	--	--
Chlorobromomethane	mg/kg	-	--	0.079 U	--	--
Chloroethane	mg/kg	950	--	0.079 U	--	--
Chloroform (Trichloromethane)	mg/kg	1200	--	0.079 U	--	--
Chloromethane (Methyl chloride)	mg/kg	1100	--	0.079 U	--	--
2-Chlorotoluene	mg/kg	500	--	0.32 U	--	--
4-Chlorotoluene	mg/kg	-	--	0.32 U	--	--
Cymene (p-Isopropyltoluene)	mg/kg	-	--	0.32 U	--	--
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	--	R	--	--
Dibromochloromethane	mg/kg	110	--	0.079 U	--	--
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	--	0.32 U	--	--
Dibromomethane	mg/kg	2000	--	0.079 U	--	--
1,2-Dichlorobenzene	mg/kg	210	--	0.079 U	--	--
1,3-Dichlorobenzene	mg/kg	170	--	0.079 U	--	--
1,4-Dichlorobenzene	mg/kg	400	--	0.079 U	--	--
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	--	0.079 U	--	--
1,1-Dichloroethane	mg/kg	890	--	0.079 U	--	--
1,2-Dichloroethane	mg/kg	91	--	0.079 U	--	--
1,1-Dichloroethene	mg/kg	200	--	0.079 U	--	--
cis-1,2-Dichloroethene	mg/kg	640	--	0.079 U	--	--
trans-1,2-Dichloroethene	mg/kg	1400	--	0.079 U	--	--
1,3-Dichloropropane	mg/kg	-	--	0.079 U	--	--
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	--	0.079 U	--	--
2,2-Dichloropropane	mg/kg	-	--	0.079 U	--	--

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-038*	*VS-039*	*VS-040*	*VS-041*
Sample Identification		*Direct*	*SO-056393-082710-CB-VSRAP-038*	*SO-056393-082710-CB-VSRAP-039*	*SO-056393-082710-CB-VSRAP-040*	*SO-056393-082710-CB-VSRAP-041*
Sample Date		*Contact*	*8/27/2010*	*8/27/2010*	*8/27/2010*	*8/27/2010*
Sample Type						
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	--	0.079 U	--	--
cis-1,3-Dichloropropene	mg/kg	-	--	0.079 U	--	--
trans-1,3-Dichloropropene	mg/kg	-	--	0.079 U	--	--
Ethylbenzene	mg/kg	140	--	0.079 U	--	--
Hexachlorobutadiene	mg/kg	100	--	0.32 U	--	--
2-Hexanone	mg/kg	2500	--	R	--	--
Isopropyl benzene	mg/kg	390	--	0.32 U	--	--
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	--	R	--	--
Methylene chloride	mg/kg	1300	--	0.065 J	--	--
Naphthalene	mg/kg	16000	--	0.32 U	--	--
N-Propylbenzene	mg/kg	2500	--	0.32 U	--	--
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	--	0.32 U	--	--
Styrene	mg/kg	400	--	0.079 U	--	--
tert-Butylbenzene	mg/kg	2500	--	0.32 U	--	--
1,1,2,2-Tetrachloroethane	mg/kg	53	--	0.079 U	--	--
1,1,1,2-Tetrachloroethane	mg/kg	440	--	0.079 U	--	--
Tetrachloroethene	mg/kg	88	--	0.079 U	--	--
Toluene	mg/kg	250	--	0.0095 J	--	--
1,2,4-Trichlorobenzene	mg/kg	990	--	0.32 U	--	--
1,2,3-Trichlorobenzene	mg/kg	-	--	0.32 U	--	--
1,1,1-Trichloroethane	mg/kg	460	--	0.079 U	--	--
1,1,2-Trichloroethane	mg/kg	180	--	0.079 U	--	--
Trichloroethene	mg/kg	500	--	0.079 U	--	--
Trichlorofluoromethane (CFC-11)	mg/kg	560	--	0.079 U	--	--
1,2,3-Trichloropropane	mg/kg	830	--	0.079 U	--	--
1,2,4-Trimethylbenzene	mg/kg	110	--	0.32 U	--	--
1,3,5-Trimethylbenzene	mg/kg	94	--	0.32 U	--	--
Vinyl chloride	mg/kg	3.8	--	0.079 U	--	--
o-Xylene	mg/kg	150	--	0.079 U	--	--
m&p-Xylenes	mg/kg	-	--	0.079 U	--	--

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-042*	*VS-043*	*VS-044*	*VS-045*
Sample Identification		*Direct*	*SO-056393-082710-CB-VSRAP-042*	*SO-056393-082710-CB-VSRAP-043*	*SO-056393-082710-CB-VSRAP-044*	*SO-056393-082710-CB-VSRAP-045*
Sample Date		*Contact*	*8/27/2010*	*8/27/2010*	*8/27/2010*	*8/27/2010*
Sample Type						
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0069 U	0.0065 U	0.075 U	0.0072 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.0069 U	0.0065 U	0.075 U	0.0072 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0069 U	0.0065 U	0.075 U	0.0072 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0069 U	0.0065 U	0.075 U	0.0072 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0069 U	0.0065 U	0.075 U	0.0072 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0069 U	0.0065 U	2.4 J	0.096 J
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0069 U	0.0065 U	0.32 J	0.016 J
Total PCBs	mg/kg	4	ND	ND	2.72 J	0.112 J
Volatile Organic Compounds						
Acetone	mg/kg	23000	--	--	--	--
Benzene	mg/kg	180	--	--	--	--
Bromobenzene	mg/kg	540	--	--	--	--
Bromodichloromethane	mg/kg	110	--	--	--	--
Bromoform	mg/kg	820	--	--	--	--
Bromomethane (Methyl bromide)	mg/kg	320	--	--	--	--
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	--	--	--	--
N-Butylbenzene	mg/kg	2500	--	--	--	--
Carbon disulfide	mg/kg	280	--	--	--	--
Carbon tetrachloride	mg/kg	96	--	--	--	--
Chlorobenzene	mg/kg	260	--	--	--	--
Chlorobromomethane	mg/kg	-	--	--	--	--
Chloroethane	mg/kg	950	--	--	--	--
Chloroform (Trichloromethane)	mg/kg	1200	--	--	--	--
Chloromethane (Methyl chloride)	mg/kg	1100	--	--	--	--
2-Chlorotoluene	mg/kg	500	--	--	--	--
4-Chlorotoluene	mg/kg	-	--	--	--	--
Cymene (p-Isopropyltoluene)	mg/kg	-	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	--	--	--	--
Dibromochloromethane	mg/kg	110	--	--	--	--
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	--	--	--	--
Dibromomethane	mg/kg	2000	--	--	--	--
1,2-Dichlorobenzene	mg/kg	210	--	--	--	--
1,3-Dichlorobenzene	mg/kg	170	--	--	--	--
1,4-Dichlorobenzene	mg/kg	400	--	--	--	--
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	--	--	--	--
1,1-Dichloroethane	mg/kg	890	--	--	--	--
1,2-Dichloroethane	mg/kg	91	--	--	--	--
1,1-Dichloroethene	mg/kg	200	--	--	--	--
cis-1,2-Dichloroethene	mg/kg	640	--	--	--	--
trans-1,2-Dichloroethene	mg/kg	1400	--	--	--	--
1,3-Dichloropropane	mg/kg	-	--	--	--	--
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	--	--	--	--
2,2-Dichloropropane	mg/kg	-	--	--	--	--

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-042*	*VS-043*	*VS-044*	*VS-045*
Sample Identification		*Direct*	*SO-056393-082710-CB-VSRAP-042*	*SO-056393-082710-CB-VSRAP-043*	*SO-056393-082710-CB-VSRAP-044*	*SO-056393-082710-CB-VSRAP-045*
Sample Date		*Contact*	*8/27/2010*	*8/27/2010*	*8/27/2010*	*8/27/2010*
Sample Type						
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	--	--	--	--
cis-1,3-Dichloropropene	mg/kg	-	--	--	--	--
trans-1,3-Dichloropropene	mg/kg	-	--	--	--	--
Ethylbenzene	mg/kg	140	--	--	--	--
Hexachlorobutadiene	mg/kg	100	--	--	--	--
2-Hexanone	mg/kg	2500	--	--	--	--
Isopropyl benzene	mg/kg	390	--	--	--	--
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	--	--	--	--
Methylene chloride	mg/kg	1300	--	--	--	--
Naphthalene	mg/kg	16000	--	--	--	--
N-Propylbenzene	mg/kg	2500	--	--	--	--
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	--	--	--	--
Styrene	mg/kg	400	--	--	--	--
tert-Butylbenzene	mg/kg	2500	--	--	--	--
1,1,2,2-Tetrachloroethane	mg/kg	53	--	--	--	--
1,1,1,2-Tetrachloroethane	mg/kg	440	--	--	--	--
Tetrachloroethene	mg/kg	88	--	--	--	--
Toluene	mg/kg	250	--	--	--	--
1,2,4-Trichlorobenzene	mg/kg	990	--	--	--	--
1,2,3-Trichlorobenzene	mg/kg	-	--	--	--	--
1,1,1-Trichloroethane	mg/kg	460	--	--	--	--
1,1,2-Trichloroethane	mg/kg	180	--	--	--	--
Trichloroethene	mg/kg	500	--	--	--	--
Trichlorofluoromethane (CFC-11)	mg/kg	560	--	--	--	--
1,2,3-Trichloropropane	mg/kg	830	--	--	--	--
1,2,4-Trimethylbenzene	mg/kg	110	--	--	--	--
1,3,5-Trimethylbenzene	mg/kg	94	--	--	--	--
Vinyl chloride	mg/kg	3.8	--	--	--	--
o-Xylene	mg/kg	150	--	--	--	--
m&p-Xylenes	mg/kg	-	--	--	--	--

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-046*	*VS-046*	*VS-048*	*VS-049*
Sample Identification		*Direct*	*SO-056393-090810-RP-VSRAP-046*	*SO-056393-090810-RP-VSRAP-047*	*SO-056393-090910-RP-VSRAP-048*	*SO-056393-090910-RP-VSRAP-049*
Sample Date		*Contact*	*9/8/2010*	*9/8/2010*	*9/9/2010*	*9/9/2010*
Sample Type				*Duplicate*		
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0069 U	0.0071 U	0 U	0.0068 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.0069 U	0.0071 U	0.007 U	0.0068 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0069 U	0.0071 U	0.007 U	0.0068 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0069 U	0.0071 U	0.007 U	0.0068 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0069 U	0.0071 U	0.007 U	0.0068 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.034	0.028	0.25	0.0068 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0069 U	0.0071 U	0 U	0.0068 U
Total PCBs	mg/kg	4	0.034	0.028	0.25	ND
Volatile Organic Compounds						
Acetone	mg/kg	23000	R	R	R	--
Benzene	mg/kg	180	0.061 U	0.068 U	0.060 U	--
Bromobenzene	mg/kg	540	0.25 U	0.28 U	0.24 U	--
Bromodichloromethane	mg/kg	110	0.061 U	0.068 U	0.060 U	--
Bromoform	mg/kg	820	0.061 U	0.068 U	0.060 U	--
Bromomethane (Methyl bromide)	mg/kg	320	0.061 U	0.068 U	0.060 U	--
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	--
N-Butylbenzene	mg/kg	2500	0.25 U	0.28 U	0.24 U	--
Carbon disulfide	mg/kg	280	0.061 U	0.068 U	0.060 U	--
Carbon tetrachloride	mg/kg	96	0.061 U	0.068 U	0.060 U	--
Chlorobenzene	mg/kg	260	0.061 U	0.068 U	0.060 U	--
Chlorobromomethane	mg/kg	-	0.061 U	0.068 U	0.060 U	--
Chloroethane	mg/kg	950	0.061 U	0.068 U	0.060 U	--
Chloroform (Trichloromethane)	mg/kg	1200	0.061 U	0.068 U	0.060 U	--
Chloromethane (Methyl chloride)	mg/kg	1100	0.061 U	0.068 U	0.060 U	--
2-Chlorotoluene	mg/kg	500	0.25 U	0.28 U	0.24 U	--
4-Chlorotoluene	mg/kg	-	0.25 U	0.28 U	0.24 U	--
Cymene (p-Isopropyltoluene)	mg/kg	-	0.25 U	0.28 U	0.24 U	--
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	R	--
Dibromochloromethane	mg/kg	110	0.061 U	0.068 U	0.060 U	--
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.25 U	0.28 U	0.24 U	--
Dibromomethane	mg/kg	2000	0.061 U	0.068 U	0.060 U	--
1,2-Dichlorobenzene	mg/kg	210	0.061 U	0.068 U	0.060 U	--
1,3-Dichlorobenzene	mg/kg	170	0.061 U	0.068 U	0.060 U	--
1,4-Dichlorobenzene	mg/kg	400	0.061 U	0.068 U	0.060 U	--
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.061 U	0.068 U	0.060 U	--
1,1-Dichloroethane	mg/kg	890	0.061 U	0.068 U	0.060 U	--
1,2-Dichloroethane	mg/kg	91	0.061 U	0.068 U	0.060 U	--
1,1-Dichloroethene	mg/kg	200	0.061 U	0.068 U	0.060 U	--
cis-1,2-Dichloroethene	mg/kg	640	0.061 U	0.068 U	0.060 U	--
trans-1,2-Dichloroethene	mg/kg	1400	0.061 U	0.068 U	0.060 U	--
1,3-Dichloropropane	mg/kg	-	0.061 U	0.068 U	0.060 U	--
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	0.061 U	0.068 U	0.060 U	--
2,2-Dichloropropane	mg/kg	-	0.061 U	0.068 U	0.060 U	--

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-046*	*VS-046*	*VS-048*	*VS-049*
Sample Identification		*Direct*	*SO-056393-090810-RP-VSRAP-046*	*SO-056393-090810-RP-VSRAP-047*	*SO-056393-090910-RP-VSRAP-048*	*SO-056393-090910-RP-VSRAP-049*
Sample Date		*Contact*	*9/8/2010*	*9/8/2010*	*9/9/2010*	*9/9/2010*
Sample Type				*Duplicate*		
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	0.061 U	0.068 U	0.060 U	--
cis-1,3-Dichloropropene	mg/kg	-	0.061 U	0.068 U	0.060 U	--
trans-1,3-Dichloropropene	mg/kg	-	0.061 U	0.068 U	0.060 U	--
Ethylbenzene	mg/kg	140	0.061 U	0.068 U	0.060 U	--
Hexachlorobutadiene	mg/kg	100	0.25 U	0.28 U	0.24 U	--
2-Hexanone	mg/kg	2500	R	R	R	--
Isopropyl benzene	mg/kg	390	0.25 U	0.28 U	0.24 U	--
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	--
Methylene chloride	mg/kg	1300	0.022 J	0.024 J	0.24 U	--
Naphthalene	mg/kg	16000	0.25 U	0.28 U	0.24 U	--
N-Propylbenzene	mg/kg	2500	0.25 U	0.28 U	0.24 U	--
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.25 U	0.28 U	0.24 U	--
Styrene	mg/kg	400	0.061 U	0.068 U	0.060 U	--
tert-Butylbenzene	mg/kg	2500	0.25 U	0.28 U	0.24 U	--
1,1,2,2-Tetrachloroethane	mg/kg	53	0.061 U	0.068 U	0.060 U	--
1,1,1,2-Tetrachloroethane	mg/kg	440	0.061 U	0.068 U	0.060 U	--
Tetrachloroethene	mg/kg	88	0.061 U	0.068 U	0.060 U	--
Toluene	mg/kg	250	0.0097 J	0.020 J	0.0096 J	--
1,2,4-Trichlorobenzene	mg/kg	990	0.25 UJ	0.28 UJ	0.24 UJ	--
1,2,3-Trichlorobenzene	mg/kg	-	0.25 UJ	0.28 UJ	0.24 UJ	--
1,1,1-Trichloroethane	mg/kg	460	0.061 U	0.068 U	0.060 U	--
1,1,2-Trichloroethane	mg/kg	180	0.061 U	0.068 U	0.060 U	--
Trichloroethene	mg/kg	500	0.061 U	0.068 U	0.060 U	--
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.061 U	0.068 U	0.060 U	--
1,2,3-Trichloropropane	mg/kg	830	0.061 U	0.068 U	0.060 U	--
1,2,4-Trimethylbenzene	mg/kg	110	0.25 U	0.28 U	0.24 U	--
1,3,5-Trimethylbenzene	mg/kg	94	0.25 U	0.28 U	0.24 U	--
Vinyl chloride	mg/kg	3.8	0.061 U	0.068 U	0.060 U	--
o-Xylene	mg/kg	150	0.061 U	0.068 U	0.060 U	--
m&p-Xylenes	mg/kg	-	0.061 U	0.068 U	0.060 U	--

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-050*	*VS-050*	*VS-052*	*VS-053*
Sample Identification		*Direct*	*SO-056393-091010-RP-VSRAP-050*	*SO-056393-091010-RP-VSRAP-051*	*SO-056393-091010-RP-VSRAP-052*	*SO-056393-091010-RP-VSRAP-053*
Sample Date		*Contact*	*9/10/2010*	*9/10/2010*	*9/10/2010*	*9/10/2010*
Sample Type				*Duplicate*		
	Units					
		a				
PCBs						
Aroclor-1016 (PCB-1016)	mg/kg	-	0.073 U	0.0074 U	0.0063 U	0.007 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.073 U	0.0074 U	0.0063 U	0.007 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.073 U	0.0074 U	0.0063 U	0.007 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.073 U	0.0074 U	0.0063 U	0.007 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.073 U	0.0074 U	0.0063 U	0.007 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.92	0.67 J	0.0063 U	0.17
Aroclor-1260 (PCB-1260)	mg/kg	-	0.073 U	0.16 J	0.0063 U	0.007 U
Total PCBs	mg/kg	4	0.92	0.83 J	ND	0.17
Volatile Organic Compounds						
Acetone	mg/kg	23000	--	--	R	R
Benzene	mg/kg	180	--	--	0.046 U	0.076 U
Bromobenzene	mg/kg	540	--	--	0.19 U	0.31 U
Bromodichloromethane	mg/kg	110	--	--	0.046 U	0.076 U
Bromoform	mg/kg	820	--	--	0.046 U	0.076 U
Bromomethane (Methyl bromide)	mg/kg	320	--	--	0.046 U	0.076 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	--	--	R	R
N-Butylbenzene	mg/kg	2500	--	--	0.19 U	0.31 U
Carbon disulfide	mg/kg	280	--	--	0.046 U	0.076 U
Carbon tetrachloride	mg/kg	96	--	--	0.046 U	0.076 U
Chlorobenzene	mg/kg	260	--	--	0.046 U	0.076 U
Chlorobromomethane	mg/kg	-	--	--	0.046 U	0.076 U
Chloroethane	mg/kg	950	--	--	0.046 U	0.076 U
Chloroform (Trichloromethane)	mg/kg	1200	--	--	0.046 U	0.076 U
Chloromethane (Methyl chloride)	mg/kg	1100	--	--	0.046 U	0.076 U
2-Chlorotoluene	mg/kg	500	--	--	0.19 U	0.31 U
4-Chlorotoluene	mg/kg	-	--	--	0.19 U	0.31 U
Cymene (p-Isopropyltoluene)	mg/kg	-	--	--	0.19 U	0.31 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	--	--	0.19 U	0.31 U
Dibromochloromethane	mg/kg	110	--	--	0.046 U	0.076 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	--	--	0.19 U	0.31 U
Dibromomethane	mg/kg	2000	--	--	0.046 U	0.076 U
1,2-Dichlorobenzene	mg/kg	210	--	--	0.046 U	0.076 U
1,3-Dichlorobenzene	mg/kg	170	--	--	0.046 U	0.076 U
1,4-Dichlorobenzene	mg/kg	400	--	--	0.046 U	0.076 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	--	--	0.046 U	0.076 U
1,1-Dichloroethane	mg/kg	890	--	--	0.046 U	0.076 U
1,2-Dichloroethane	mg/kg	91	--	--	0.046 U	0.076 U
1,1-Dichloroethene	mg/kg	200	--	--	0.046 U	0.076 U
cis-1,2-Dichloroethene	mg/kg	640	--	--	0.046 U	0.076 U
trans-1,2-Dichloroethene	mg/kg	1400	--	--	0.046 U	0.076 U
1,3-Dichloropropane	mg/kg	-	--	--	0.046 U	0.076 U
Volatile Organic Compounds - Continued						
1,2-Dichloropropane	mg/kg	140	--	--	0.046 U	0.076 U
2,2-Dichloropropane	mg/kg	-	--	--	0.046 U	0.076 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-050*	*VS-050*	*VS-052*	*VS-053*
Sample Identification		*Direct*	*SO-056393-091010-RP-VSRAP-050*	*SO-056393-091010-RP-VSRAP-051*	*SO-056393-091010-RP-VSRAP-052*	*SO-056393-091010-RP-VSRAP-053*
Sample Date		*Contact*	*9/10/2010*	*9/10/2010*	*9/10/2010*	*9/10/2010*
Sample Type				*Duplicate*		
	Units					
		a				
1,1-Dichloropropene	mg/kg	-	--	--	0.046 U	0.076 U
cis-1,3-Dichloropropene	mg/kg	-	--	--	0.046 U	0.076 U
trans-1,3-Dichloropropene	mg/kg	-	--	--	0.046 U	0.076 U
Ethylbenzene	mg/kg	140	--	--	0.0073 J	0.076 U
Hexachlorobutadiene	mg/kg	100	--	--	0.19 U	0.31 U
2-Hexanone	mg/kg	2500	--	--	1.9 U	3.1 U
Isopropyl benzene	mg/kg	390	--	--	0.19 U	0.31 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	--	--	R	R
Methylene chloride	mg/kg	1300	--	--	0.25	0.31 U
Naphthalene	mg/kg	16000	--	--	0.19 U	0.31 U
N-Propylbenzene	mg/kg	2500	--	--	0.19 U	0.31 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	--	--	0.19 U	0.31 U
Styrene	mg/kg	400	--	--	0.046 U	0.076 U
tert-Butylbenzene	mg/kg	2500	--	--	0.19 U	0.31 U
1,1,2,2-Tetrachloroethane	mg/kg	53	--	--	0.046 U	0.076 U
1,1,1,2-Tetrachloroethane	mg/kg	440	--	--	0.046 U	0.076 U
Tetrachloroethene	mg/kg	88	--	--	0.046 U	0.076 U
Toluene	mg/kg	250	--	--	0.039 J	0.050 J
1,2,4-Trichlorobenzene	mg/kg	990	--	--	0.19 U	0.31 U
1,2,3-Trichlorobenzene	mg/kg	-	--	--	0.19 U	0.31 U
1,1,1-Trichloroethane	mg/kg	460	--	--	0.046 U	0.076 U
1,1,2-Trichloroethane	mg/kg	180	--	--	0.046 U	0.076 U
Trichloroethene	mg/kg	500	--	--	0.046 U	0.076 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	--	--	0.046 U	0.076 U
1,2,3-Trichloropropane	mg/kg	830	--	--	0.046 U	0.076 U
1,2,4-Trimethylbenzene	mg/kg	110	--	--	0.19 U	0.31 U
1,3,5-Trimethylbenzene	mg/kg	94	--	--	0.19 U	0.31 U
Vinyl chloride	mg/kg	3.8	--	--	0.046 U	0.076 U
o-Xylene	mg/kg	150	--	--	0.046 U	0.076 U
m&p-Xylenes	mg/kg	-	--	--	0.025 J	0.076 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-054*	*VS-055*	*VS-056*	*VS-057*	*VS-058*
Sample Identification		*Direct*	*SO-056393-091010-RP-VSRAP-054*	*SO-056393-091010-RP-VSRAP-055*	*SO-056393-091010-RP-VSRAP-057*	*SO-056393-091310-RP-VSRAP-056*	*SO-056393-121610-RP-058*
Sample Date		*Contact*	*9/10/2010*	*9/10/2010*	*9/10/2010*	*9/13/2010*	*12/16/2010*
Sample Type							
	Units						
		a					
PCBs							
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0069 U	0.0069 U	0.0069 U	0.073 U	0.0052 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.0069 U	0.0069 U	0.0069 U	0.073 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0069 U	0.0069 U	0.0069 U	0.073 U	0.0052 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0069 U	0.0069 U	0.0069 U	0.073 U	0.0052 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0069 U	0.0069 U	0.0069 U	4.1 J	0.0052 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.045 J	0.28 J	0.0069 U	1.4 J	0.0052 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.013 J	0.053 J	0.0069 U	0.34 J	0.0052 U
Total PCBs	mg/kg	4	0.058 J	0.333 J	ND	**5.84 J[ab]**	ND
Volatile Organic Compounds							
Acetone	mg/kg	23000	R	--	R	R	R
Benzene	mg/kg	180	0.068 U	--	0.016 J	0.074 U	0.049 U
Bromobenzene	mg/kg	540	0.28 U	--	0.45 U	0.30 U	0.20 U
Bromodichloromethane	mg/kg	110	0.068 U	--	0.12 U	0.074 U	0.049 U
Bromoform	mg/kg	820	0.068 U	--	0.12 U	0.074 U	0.049 U
Bromomethane (Methyl bromide)	mg/kg	320	0.068 U	--	0.12 U	0.074 U	0.049 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	--	R	R	R
N-Butylbenzene	mg/kg	2500	0.28 U	--	0.45 U	0.30 U	0.20 U
Carbon disulfide	mg/kg	280	0.068 U	--	0.12 U	0.074 U	0.049 UJ
Carbon tetrachloride	mg/kg	96	0.068 U	--	0.12 U	0.074 U	0.049 U
Chlorobenzene	mg/kg	260	0.068 U	--	0.12 U	0.074 U	0.049 U
Chlorobromomethane	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U
Chloroethane	mg/kg	950	0.068 U	--	0.12 U	0.074 U	0.049 U
Chloroform (Trichloromethane)	mg/kg	1200	0.068 U	--	0.12 U	0.074 U	0.049 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.068 U	--	0.12 U	0.074 U	0.049 U
2-Chlorotoluene	mg/kg	500	0.28 U	--	0.45 U	0.30 U	0.20 U
4-Chlorotoluene	mg/kg	-	0.28 U	--	0.45 U	0.30 U	0.20 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.28 U	--	0.45 U	0.30 U	0.20 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.28 U	--	0.45 U	0.30 U	0.20 UJ
Dibromochloromethane	mg/kg	110	0.068 U	--	0.12 U	0.074 U	0.049 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.28 U	--	0.45 U	0.30 U	0.20 U
Dibromomethane	mg/kg	2000	0.068 U	--	0.12 U	0.074 U	0.049 U
1,2-Dichlorobenzene	mg/kg	210	0.068 U	--	0.12 U	0.074 U	0.049 U
1,3-Dichlorobenzene	mg/kg	170	0.068 U	--	0.12 U	0.074 U	0.049 U
1,4-Dichlorobenzene	mg/kg	400	0.068 U	--	0.12 U	0.074 U	0.049 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.068 U	--	0.12 U	0.074 U	0.049 U
1,1-Dichloroethane	mg/kg	890	0.068 U	--	0.12 U	0.074 U	0.049 U
1,2-Dichloroethane	mg/kg	91	0.068 U	--	0.12 U	0.074 U	0.049 U
1,1-Dichloroethene	mg/kg	200	0.068 U	--	0.12 U	0.074 U	0.049 U
cis-1,2-Dichloroethene	mg/kg	640	0.068 U	--	0.12 U	0.074 U	0.049 U
trans-1,2-Dichloroethene	mg/kg	1400	0.068 U	--	0.12 U	0.074 U	0.049 U
1,3-Dichloropropane	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U
Volatile Organic Compounds - Continued							
1,2-Dichloropropane	mg/kg	140	0.068 U	--	0.12 U	0.074 U	0.049 U
2,2-Dichloropropane	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-054*	*VS-055*	*VS-056*	*VS-057*	*VS-058*
Sample Identification		*Direct*	*SO-056393-091010-RP-VSRAP-054*	*SO-056393-091010-RP-VSRAP-055*	*SO-056393-091010-RP-VSRAP-057*	*SO-056393-091310-RP-VSRAP-056*	*SO-056393-121610-RP-058*
Sample Date		*Contact*	*9/10/2010*	*9/10/2010*	*9/10/2010*	*9/13/2010*	*12/16/2010*
Sample Type							
	Units						
		a					
1,1-Dichloropropene	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U
cis-1,3-Dichloropropene	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U
trans-1,3-Dichloropropene	mg/kg	-	0.068 U	--	0.12 U	0.074 U	0.049 U
Ethylbenzene	mg/kg	140	0.068 U	--	0.12 U	0.074 U	0.049 U
Hexachlorobutadiene	mg/kg	100	0.28 U	--	0.45 U	0.30 U	0.20 U
2-Hexanone	mg/kg	2500	2.8 U	--	4.5 U	3.0 U	R
Isopropyl benzene	mg/kg	390	0.28 U	--	0.45 U	0.30 U	0.20 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	--	R	R	2.0 U
Methylene chloride	mg/kg	1300	0.28 U	--	0.45 U	0.30 U	0.035 J
Naphthalene	mg/kg	16000	0.28 U	--	0.45 U	0.30 U	0.20 U
N-Propylbenzene	mg/kg	2500	0.28 U	--	0.45 U	0.30 U	0.20 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.28 U	--	0.45 U	0.30 U	0.20 U
Styrene	mg/kg	400	0.068 U	--	0.12 U	0.074 U	0.049 U
tert-Butylbenzene	mg/kg	2500	0.28 U	--	0.45 U	0.30 U	0.20 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.068 U	--	0.12 U	0.074 U	0.049 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.068 U	--	0.12 U	0.074 U	0.049 U
Tetrachloroethene	mg/kg	88	0.068 U	--	0.12 U	0.074 U	0.049 U
Toluene	mg/kg	250	0.014 J	--	0.16	0.074 U	0.049 U
1,2,4-Trichlorobenzene	mg/kg	990	0.28 U	--	0.45 U	0.30 U	0.20 U
1,2,3-Trichlorobenzene	mg/kg	-	0.28 U	--	0.45 U	0.30 U	0.20 U
1,1,1-Trichloroethane	mg/kg	460	0.068 U	--	0.12 U	0.074 U	0.049 U
1,1,2-Trichloroethane	mg/kg	180	0.068 U	--	0.12 U	0.074 U	0.049 U
Trichloroethene	mg/kg	500	0.068 U	--	0.12 U	0.074 U	0.049 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.068 U	--	0.12 U	0.074 U	0.049 U
1,2,3-Trichloropropane	mg/kg	830	0.068 U	--	0.12 U	0.074 U	0.049 U
1,2,4-Trimethylbenzene	mg/kg	110	0.28 U	--	0.018 J	0.30 U	0.20 U
1,3,5-Trimethylbenzene	mg/kg	94	0.28 U	--	0.45 U	0.30 U	0.20 U
Vinyl chloride	mg/kg	3.8	0.068 U	--	0.12 U	0.074 U	0.049 U
o-Xylene	mg/kg	150	0.068 U	--	0.018 J	0.074 U	0.049 U
m&p-Xylenes	mg/kg	-	0.068 U	--	0.036 J	0.074 U	0.049 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-059*	*VS-060*	*VS-061*	*VS-062*	*VS-063*	*VS-064*
Sample Identification		*Direct*	*SO-056393-121610-RP-059*	*SO-056393-121610-RP-060*	*SO-056393-122110-AS-061*	*SO-056393-122110-AS-062*	*SO-056393-122110-AS-063*	*SO-056393-122110-AS-064*
Sample Date		*Contact*	*12/16/2010*	*12/16/2010*	*12/21/2010*	*12/21/2010*	*12/21/2010*	*12/21/2010*
Sample Type								
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0061 U	0.0054 U	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.013 U	0.011 U	0.011 U	0.012 U	0.011 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0061 U	0.0054 U	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0061 U	0.0054 U	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0061 U	0.0054 U	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0061 U	0.0035 J	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0061 U	0.0054 U	0.0052 U	0.0058 U	0.0053 U	0.0053 U
Total PCBs	mg/kg	4	ND	0.0035 J	ND	ND	ND	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	1.8 U	1.6 U	2.0 U	2.0 U
Benzene	mg/kg	180	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Bromobenzene	mg/kg	540	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Bromodichloromethane	mg/kg	110	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Bromoform	mg/kg	820	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Bromomethane (Methyl bromide)	mg/kg	320	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	1.8 U	1.6 U	2.0 U	2.0 U
N-Butylbenzene	mg/kg	2500	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Carbon disulfide	mg/kg	280	0.062 UJ	0.049 UJ	0.045 U	0.039 U	0.049 U	0.049 U
Carbon tetrachloride	mg/kg	96	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Chlorobenzene	mg/kg	260	0.062 U	0.014 J	0.045 U	0.039 U	0.049 U	0.049 U
Chlorobromomethane	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Chloroethane	mg/kg	950	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Chloroform (Trichloromethane)	mg/kg	1200	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
2-Chlorotoluene	mg/kg	500	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
4-Chlorotoluene	mg/kg	-	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.25 UJ	0.20 UJ	0.18 U	0.16 U	0.20 U	0.20 U
Dibromochloromethane	mg/kg	110	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Dibromomethane	mg/kg	2000	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,2-Dichlorobenzene	mg/kg	210	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,3-Dichlorobenzene	mg/kg	170	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,4-Dichlorobenzene	mg/kg	400	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,1-Dichloroethane	mg/kg	890	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,2-Dichloroethane	mg/kg	91	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,1-Dichloroethene	mg/kg	200	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
cis-1,2-Dichloroethene	mg/kg	640	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
trans-1,2-Dichloroethene	mg/kg	1400	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,3-Dichloropropane	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
2,2-Dichloropropane	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-059*	*VS-060*	*VS-061*	*VS-062*	*VS-063*	*VS-064*
Sample Identification		*Direct*	*SO-056393-121610-RP-059*	*SO-056393-121610-RP-060*	*SO-056393-122110-AS-061*	*SO-056393-122110-AS-062*	*SO-056393-122110-AS-063*	*SO-056393-122110-AS-064*
Sample Date		*Contact*	*12/16/2010*	*12/16/2010*	*12/21/2010*	*12/21/2010*	*12/21/2010*	*12/21/2010*
Sample Type								
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
cis-1,3-Dichloropropene	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
trans-1,3-Dichloropropene	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Ethylbenzene	mg/kg	140	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Hexachlorobutadiene	mg/kg	100	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
2-Hexanone	mg/kg	2500	R	R	1.8 U	1.6 U	2.0 U	2.0 U
Isopropyl benzene	mg/kg	390	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	2.5 U	2.0 U	1.8 U	1.6 U	2.0 U	2.0 U
Methylene chloride	mg/kg	1300	0.038 J	0.043 J	0.18 U	0.16 U	0.20 U	0.20 U
Naphthalene	mg/kg	16000	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
N-Propylbenzene	mg/kg	2500	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Styrene	mg/kg	400	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
tert-Butylbenzene	mg/kg	2500	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Tetrachloroethene	mg/kg	88	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Toluene	mg/kg	250	0.062 U	0.028 J	0.045 U	0.039 U	0.049 U	0.049 U
1,2,4-Trichlorobenzene	mg/kg	990	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene	mg/kg	-	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
1,1,1-Trichloroethane	mg/kg	460	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,1,2-Trichloroethane	mg/kg	180	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Trichloroethene	mg/kg	500	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,2,3-Trichloropropane	mg/kg	830	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
1,2,4-Trimethylbenzene	mg/kg	110	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene	mg/kg	94	0.25 U	0.20 U	0.18 U	0.16 U	0.20 U	0.20 U
Vinyl chloride	mg/kg	3.8	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
o-Xylene	mg/kg	150	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U
m&p-Xylenes	mg/kg	-	0.062 U	0.049 U	0.045 U	0.039 U	0.049 U	0.049 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-065*	*VS-066*	*VS-066*	*VS-068*	*VS-069*	*VS-070*
Sample Identification		*Direct*	*SO-056393-122110-AS-065*	*SO-056393-122110-AS-066*	*SO-056393-122110-AS-067*	*SO-056393-122910-RP-068*	*SO-056393-122910-RP-069*	*SO-056393-122910-RP-070*
Sample Date		*Contact*	*12/21/2010*	*12/21/2010*	*12/21/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*
Sample Type					*Duplicate*			
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.0074 U	0.006 U	0.0053 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.013 U	0.011 U	0.011 U	0.015 U	0.012 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.0074 U	0.006 U	0.0053 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.0074 U	0.006 U	0.0053 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.0074 U	0.006 U	0.0053 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.06	0.14	0.0085
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0061 U	0.0052 U	0.0052 U	0.0074 U	0.006 U	0.0053 U
Total PCBs	mg/kg	4	ND	ND	ND	0.06	0.14	0.0085
Volatile Organic Compounds								
Acetone	mg/kg	23000	2.3 U	2.1 U	2.0 U	R	R	R
Benzene	mg/kg	180	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Bromobenzene	mg/kg	540	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Bromodichloromethane	mg/kg	110	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Bromoform	mg/kg	820	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Bromomethane (Methyl bromide)	mg/kg	320	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	2.3 U	2.1 U	2.0 U	R	R	R
N-Butylbenzene	mg/kg	2500	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Carbon disulfide	mg/kg	280	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Carbon tetrachloride	mg/kg	96	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Chlorobenzene	mg/kg	260	0.056 U	0.052 U	0.050 U	0.024 J	0.061 U	0.019 J
Chlorobromomethane	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Chloroethane	mg/kg	950	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Chloroform (Trichloromethane)	mg/kg	1200	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
2-Chlorotoluene	mg/kg	500	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
4-Chlorotoluene	mg/kg	-	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Dibromochloromethane	mg/kg	110	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Dibromomethane	mg/kg	2000	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,2-Dichlorobenzene	mg/kg	210	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,3-Dichlorobenzene	mg/kg	170	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,4-Dichlorobenzene	mg/kg	400	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,1-Dichloroethane	mg/kg	890	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,2-Dichloroethane	mg/kg	91	0.056 U	0.052 U	0.050 U	0.087 UJ	0.061 UJ	0.053 UJ
1,1-Dichloroethene	mg/kg	200	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
cis-1,2-Dichloroethene	mg/kg	640	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
trans-1,2-Dichloroethene	mg/kg	1400	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,3-Dichloropropane	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
2,2-Dichloropropane	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-065*	*VS-066*	*VS-066*	*VS-068*	*VS-069*	*VS-070*
Sample Identification		*Direct*	*SO-056393-122110-AS-065*	*SO-056393-122110-AS-066*	*SO-056393-122110-AS-067*	*SO-056393-122910-RP-068*	*SO-056393-122910-RP-069*	*SO-056393-122910-RP-070*
Sample Date		*Contact*	*12/21/2010*	*12/21/2010*	*12/21/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*
Sample Type					*Duplicate*			
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
cis-1,3-Dichloropropene	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
trans-1,3-Dichloropropene	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Ethylbenzene	mg/kg	140	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Hexachlorobutadiene	mg/kg	100	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
2-Hexanone	mg/kg	2500	2.3 U	2.1 U	2.0 U	3.5 U	2.5 U	2.2 U
Isopropyl benzene	mg/kg	390	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	2.3 U	2.1 U	2.0 U	3.5 U	2.5 U	2.2 U
Methylene chloride	mg/kg	1300	0.23 U	0.021 J	0.20 U	0.099 J	0.041 J	0.093 J
Naphthalene	mg/kg	16000	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
N-Propylbenzene	mg/kg	2500	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Styrene	mg/kg	400	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
tert-Butylbenzene	mg/kg	2500	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Tetrachloroethene	mg/kg	88	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Toluene	mg/kg	250	0.056 U	0.052 U	0.050 U	0.042 J	0.032 J	0.011 J
1,2,4-Trichlorobenzene	mg/kg	990	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
1,2,3-Trichlorobenzene	mg/kg	-	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
1,1,1-Trichloroethane	mg/kg	460	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,1,2-Trichloroethane	mg/kg	180	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Trichloroethene	mg/kg	500	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,2,3-Trichloropropane	mg/kg	830	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
1,2,4-Trimethylbenzene	mg/kg	110	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
1,3,5-Trimethylbenzene	mg/kg	94	0.23 U	0.21 U	0.20 U	0.35 U	0.25 U	0.22 U
Vinyl chloride	mg/kg	3.8	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
o-Xylene	mg/kg	150	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U
m&p-Xylenes	mg/kg	-	0.056 U	0.052 U	0.050 U	0.087 U	0.061 U	0.053 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-071*	*VS-072*	*VS-073*	*VS-074*	*VS-075*	*VS-076*
Sample Identification		*Direct*	*SO-056393-122910-RP-071*	*SO-056393-122910-RP-072*	*SO-056393-122910-RP-073*	*SO-056393-122910-RP-074*	*SO-056393-122910-RP-075*	*SO-056393-122910-RP-076*
Sample Date		*Contact*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*
Sample Type								
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0065 U	0.0071 U	0.0061 U	0.0076 U	0.0061 U	0.0052 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.013 U	0.015 U	0.013 U	0.016 U	0.013 U	0.011 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0065 U	0.0071 U	0.0061 U	0.0076 U	0.0061 U	0.0052 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0065 U	0.0071 U	0.0061 U	0.0076 U	0.0061 U	0.0052 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0065 U	0.0071 U	0.0061 U	0.0076 U	0.0061 U	0.0052 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0065 U	0.0092	0.0061 U	0.0067 J	0.0059 J	0.0052 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0065 U	0.0071 U	0.0061 U	0.0076 U	0.0061 U	0.0052 U
Total PCBs	mg/kg	4	ND	0.0092	ND	0.0067 J	0.0059 J	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Bromobenzene	mg/kg	540	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Bromodichloromethane	mg/kg	110	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Bromoform	mg/kg	820	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Bromomethane (Methyl bromide)	mg/kg	320	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Carbon disulfide	mg/kg	280	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Carbon tetrachloride	mg/kg	96	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Chlorobenzene	mg/kg	260	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Chlorobromomethane	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Chloroethane	mg/kg	950	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Chloroform (Trichloromethane)	mg/kg	1200	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
2-Chlorotoluene	mg/kg	500	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
4-Chlorotoluene	mg/kg	-	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Dibromochloromethane	mg/kg	110	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Dibromomethane	mg/kg	2000	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,2-Dichlorobenzene	mg/kg	210	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,3-Dichlorobenzene	mg/kg	170	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,4-Dichlorobenzene	mg/kg	400	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,1-Dichloroethane	mg/kg	890	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,2-Dichloroethane	mg/kg	91	0.071 UJ	0.080 UJ	0.058 UJ	0.11 UJ	0.059 UJ	0.051 UJ
1,1-Dichloroethene	mg/kg	200	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
cis-1,2-Dichloroethene	mg/kg	640	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
trans-1,2-Dichloroethene	mg/kg	1400	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,3-Dichloropropane	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
2,2-Dichloropropane	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			VS-071	VS-072	VS-073	VS-074	VS-075	VS-076
Sample Identification		*Direct*	*SO-056393-122910-RP-071*	*SO-056393-122910-RP-072*	*SO-056393-122910-RP-073*	*SO-056393-122910-RP-074*	*SO-056393-122910-RP-075*	*SO-056393-122910-RP-076*
Sample Date		*Contact*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*	*12/29/2010*
Sample Type								
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
cis-1,3-Dichloropropene	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
trans-1,3-Dichloropropene	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Ethylbenzene	mg/kg	140	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Hexachlorobutadiene	mg/kg	100	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
2-Hexanone	mg/kg	2500	2.9 U	3.2 U	2.3 U	4.2 U	2.4 U	2.1 U
Isopropyl benzene	mg/kg	390	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	2.9 U	3.2 U	2.3 U	4.2 U	2.4 U	2.1 U
Methylene chloride	mg/kg	1300	0.044 J	0.044 J	0.034 J	0.041 J	0.032 J	0.21 U
Naphthalene	mg/kg	16000	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
N-Propylbenzene	mg/kg	2500	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Styrene	mg/kg	400	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
tert-Butylbenzene	mg/kg	2500	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Tetrachloroethene	mg/kg	88	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Toluene	mg/kg	250	0.032 J	0.021 J	0.030 J	0.029 J	0.026 J	0.023 J
1,2,4-Trichlorobenzene	mg/kg	990	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
1,2,3-Trichlorobenzene	mg/kg	-	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
1,1,1-Trichloroethane	mg/kg	460	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,1,2-Trichloroethane	mg/kg	180	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Trichloroethene	mg/kg	500	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,2,3-Trichloropropane	mg/kg	830	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
1,2,4-Trimethylbenzene	mg/kg	110	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
1,3,5-Trimethylbenzene	mg/kg	94	0.29 U	0.32 U	0.23 U	0.42 U	0.24 U	0.21 U
Vinyl chloride	mg/kg	3.8	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
o-Xylene	mg/kg	150	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U
m&p-Xylenes	mg/kg	-	0.071 U	0.080 U	0.058 U	0.11 U	0.059 U	0.051 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-077*	*VS-078*	*VS-079*	*VS-079*	*VS-081*	*VS-082*
Sample Identification		*Direct*	*SO-056393-122910-RP-077*	*SO-056393-122910-RP-078*	*SO-056393-010311-RP-079*	*SO-056393-010311-RP-080*	*SO-056393-010311-RP-081*	*SO-056393-010311-RP-082*
Sample Date		*Contact*	*12/29/2010*	*12/29/2010*	*1/3/2011*	*1/3/2011*	*1/3/2011*	*1/3/2011*
Sample Type						*Duplicate*		
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0058 U	0.0074 U	0.01 U	0.05 U	0.0099 U	0.01 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.012 U	0.015 U	0.02 U	0.099 U	0.02 U	0.02 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0058 U	0.0074 U	0.01 U	0.05 U	0.0099 U	0.01 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0058 U	0.0074 U	0.01 U	0.05 U	0.0099 U	0.01 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0058 U	0.0074 U	0.01 U	0.05 U	0.0099 U	0.01 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.064	0.0071 J	0.3	0.54	0.0099 U	0.01 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0058 U	0.0074 U	0.01 U	0.05 U	0.0099 U	0.01 U
Total PCBs	mg/kg	4	0.064	0.0071 J	0.3	0.54	ND	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Bromobenzene	mg/kg	540	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Bromodichloromethane	mg/kg	110	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Bromoform	mg/kg	820	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Bromomethane (Methyl bromide)	mg/kg	320	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Carbon disulfide	mg/kg	280	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Carbon tetrachloride	mg/kg	96	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Chlorobenzene	mg/kg	260	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Chlorobromomethane	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Chloroethane	mg/kg	950	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Chloroform (Trichloromethane)	mg/kg	1200	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
2-Chlorotoluene	mg/kg	500	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
4-Chlorotoluene	mg/kg	-	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Dibromochloromethane	mg/kg	110	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Dibromomethane	mg/kg	2000	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,2-Dichlorobenzene	mg/kg	210	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,3-Dichlorobenzene	mg/kg	170	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,4-Dichlorobenzene	mg/kg	400	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,1-Dichloroethane	mg/kg	890	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,2-Dichloroethane	mg/kg	91	0.057 UJ	0.098 UJ	0.074 U	0.069 U	0.070 U	0.050 U
1,1-Dichloroethene	mg/kg	200	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
cis-1,2-Dichloroethene	mg/kg	640	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
trans-1,2-Dichloroethene	mg/kg	1400	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,3-Dichloropropane	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
2,2-Dichloropropane	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-077*	*VS-078*	*VS-079*	*VS-079*	*VS-081*	*VS-082*
Sample Identification		*Direct*	*SO-056393-122910-RP-077*	*SO-056393-122910-RP-078*	*SO-056393-010311-RP-079*	*SO-056393-010311-RP-080*	*SO-056393-010311-RP-081*	*SO-056393-010311-RP-082*
Sample Date		*Contact*	*12/29/2010*	*12/29/2010*	*1/3/2011*	*1/3/2011*	*1/3/2011*	*1/3/2011*
Sample Type						*Duplicate*		
	Units	a						
1,1-Dichloropropene	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
cis-1,3-Dichloropropene	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
trans-1,3-Dichloropropene	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Ethylbenzene	mg/kg	140	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Hexachlorobutadiene	mg/kg	100	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
2-Hexanone	mg/kg	2500	2.3 U	3.9 U	3.0 U	2.8 U	2.8 U	2.0 U
Isopropyl benzene	mg/kg	390	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	2.3 U	3.9 U	R	R	R	R
Methylene chloride	mg/kg	1300	0.23 U	0.10 J	0.030 J	0.029 J	0.28 U	0.20 U
Naphthalene	mg/kg	16000	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
N-Propylbenzene	mg/kg	2500	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Styrene	mg/kg	400	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
tert-Butylbenzene	mg/kg	2500	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Tetrachloroethene	mg/kg	88	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Toluene	mg/kg	250	0.015 J	0.041 J	0.013 J	0.019 J	0.018 J	0.017 J
1,2,4-Trichlorobenzene	mg/kg	990	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
1,2,3-Trichlorobenzene	mg/kg	-	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
1,1,1-Trichloroethane	mg/kg	460	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,1,2-Trichloroethane	mg/kg	180	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Trichloroethene	mg/kg	500	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,2,3-Trichloropropane	mg/kg	830	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
1,2,4-Trimethylbenzene	mg/kg	110	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
1,3,5-Trimethylbenzene	mg/kg	94	0.23 U	0.39 U	0.30 U	0.28 U	0.28 U	0.20 U
Vinyl chloride	mg/kg	3.8	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
o-Xylene	mg/kg	150	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U
m&p-Xylenes	mg/kg	-	0.057 U	0.098 U	0.074 U	0.069 U	0.070 U	0.050 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-083*	*VS-084*	*VS-085*	*VS-087*	*VS-089*	*VS-089*
Sample Identification		*Direct*	*SO-056393-010311-RP-083*	*SO-056393-010411-RP-084*	*SO-056393-010411-RP-085*	*SO-056393-010511-RP-087*	*SO-056393-010611-RP-089*	*SO-056393-010611-RP-090*
Sample Date		*Contact*	*1/3/2011*	*1/4/2011*	*1/4/2011*	*1/5/2011*	*1/6/2011*	*1/6/2011*
Sample Type								*Duplicate*
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0098 U	0.0098 U	0.01 U	0.0073 U	0.0067 U	0.0069 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.02 U	0.02 U	0.02 U	0.015 U	0.014 U	0.014 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0098 U	0.0098 U	0.01 U	0.0073 U	0.0067 U	0.0069 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0098 U	0.0098 U	0.01 U	0.0073 U	0.0067 U	0.0069 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0098 U	0.0098 U	0.01 U	0.0073 U	0.0067 U	0.0069 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.048	0.0098 U	0.0056 J	0.0061 J	0.0067 U	0.0069 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0098 U	0.0098 U	0.01 U	0.0073 U	0.0067 U	0.0069 U
Total PCBs	mg/kg	4	0.048	ND	0.0056 J	0.0061 J	ND	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.079 U	0.079 U	0.096 U	0.067 U	0.0057 J	0.045 U
Bromobenzene	mg/kg	540	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Bromodichloromethane	mg/kg	110	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Bromoform	mg/kg	820	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Bromomethane (Methyl bromide)	mg/kg	320	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Carbon disulfide	mg/kg	280	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Carbon tetrachloride	mg/kg	96	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Chlorobenzene	mg/kg	260	0.079 U	0.079 U	0.096 U	0.025 J	0.082	0.045 U
Chlorobromomethane	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Chloroethane	mg/kg	950	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Chloroform (Trichloromethane)	mg/kg	1200	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.079 U	0.079 U	0.096 U	0.067 UJ	0.048 UJ	0.045 UJ
2-Chlorotoluene	mg/kg	500	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
4-Chlorotoluene	mg/kg	-	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.32 U	0.32 U	0.39 U	R	R	R
Dibromochloromethane	mg/kg	110	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Dibromomethane	mg/kg	2000	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,2-Dichlorobenzene	mg/kg	210	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,3-Dichlorobenzene	mg/kg	170	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,4-Dichlorobenzene	mg/kg	400	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,1-Dichloroethane	mg/kg	890	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,2-Dichloroethane	mg/kg	91	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,1-Dichloroethene	mg/kg	200	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
cis-1,2-Dichloroethene	mg/kg	640	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
trans-1,2-Dichloroethene	mg/kg	1400	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,3-Dichloropropane	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
2,2-Dichloropropane	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-083*	*VS-084*	*VS-085*	*VS-087*	*VS-089*	*VS-089*
Sample Identification		*Direct*	*SO-056393-010311-RP-083*	*SO-056393-010411-RP-084*	*SO-056393-010411-RP-085*	*SO-056393-010511-RP-087*	*SO-056393-010611-RP-089*	*SO-056393-010611-RP-090*
Sample Date		*Contact*	*1/3/2011*	*1/4/2011*	*1/4/2011*	*1/5/2011*	*1/6/2011*	*1/6/2011*
Sample Type								*Duplicate*
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
cis-1,3-Dichloropropene	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
trans-1,3-Dichloropropene	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Ethylbenzene	mg/kg	140	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Hexachlorobutadiene	mg/kg	100	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
2-Hexanone	mg/kg	2500	3.2 U	3.2 U	3.9 U	R	R	R
Isopropyl benzene	mg/kg	390	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R	R	R
Methylene chloride	mg/kg	1300	0.32 U	0.32 U	0.038 J	0.073 J	0.18 J	0.030 J
Naphthalene	mg/kg	16000	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
N-Propylbenzene	mg/kg	2500	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Styrene	mg/kg	400	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
tert-Butylbenzene	mg/kg	2500	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Tetrachloroethene	mg/kg	88	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Toluene	mg/kg	250	0.022 J	0.019 J	0.029 J	0.029 J	0.036 J	0.012 J
1,2,4-Trichlorobenzene	mg/kg	990	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
1,2,3-Trichlorobenzene	mg/kg	-	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
1,1,1-Trichloroethane	mg/kg	460	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,1,2-Trichloroethane	mg/kg	180	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Trichloroethene	mg/kg	500	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,2,3-Trichloropropane	mg/kg	830	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
1,2,4-Trimethylbenzene	mg/kg	110	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
1,3,5-Trimethylbenzene	mg/kg	94	0.32 U	0.32 U	0.39 U	0.27 U	0.19 U	0.18 U
Vinyl chloride	mg/kg	3.8	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
o-Xylene	mg/kg	150	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U
m&p-Xylenes	mg/kg	-	0.079 U	0.079 U	0.096 U	0.067 U	0.048 U	0.045 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-091*	*VS-092*	*VS-093*	*VS-094*	*VS-095*	*VS-096*
Sample Identification		*Direct*	*SO-056393-010711-RP-091*	*SO-056393-010711-RP-092*	*SO-056393-011011-RP-093*	*SO-056393-011011-RP-094*	*SO-056393-011011-RP-095*	*SO-056393-011011-RP-096*
Sample Date		*Contact*	*1/7/2011*	*1/7/2011*	*1/10/2011*	*1/10/2011*	*1/10/2011*	*1/10/2011*
Sample Type								
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0071 U	0.0069 U	0.0069 U	0.007 U	0.007 U	0.037 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.015 U	0.014 U	0.014 U	0.014 U	0.014 U	0.073 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0071 U	0.0069 U	0.0069 U	0.007 U	0.007 U	0.037 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0071 U	0.0069 U	0.0069 U	0.007 U	0.007 U	0.037 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0071 U	0.0069 U	0.0069 U	0.007 U	0.007 U	0.037 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.058	0.0069 U	0.0074	0.19	0.01	0.4
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0071 U	0.0069 U	0.0069 U	0.007 U	0.007 U	0.037 U
Total PCBs	mg/kg	4	0.058	ND	0.0074	0.19	0.01	0.4
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Bromobenzene	mg/kg	540	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Bromodichloromethane	mg/kg	110	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Bromoform	mg/kg	820	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Bromomethane (Methyl bromide)	mg/kg	320	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Carbon disulfide	mg/kg	280	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Carbon tetrachloride	mg/kg	96	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Chlorobenzene	mg/kg	260	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Chlorobromomethane	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Chloroethane	mg/kg	950	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Chloroform (Trichloromethane)	mg/kg	1200	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.048 UJ	0.050 UJ	0.049 U	0.052 U	0.049 U	0.051 U
2-Chlorotoluene	mg/kg	500	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
4-Chlorotoluene	mg/kg	-	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	0.20 U	0.21 U	0.20 U	0.21 U
Dibromochloromethane	mg/kg	110	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Dibromomethane	mg/kg	2000	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2-Dichlorobenzene	mg/kg	210	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,3-Dichlorobenzene	mg/kg	170	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,4-Dichlorobenzene	mg/kg	400	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,1-Dichloroethane	mg/kg	890	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2-Dichloroethane	mg/kg	91	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,1-Dichloroethene	mg/kg	200	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
cis-1,2-Dichloroethene	mg/kg	640	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
trans-1,2-Dichloroethene	mg/kg	1400	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,3-Dichloropropane	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
2,2-Dichloropropane	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-091*	*VS-092*	*VS-093*	*VS-094*	*VS-095*	*VS-096*
Sample Identification		*Direct*	*SO-056393-010711-RP-091*	*SO-056393-010711-RP-092*	*SO-056393-011011-RP-093*	*SO-056393-011011-RP-094*	*SO-056393-011011-RP-095*	*SO-056393-011011-RP-096*
Sample Date		*Contact*	*1/7/2011*	*1/7/2011*	*1/10/2011*	*1/10/2011*	*1/10/2011*	*1/10/2011*
Sample Type								
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
cis-1,3-Dichloropropene	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
trans-1,3-Dichloropropene	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Ethylbenzene	mg/kg	140	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Hexachlorobutadiene	mg/kg	100	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
2-Hexanone	mg/kg	2500	R	R	2.0 U	2.1 U	2.0 U	2.1 U
Isopropyl benzene	mg/kg	390	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R	R	R
Methylene chloride	mg/kg	1300	0.024 J	0.029 J	0.027 J	0.033 J	0.029 J	0.030 J
Naphthalene	mg/kg	16000	0.0096 J	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
N-Propylbenzene	mg/kg	2500	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Styrene	mg/kg	400	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
tert-Butylbenzene	mg/kg	2500	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Tetrachloroethene	mg/kg	88	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Toluene	mg/kg	250	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2,4-Trichlorobenzene	mg/kg	990	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
1,2,3-Trichlorobenzene	mg/kg	-	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
1,1,1-Trichloroethane	mg/kg	460	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,1,2-Trichloroethane	mg/kg	180	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Trichloroethene	mg/kg	500	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2,3-Trichloropropane	mg/kg	830	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
1,2,4-Trimethylbenzene	mg/kg	110	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
1,3,5-Trimethylbenzene	mg/kg	94	0.20 U	0.20 U	0.20 U	0.21 U	0.20 U	0.21 U
Vinyl chloride	mg/kg	3.8	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
o-Xylene	mg/kg	150	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U
m&p-Xylenes	mg/kg	-	0.048 U	0.050 U	0.049 U	0.052 U	0.049 U	0.051 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-097*	*VS-098*	*VS-099*	*VS-100*	*VS-101*	*VS-101*
Sample Identification		*Direct*	*SO-056393-011111-RP-097*	*SO-056393-011111-RP-098*	*SO-056393-011111-RP-099*	*SO-056393-011111-RP-100*	*SO-056393-011311-BW-101*	*SO-056393-011311-BW-102*
Sample Date		*Contact*	*1/11/2011*	*1/11/2011*	*1/11/2011*	*1/11/2011*	*1/13/2011*	*1/13/2011*
Sample Type								*Duplicate*
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0072 U	0.007 U	0.0071 U	0.0069 U	0.0067 U	0.0068 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.015 U	0.014 U	0.015 U	0.014 U	0.014 U	0.014 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0072 U	0.007 U	0.0071 U	0.0069 U	0.0067 U	0.0068 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0072 U	0.007 U	0.0071 U	0.0069 U	0.0067 U	0.0068 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0072 U	0.007 U	0.0071 U	0.0041 J	0.0067 U	0.0068 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.013	0.011	0.0025 J	0.0069 U	0.0067 U	0.0068 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0072 U	0.007 U	0.0071 U	0.0021 J	0.0067 U	0.0068 U
Total PCBs	mg/kg	4	0.013	0.011	0.0025	0.0062 J	ND	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Bromobenzene	mg/kg	540	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane	mg/kg	110	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Bromoform	mg/kg	820	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Bromomethane (Methyl bromide)	mg/kg	320	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Carbon disulfide	mg/kg	280	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Carbon tetrachloride	mg/kg	96	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Chlorobenzene	mg/kg	260	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Chlorobromomethane	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Chloroethane	mg/kg	950	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Chloroform (Trichloromethane)	mg/kg	1200	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
2-Chlorotoluene	mg/kg	500	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
4-Chlorotoluene	mg/kg	-	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.24 U	0.21 U	0.18 U	0.20 U	R	R
Dibromochloromethane	mg/kg	110	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Dibromomethane	mg/kg	2000	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2-Dichlorobenzene	mg/kg	210	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,3-Dichlorobenzene	mg/kg	170	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,4-Dichlorobenzene	mg/kg	400	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,1-Dichloroethane	mg/kg	890	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2-Dichloroethane	mg/kg	91	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,1-Dichloroethene	mg/kg	200	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
cis-1,2-Dichloroethene	mg/kg	640	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
trans-1,2-Dichloroethene	mg/kg	1400	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,3-Dichloropropane	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
2,2-Dichloropropane	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-097*	*VS-098*	*VS-099*	*VS-100*	*VS-101*	*VS-101*
Sample Identification		*Direct*	*SO-056393-011111-RP-097*	*SO-056393-011111-RP-098*	*SO-056393-011111-RP-099*	*SO-056393-011111-RP-100*	*SO-056393-011311-BW-101*	*SO-056393-011311-BW-102*
Sample Date		*Contact*	*1/11/2011*	*1/11/2011*	*1/11/2011*	*1/11/2011*	*1/13/2011*	*1/13/2011*
Sample Type								*Duplicate*
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
cis-1,3-Dichloropropene	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
trans-1,3-Dichloropropene	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Ethylbenzene	mg/kg	140	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Hexachlorobutadiene	mg/kg	100	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
2-Hexanone	mg/kg	2500	2.4 U	2.1 U	1.8 U	2.0 U	R	R
Isopropyl benzene	mg/kg	390	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R	R	R
Methylene chloride	mg/kg	1300	0.040 J	0.032 J	0.037 J	0.034 J	0.028 J	0.024 J
Naphthalene	mg/kg	16000	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
N-Propylbenzene	mg/kg	2500	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Styrene	mg/kg	400	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
tert-Butylbenzene	mg/kg	2500	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Tetrachloroethene	mg/kg	88	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Toluene	mg/kg	250	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2,4-Trichlorobenzene	mg/kg	990	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene	mg/kg	-	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane	mg/kg	460	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,1,2-Trichloroethane	mg/kg	180	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Trichloroethene	mg/kg	500	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2,3-Trichloropropane	mg/kg	830	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
1,2,4-Trimethylbenzene	mg/kg	110	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene	mg/kg	94	0.24 U	0.21 U	0.18 U	0.20 U	0.20 U	0.20 U
Vinyl chloride	mg/kg	3.8	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
o-Xylene	mg/kg	150	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U
m&p-Xylenes	mg/kg	-	0.059 U	0.051 U	0.045 U	0.048 U	0.050 U	0.050 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-103*	*VS-104*	*VS-105*	*VS-106*	*VS-107*	*VS-108*
Sample Identification		*Direct*	*SO-056393-011311-BW-103*	*SO-056393-011311-BW-104*	*SO-056393-011311-BW-105*	*SO-056393-011411-BW-106*	*SO-056393-011411-BW-107*	*SO-056393-011411-BW-108*
Sample Date		*Contact*	*1/13/2011*	*1/13/2011*	*1/13/2011*	*1/14/2011*	*1/14/2011*	*1/14/2011*
Sample Type								
	Units							
		a						
PCBs								
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0068 U	0.0071 U	0.064 U	0.0072 U	0.0064 U	0.0065 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.014 U	0.015 U	0.13 U	0.015 U	0.013 U	0.013 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0068 U	0.0071 U	0.064 U	0.0072 U	0.0064 U	0.0065 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0068 U	0.0071 U	0.064 U	0.0072 U	0.0064 U	0.0065 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0068 U	0.0071 U	1.3	0.0072 U	0.0064 U	0.0065 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.0068 U	0.0071 U	0.064 U	0.0027 J	0.013	0.0065 U
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0068 U	0.0071 U	0.064 U	0.0072 U	0.0064 U	0.0065 U
Total PCBs	mg/kg	4	ND	ND	1.3	0.0027 J	0.013	ND
Volatile Organic Compounds								
Acetone	mg/kg	23000	R	R	R	R	R	R
Benzene	mg/kg	180	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Bromobenzene	mg/kg	540	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Bromodichloromethane	mg/kg	110	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Bromoform	mg/kg	820	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Bromomethane (Methyl bromide)	mg/kg	320	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Carbon disulfide	mg/kg	280	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Carbon tetrachloride	mg/kg	96	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Chlorobenzene	mg/kg	260	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Chlorobromomethane	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Chloroethane	mg/kg	950	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Chloroform (Trichloromethane)	mg/kg	1200	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
2-Chlorotoluene	mg/kg	500	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
4-Chlorotoluene	mg/kg	-	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	R	R	R	R	R	R
Dibromochloromethane	mg/kg	110	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Dibromomethane	mg/kg	2000	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2-Dichlorobenzene	mg/kg	210	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,3-Dichlorobenzene	mg/kg	170	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,4-Dichlorobenzene	mg/kg	400	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,1-Dichloroethane	mg/kg	890	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2-Dichloroethane	mg/kg	91	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,1-Dichloroethene	mg/kg	200	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
cis-1,2-Dichloroethene	mg/kg	640	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
trans-1,2-Dichloroethene	mg/kg	1400	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,3-Dichloropropane	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Volatile Organic Compounds - Continued								
1,2-Dichloropropane	mg/kg	140	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
2,2-Dichloropropane	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-103*	*VS-104*	*VS-105*	*VS-106*	*VS-107*	*VS-108*
Sample Identification		*Direct*	*SO-056393-011311-BW-103*	*SO-056393-011311-BW-104*	*SO-056393-011311-BW-105*	*SO-056393-011411-BW-106*	*SO-056393-011411-BW-107*	*SO-056393-011411-BW-108*
Sample Date		*Contact*	*1/13/2011*	*1/13/2011*	*1/13/2011*	*1/14/2011*	*1/14/2011*	*1/14/2011*
Sample Type								
	Units							
		a						
1,1-Dichloropropene	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
cis-1,3-Dichloropropene	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
trans-1,3-Dichloropropene	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Ethylbenzene	mg/kg	140	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Hexachlorobutadiene	mg/kg	100	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
2-Hexanone	mg/kg	2500	R	R	R	R	R	R
Isopropyl benzene	mg/kg	390	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R	R	R
Methylene chloride	mg/kg	1300	0.020 J	0.022 J	0.25 U	0.044 J	0.040 J	0.045 J
Naphthalene	mg/kg	16000	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
N-Propylbenzene	mg/kg	2500	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Styrene	mg/kg	400	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
tert-Butylbenzene	mg/kg	2500	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Tetrachloroethene	mg/kg	88	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Toluene	mg/kg	250	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2,4-Trichlorobenzene	mg/kg	990	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
1,2,3-Trichlorobenzene	mg/kg	-	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
1,1,1-Trichloroethane	mg/kg	460	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,1,2-Trichloroethane	mg/kg	180	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Trichloroethene	mg/kg	500	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2,3-Trichloropropane	mg/kg	830	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
1,2,4-Trimethylbenzene	mg/kg	110	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
1,3,5-Trimethylbenzene	mg/kg	94	0.21 U	0.25 U	0.25 U	0.35 U	0.28 U	0.29 U
Vinyl chloride	mg/kg	3.8	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
o-Xylene	mg/kg	150	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U
m&p-Xylenes	mg/kg	-	0.051 U	0.061 U	0.061 U	0.088 U	0.069 U	0.072 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-109*	*VS-111*	*VS-112*	*VS-113*	*VS-114*
Sample Identification		*Direct*	*SO-056393-011811-EV-109*	*SO-056393-011811-EV-111*	*SO-056393-011811-EV-112*	*SO-056393-011811-EV-113*	*SO-056393-011811-EV-114*
Sample Date		*Contact*	*1/18/2011*	*1/18/2011*	*1/18/2011*	*1/18/2011*	*1/18/2011*
Sample Type							
	Units						
		a					
PCBs							
Aroclor-1016 (PCB-1016)	mg/kg	-	0.0056 U	0.0057 U	0.0055 U	0.03 U	0.062 U
Aroclor-1221 (PCB-1221)	mg/kg	-	0.012 U	0.012 U	0.011 U	0.059 U	0.13 U
Aroclor-1232 (PCB-1232)	mg/kg	-	0.0056 U	0.0057 U	0.0055 U	0.03 U	0.062 U
Aroclor-1242 (PCB-1242)	mg/kg	-	0.0056 U	0.0057 U	0.0055 U	0.03 U	0.062 U
Aroclor-1248 (PCB-1248)	mg/kg	-	0.0056 U	0.0057 U	0.0055 U	0.03 U	0.062 U
Aroclor-1254 (PCB-1254)	mg/kg	-	0.073	0.0057 U	0.0055 U	0.39	2
Aroclor-1260 (PCB-1260)	mg/kg	-	0.0056 U	0.0057 U	0.0037 J	0.03 U	0.062 U
Total PCBs	mg/kg	4	0.073	ND	0.0037 J	0.39	2
Volatile Organic Compounds							
Acetone	mg/kg	23000	R	R	R	R	R
Benzene	mg/kg	180	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Bromobenzene	mg/kg	540	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Bromodichloromethane	mg/kg	110	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Bromoform	mg/kg	820	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Bromomethane (Methyl bromide)	mg/kg	320	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
2-Butanone (Methyl ethyl ketone) (MEK)	mg/kg	27000	R	R	R	R	R
N-Butylbenzene	mg/kg	2500	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Carbon disulfide	mg/kg	280	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Carbon tetrachloride	mg/kg	96	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Chlorobenzene	mg/kg	260	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Chlorobromomethane	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Chloroethane	mg/kg	950	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Chloroform (Trichloromethane)	mg/kg	1200	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Chloromethane (Methyl chloride)	mg/kg	1100	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
2-Chlorotoluene	mg/kg	500	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
4-Chlorotoluene	mg/kg	-	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Cymene (p-Isopropyltoluene)	mg/kg	-	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
1,2-Dibromo-3-chloropropane (DBCP)	mg/kg	1.2	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Dibromochloromethane	mg/kg	110	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2-Dibromoethane (Ethylene dibromide)	mg/kg	0.092	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Dibromomethane	mg/kg	2000	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2-Dichlorobenzene	mg/kg	210	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,3-Dichlorobenzene	mg/kg	170	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,4-Dichlorobenzene	mg/kg	400	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Dichlorodifluoromethane (CFC-12)	mg/kg	1000	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,1-Dichloroethane	mg/kg	890	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2-Dichloroethane	mg/kg	91	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,1-Dichloroethene	mg/kg	200	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
cis-1,2-Dichloroethene	mg/kg	640	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
trans-1,2-Dichloroethene	mg/kg	1400	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,3-Dichloropropane	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Volatile Organic Compounds - Continued							
1,2-Dichloropropane	mg/kg	140	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
2,2-Dichloropropane	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U

TABLE 4.4

VERIFICATION SAMPLING ANALYTICAL RESULTS-ADDITIONAL ASPHALT PLANT PROPERTY LOCATIONS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location			*VS-109*	*VS-111*	*VS-112*	*VS-113*	*VS-114*
Sample Identification		*Direct*	*SO-056393-011811-EV-109*	*SO-056393-011811-EV-111*	*SO-056393-011811-EV-112*	*SO-056393-011811-EV-113*	*SO-056393-011811-EV-114*
Sample Date		*Contact*	*1/18/2011*	*1/18/2011*	*1/18/2011*	*1/18/2011*	*1/18/2011*
Sample Type							
	Units						
		a					
1,1-Dichloropropene	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
cis-1,3-Dichloropropene	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
trans-1,3-Dichloropropene	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Ethylbenzene	mg/kg	140	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Hexachlorobutadiene	mg/kg	100	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
2-Hexanone	mg/kg	2500	2.1 U	2.0 U	2.2 U	2.8 U	2.7 U
Isopropyl benzene	mg/kg	390	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	mg/kg	2700	R	R	R	R	R
Methylene chloride	mg/kg	1300	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Naphthalene	mg/kg	16000	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
N-Propylbenzene	mg/kg	2500	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
2-Phenylbutane (sec-Butylbenzene)	mg/kg	2500	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Styrene	mg/kg	400	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
tert-Butylbenzene	mg/kg	2500	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
1,1,2,2-Tetrachloroethane	mg/kg	53	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,1,1,2-Tetrachloroethane	mg/kg	440	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Tetrachloroethene	mg/kg	88	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Toluene	mg/kg	250	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2,4-Trichlorobenzene	mg/kg	990	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
1,2,3-Trichlorobenzene	mg/kg	-	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
1,1,1-Trichloroethane	mg/kg	460	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,1,2-Trichloroethane	mg/kg	180	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Trichloroethene	mg/kg	500	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
Trichlorofluoromethane (CFC-11)	mg/kg	560	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2,3-Trichloropropane	mg/kg	830	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
1,2,4-Trimethylbenzene	mg/kg	110	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
1,3,5-Trimethylbenzene	mg/kg	94	0.21 U	0.20 U	0.22 U	0.28 U	0.27 U
Vinyl chloride	mg/kg	3.8	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
o-Xylene	mg/kg	150	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U
m&p-Xylenes	mg/kg	-	0.051 U	0.049 U	0.055 U	0.068 U	0.067 U

Notes:
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
(a) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.

TABLE 5.1

CONSTRUCTION CONTRACTOR SUBMITTAL LIST
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Specification Section	*Submittal Name*	*Submittal Number*	*Date Submitted*	*Date Approved*	*Date Rejected*	*Date Resubmitted*	*Comment*
02320	General Fill	56913-01	5/10/2010	5/14/2010	NA	NA	-
02072	Liner	56913-02	5/14/2010	5/25/2010	NA	NA	-
02073	Geocomposite	56913-03	5/14/2010	5/25/2010	NA	NA	-
02072	Mid America Lining	56913-04	5/14/2010	5/25/2010	NA	NA	-
NA	Valley City Environmental	56913-05	5/30/2010	-	-	-	-
NA	City Of Plainwell Water Renewal Plant	56913-06	5/30/2010	-	-	-	-
02320	Select Granular Fill	56913-07	5/30/2010	6/1/2010	NA	NA	-
02377	Geotextile - 12 oz	56913-08	6/3/2010	6/4/2010	NA	NA	-
02377	Geotextile - 8 ounce	56913-08	6/3/2010	6/4/10 (CRA) and 6/22/10 (EPA)	NA	NA	-
-	-	09 Not Used	-	-	-	-	-
02072	Project Specific Liner Manufacturer Data	56913-10	6/10/2010	6/25/2010	NA	NA	-
02073	Project Specific Geocomposite Manufacturer Data	56913-11	6/15/2010	6/16/2010	NA	NA	-
02911	Engineered Soil / Wetland Mix	56913-12	6/15/2010	6/16/2010	NA	NA	-
02072	Interface Friction Testing	56913-13	6/18/2010	6/25/2010	NA	6/23/2010	Additional Test Results received from TRI
02320	General Fill - Sieve #2	56913-14	6/21/2010	6/23/2010	NA	NA	-
02072	Geosynthetic Testing - Liner	56913-15	6/21/2010	6/23/2010	NA	NA	-
02072	Manufacturer Statement - Liner	56913-16	6/24/2010	6/25/2010	-	-	-
02320	General Fill - Sieve #3	56913-17	7/16/2010	-	-	-	-
02320	General Fill - Sieve #4	56913-18	7/28/2010	-	-	-	-
02320	General Fill - Sieve #5	56913-19	8/2/2010	8/9/2010	NA	NA	-
02923	Fertilizer	56913-20	8/10/2010	-	8/17/2010	9/5/2010	-
02376	Erosion Control Blanket - Outside Landfill Swale	56913-21	8/10/2010	-	-	-	-
02320	General Fill - Sieve #6	56913-22	8/26/2010	-	-	-	-
02320	General Fill - Sieve #7	56913-23	8/26/2010	-	-	-	-
02072	Proposed Panel Layout	56913-24	9/1/2010	-	-	-	-
02072	Liner Forms	56913-25	9/1/2010	9/8/2010	-	-	-
02072	Liner Field Crew Experience Information	56913-26	9/1/2010	9/9/2010	-	-	-
02921	Seeding Plan	-	-	-	-	-	-
02320	General Fill - Sieve #8	56913-27	9/10/2010	-	-	-	-
02072	Calibration Cert for Field Tensiometer	56913-28	9/17/2010	9/17/2010	-	-	-
02320	Gas Venting Layer Sieve #1	56913-29	9/17/2010	9/21/2010	-	-	-
02320	Gas Venting Layer Sieve #2	56913-30	9/17/2010	9/21/2010	-	-	-
02320	Gas Venting Layer - Hydraulic Conductivity #1	56913-31	9/17/2010	9/21/2010	-	-	-
02320	Gas Venting Layer - Hydraulic Conductivity #2	56913-32	9/17/2010	9/21/2010	-	-	-
02320	Gas Venting Layer - Hydraulic Conductivity #3	56913-33	9/17/2010	9/21/2010	-	-	-
02320	Gas Venting Layer Sieve #3	56913-34	9/20/2010	9/21/2010	-	-	-
02320	Gas Venting Layer Sieve #4	56913-35	9/20/2010	9/21/2010	-	-	-
02072	Peel and Shear - First Set of Data	56913-36	9/20/2010	9/21/2010	-	-	-
02072	Peel and Shear - 2nd Set of Data	56913-37	9/21/2010	-	-	-	-
02072	Peel and Shear - 3rd Set of Data	56913-38	9/22/2010	-	-	-	-
02072	Updated 56913-15	56913-15 Update	9/22/2010	-	-	-	-
02320	Gas Venting Layer - Hydraulic Conductivity #4	56913-39	9/22/2010	-	-	-	-
02072	Peel and Shear - 4th Set of Data	56913-40	9/28/2010	10/6/2010	-	-	-
02320	General Fill - Sieve # 9	56913-41	9/30/2010	10/5/2010	-	-	-
02320	General Fill - Sieve #10	56913-42	9/30/2010	10/5/2010	-	-	-

TABLE 5.1

CONSTRUCTION CONTRACTOR SUBMITTAL LIST
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Specification Section	*Submittal Name*	*Submittal Number*	*Date Submitted*	*Date Approved*	*Date Rejected*	*Date Resubmitted*	*Comment*
02320	Gas Venting Layer - Sieve # 5	56913-43	9/30/2010	10/5/2010	-	-	-
02320	Gas Venting Layer - Sieve #6	56913-44	9/30/2010	10/5/2010	-	-	-
02320	Gas Venting Layer - Sieve # 7	56913-45	9/30/2010	10/5/2010	-	-	-
02320	Gas Venting Layer - Hydraulic Conductivity #5	56913-46	9/30/2010	10/5/2010	-	-	-
02077	Geoweb	56913-47	10/5/2010	10/11/2010	-	-	-
02072	Peel and Shear - 5th Set of Data	56913-48	10/6/2010	10/11/2010	-	-	-
02072	Direct Shear Tests on 2NS/Gas Venting Layer	56913-49	10/6/2010	10/12/2011	-	-	-
02072	Peel and Shear - 6th and Final Set of Data	56913-50	10/8/2010	10/11/2010	-	-	-
02072	Additional Liner Rolls - Manufacturer Certs	56913-51	10/8/2010	10/11/2010	-	-	-
02911	Topsoil - A37 Source	56913-52	10/11/2010	10/11/2010	-	-	Conditional pH slightly high
02911	Topsoil - A37 Source - Additional pH data	56913-52B	10/13/2010	10/11/2010	-	-	additional pH data
02072	Final Liner Panel Layout	56913-53	10/18/2010	10/25/2010	-	-	-
02911	22 A Submittal - Chemical Analysis	56913-54	10/21/2010	10/25/2010	-	-	-
02320	General Fill - Sieve #11	56913-55	10/26/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #12	56913-56	10/26/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #13	56913-57	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #14	56913-58	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #15	56913-59	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #16	56913-60	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #17	56913-61	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #18	56913-62	10/27/2010	11/23/2010	-	-	-
02320	General Fill - Sieve #19	56913-63	10/27/2010	11/23/2010	-	-	-
02911	Topsoil - 2nd Source - Sweet Pit - Agg Industries	56913-64	11/7/2010	-	-	-	-
02376	Tackifer - Submittal	56913-65	11/22/2010	-	-	-	-
02320	General Fill - Sieve #20	56913-66	11/22/2010	-	-	-	-
02320	General Fill - Sieve #21	56913-67	11/22/2010	-	-	-	-
02320	General Fill - Sieve #22	56913-68	11/22/2010	-	-	-	-
02320	General Fill - Sieve #23	56913-69	11/22/2010	-	-	-	-
02320	General Fill - Sieve #24	56913-70	11/22/2010	-	-	-	-
02320	General Fill - Sieve #25	56913-71	11/23/2010	-	-	-	-
02320	General Fill - Sieve #26	56913-72	11/23/2010	-	-	-	-
02320	General Fill - Sieve #27	56913-73	11/23/2010	-	-	-	-
02320	General Fill - Sieve #28	56913-74	11/23/2010	-	-	-	-
02320	General Fill - Sieve #29	56913-75	11/29/2010	-	-	-	-
02320	General Fill - Sieve #30	56913-76	11/29/2010	-	-	-	-
02320	General Fill - Sieve #31	56913-77	11/29/2010	-	-	-	-
02320	General Fill - Sieve #32	56913-78	11/29/2010	-	-	-	-
02320	General Fill - Sieve #33	56913-79	11/29/2010	-	-	-	-
02320	General Fill - Sieve #34	56913-80	11/29/2010	-	-	-	-
02320	General Fill - Sieve #35	56913-81	11/29/2010	-	-	-	-
02320	General Fill - Sieve #36	56913-82	11/29/2010	-	-	-	-
02911	Topsoil A37 Pit - Sieve 2	56913-83	12/8/2010	-	-	-	-
02911	Topsoil A37 Pit - Sieve 3	56913-84	12/8/2010	-	-	-	-
02911	Topsoil A37 - Sieve 4	56913-85	12/15/2010	-	-	-	-
02911	Topsoil A37 - Sieve 5	56913-86	12/15/2010	-	-	-	-

TABLE 5.1

CONSTRUCTION CONTRACTOR SUBMITTAL LIST
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Specification Section	*Submittal Name*	*Submittal Number*	*Date Submitted*	*Date Approved*	*Date Rejected*	*Date Resubmitted*	*Comment*
02911	Topsoil A37 - Sieve 6	56913-87	11/30/2010	-	-	-	-
02911	Topsoil Sweet Pit - Sieve 1	56913-88	11/30/2010	-	-	-	-
02911	Topsoil Sweet Pit - Sieve 2	56913-89	11/30/2010	-	-	-	-
02320	General Fill - Proctor	56913-90	1/31/2011	-	-	-	-
02320	Compaction Testing at Wyoming Asphalt	56913-91	1/31/2011	-	-	-	-

TABLE 5.2

PANEL SEAMING FIELD DESTRUCTIVE TEST SUMMARY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Date	*Destructive Test Number*	*Seam Number*	*Result (Pass/Fail)*
9/15/10	1	2/3	Pass
9/15/10	2	10/11	Pass
9/15/10	3	5/6	Pass
9/15/10	4	1/18	Pass
9/15/10	5	24/25	Pass
9/15/10	6	22/31	Pass
9/15/10	7	33/34	Pass
9/15/10	8	37/38	Pass
9/15/10	9	40/41	Pass
9/17/10	10	47/48	Pass
9/17/10	11	51/52	Pass
9/17/10	12	56/57	Pass
9/17/10	13	58/60	Pass
9/17/10	14	R22/P27	Pass
9/17/10	15	33/41	Pass
9/21/10	16	63/65	Pass
9/21/10	17	66/67	Pass
9/21/10	18	65/66	Pass
9/21/10	19	36/66	Pass
9/23/10	20	71/72	Pass
9/23/10	21	68/70	Pass
9/23/10	22	74/75	Pass
10/4/10	23	78/79	Pass
10/4/10	24	76/87	Pass
10/4/10	25	83/84	Pass
10/4/10	26	83/89	Pass
10/4/10	27	92/93	Pass
10/4/10	28	95/96	Pass
10/4/10	29	99/100	Pass
10/5/10	30	75/79	Pass
10/5/10	31	101/112	Pass
10/5/10	32	116/118	Pass
10/5/10	33	54/107	Pass
10/5/10	34	109/110	Pass
10/5/10	35	46/97	Pass
10/6/10	36	112/R153	Pass

TABLE 5.3

IN-PLACE DENSITY TESTING SUMMARY
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OSTEGO TOWNSHIP, MICHIGAN

Date	*Test Location*	*Lift Number/Elevation (ft AMSL)*	*Compaction Result (%)*
5/24/2010	3-D	1	92.2
5/27/2010	5/6 - CD	2	98.3
5/27/2010	5/6 - C	3	92.6
5/27/2010	5/6 - BC	4	91.0
6/4/2010	6 - D	1	93.5
6/4/2010	5.5 - D	1	98.4
6/4/2010	5 - D	1	99.2
6/4/2010	5 - E	2	96.4
6/4/2010	5.5 - E	2	97.5
6/4/2010	4 - E	1	94.1
6/4/2010	4 - F	1	90.3
6/4/2010	3 - F	1	93.1
7/2/10	3.5 - D.5	725	128.5
7/2/10	2.75 - C.5	722	91.1
7/2/10	2.5 - F.5	720	103.8
7/9/10	5.2 - D.2	731	99.0
7/9/10	3.8 - E	721.5	99.7
7/9/10	3.8 - E.5	721	97.8
7/9/10	4.5 - C.2	726	95.8
7/14/10	2.7 - C.5	724	91.8
7/14/10	4.2 - D.8	728	109.6
7/14/10	4.3 - D.5	726	94.5
7/14/10	3.2 - F.2	720	90.0
7/22/10	4.2 - B.9	728	104.4
7/22/10	3.5 - C.5	728	91.9
7/22/10	3.0 - B.5	720	109.8
7/22/10	2.9 - B.5	720	70.5*
7/22/10	3.3 - D.3	719	94.4
7/22/10	4.2 - D.5	731	104.5
7/22/10	5.5 - D.2	734	81.9*
7/29/10	3.7 - E.5	721	95.6
7/29/10	2.2 -D.8	723	92.7
7/29/10	1.8 - D.2	720	93.4
7/29/10	5.5 - C	731	90.3
8/12/10	1.8 - D.5	720	93.3
8/12/10	4 - D.5	725	100.3
8/13/10	2.8 - D.5	723	91.1
8/20/10	3.75 - C.3	731	103.6
8/20/10	3 - F	727	97.7
8/20/10	2.3 - C.3	720	97.2
8/20/10	2.8 - C.5	724	101.8
8/31/10	6.2 - C.8	734	96.1
8/31/10	4.75 - B.8	730	97.8
8/31/10	2.7 - C.75	724	95.7
8/31/10	3.2 - B.8	723	99.5
8/31/10	2.75 - E.2	726	97.3
8/31/10	4.3 - C.75	734	95.0
8/31/10	2.2 - F.2	724	96.8

Notes:
ft AMSL - Feet above mean sea level.
* Compaction test done for information only, not intended as a final test.

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 101*	*MW 101*	*MW 101*	*MW 101*
Sample Identification:					*VAS-56393-111110-DD-012*	*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-003*	*VAS-56393-111010-DD-009*
Sample Date:					*11/11/2010*	*11/10/2010*	*11/9/2010*	*11/10/2010*
Sample Depth:					(34-39) ft bgs	(39-44) ft bgs	(44-49) ft bgs	(49-54) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	*(50.4-54) ft bgs*
	Units	*a*	*b*	*c*				
Metals								
Aluminum	µg/L	50	50		**69.4[ab]**	**2210[ab]**	**1400[ab]**	**1660[ab]**
Antimony	µg/L	6	6	130	0.032 J	0.162	0.312 N	0.191
Arsenic	µg/L	10	10	150	0.4 J	4.9	3.2 N	4.9
Barium	µg/L	2000	2000	1400	87.1	148	108	117
Beryllium	µg/L	4	4	41	0.01 J	0.239	0.096	0.197
Cadmium	µg/L	5	5	5.1	0.012 J	0.127	0.088	0.092
Chromium	µg/L	100	100	11	**24.4[c]**	**27.3[c]**	**32.7[c]**	**67.3[c]**
Cobalt	µg/L	40	100	100	0.567	7.480	9.140	8.810
Copper	µg/L	1000	1000	23	1.28	14.5	12.1	15.9
Iron	µg/L	300	300		**1390[ab]**	**24100[ab]**	**13000[ab]**	**21600[ab]**
Lead	µg/L	4	4	34	0.3	**11.2[ab]**	**7.180[ab]**	**12.0[ab]**
Magnesium	µg/L	400000	1100000		25600	52800	38700	50700
Manganese	µg/L	50	50	5200	**63.3[ab]**	**1150[ab]**	**853[ab]**	**938[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	19.1	21.9	28.4	50.5
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.006 J	0.019 J	0.022	0.014 J
Sodium	µg/L	120000	350000		23600	24100	23900	24200
Thallium	µg/L	2	2	3.7	0.025	0.192	0.112	0.133
Vanadium	µg/L	4.5	62	12	0.20 U	**7.92[a]**	4.31	**6.35[a]**
Zinc	µg/L	2400	5000	310	2	42.5	23.5	30.9
PCBs								
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.040 U	0.040 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Volatile Organic Compounds								
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.50 U	0.060 J	0.060 J	0.060 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 101*	*MW 101*	*MW 101*	*MW 101*
Sample Identification:					*VAS-56393-111110-DD-012*	*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-003*	*VAS-56393-111010-DD-009*
Sample Date:					*11/11/2010*	*11/10/2010*	*11/9/2010*	*11/10/2010*
Sample Depth:					(34-39) ft bgs	(39-44) ft bgs	(44-49) ft bgs	(49-54) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	*(50.4-54) ft bgs*
	Units	*a*	*b*	*c*				
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Volatile Organic Compounds - Continued								
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	0.15 J	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 101*	*MW 101*	*MW 101*	*MW 101*
Sample Identification:					*VAS-56393-111110-DD-012*	*VAS-56393-111010-DD-010*	*VAS-56393-110910-DD-003*	*VAS-56393-111010-DD-009*
Sample Date:					*11/11/2010*	*11/10/2010*	*11/9/2010*	*11/10/2010*
Sample Depth:					(34-39) ft bgs	(39-44) ft bgs	(44-49) ft bgs	(49-54) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	*(50.4-54) ft bgs*
	Units	*a*	*b*	*c*				
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued								
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.43 J	1.8	0.16 J	0.41 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Field Parameters								
Conductivity, field	mS/cm				0.661	0.674	0.686	0.678
Dissolved oxygen (DO), field	mg/L				--	--	1.86	--
Oxidation reduction potential (ORP), field	millivolts				-93	-164	-193	-158
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.18	7.21	7.11	7.30
Temperature, field	Deg C				13.78	15.45	16.58	16.43
Turbidity (field)	NTU				19.7	211	1000 U	1000 U
Pump Intake	ft bgs				38	43	48	53
Pumping Rate	mg/min				160	240	125	150

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.

a Residential & Commercial I Drinking Water.

b Industrial & Commercial II, III, IV Drinking Water.

c Feet below ground surface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Feet below ground surface.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 101*	*MW 101*	*MW 101*	*MW 101*	*MW 101*	*Highest Valu*
Sample Identification:		*VAS-56393-111010-DD-007*	*VAS-56393-111010-DD-008*	*VAS-56393-111010-DD-006*	*VAS-56393-110910-DD-002*	*VAS-56393-110910-DD-001*	
Sample Date:		*11/10/2010*	*11/10/2010*	*11/10/2010*	*11/9/2010*	*11/9/2010*	
Sample Depth:		(54-59) ft bgs	(54-58) ft bgs	(59-64) ft bgs	(64-69) ft bgs	(69-74) ft bgs	
Screen Depth:	*Groundı*	*(55.4-59) ft bgs*	*(55.4-58) ft bgs*	*(60.4-64) ft bgs*	*(65.4-69) ft bgs*	*(70.4-74) ft bgs*	
	Units						
Metals							
Aluminum	µg/L	932[ab]	962[ab]	685[ab]	1320[ab]	2390[ab]	2390
Antimony	µg/L	0.167	0.171	0.187	0.396 N	0.744 N	0.744
Arsenic	µg/L	4.0	4.3	2.9	3.5 N	4.4 N	4.9
Barium	µg/L	99.4	101	90.9	106	344	344
Beryllium	µg/L	0.083	0.101	0.049	0.126	0.192	0.239
Cadmium	µg/L	0.047	0.049	0.051	0.089	0.766	0.766
Chromium	µg/L	32.5[c]	32.3[c]	37.1[c]	15.7[c]	32.5[c]	67.3
Cobalt	µg/L	5.200	5.350	4.240	10.5	17.5	17.5
Copper	µg/L	11.3	11.9	11.4	17.4	58.0[c]	58
Iron	µg/L	11800[ab]	12600[ab]	8670[ab]	14100[ab]	30500 *[ab]	30500
Lead	µg/L	6.420[ab]	6.720[ab]	3.470	7.530[ab]	17.3[ab]	17.3
Magnesium	µg/L	34900	36200	30700	40600	41400	52800
Manganese	µg/L	455[ab]	480[ab]	391[ab]	937[ab]	5280[abc]	5280
Mercury	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	N/A
Nickel	µg/L	32.0	31.9	35.6	18.1	75.5	75.5
Selenium	µg/L	0.4 J	0.3 J	1.0 U	1.0 U	1.0 U	0.4
Silver	µg/L	0.026	0.014 J	0.045	0.030	0.028	0.045
Sodium	µg/L	23400	24000	24000	25500	24400	25500
Thallium	µg/L	0.096	0.101	0.090	0.180	0.990	0.99
Vanadium	µg/L	3.79	4.21	2.01	5.51[a]	7.64[a]	7.92
Zinc	µg/L	26.8	28.8	44.4	34.3	121	121
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.039 U	0.040 U	0.040 U	0.040 U	0.040 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Volatile Organic Compounds							
Acetone	µg/L	20 U	20 U	20 U	20 U	20 U	N/A
Benzene	µg/L	*0.070 J*	*0.070 J*	*0.50 U*	*0.10 J*	*0.15 J*	*0.15*
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	20 U	20 U	N/A

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 101*	*MW 101*	*MW 101*	*MW 101*	*MW 101*	*Highest Valu*
Sample Identification:		*VAS-56393-111010-DD-007*	*VAS-56393-111010-DD-008*	*VAS-56393-111010-DD-006*	*VAS-56393-110910-DD-002*	*VAS-56393-110910-DD-001*	
Sample Date:		*11/10/2010*	*11/10/2010*	*11/10/2010*	*11/9/2010*	*11/9/2010*	
Sample Depth:		(54-59) ft bgs	(54-58) ft bgs	(59-64) ft bgs	(64-69) ft bgs	(69-74) ft bgs	
Screen Depth:	*Groundı*	*(55.4-59) ft bgs*	*(55.4-58) ft bgs*	*(60.4-64) ft bgs*	*(65.4-69) ft bgs*	*(70.4-74) ft bgs*	
	Units						
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Volatile Organic Compounds - Continued							
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.11 J	0.11
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.50 U	0.50 U	0.50 U	0.080 J	0.090 J	0.09
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	0.16 J	0.18 J	0.26 J	0.26
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A

TABLE 7.1

MW-101
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 101*	*MW 101*	*MW 101*	*MW 101*	*MW 101*	*Highest Valu*
Sample Identification:		*VAS-56393-111010-DD-007*	*VAS-56393-111010-DD-008*	*VAS-56393-111010-DD-006*	*VAS-56393-110910-DD-002*	*VAS-56393-110910-DD-001*	
Sample Date:		*11/10/2010*	*11/10/2010*	*11/10/2010*	*11/9/2010*	*11/9/2010*	
Sample Depth:		(54-59) ft bgs	(54-58) ft bgs	(59-64) ft bgs	(64-69) ft bgs	(69-74) ft bgs	
Screen Depth:	*Groundw*	*(55.4-59) ft bgs*	*(55.4-58) ft bgs*	*(60.4-64) ft bgs*	*(65.4-69) ft bgs*	*(70.4-74) ft bgs*	
	Units						
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued							
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.16 J	0.18 J	0.12 J	0.33 J	0.40 J	1.8
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	0.080 J	0.08
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U	0.11 J	0.15 J	0.15
Field Parameters							
Conductivity, field	mS/cm	0.678	0.678	0.677	0.691	0.690	0.691
Dissolved oxygen (DO), field	mg/L	*1.97*	*1.97*	*1.99*	*1.19*	*0.59*	*1.99*
Oxidation reduction potential (ORP), field	millivolts	-169	-169	-182	-236	-357	-93
pH, field	s.u.	7.16	7.16	7.10	7.27	7.21	7.3
Temperature, field	Deg C	15.06	15.06	12.75	17.88	14.76	17.88
Turbidity (field)	NTU	1000 U	1000 U	417	1000 U	1000 U	417
Pump Intake	ft bgs	58	57	63	68	73	73
Pumping Rate	mg/min	180	180	180	100	150	240

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Co
Criteria - applicable with the time VAS sampling was completed perfor

a Residential & Commercial I Drinking Water.

b Industrial & Commercial II, III, IV Drinking Water.

c Feet below ground surface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Feet below ground surface.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-105*	*VAS-56393-112210-DD-106*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					**(5-10) ft bgs**	**(10-15) ft bgs**	**(15-20) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**2190[ab]**	**320[ab]**	**778[ab]**
Antimony	µg/L	6	6	130	0.148 N	0.131 N	0.132 N
Arsenic	µg/L	10	10	150	2.8 N	1.3 N	1.6 N
Barium	µg/L	2000	2000	1400	141	68.5	73.4
Beryllium	µg/L	4	4	41	0.172	0.016 J	0.040
Cadmium	µg/L	5	5	5.1	0.084	0.017 J	0.034
Chromium	µg/L	100	100	11	**14.7[c]**	3.66	5.28
Cobalt	µg/L	40	100	100	8.030	2.810	4.050
Copper	µg/L	1000	1000	23	8.80	1.86	3.31
Iron	µg/L	300	300		**12300[ab]**	**2170[ab]**	**5440[ab]**
Lead	µg/L	4	4	34	**7.300[ab]**	1.060	2.620
Magnesium	µg/L	400000	1100000		49800	28900	31400
Manganese	µg/L	50	50	5200	**2990[ab]**	**1430[ab]**	**1210[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	19.4	8.14	8.22
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.010 J	0.020 U	0.020 U
Sodium	µg/L	120000	350000		23200	19700	20000
Thallium	µg/L	2	2	3.7	0.161	0.107	0.064
Vanadium	µg/L	4.5	62	12	**5.56[a]**	0.92	2.36
Zinc	µg/L	2400	5000	310	38.4	11.3	15.6
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.040	0.0064 J	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.0086 J	0.020 U	0.020 U

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-105*	*VAS-56393-112210-DD-106*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(5-10) ft bgs	(10-15) ft bgs	(15-20) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	5.6 J	20 U	20 U
Benzene	µg/L	5	5	200	0.17 J	0.19 J	0.33 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.10 J	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.080 J	0.10 J
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-105*	*VAS-56393-112210-DD-106*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(5-10) ft bgs	(10-15) ft bgs	(15-20) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued							
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.060 J	0.11 J	0.10 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.29 J	0.39 J	0.60
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.10 J	0.10 J	0.12 J

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-107*	*VAS-56393-112210-DD-105*	*VAS-56393-112210-DD-106*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					**(5-10) ft bgs**	**(10-15) ft bgs**	**(15-20) ft bgs**
Screen Depth:		*Groundwater Cleanup Criteria* [(1)]			*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.832	0.674	0.635
Dissolved oxygen (DO), field	mg/L				5.52	0.26	2.71
Oxidation reduction potential (ORP), field	millivolts				37	-128	-89
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.60	7.72	7.71
Temperature, field	Deg C				14.51	14.22	15.11
Turbidity (field)	NTU				1000 U	101	433
Pump Intake	ft bgs				9	14	19
Pumping Rate	mg/min				20	60	50

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
	Feet below ground surface.
	Highest concentration observed for associated analyte.
PCBs	Polychlorinated Biphenyls.
N	TIC presumptively present.
N/A	

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-104*	*VAS-56393-112210-DD-103*	*VAS-56393-112210-DD-102*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [7]				*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**127[ab]**	**205[ab]**	**138[ab]**
Antimony	µg/L	6	6	130	0.102 N	0.107 N	0.137 N
Arsenic	µg/L	10	10	150	0.7 N	0.6 N	1.7 N
Barium	µg/L	2000	2000	1400	65.7	64.4	68.7
Beryllium	µg/L	4	4	41	0.020 U	0.020 U	0.020 U
Cadmium	µg/L	5	5	5.1	0.009 J	0.018 J	0.010 J
Chromium	µg/L	100	100	11	1.73	3.05	2.84
Cobalt	µg/L	40	100	100	4.080	1.260	2.250
Copper	µg/L	1000	1000	23	1.28	1.12	1.86
Iron	µg/L	300	300		**1150[ab]**	**1160[ab]**	**1840[ab]**
Lead	µg/L	4	4	34	0.474	0.699	0.717
Magnesium	µg/L	400000	1100000		22400	23700	24200
Manganese	µg/L	50	50	5200	**451[ab]**	**149[ab]**	**372[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	6.10	4.09	6.38
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.004 J
Sodium	µg/L	120000	350000		19300	19800	20300
Thallium	µg/L	2	2	3.7	0.031	0.028	0.030
Vanadium	µg/L	4.5	62	12	0.43	0.53	0.49
Zinc	µg/L	2400	5000	310	16.8	6.3	25.7
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.040 U	0.040 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-104*	*VAS-56393-112210-DD-103*	*VAS-56393-112210-DD-102*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.50 U	0.090 J	0.080 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.18 J	0.17 J	0.12 J
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-104*	*VAS-56393-112210-DD-103*	*VAS-56393-112210-DD-102*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued							
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.50 U	0.18 J	0.18 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.50 U

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*
Sample Identification:					*VAS-56393-112210-DD-104*	*VAS-56393-112210-DD-103*	*VAS-56393-112210-DD-102*
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.593	0.604	0.623
Dissolved oxygen (DO), field	mg/L				0.17	0.47	0.23
Oxidation reduction potential (ORP), field	millivolts				-90	-121	-112
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.60	7.55	7.67
Temperature, field	Deg C				14.8	15.2	14.45
Turbidity (field)	NTU				40.8	17.9	1000 U
Pump Intake	ft bgs				24	29	34
Pumping Rate	mg/min				200	200	200

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
	Feet below ground surface.
	Highest concentration observed for associated analyte.
PCBs	Polychlorinated Biphenyls.
N	TIC presumptively present.
N/A	

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*	*Highest Value*
Sample Identification:					*VAS-56393-112210-DD-101*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*	
Sample Depth:					**(35-40) ft bgs**	**(40-45) ft bgs**	**(40-45) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*				
Metals								
Aluminum	µg/L	50	50		**6820[ab]**	**5350[ab]**	**6240[ab]**	6820
Antimony	µg/L	6	6	130	0.200 N	0.240 N	0.236 N	0.24
Arsenic	µg/L	10	10	150	4.7 N	5.7 N	6.0 N	6
Barium	µg/L	2000	2000	1400	246	282	301	301
Beryllium	µg/L	4	4	41	0.612	0.525	0.611	0.612
Cadmium	µg/L	5	5	5.1	0.355	0.349	0.393	0.393
Chromium	µg/L	100	100	11	**94.5[c]**	**153[abc]**	**165[abc]**	165
Cobalt	µg/L	40	100	100	15.7	17.1	18.3	18.3
Copper	µg/L	1000	1000	23	**42.6[c]**	**65.7[c]**	**70.1[c]**	70.1
Iron	µg/L	300	300		**54000[ab]**	**92100[ab]**	**95400[ab]**	95400
Lead	µg/L	4	4	34	**24.5[ab]**	**34.9[abc]**	**38.2[abc]**	38.2
Magnesium	µg/L	400000	1100000		89300	83400	89100	89300
Manganese	µg/L	50	50	5200	**2460[ab]**	**3270[ab]**	**3500[ab]**	3500
Mercury	µg/L	2	2	0.0013	**0.06 J[c]**	**0.04 J[c]**	**0.04 J[c]**	0.06
Nickel	µg/L	100	100	130	40.2	52.7	55.9	55.9
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	N/A
Silver	µg/L	34	98	0.2	0.049	0.068	0.078	0.078
Sodium	µg/L	120000	350000		21100	23400	23100	23400
Thallium	µg/L	2	2	3.7	0.287	0.380	0.408	0.408
Vanadium	µg/L	4.5	62	12	**13.9[ac]**	**10.8[a]**	**11.8[a]**	13.9
Zinc	µg/L	2400	5000	310	182	306	**318[c]**	318
PCBs								
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.039 U	0.040 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.0067 J	0.0088 J	0.014 J	0.04
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.0051 J	0.0073 J	0.0086

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*	*Highest Value*
Sample Identification:					*VAS-56393-112210-DD-101*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*	
Sample Depth:					(35-40) ft bgs	(40-45) ft bgs	(40-45) ft bgs	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*				
Volatile Organic Compounds								
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	5.6
Benzene	µg/L	5	5	200	0.31 J	0.22 J	0.24 J	0.33
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	800	2300	ID	0.18 J	0.23 J	0.25 J	0.25
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	N/A
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	80	80	170	0.14 J	0.090 J	0.50 U	0.18
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.080 J	0.08
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*	*Highest Value*
Sample Identification:					*VAS-56393-112210-DD-101*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*	
Sample Depth:					**(35-40) ft bgs**	**(40-45) ft bgs**	**(40-45) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*				
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued								
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	74	74	18	0.21 J	0.23 J	0.22 J	0.23
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	790	790	140	0.72	0.66	0.70	0.72
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	63	63	17	0.11 J	0.12 J	0.14 J	0.14
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	280	280	35	0.10 J	0.090 J	0.11 J	0.11
m&p-Xylenes	µg/L				0.28 J	0.23 J	0.26 J	0.28

TABLE 7.2

MW-102
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 102*	*MW 102*	*MW 102*	*Highest Value*
Sample Identification:					*VAS-56393-112210-DD-101*	*VAS-56393-112210-DD-098*	*VAS-56393-112210-DD-099*	
Sample Date:					*11/22/2010*	*11/22/2010*	*11/22/2010*	
Sample Depth:					**(35-40) ft bgs**	**(40-45) ft bgs**	**(40-45) ft bgs**	
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*				
Field Parameters								
Conductivity, field	mS/cm				0.598	0.662	0.662	0.832
Dissolved oxygen (DO), field	mg/L				0.43	0.09	0.09	5.52
Oxidation reduction potential (ORP), field	millivolts				-157	-147	-147	37
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.56	7.85	7.85	7.85
Temperature, field	Deg C				15.15	14.62	14.62	15.2
Turbidity (field)	NTU				1000 U	1000 U	1000 U	433
Pump Intake	ft bgs				39	44	44	44
Pumping Rate	mg/min				250	200	200	250

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
	Feet below ground surface.
	Highest concentration observed for associated analyte.
PCBs	Polychlorinated Biphenyls.
N	TIC presumptively present.
N/A	

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-095*	*VAS-56393-111910-DD-093*	*VAS-56393-111910-DD-091*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					(9-14) ft bgs	(14-19) ft bgs	(19-24) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**1710[ab]**	**78.7[ab]**	**289[ab]**
Antimony	µg/L	6	6	130	0.122 N	0.079 N	0.068 N
Arsenic	µg/L	10	10	150	4.1 N	0.4 J,N	0.8 N
Barium	µg/L	2000	2000	1400	167	91.3	73.2
Beryllium	µg/L	4	4	41	0.140	0.020 U	0.010 J
Cadmium	µg/L	5	5	5.1	0.104	0.013 J	0.021
Chromium	µg/L	100	100	11	**11.4[c]**	1.12	3.38
Cobalt	µg/L	40	100	100	4.440	1.520	2.280
Copper	µg/L	1000	1000	23	12.4	0.81	2.51
Iron	µg/L	300	300		**14600[ab]**	**655[ab]**	**2160[ab]**
Lead	µg/L	4	4	34	**6.780[ab]**	0.327	1.170
Magnesium	µg/L	400000	1100000		38700	27100	24900
Manganese	µg/L	50	50	5200	**893[ab]**	**403[ab]**	**190[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	10.8	4.29	4.68
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.009 J	0.006 J	0.004 J
Sodium	µg/L	120000	350000		20100	20900	21400
Thallium	µg/L	2	2	3.7	0.083	0.030	0.029
Vanadium	µg/L	4.5	62	12	**5.35[a]**	0.37	0.96
Zinc	µg/L	2400	5000	310	42.8	2.5	13.0
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.0060 J	0.0026 JP	0.0025 JP
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-095*	*VAS-56393-111910-DD-093*	*VAS-56393-111910-DD-091*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.070 J	0.11 J	0.070 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.13 J	0.080 J	0.080 J
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-095*	*VAS-56393-111910-DD-093*	*VAS-56393-111910-DD-091*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.050 J	0.060 J	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.18 J	0.24 J	0.15 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.10 J	0.50 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-095*	*VAS-56393-111910-DD-093*	*VAS-56393-111910-DD-091*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.601	0.623	0.631
Dissolved oxygen (DO), field	mg/L				0.47	0.74	1.12
Oxidation reduction potential (ORP), field	millivolts				-80	-102	-120
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.37	7.49	7.46
Temperature, field	Deg C				11.71	11.25	10.52
Turbidity (field)	NTU				1000 U	6.14	108
Pump Intake	ft bgs				13	18	23
Pumping Rate	mg/min				220	300	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
JP Feet below ground surface.
N TIC presumptively present.
N/A
PCBs Polychlorinated Biphenyls.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-089*	*VAS-56393-111910-DD-087*	*VAS-56393-111810-DD-084*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/18/2010*
Sample Depth:					(24-29) ft bgs	(29-34) ft bgs	(34-39) ft bgs
Screen Depth:		*Groundwater Cleanup Criteria* [1]			*(25.4-29) ft bgs*	*(34-0-33.0) ft bgs*	*(35.4-39) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**3770[ab]**	**6030[ab]**	**4560[ab]**
Antimony	µg/L	6	6	130	0.156 N	0.162 N	0.168 N
Arsenic	µg/L	10	10	150	3.4 N	3.3 N	3.2
Barium	µg/L	2000	2000	1400	139	195	168
Beryllium	µg/L	4	4	41	0.280	0.514	0.321
Cadmium	µg/L	5	5	5.1	0.164	0.302	0.240
Chromium	µg/L	100	100	11	**31.7[c]**	**71.4[c]**	**88.9[c]**
Cobalt	µg/L	40	100	100	7.810	11.4	8.890
Copper	µg/L	1000	1000	23	**23.9[c]**	**37.0[c]**	**36.3[c]**
Iron	µg/L	300	300		**26900[ab]**	**46100[ab]**	**29300[ab]**
Lead	µg/L	4	4	34	**18.1[ab]**	**29.1[ab]**	**16.7[ab]**
Magnesium	µg/L	400000	1100000		52700	75300	75600
Manganese	µg/L	50	50	5200	**822[ab]**	**1150[ab]**	**947[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	**0.04 J[c]**	**0.04 J[c]**
Nickel	µg/L	100	100	130	20.2	31.1	30.1
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.022	0.046	0.027
Sodium	µg/L	120000	350000		22100	23600	22700
Thallium	µg/L	2	2	3.7	0.150	0.177	0.147
Vanadium	µg/L	4.5	62	12	**9.24[a]**	**11.2[a]**	**9.82[a]**
Zinc	µg/L	2400	5000	310	115	152	185
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.0091 J	0.020	0.014 J
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-089*	*VAS-56393-111910-DD-087*	*VAS-56393-111810-DD-084*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/18/2010*
Sample Depth:					(24-29) ft bgs	(29-34) ft bgs	(34-39) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(25.4-29) ft bgs*	*(34-0-33.0) ft bgs*	*(35.4-39) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.060 J	0.060 J	0.070 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-089*	*VAS-56393-111910-DD-087*	*VAS-56393-111810-DD-084*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/18/2010*
Sample Depth:					**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(25.4-29) ft bgs*	*(34-0-33.0) ft bgs*	*(35.4-39) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.050 J	0.50 U	0.080 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.14 J	0.16 J	0.20 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.50 U

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*MW 103*
Sample Identification:					*VAS-56393-111910-DD-089*	*VAS-56393-111910-DD-087*	*VAS-56393-111810-DD-084*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/18/2010*
Sample Depth:					**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(25.4-29) ft bgs*	*(34-0-33.0) ft bgs*	*(35.4-39) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.628	0.628	0.633
Dissolved oxygen (DO), field	mg/L				0.89	0.53	0.56
Oxidation reduction potential (ORP), field	millivolts				-116	-133	-144
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.47	7.33	7.52
Temperature, field	Deg C				10.38	9.1	10.54
Turbidity (field)	NTU				1000 U	1000 U	1000 U
Pump Intake	ft bgs				28	33	38
Pumping Rate	mg/min				300	200	200

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
JP	Feet below ground surface.
N	TIC presumptively present.
N/A	
PCBs	Polychlorinated Biphenyls.
	Concentration exceeds cleanup criteria (1).
	Highest concentration observed for associated analyte.

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*Highest Value*
Sample Identification:					*VAS-56393-111810-DD-081*	*VAS-56393-111810-DD-079*	
Sample Date:					*11/18/2010*	*11/18/2010*	
Sample Depth:					**(39-44) ft bgs**	**(44-49) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**4440[ab]**	**3080[ab]**	6030
Antimony	µg/L	6	6	130	0.194 N	0.193 N	0.194
Arsenic	µg/L	10	10	150	3.5	2.9	4.1
Barium	µg/L	2000	2000	1400	154	149	195
Beryllium	µg/L	4	4	41	0.332	0.272	0.514
Cadmium	µg/L	5	5	5.1	0.226	0.193	0.302
Chromium	µg/L	100	100	11	**81.5[c]**	**117[abc]**	117
Cobalt	µg/L	40	100	100	9.120	9.340	11.4
Copper	µg/L	1000	1000	23	**34.3[c]**	**42.6[c]**	42.6
Iron	µg/L	300	300		**28500[ab]**	**24800[ab]**	46100
Lead	µg/L	4	4	34	**14.5[ab]**	**8.850[ab]**	29.1
Magnesium	µg/L	400000	1100000		76100	82500	82500
Manganese	µg/L	50	50	5200	**898[ab]**	**997[ab]**	1150
Mercury	µg/L	2	2	0.0013	**0.02 J[c]**	**0.03 J[c]**	0.04
Nickel	µg/L	100	100	130	31.3	33.1	33.1
Selenium	µg/L	50	50	5	1.0 U	1.0 U	N/A
Silver	µg/L	34	98	0.2	0.029	0.031	0.046
Sodium	µg/L	120000	350000		23100	24400	24400
Thallium	µg/L	2	2	3.7	0.133	0.129	0.177
Vanadium	µg/L	4.5	62	12	**9.10[a]**	**5.33[a]**	11.2
Zinc	µg/L	2400	5000	310	234	187	234
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.039 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.012 J	0.012 J	0.02
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*Highest Value*
Sample Identification:					*VAS-56393-111810-DD-081*	*VAS-56393-111810-DD-079*	
Sample Date:					*11/18/2010*	*11/18/2010*	
Sample Depth:					**(39-44) ft bgs**	**(44-49) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	N/A
Benzene	µg/L	5	5	200	0.080 J	0.10 J	0.11
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	N/A
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	N/A
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L				0.50 U	0.50 U	N/A
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.13
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L				2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	N/A

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*Highest Value*
Sample Identification:					*VAS-56393-111810-DD-081*	*VAS-56393-111810-DD-079*	
Sample Date:					*11/18/2010*	*11/18/2010*	
Sample Depth:					(39-44) ft bgs	(44-49) ft bgs	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	74	74	18	0.050 J	0.11 J	0.11
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	1000	2900		20 U	20 U	N/A
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	N/A
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	N/A
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Styrene	µg/L	100	100	80	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	N/A
Toluene	µg/L	790	790	140	0.20 J	0.28 J	0.28
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	N/A
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L				0.50 U	0.10 J	0.1

TABLE 7.3

MW-103
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 103*	*MW 103*	*Highest Value*
Sample Identification:					*VAS-56393-111810-DD-081*	*VAS-56393-111810-DD-079*	
Sample Date:					*11/18/2010*	*11/18/2010*	
Sample Depth:					(39-44) ft bgs	(44-49) ft bgs	
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(40.4-44) ft bgs*	*(45.4-49) ft bgs*	
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.643	0.664	0.664
Dissolved oxygen (DO), field	mg/L				0.35	0.35	1.12
Oxidation reduction potential (ORP), field	millivolts				-157	-177	-80
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.56	7.61	7.61
Temperature, field	Deg C				10.19	10.23	11.71
Turbidity (field)	NTU				1000 U	1000 U	108
Pump Intake	ft bgs				43	48	48
Pumping Rate	mg/min				200	200	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
JP Feet below ground surface.
N TIC presumptively present.
N/A
PCBs Polychlorinated Biphenyls.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-053*	*VAS-56393-111610-DD-051*	*VAS-56393-111610-DD-049*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					(5-10) ft bgs	(10-15) ft bgs	(15-20) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**216**[ab]	33.9	**666**[ab]
Antimony	µg/L	6	6	130	0.195	0.060 N	0.095 N
Arsenic	µg/L	10	10	150	1.3 J	0.4 J,N	1.7 J,N
Barium	µg/L	2000	2000	1400	179	130	116
Beryllium	µg/L	4	4	41	0.020 U	0.020 U	0.037
Cadmium	µg/L	5	5	5.1	0.012 J	0.016 J	0.032
Chromium	µg/L	100	100	11	1.35	0.91	3.71
Cobalt	µg/L	40	100	100	2.190	1.620	3.700
Copper	µg/L	1000	1000	23	0.84	1.47	3.00
Iron	µg/L	300	300		**1240**[ab]	288	**3590**[ab]
Lead	µg/L	4	4	34	0.837	0.147	1.800
Magnesium	µg/L	400000	1100000		43000	26200	31500
Manganese	µg/L	50	50	5200	**1680**[ab]	**762**[ab]	**903**[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U
Nickel	µg/L	*100*	*100*	*130*	*5.68*	*5.32*	*9.63*
Selenium	µg/L	50	50	5	1.0 U	1.0 U	0.4 J,N
Silver	µg/L	34	98	0.2	0.020 U	0.006 J	0.004 J
Sodium	µg/L	120000	350000		26600	21500	22400
Thallium	µg/L	2	2	3.7	0.008 J	0.015 J	0.042
Vanadium	µg/L	4.5	62	12	0.69	0.28	1.99
Zinc	µg/L	2400	5000	310	4.4	2.9	9.3
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.025 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.050 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.025 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.025 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.011 J	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.025 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.025 U	0.020 U	0.020 U

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-053*	*VAS-56393-111610-DD-051*	*VAS-56393-111610-DD-049*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					(5-10) ft bgs	(10-15) ft bgs	(15-20) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	5.1 J	20 U	20 U
Benzene	µg/L	5	5	200	0.65	0.21 J	0.14 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-053*	*VAS-56393-111610-DD-051*	*VAS-56393-111610-DD-049*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					(5-10) ft bgs	(10-15) ft bgs	(15-20) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.14 J	0.080 J	0.060 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.96	0.45 J	0.43 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.11 J	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.20 J	0.13 J	0.12 J

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-053*	*VAS-56393-111610-DD-051*	*VAS-56393-111610-DD-049*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					**(5-10) ft bgs**	**(10-15) ft bgs**	**(15-20) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(6.4-10) ft bgs*	*(11.4-15) ft bgs*	*(16.4-20) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.749	0.625	0.636
Dissolved oxygen (DO), field	mg/L				5.35	1.87	0.41
Oxidation reduction potential (ORP), field	millivolts				17	-84	-171
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.92	7.66	7.68
Temperature, field	Deg C				9.43	10.9	10.38
Turbidity (field)	NTU				1000 U	4.81	15
Pump Intake	ft bgs				9	14	19
Pumping Rate	mg/min				100	150	100

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
JP Feet below ground surface.
N TIC presumptively present.
N/A
PCBs Polychlorinated Biphenyls.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-047*	*VAS-56393-111610-DD-046*	*VAS-56393-111510-DD-042*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:		*Groundwater Cleanup Criteria* [(1)]			*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**4080[ab]**	**1740[ab]**	**3010[ab]**
Antimony	µg/L	6	6	130	0.163 N	0.235 N	0.167
Arsenic	µg/L	10	10	150	5.4 N	3.4 N	3.9
Barium	µg/L	2000	2000	1400	164	116	130
Beryllium	µg/L	4	4	41	0.373	0.155	0.237
Cadmium	µg/L	5	5	5.1	0.276	0.132	0.161
Chromium	µg/L	100	100	11	**27.7[c]**	**25.7[c]**	**31.4[c]**
Cobalt	µg/L	40	100	100	11.6	4.900	8.040
Copper	µg/L	1000	1000	23	**25.7[c]**	18.8	20.3
Iron	µg/L	300	300		**32300[ab]**	**15200[ab]**	**22400[ab]**
Lead	µg/L	4	4	34	**22.5[ab]**	**15.4[ab]**	**13.0[ab]**
Magnesium	µg/L	400000	1100000		55700	43400	56500
Manganese	µg/L	50	50	5200	**1090[ab]**	**532[ab]**	**733[ab]**
Mercury	µg/L	2	2	0.0013	**0.05 J[c]**	**0.02 J[c]**	0.20 U
Nickel	µg/L	100	100	130	24.9	17.5	19.5
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.025	0.016 J	0.023
Sodium	µg/L	120000	350000		24000	21300	21600
Thallium	µg/L	2	2	3.7	0.164	0.092	0.150
Vanadium	µg/L	4.5	62	12	**11.4[a]**	**5.67[a]**	**9.10[a]**
Zinc	µg/L	2400	5000	310	134	81.8	137
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.040 U	0.039 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.0059 JP	0.011 J	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-047*	*VAS-56393-111610-DD-046*	*VAS-56393-111510-DD-042*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.090 J	0.070 J	0.12 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-047*	*VAS-56393-111610-DD-046*	*VAS-56393-111510-DD-042*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.050 J	0.50 U	0.090 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.25 J	0.19 J	0.49 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.13 J

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*MW 104*
Sample Identification:					*VAS-56393-111610-DD-047*	*VAS-56393-111610-DD-046*	*VAS-56393-111510-DD-042*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*
Sample Depth:					(20-25) ft bgs	(25-30) ft bgs	(30-35) ft bgs
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(21.4-25) ft bgs*	*(26.4-30) ft bgs*	*(31.4-35) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.676	0.693	0.714
Dissolved oxygen (DO), field	mg/L				0.68	1.32	0.95
Oxidation reduction potential (ORP), field	millivolts				-79	-33	-99
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.55	7.46	7.37
Temperature, field	Deg C				10.33	10.35	12.28
Turbidity (field)	NTU				1000 U	1000 U	1000 U
Pump Intake	ft bgs				24	29	34
Pumping Rate	mg/min				200	200	300

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
JP	Feet below ground surface.
N	TIC presumptively present.
N/A	
PCBs	Polychlorinated Biphenyls.
	Concentration exceeds cleanup criteria (1).
	Highest concentration observed for associated analyte.

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-040*	*VAS-56393-111510-DD-036*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					(35-40) ft bgs	(40-45) ft bgs	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**4180**[ab]	**3090**[ab]	4180
Antimony	µg/L	6	6	130	0.156	0.184	0.235
Arsenic	µg/L	10	10	150	3.8	3.5	5.4
Barium	µg/L	2000	2000	1400	156	142	179
Beryllium	µg/L	4	4	41	0.289	0.202	0.373
Cadmium	µg/L	5	5	5.1	0.171	0.139	0.276
Chromium	µg/L	100	100	11	**71.0**[c]	**73.4**[c]	73.4
Cobalt	µg/L	40	100	100	6.620	5.670	11.6
Copper	µg/L	1000	1000	23	**26.3**[c]	**28.2**[c]	28.2
Iron	µg/L	300	300		**29300**[ab]	**26000**[ab]	32300
Lead	µg/L	4	4	34	**12.3**[ab]	**8.920**[ab]	22.5
Magnesium	µg/L	400000	1100000		53400	43900	56500
Manganese	µg/L	50	50	5200	**783**[ab]	**798**[ab]	1680
Mercury	µg/L	2	2	0.0013	**0.02 J**[c]	**0.02 J**[c]	0.05
Nickel	µg/L	100	100	130	25.4	25.1	25.4
Selenium	µg/L	50	50	5	1.0 U	1.0 U	0.4
Silver	µg/L	34	98	0.2	0.040	0.035	0.04
Sodium	µg/L	120000	350000		25300	24600	26600
Thallium	µg/L	2	2	3.7	0.140	0.098	0.164
Vanadium	µg/L	4.5	62	12	**8.68**[a]	**6.62**[a]	11.4
Zinc	µg/L	2400	5000	310	130	239	239
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.018 J	0.029	0.029
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-040*	*VAS-56393-111510-DD-036*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					(35-40) ft bgs	(40-45) ft bgs	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	5.1
Benzene	µg/L	5	5	200	0.12 J	0.20 J	0.65
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	N/A
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	800	2300	ID	0.26 J	0.18 J	0.26
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L				0.50 U	0.50 U	N/A
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L				2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	N/A

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-040*	*VAS-56393-111510-DD-036*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					(35-40) ft bgs	(40-45) ft bgs	
Screen Depth:		*Groundwater Cleanup Criteria* [1]			*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	74	74	18	0.050 J	0.080 J	0.14
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	1000	2900		20 U	20 U	N/A
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	N/A
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	N/A
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Styrene	µg/L	100	100	80	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	N/A
Toluene	µg/L	790	790	140	0.41 J	0.69	0.96
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	N/A
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.11
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.2

TABLE 7.4

MW-104
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 104*	*MW 104*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-040*	*VAS-56393-111510-DD-036*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					**(35-40) ft bgs**	**(40-45) ft bgs**	
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(36.4-40) ft bgs*	*(41.4-45) ft bgs*	
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.698	0.706	0.749
Dissolved oxygen (DO), field	mg/L				0.62	0.8	5.35
Oxidation reduction potential (ORP), field	millivolts				-127	-122	17
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.39	7.38	7.92
Temperature, field	Deg C				12.27	12.52	12.52
Turbidity (field)	NTU				1000 U	1000 U	15
Pump Intake	ft bgs				39	44	44
Pumping Rate	mg/min				300	300	300

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
JP	Feet below ground surface.
N	TIC presumptively present.
N/A	
PCBs	Polychlorinated Biphenyls.
	Concentration exceeds cleanup criteria (1).
	Highest concentration observed for associated analyte.

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-054*	*VAS-56393-111610-DD-052*	*VAS-56393-111610-DD-050*	*VAS-56393-111610-DD-048*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					**(7-12) ft bgs**	**(12-17) ft bgs**	**(17-22) ft bgs**	**(22-27) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*
	Units	*a*	*b*	*c*				
Metals								
Aluminum	µg/L	50	50		**3730[ab]**	**691[ab]**	**96.3[ab]**	**135[ab]**
Antimony	µg/L	6	6	130	0.074	0.145	0.056 N	0.116 N
Arsenic	µg/L	10	10	150	3.0	2.1	0.7 J,N	0.8 J,N
Barium	µg/L	2000	2000	1400	177	148	76.7	82.0
Beryllium	µg/L	4	4	41	0.282	0.078	0.020 U	0.020 U
Cadmium	µg/L	5	5	5.1	0.181	0.035	0.005 J	0.010 J
Chromium	µg/L	100	100	11	**11.5[c]**	**11.7[c]**	0.95	2.77
Cobalt	µg/L	40	100	100	6.180	3.510	1.060	2.150
Copper	µg/L	1000	1000	23	12.6	6.28	0.98	1.42
Iron	µg/L	300	300		**19800[ab]**	**4800[ab]**	**799[ab]**	**1480[ab]**
Lead	µg/L	4	4	34	**15.4[ab]**	3.890	0.333	0.440
Magnesium	µg/L	400000	1100000		42300	41900	24500	28900
Manganese	µg/L	50	50	5200	**956[ab]**	**1170[ab]**	**184[ab]**	**521[ab]**
Mercury	µg/L	2	2	0.0013	**0.05 J[c]**	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	14.6	9.12	2.87	5.77
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.015 J	0.007 J	0.020 U	0.006 J
Sodium	µg/L	120000	350000		23600	23500	21400	23000
Thallium	µg/L	2	2	3.7	0.104	0.048	0.011 J	0.024
Vanadium	µg/L	4.5	62	12	**7.19[a]**	2.60	0.39	0.57
Zinc	µg/L	2400	5000	310	50.7	17.2	15.1	17.5
PCBs								
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.027	0.016 J	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-054*	*VAS-56393-111610-DD-052*	*VAS-56393-111610-DD-050*	*VAS-56393-111610-DD-048*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					**(7-12) ft bgs**	**(12-17) ft bgs**	**(17-22) ft bgs**	**(22-27) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds								
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.50 U	0.14 J	0.50 U	0.30 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.080 J	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-054*	*VAS-56393-111610-DD-052*	*VAS-56393-111610-DD-050*	*VAS-56393-111610-DD-048*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					**(7-12) ft bgs**	**(12-17) ft bgs**	**(17-22) ft bgs**	**(22-27) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds - Continued								
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.50 U	0.060 J	0.50 U	0.13 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.15 J	0.41 J	0.20 J	0.66
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.18 J	0.50 U	0.10 J	0.10 J
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.10 J	0.50 U	0.18 J

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-054*	*VAS-56393-111610-DD-052*	*VAS-56393-111610-DD-050*	*VAS-56393-111610-DD-048*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/16/2010*	*11/16/2010*
Sample Depth:					**(7-12) ft bgs**	**(12-17) ft bgs**	**(17-22) ft bgs**	**(22-27) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*
	Units	*a*	*b*	*c*				
Field Parameters								
Conductivity, field	mS/cm				0.743	0.715	0.648	0.680
Dissolved oxygen (DO), field	mg/L				0.67	4.95	0.88	0.45
Oxidation reduction potential (ORP), field	millivolts				-20	-32	-93	-169
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.17	7.56	7.43	7.60
Temperature, field	Deg C				11.12	10.95	11.2	10.94
Turbidity (field)	NTU				1000 U	26.3	28.2	25.9
Pump Intake	ft bgs				11	16	21	26
Pumping Rate	mg/min				200	150	200	200

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
N Feet below ground surface.
N/A
PCBs Polychlorinated Biphenyls.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-044*	*VAS-56393-111610-DD-045*	*VAS-56393-111510-DD-041*	*VAS-56393-111510-DD-039*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Depth:					**(27-32) ft bgs**	**(27-32) ft bgs**	**(32-37) ft bgs**	**(37-42) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(28.4-32) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*				
Metals								
Aluminum	µg/L	50	50		**6080[ab]**	**5940[ab]**	**488[ab]**	**3310[ab]**
Antimony	µg/L	6	6	130	0.254 N	0.262 N	0.169	0.381
Arsenic	µg/L	10	10	150	8.3 N	8.5 N	1.8	8.6
Barium	µg/L	2000	2000	1400	265	248	85.1	145
Beryllium	µg/L	4	4	41	0.489	0.480	0.021	0.242
Cadmium	µg/L	5	5	5.1	0.280	0.246	0.028	0.128
Chromium	µg/L	100	100	11	**86.0[c]**	**84.3[c]**	6.87	**56.0[c]**
Cobalt	µg/L	40	100	100	11.9	11.3	2.580	5.880
Copper	µg/L	1000	1000	23	**68.3[c]**	**64.5[c]**	7.77	**71.0[c]**
Iron	µg/L	300	300		**49700[ab]**	**49100[ab]**	**3940[ab]**	**28800[ab]**
Lead	µg/L	4	4	34	**25.8[ab]**	**26.3[ab]**	1.470	**14.7[ab]**
Magnesium	µg/L	400000	1100000		73500	68900	26300	58400
Manganese	µg/L	50	50	5200	**1650[ab]**	**1530[ab]**	**413[ab]**	**711[ab]**
Mercury	µg/L	2	2	0.0013	**0.07 J[c]**	**0.05 J[c]**	0.20 U	**0.03 J[c]**
Nickel	µg/L	100	100	130	52.2	49.2	10.3	45.1
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	0.6 J
Silver	µg/L	34	98	0.2	0.064	0.056	0.008 J	0.037
Sodium	µg/L	120000	350000		23000	22900	20700	21100
Thallium	µg/L	2	2	3.7	0.188	0.185	0.027	0.096
Vanadium	µg/L	4.5	62	12	**12.1[ac]**	**12.1[ac]**	1.32	**7.59[a]**
Zinc	µg/L	2400	5000	310	**1080[c]**	**987[c]**	232	**1800[c]**
PCBs								
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.039 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-044*	*VAS-56393-111610-DD-045*	*VAS-56393-111510-DD-041*	*VAS-56393-111510-DD-039*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Depth:					**(27-32) ft bgs**	**(27-32) ft bgs**	**(32-37) ft bgs**	**(37-42) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(28.4-32) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds								
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.21 J	0.23 J	0.13 J	0.080 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.15 J	0.18 J	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.10 J	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-044*	*VAS-56393-111610-DD-045*	*VAS-56393-111510-DD-041*	*VAS-56393-111510-DD-039*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Depth:					**(27-32) ft bgs**	**(27-32) ft bgs**	**(32-37) ft bgs**	**(37-42) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(28.4-32) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds - Continued								
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.12 J	0.13 J	0.060 J	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	0.17 J	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.54	0.59	0.54	0.37 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.12 J	0.12 J	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.11 J	0.13 J	0.10 J	0.50 U

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*MW 105*	*MW 105*
Sample Identification:					*VAS-56393-111610-DD-044*	*VAS-56393-111610-DD-045*	*VAS-56393-111510-DD-041*	*VAS-56393-111510-DD-039*
Sample Date:					*11/16/2010*	*11/16/2010*	*11/15/2010*	*11/15/2010*
Sample Depth:					**(27-32) ft bgs**	**(27-32) ft bgs**	**(32-37) ft bgs**	**(37-42) ft bgs**
Screen Depth:					*(28.4-32) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Groundwater Cleanup Criteria (1)							
	Units	*a*	*b*	*c*				
Field Parameters								
Conductivity, field	mS/cm				0.675	0.675	0.646	0.629
Dissolved oxygen (DO), field	mg/L				0.57	0.57	0.33	0.75
Oxidation reduction potential (ORP), field	millivolts				-144	-144	-100	-36
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.43	7.43	7.74	7.53
Temperature, field	Deg C				9.76	9.76	11.27	10.98
Turbidity (field)	NTU				1000 U	1000 U	1000 U	1000 U
Pump Intake	ft bgs				31	31	36	41
Pumping Rate	mg/min				200	200	180	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
N Feet below ground surface.
N/A
PCBs Polychlorinated Biphenyls.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-035*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					**(42-47) ft bgs**	**(42-47) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**5060[ab]**	**5020[ab]**	6080
Antimony	µg/L	6	6	130	0.160	0.147	0.381
Arsenic	µg/L	10	10	150	7.7	7.2	8.6
Barium	µg/L	2000	2000	1400	204	202	265
Beryllium	µg/L	4	4	41	0.430	0.361	0.489
Cadmium	µg/L	5	5	5.1	0.237	0.230	0.28
Chromium	µg/L	100	100	11	**59.2[c]**	**57.5[c]**	86
Cobalt	µg/L	40	100	100	8.440	8.290	11.9
Copper	µg/L	1000	1000	23	**27.9[c]**	**27.5[c]**	71
Iron	µg/L	300	300		**37800[ab]**	**37600[ab]**	49700
Lead	µg/L	4	4	34	**24.5[ab]**	**23.9[ab]**	26.3
Magnesium	µg/L	400000	1100000		81900	81800	81900
Manganese	µg/L	50	50	5200	**1180[ab]**	**1170[ab]**	1650
Mercury	µg/L	2	2	0.0013	**0.10 J[c]**	**0.06 J[c]**	0.1
Nickel	µg/L	100	100	130	25.3	24.7	52.2
Selenium	µg/L	50	50	5	1.0 U	1.0 U	0.6
Silver	µg/L	34	98	0.2	0.043	0.040	0.064
Sodium	µg/L	120000	350000		22100	21600	23600
Thallium	µg/L	2	2	3.7	0.127	0.121	0.188
Vanadium	µg/L	4.5	62	12	**10.4[a]**	**10.3[a]**	12.1
Zinc	µg/L	2400	5000	310	78.4	77.0	1800
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.040 U	0.039 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.018 J	0.018 J	0.027
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	N/A

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-035*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					**(42-47) ft bgs**	**(42-47) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	N/A
Benzene	µg/L	5	5	200	0.16 J	0.15 J	0.3
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	N/A
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	800	2300	ID	0.14 J	0.14 J	0.18
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L				0.50 U	0.50 U	N/A
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.080 J	0.1
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L				2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	N/A

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-035*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					**(42-47) ft bgs**	**(42-47) ft bgs**	
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	74	74	18	0.090 J	0.090 J	0.13
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	1000	2900		20 U	20 U	N/A
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	N/A
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	N/A
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	0.17
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	N/A
Styrene	µg/L	100	100	80	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	N/A
Toluene	µg/L	790	790	140	0.59	0.58	0.66
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.18
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	N/A
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L				0.11 J	0.50 U	0.18

TABLE 7.5

MW-105
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 105*	*MW 105*	*Highest Value*
Sample Identification:					*VAS-56393-111510-DD-034*	*VAS-56393-111510-DD-035*	
Sample Date:					*11/15/2010*	*11/15/2010*	
Sample Depth:					**(42-47) ft bgs**	**(42-47) ft bgs**	
Screen Depth:		*Groundwater Cleanup Criteria* (1)			*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units	*a*	*b*	*c*			
Field Parameters							
Conductivity, field	mS/cm				0.635	0.635	0.743
Dissolved oxygen (DO), field	mg/L				0.61	0.61	4.95
Oxidation reduction potential (ORP), field	millivolts				-56	-56	-20
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.67	7.67	7.74
Temperature, field	Deg C				10.95	10.95	11.27
Turbidity (field)	NTU				1000 U	1000 U	28.2
Pump Intake	ft bgs				46	46	46
Pumping Rate	mg/min				300	300	300

Notes:

(1)	Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a	Residential and Commercial I Drinking Water.
b	Industrial and Commercial II, III, IV Drinking Water.
c	Groundwater Surface Water Interface.
ft bgs	Feet below ground surface.
U	Not present at or above the associated value.
J	Laboratory qualified as an estimated value.
N	Feet below ground surface.
N/A	
PCBs	Polychlorinated Biphenyls.
	Concentration exceeds cleanup criteria (1).
	Highest concentration observed for associated analyte.

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 106*	*MW 106*	*MW 106*	*MW 106*
Sample Identification:					*VAS-56393-111510-DD-033*	*VAS-56393-111210-DD-030*	*VAS-56393-111210-DD-028*	*VAS-56393-111210-DD-024*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*				
Metals								
Aluminum	µg/L	50	50		**1110[ab]**	**227[ab]**	**118[ab]**	**69.2[ab]**
Antimony	µg/L	6	6	130	0.124	0.132	0.069	0.033 J
Arsenic	µg/L	10	10	150	**18.3[ab]**	2.8	1.5	0.5
Barium	µg/L	2000	2000	1400	693	224	141	80.8
Beryllium	µg/L	4	4	41	0.102	0.020 U	0.020 U	0.020 U
Cadmium	µg/L	5	5	5.1	0.084	0.026	0.008 J	0.008 J
Chromium	µg/L	100	100	11	6.62	1.98	1.02	0.59
Cobalt	µg/L	40	100	100	2.210	2.470	1.520	0.522
Copper	µg/L	1000	1000	23	6.81	3.09	0.80	1.04
Iron	µg/L	300	300		**29000[ab]**	**4060[ab]**	**1190[ab]**	**572[ab]**
Lead	µg/L	4	4	34	**4.050[ab]**	0.798	0.422	0.452
Magnesium	µg/L	400000	1100000		38000	29800	26600	24900
Manganese	µg/L	50	50	5200	**979[ab]**	**1290[ab]**	**631[ab]**	**72.3[ab]**
Mercury	µg/L	2	2	0.0013	**0.04 J[c]**	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	5.37	6.06	2.25	1.28
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.031	0.011 J	0.020 U	0.020 U
Sodium	µg/L	120000	350000		18000	26000	22200	21900
Thallium	µg/L	2	2	3.7	0.012 J	0.008 J	0.008 J	0.008 J
Vanadium	µg/L	4.5	62	12	3.27	0.88	0.47	0.35
Zinc	µg/L	2400	5000	310	14.2	6.5	2.5	1.5
PCBs								
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.039 U	0.039 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.075	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 106*	*MW 106*	*MW 106*	*MW 106*
Sample Identification:					*VAS-56393-111510-DD-033*	*VAS-56393-111210-DD-030*	*VAS-56393-111210-DD-028*	*VAS-56393-111210-DD-024*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds								
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	5.5 J
Benzene	µg/L	5	5	200	0.30 J	0.12 J	0.50 U	0.50 U
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 106*	*MW 106*	*MW 106*	*MW 106*
Sample Identification:					*VAS-56393-111510-DD-033*	*VAS-56393-111210-DD-030*	*VAS-56393-111210-DD-028*	*VAS-56393-111210-DD-024*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*				
Volatile Organic Compounds - Continued								
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.080 J	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	2.3	0.18 J	0.07 J	0.50 U
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.1 J	0.19 J	0.16 J
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.10 J	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.23 J	0.50 U	0.50 U	0.50 U
Field Parameters								
Conductivity, field	mS/cm				1.205	0.833	0.722	0.688
Dissolved oxygen (DO), field	mg/L				0.43	0.8	1.05	1.69
Oxidation reduction potential (ORP), field	millivolts				-98	-110	-86	-33
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	6.64	6.90	7.03	7.11
Temperature, field	Deg C				11.87	18.38	13.93	12.85

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:				*MW 106*	*MW 106*	*MW 106*	*MW 106*
Sample Identification:				*VAS-56393-111510-DD-033*	*VAS-56393-111210-DD-030*	*VAS-56393-111210-DD-028*	*VAS-56393-111210-DD-024*
Sample Date:				*11/15/2010*	*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:				**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**	**(19-24) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* (1)			*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters - Continued							
Turbidity (field)	NTU				134	17.8	4.64	30.2
Pump Intake	ft bgs				8	13	18	23
Pumping Rate	mg/min				300	85	300	180

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Feet below ground surface.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Feet below ground surface.
J Laboratory qualified as an estimated value.
Concentration exceeds cleanup criteria (1).

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 106*	*MW 106*	*MW 106*	*MW 106*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-021*	*VAS-56393-111210-DD-019*	*VAS-56393-111110-DD-016*	*VAS-56393-111110-DD-014*	
Sample Date:		*11/12/2010*	*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Ground*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Metals						
Aluminum	µg/L	**268[ab]**	**179[ab]**	**1520[ab]**	**3040[ab]**	3040
Antimony	µg/L	0.047 J	0.056	0.144	0.194	0.194
Arsenic	µg/L	1.2	1.0	6.2	7.7	18.3
Barium	µg/L	82.6	84.2	111	155	693
Beryllium	µg/L	0.010 J	0.020 U	0.115	0.269	0.269
Cadmium	µg/L	0.013 J	0.021	0.06	0.191	0.191
Chromium	µg/L	2.14	1.95	**17.2[c]**	**43.4[c]**	43.4
Cobalt	µg/L	0.660	1.300	3.35	5.77	5.77
Copper	µg/L	2.08	1.89	13.8	**28.4[c]**	28.4
Iron	µg/L	**1680[ab]**	**1460[ab]**	**11900[ab]**	**27600[ab]**	29000
Lead	µg/L	1.250	0.876	**10.6[ab]**	**20.9[ab]**	20.9
Magnesium	µg/L	26200	25700	32300	42300	42300
Manganese	µg/L	**103[ab]**	**313[ab]**	**424[ab]**	**579[ab]**	1290
Mercury	µg/L	0.20 U	0.20 U	**0.02 J[c]**	**0.09 J[c]**	0.09
Nickel	µg/L	2.19	3.59	10.6	22.6	22.6
Selenium	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	N/A
Silver	µg/L	0.020 U	0.020 U	0.017 J	0.041	0.041
Sodium	µg/L	21500	21800	24700	40400	40400
Thallium	µg/L	0.016 J	0.040	0.065	0.089	0.089
Vanadium	µg/L	1.04	0.69	**4.58[a]**	**8.03[a]**	8.03
Zinc	µg/L	6.0	4.5	30.6	69.4	69.4
PCBs						
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.039 U	0.040 U	0.040 U	0.040 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1254 (PCB-1254)	µg/L	0.012 J	0.019 J	0.069	0.15	0.15
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 106*	*MW 106*	*MW 106*	*MW 106*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-021*	*VAS-56393-111210-DD-019*	*VAS-56393-111110-DD-016*	*VAS-56393-111110-DD-014*	
Sample Date:		*11/12/2010*	*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Ground*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Volatile Organic Compounds						
Acetone	µg/L	20 U	20 U	20 U	20 U	5.5
Benzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.3
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 106*	*MW 106*	*MW 106*	*MW 106*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-021*	*VAS-56393-111210-DD-019*	*VAS-56393-111110-DD-016*	*VAS-56393-111110-DD-014*	
Sample Date:		*11/12/2010*	*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Ground*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Volatile Organic Compounds - Continued						
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.08
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.06 J	0.65	0.51	0.35 J	2.3
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	0.15 J	0.16 J	0.12 J	0.50 U	0.19
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.1
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.23
Field Parameters						
Conductivity, field	mS/cm	0.677	0.688	0.710	0.785	1.205
Dissolved oxygen (DO), field	mg/L	1.7	1.71	1.39	1.26	1.71
Oxidation reduction potential (ORP), field	millivolts	-43	-64	1	23	23
pH, field	s.u.	7.12	7.21	7.87	7.79	7.87
Temperature, field	Deg C	12.61	11.97	13.19	12.76	18.38

TABLE 7.6

MW-106
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 106*	*MW 106*	*MW 106*	*MW 106*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-021*	*VAS-56393-111210-DD-019*	*VAS-56393-111110-DD-016*	*VAS-56393-111110-DD-014*	
Sample Date:		*11/12/2010*	*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(24-29) ft bgs**	**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Ground*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Field Parameters - Continued						
Turbidity (field)	NTU	67.9	1000 U	1000 U	1000 U	134
Pump Intake	ft bgs	28	33	38	43	43
Pumping Rate	mg/min	250	300	300	300	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-(
Cleanup Criteria - applicable with the time VAS sampling was comp
a Residential and Commercial I Drinking Water.
b Feet below ground surface.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Feet below ground surface.
J Laboratory qualified as an estimated value.
Concentration exceeds cleanup criteria (1).

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 107*	*MW 107*	*MW 107*
Sample Identification:					*VAS-56393-111510-DD-032*	*VAS-56393-111210-DD-029*	*VAS-56393-111210-DD-025*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*
	Units	*a*	*b*	*c*			
Metals							
Aluminum	µg/L	50	50		**68.3[ab]**	**2910[ab]**	**1140[ab]**
Antimony	µg/L	6	6	130	0.075	0.209	0.133
Arsenic	µg/L	10	10	150	0.9	3.4	2.6
Barium	µg/L	2000	2000	1400	215	141	111
Beryllium	µg/L	4	4	41	0.020 U	0.285	0.099
Cadmium	µg/L	5	5	5.1	0.047	0.212	0.067
Chromium	µg/L	100	100	11	1.60	**41.7[c]**	**30.3[c]**
Cobalt	µg/L	40	100	100	4.310	8.360	3.700
Copper	µg/L	1000	1000	23	1.74	**27.6[c]**	10.7
Iron	µg/L	300	300		**985[ab]**	**26600[ab]**	**10800[ab]**
Lead	µg/L	4	4	34	0.439	**16.9[ab]**	**5.330[ab]**
Magnesium	µg/L	400000	1100000		30000	47000	35600
Manganese	µg/L	50	50	5200	**3980[ab]**	**1810[ab]**	**721[ab]**
Mercury	µg/L	2	2	0.0013	0.20 U	**0.02 J[c]**	0.20 U
Nickel	µg/L	100	100	130	10.7	35.7	24.2
Selenium	µg/L	50	50	5	1.0 U	0.3 J	1.0 U
Silver	µg/L	34	98	0.2	0.009 J	0.017 J	0.013 J
Sodium	µg/L	120000	350000		21700	23200	23400
Thallium	µg/L	2	2	3.7	0.055	0.296	0.116
Vanadium	µg/L	4.5	62	12	0.47	**9.86[a]**	4.22
Zinc	µg/L	2400	5000	310	6.2	57.9	24.5
PCBs							
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 107*	*MW 107*	*MW 107*
Sample Identification:					*VAS-56393-111510-DD-032*	*VAS-56393-111210-DD-029*	*VAS-56393-111210-DD-025*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds							
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.33 J	0.50 U	0.50 U
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 107*	*MW 107*	*MW 107*
Sample Identification:					*VAS-56393-111510-DD-032*	*VAS-56393-111210-DD-029*	*VAS-56393-111210-DD-025*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*
	Units	*a*	*b*	*c*			
Volatile Organic Compounds - Continued							
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.080 J	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	1.8	0.50 U	0.11 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	0.070 J	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.090 J	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.22 J	0.50 U	0.50 U
Field Parameters							
Conductivity, field	mS/cm				0.905	0.777	0.750
Dissolved oxygen (DO), field	mg/L				0.16	0.67	1.28
Oxidation reduction potential (ORP), field	millivolts				5	37	15
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	6.87	7.63	7.76
Temperature, field	Deg C				11.76	14.62	14.14

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 107*	*MW 107*	*MW 107*
Sample Identification:					*VAS-56393-111510-DD-032*	*VAS-56393-111210-DD-029*	*VAS-56393-111210-DD-025*
Sample Date:					*11/15/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:					**(4-9) ft bgs**	**(9-14) ft bgs**	**(14-19) ft bgs**
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*
	Units	*a*	*b*	*c*			
Field Parameters - Continued							
Turbidity (field)	NTU				9.24	157	376
Pump Intake	ft bgs				8	13	18
Pumping Rate	mg/min				350	250	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Feet below ground surface.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*
Sample Identification:		*VAS-56393-111210-DD-022*	*VAS-56393-111210-DD-023*	*VAS-56393-111210-DD-020*
Sample Date:		*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:		**(19-24) ft bgs**	**(19-24) ft bgs**	**(24-29) ft bgs**
Screen Depth:	*Groundwater Units*	*(20.4-24) ft bgs*	*(20.4-24) ft bgs*	*(25.4-29) ft bgs*
Metals				
Aluminum	µg/L	8.5	8.9	48.6
Antimony	µg/L	0.054	0.050 J	0.049 J
Arsenic	µg/L	0.2 J	0.3 J	0.4 J
Barium	µg/L	76.8	77.1	76.8
Beryllium	µg/L	0.020 U	0.020 U	0.020 U
Cadmium	µg/L	0.008 J	0.012 J	0.008 J
Chromium	µg/L	0.23	0.30	1.61
Cobalt	µg/L	1.610	1.660	1.790
Copper	µg/L	0.46	0.63	1.24
Iron	µg/L	149	146	**734[ab]**
Lead	µg/L	0.032	0.043	0.187
Magnesium	µg/L	26000	25500	26000
Manganese	µg/L	**359[ab]**	**370[ab]**	**259[ab]**
Mercury	µg/L	0.20 U	0.20 U	0.20 U
Nickel	µg/L	3.92	4.14	3.87
Selenium	µg/L	1.0 U	1.0 U	1.0 U
Silver	µg/L	0.020 U	0.004 J	0.020 U
Sodium	µg/L	23500	23100	23400
Thallium	µg/L	0.041	0.050	0.026
Vanadium	µg/L	0.09 J	0.10 J	0.20
Zinc	µg/L	1.2	1.8	6.9
PCBs				
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.039 U	0.039 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*
Sample Identification:		*VAS-56393-111210-DD-022*	*VAS-56393-111210-DD-023*	*VAS-56393-111210-DD-020*
Sample Date:		*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:		**(19-24) ft bgs**	**(19-24) ft bgs**	**(24-29) ft bgs**
Screen Depth:	*Groundwater Units*	*(20.4-24) ft bgs*	*(20.4-24) ft bgs*	*(25.4-29) ft bgs*
Volatile Organic Compounds				
Acetone	µg/L	20 U	20 U	20 U
Benzene	µg/L	0.50 U	0.50 U	0.07 J
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*
Sample Identification:		*VAS-56393-111210-DD-022*	*VAS-56393-111210-DD-023*	*VAS-56393-111210-DD-020*
Sample Date:		*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:		**(19-24) ft bgs**	**(19-24) ft bgs**	**(24-29) ft bgs**
Screen Depth:	*Groundwater Units*	*(20.4-24) ft bgs*	*(20.4-24) ft bgs*	*(25.4-29) ft bgs*
Volatile Organic Compounds - Continued				
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	20 U	20 U	20 U
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U
Styrene	µg/L	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U
Toluene	µg/L	0.37 J	0.4 J	0.15 J
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U
Field Parameters				
Conductivity, field	mS/cm	0.744	0.744	0.732
Dissolved oxygen (DO), field	mg/L	1.52	1.52	1.52
Oxidation reduction potential (ORP), field	millivolts	22	22	-19
pH, field	s.u.	7.81	7.81	7.89
Temperature, field	Deg C	13.12	13.12	11.89

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*
Sample Identification:		*VAS-56393-111210-DD-022*	*VAS-56393-111210-DD-023*	*VAS-56393-111210-DD-020*
Sample Date:		*11/12/2010*	*11/12/2010*	*11/12/2010*
Sample Depth:		**(19-24) ft bgs**	**(19-24) ft bgs**	**(24-29) ft bgs**
Screen Depth:	*Groundı*	*(20.4-24) ft bgs*	*(20.4-24) ft bgs*	*(25.4-29) ft bgs*
	Units			
Field Parameters - Continued				
Turbidity (field)	NTU	3.01	3.01	1000 U
Pump Intake	ft bgs	23	23	28
Pumping Rate	mg/min	300	300	250

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Cc
Criteria - applicable with the time VAS sampling was completed perfo:

a Feet below ground surface.

b Industrial and Commercial II, III, IV Drinking Water.

c Groundwater Surface Water Interface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Laboratory qualified as an estimated value.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-018*	*VAS-56393-111110-DD-015*	*VAS-56393-111110-DD-013*	
Sample Date:		*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Groundı*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units				
Metals					
Aluminum	µg/L	**88.2[ab]**	**1670[ab]**	**1310[ab]**	2910
Antimony	µg/L	0.064	0.167	0.21	0.21
Arsenic	µg/L	0.8	3.9	3.4	3.9
Barium	µg/L	86.0	126	123	215
Beryllium	µg/L	0.020 U	0.13	0.113	0.285
Cadmium	µg/L	0.012 J	0.13	0.129	0.212
Chromium	µg/L	1.37	**19.1[c]**	**34.5[c]**	41.7
Cobalt	µg/L	1.560	5.46	8.47	8.47
Copper	µg/L	1.70	19.9	**27.5[c]**	27.6
Iron	µg/L	**1250[ab]**	**16300[ab]**	**16800[ab]**	26600
Lead	µg/L	0.494	**10.2[ab]**	**7.25[ab]**	16.9
Magnesium	µg/L	26700	42600	44800	47000
Manganese	µg/L	**228[ab]**	**685[ab]**	**1030[ab]**	3980
Mercury	µg/L	0.20 U	0.20 U	0.20 U	0.02
Nickel	µg/L	3.89	14.7	25.6	35.7
Selenium	µg/L	1.0 U	1.0 U	1.0 U	0.3
Silver	µg/L	0.020 U	0.013 J	0.025	0.025
Sodium	µg/L	25400	32700	33300	33300
Thallium	µg/L	0.028	0.135	0.139	0.296
Vanadium	µg/L	0.47	**6.49[a]**	**4.55[a]**	9.86
Zinc	µg/L	4.7	56.8	197	197
PCBs					
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.040 U	0.040 U	0.050 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	N/A

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-018*	*VAS-56393-111110-DD-015*	*VAS-56393-111110-DD-013*	
Sample Date:		*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Groundt*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units				
Volatile Organic Compounds					
Acetone	µg/L	20 U	20 U	20 U	N/A
Benzene	µg/L	0.06 J	0.07 J	0.12 J	0.33
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	N/A
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	N/A
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-018*	*VAS-56393-111110-DD-015*	*VAS-56393-111110-DD-013*	
Sample Date:		*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Groundwater Units*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
Volatile Organic Compounds - Continued					
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.50 U	0.50 U	0.06 J	0.08
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.28 J	0.39 J	0.73	1.8
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	0.50 U	0.09 J	0.08 J	0.09
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	0.07
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.09
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U	0.22
Field Parameters					
Conductivity, field	mS/cm	0.754	0.869	0.874	0.905
Dissolved oxygen (DO), field	mg/L	1.81	2.12	1.95	2.12
Oxidation reduction potential (ORP), field	millivolts	-23	-70	-86	37
pH, field	s.u.	7.93	7.16	7.20	7.93
Temperature, field	Deg C	11.4	14.33	15.6	15.6

TABLE 7.7

MW-107
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 107*	*MW 107*	*MW 107*	*Highest Value*
Sample Identification:		*VAS-56393-111210-DD-018*	*VAS-56393-111110-DD-015*	*VAS-56393-111110-DD-013*	
Sample Date:		*11/12/2010*	*11/11/2010*	*11/11/2010*	
Sample Depth:		**(29-34) ft bgs**	**(34-39) ft bgs**	**(39-44) ft bgs**	
Screen Depth:	*Groundı*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units				
Field Parameters - Continued					
Turbidity (field)	NTU	1000 U	1000 U	1000 U	376
Pump Intake	ft bgs	33	38	43	43
Pumping Rate	mg/min	250	300	100	350

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Cc
Criteria - applicable with the time VAS sampling was completed perfo:

a Feet below ground surface.

b Industrial and Commercial II, III, IV Drinking Water.

c Groundwater Surface Water Interface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Laboratory qualified as an estimated value.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 108*	*MW 108*	*MW 108*	*MW 108*	*MW 108*
Sample Identification:					*VAS-56393-111810-DD-076*	*VAS-56393-111810-DD-075*	*VAS-56393-111710-DD-068*	*VAS-56393-111710-DD-069*	*VAS-56393-111710-DD-066*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(4-9) ft bgs	(9-14) ft bgs	(14-19) ft bgs	(14-19) ft bgs	(19-24) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50		12.6	13.2	19.0	14.2	27.3
Antimony	µg/L	6	6	130	0.089 N	0.047 J,N	0.102 N	0.102 N	0.114 N
Arsenic	µg/L	10	10	150	0.3 J,N	0.2 J,N	0.1 J	0.3 J	0.4 J
Barium	µg/L	2000	2000	1400	88.7	84.6	80.5	81.2	91.8
Beryllium	µg/L	4	4	41	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Cadmium	µg/L	5	5	5.1	0.009 J	0.007 J	0.011 J	0.010 J	0.008 J
Chromium	µg/L	100	100	11	0.48	0.71	0.90	0.46	1.48
Cobalt	µg/L	40	100	100	0.834	0.758	2.070	2.060	4.120
Copper	µg/L	1000	1000	23	0.42	0.57	0.41 N	0.34 N	0.57 N
Iron	µg/L	300	300		84.8	133	166	151	352[ab]
Lead	µg/L	4	4	34	0.052	0.051	0.051	0.047	0.137
Magnesium	µg/L	400000	1100000		26400	25400	26700	26700	26000
Manganese	µg/L	50	50	5200	447[ab]	332[ab]	790[ab]	790[ab]	948[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	3.04	3.76	7.62 N	7.41 N	8.90 N
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	0.5 J,N	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000		21800	22900	23000	23100	22600
Thallium	µg/L	2	2	3.7	0.042	0.060	0.090	0.092	0.077
Vanadium	µg/L	4.5	62	12	0.24	0.18 J	0.07 J	0.13 J	0.21
Zinc	µg/L	2400	5000	310	1.9	4.0	2.6	2.9	2.3
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.039 U	0.039 U	0.039 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.012 JP	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.10 J	0.50 U	0.15 J	0.15 J	0.080 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 108*	*MW 108*	*MW 108*	*MW 108*	*MW 108*
Sample Identification:					*VAS-56393-111810-DD-076*	*VAS-56393-111810-DD-075*	*VAS-56393-111710-DD-068*	*VAS-56393-111710-DD-069*	*VAS-56393-111710-DD-066*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(4-9) ft bgs	(9-14) ft bgs	(14-19) ft bgs	(14-19) ft bgs	(19-24) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*					
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.070 J	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.080 J	0.50 U	0.10 J	0.090 J	0.050 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.26 J	0.15 J	0.29 J	0.31 J	0.20 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 108*	*MW 108*	*MW 108*	*MW 108*	*MW 108*
Sample Identification:					*VAS-56393-111810-DD-076*	*VAS-56393-111810-DD-075*	*VAS-56393-111710-DD-068*	*VAS-56393-111710-DD-069*	*VAS-56393-111710-DD-066*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(4-9) ft bgs	(9-14) ft bgs	(14-19) ft bgs	(14-19) ft bgs	(19-24) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(5.4-9) ft bgs*	*(10.4-14) ft bgs*	*(15.4-19) ft bgs*	*(15.4-19) ft bgs*	*(20.4-24) ft bgs*
	Units	*a*	*b*	*c*					
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.11 J	0.50 U	0.13 J	0.13 J	0.50 U
Field Parameters									
Conductivity, field	mS/cm				0.751	0.721	0.723	0.723	0.716
Dissolved oxygen (DO), field	mg/L				3.24	2.02	0.9	0.9	1.34
Oxidation reduction potential (ORP), field	millivolts				9	-26	-78	-78	-70
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.33	7.27	7.43	7.43	7.37
Temperature, field	Deg C				11.2	12.14	12.63	12.63	12.51
Turbidity (field)	NTU				2.45	5.13	8.8	8.8	9.33
Pump Intake	ft bgs				8	13	18	18	23
Pumping Rate	mg/min				100	225	200	200	150

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Feet below ground surface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Feet below ground surface.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 108*	*MW 108*	*MW 108*	*MW 108*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-064*	*VAS-56393-111710-DD-062*	*VAS-56393-111710-DD-060*	*VAS-56393-111710-DD-056*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(24-29) ft bgs	(29-34) ft bgs	(34-39) ft bgs	(39-44) ft bgs	
Screen Depth:	*Groundi*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Metals						
Aluminum	µg/L	55.4[ab]	554[ab]	45.7	2770[ab]	2770
Antimony	µg/L	0.076 N	0.097 N	0.097 N	0.166 N	0.166
Arsenic	µg/L	0.9	14.8[ab]	0.4 J	9.2	14.8
Barium	µg/L	88.0	131	128	614	614
Beryllium	µg/L	0.020 U	0.052	0.020 U	0.276	0.276
Cadmium	µg/L	0.011 J	0.042	0.010 J	0.392	0.392
Chromium	µg/L	0.99	5.24	1.13	62.7[c]	62.7
Cobalt	µg/L	2.700	3.780	1.600	16.0	16
Copper	µg/L	0.88 N	5.74 N	0.79 N	38.8 N[c]	38.8
Iron	µg/L	696[ab]	10500[ab]	2060[ab]	28000[ab]	28000
Lead	µg/L	0.331	5.280[ab]	0.162	13.0[ab]	13
Magnesium	µg/L	26000	29000	29400	124000	124000
Manganese	µg/L	393[ab]	530[ab]	313[ab]	3750[ab]	3750
Mercury	µg/L	0.20 U	0.20 U	0.20 U	0.05 J[c]	0.05
Nickel	µg/L	5.54 N	7.04 N	7.02 N	43.8 N	43.8
Selenium	µg/L	1.0 U	0.3 J,N	0.4 J,N	1.0 U	0.5
Silver	µg/L	0.020 U	0.006 J	0.020 U	0.020	0.02
Sodium	µg/L	23000	26600	42200	57700	57700
Thallium	µg/L	0.057	0.127	0.048	0.381	0.381
Vanadium	µg/L	0.35	2.92	0.27	8.06[a]	8.06
Zinc	µg/L	4.8	25.4	5.4	166	166
PCBs						
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.039 U	0.039 U	0.039 U	0.039 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.012
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.0074 J	0.0059 J	0.039	0.039
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Volatile Organic Compounds						
Acetone	µg/L	20 U	20 U	20 U	20 U	N/A
Benzene	µg/L	0.50 U	0.090 J	0.50 U	0.14 J	0.15
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	0.13 J	0.13
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 108*	*MW 108*	*MW 108*	*MW 108*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-064*	*VAS-56393-111710-DD-062*	*VAS-56393-111710-DD-060*	*VAS-56393-111710-DD-056*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(24-29) ft bgs	(29-34) ft bgs	(34-39) ft bgs	(39-44) ft bgs	
Screen Depth:	*Ground*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.07
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.16 J	0.16
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.50 U	0.50 U	0.50 U	0.11 J	0.11
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U	0.17 J	0.17
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.11 J	0.14 J	0.060 J	0.41 J	0.41
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,1-Trichloroethane	µg/L	0.50 U	0.50 U	0.32 J	0.50 U	0.32
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.8

MW-108
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 108*	*MW 108*	*MW 108*	*MW 108*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-064*	*VAS-56393-111710-DD-062*	*VAS-56393-111710-DD-060*	*VAS-56393-111710-DD-056*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(24-29) ft bgs	(29-34) ft bgs	(34-39) ft bgs	(39-44) ft bgs	
Screen Depth:	*Groundi*	*(25.4-29) ft bgs*	*(30.4-34) ft bgs*	*(35.4-39) ft bgs*	*(40.4-44) ft bgs*	
	Units					
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	0.070 J	0.07
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U	0.15 J	0.15
Field Parameters						
Conductivity, field	mS/cm	0.696	0.715	0.875	0.966	0.966
Dissolved oxygen (DO), field	mg/L	1.73	1.64	1.22	0.33	3.24
Oxidation reduction potential (ORP), field	millivolts	-52	-67	-109	-125	9
pH, field	s.u.	7.40	7.37	7.25	7.28	7.43
Temperature, field	Deg C	12.7	12.99	12.26	10.9	12.99
Turbidity (field)	NTU	49.8	1000 U	23.4	1000 U	49.8
Pump Intake	ft bgs	28	33	38	43	43
Pumping Rate	mg/min	200	200	200	200	225

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-C
Cleanup Criteria - applicable with the time VAS sampling was comple

a Residential and Commercial I Drinking Water.

b Industrial and Commercial II, III, IV Drinking Water.

c Feet below ground surface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Feet below ground surface.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 109*	*MW 109*	*MW 109*	*MW 109*	*MW 109*
Sample Identification:					*VAS-56393-111810-DD-077*	*VAS-56393-111810-DD-074*	*VAS-56393-111710-DD-070*	*VAS-56393-111710-DD-067*	*VAS-56393-111710-DD-065*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(7-12) ft bgs	(12-17) ft bgs	(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50		686[ab]	302[ab]	48.4	68.2[ab]	198[ab]
Antimony	µg/L	6	6	130	0.079 N	0.083 N	0.078 N	0.069 N	0.120 N
Arsenic	µg/L	10	10	150	1.0	0.8	0.5 J	0.4 J	0.8
Barium	µg/L	2000	2000	1400	94.7	74.7	67.4	75.0	80.1
Beryllium	µg/L	4	4	41	0.043	0.022	0.020 U	0.008 J	0.020 U
Cadmium	µg/L	5	5	5.1	0.112	0.031	0.021	0.018 J	0.013 J
Chromium	µg/L	100	100	11	2.26	2.01	0.72	0.81	2.43
Cobalt	µg/L	40	100	100	2.060	2.100	1.340	1.410	3.570
Copper	µg/L	1000	1000	23	3.49	1.88	0.87 N	1.19 N	2.00 N
Iron	µg/L	300	300		2160[ab]	1430[ab]	327[ab]	555[ab]	1470[ab]
Lead	µg/L	4	4	34	1.920	0.897	0.162	0.232	0.663
Magnesium	µg/L	400000	1100000		32200	29200	27300	26100	27400
Manganese	µg/L	50	50	5200	1280[ab]	716[ab]	506[ab]	398[ab]	635[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	9.75	9.54	7.02 N	6.16 N	9.61 N
Selenium	µg/L	50	50	5	1.0 U	1.0 U	0.3 J,N	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.005 J	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000		17900	22200	23200	22000	23300
Thallium	µg/L	2	2	3.7	0.141	0.142	0.086	0.067	0.050
Vanadium	µg/L	4.5	62	12	1.96	1.16	0.28	0.32	0.64
Zinc	µg/L	2400	5000	310	13.9	17.7	10.6	12.2	21.5
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.040 U	0.062 U	0.040 U	0.039 U	0.039 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.031 U	0.020 U	0.020 U	0.020 U
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.12 J	0.070 J	0.12 J
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 109*	*MW 109*	*MW 109*	*MW 109*	*MW 109*
Sample Identification:					*VAS-56393-111810-DD-077*	*VAS-56393-111810-DD-074*	*VAS-56393-111710-DD-070*	*VAS-56393-111710-DD-067*	*VAS-56393-111710-DD-065*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(7-12) ft bgs	(12-17) ft bgs	(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*
	Units	*a*	*b*	*c*					
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.50 U	0.11 J	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.50 U	0.50 U	0.060 J	0.50 U	0.070 J
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.50 U	0.16 J	0.23 J	0.14 J	0.26 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 109*	*MW 109*	*MW 109*	*MW 109*	*MW 109*
Sample Identification:					*VAS-56393-111810-DD-077*	*VAS-56393-111810-DD-074*	*VAS-56393-111710-DD-070*	*VAS-56393-111710-DD-067*	*VAS-56393-111710-DD-065*
Sample Date:					*11/18/2010*	*11/18/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*
Sample Depth:					(7-12) ft bgs	(12-17) ft bgs	(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(8.4-12) ft bgs*	*(13.4-17) ft bgs*	*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*
	Units	*a*	*b*	*c*					
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.11 J	0.50 U	0.11 J
Field Parameters									
Conductivity, field	mS/cm				0.963	0.805	0.729	0.701	0.693
Dissolved oxygen (DO), field	mg/L				0.64	5.28	1	1.39	1.01
Oxidation reduction potential (ORP), field	millivolts				50	79	-10	-1	-61
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	6.81	7.19	7.31	7.37	7.56
Temperature, field	Deg C				10.84	8.94	11.89	12.11	12.44
Turbidity (field)	NTU				105	216	9.42	26.9	62.3
Pump Intake	ft bgs				11	16	21	26	31
Pumping Rate	mg/min				200	< 50	200	180	200

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Residential and Commercial I Drinking Water.
b Industrial and Commercial II, III, IV Drinking Water.
c Feet below ground surface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Feet below ground surface.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 109*	*MW 109*	*MW 109*	*MW 109*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-063*	*VAS-56393-111710-DD-061*	*VAS-56393-111710-DD-057*	*VAS-56393-111710-DD-058*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(32-37) ft bgs	(37-42) ft bgs	(42-47) ft bgs	(42-47) ft bgs	Highest Value
Screen Depth:	*Groundı*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units					
Metals						
Aluminum	µg/L	4560[ab]	8120[ab]	1040[ab]	1010[ab]	8120
Antimony	µg/L	0.190 N	0.229 N	0.142 N	0.134 N	0.229
Arsenic	µg/L	4.7	5.7	2.2	2.2	5.7
Barium	µg/L	194	290	99.6	96.0	290
Beryllium	µg/L	0.463	0.779	0.092	0.063	0.779
Cadmium	µg/L	0.220	0.398	0.066	0.040	0.398
Chromium	µg/L	42.1[c]	85.3[c]	16.7[c]	14.7[c]	85.3
Cobalt	µg/L	14.4	19.6	4.100	3.720	19.6
Copper	µg/L	38.7 N[c]	71.8 N[c]	12.9 N	10.7 N	71.8
Iron	µg/L	38200[ab]	62300[ab]	9500[ab]	8240[ab]	62300
Lead	µg/L	21.9[ab]	37.6[abc]	3.870	3.270	37.6
Magnesium	µg/L	60400	87100	32100	30300	87100
Manganese	µg/L	1770[ab]	2910[ab]	529[ab]	459[ab]	2910
Mercury	µg/L	0.06 J[c]	0.11 J[c]	0.20 U	0.20 U	0.11
Nickel	µg/L	31.9 N	56.5 N	14.7 N	13.4 N	56.5
Selenium	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	0.3
Silver	µg/L	0.029	0.051	0.018 J	0.011 J	0.051
Sodium	µg/L	24300	25500	32600	32000	32600
Thallium	µg/L	0.279	0.424	0.071	0.066	0.424
Vanadium	µg/L	11.1[a]	15.0[ac]	3.04	2.76	15
Zinc	µg/L	309	719[c]	175	144	719
PCBs						
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.039 U	0.039 U	0.039 U	0.039 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Volatile Organic Compounds						
Acetone	µg/L	20 U	20 U	20 U	20 U	N/A
Benzene	µg/L	0.14 J	0.15 J	0.070 J	0.070 J	0.15
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 109*	*MW 109*	*MW 109*	*MW 109*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-063*	*VAS-56393-111710-DD-061*	*VAS-56393-111710-DD-057*	*VAS-56393-111710-DD-058*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(32-37) ft bgs	(37-42) ft bgs	(42-47) ft bgs	(42-47) ft bgs	Highest Value
Screen Depth:	*Groundwater Units*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.11
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.090 J	0.10 J	0.060 J	0.50 U	0.1
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.32 J	0.34 J	0.25 J	0.24 J	0.34
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A

TABLE 7.9

MW-109
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 109*	*MW 109*	*MW 109*	*MW 109*	*Highest Value*
Sample Identification:		*VAS-56393-111710-DD-063*	*VAS-56393-111710-DD-061*	*VAS-56393-111710-DD-057*	*VAS-56393-111710-DD-058*	
Sample Date:		*11/17/2010*	*11/17/2010*	*11/17/2010*	*11/17/2010*	
Sample Depth:		(32-37) ft bgs	(37-42) ft bgs	(42-47) ft bgs	(42-47) ft bgs	Highest Value
Screen Depth:	*Groundı*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	
	Units					
1,1,1-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L	0.11 J	0.13 J	0.50 U	0.50 U	0.13
Field Parameters						
Conductivity, field	mS/cm	0.685	0.683	0.692	0.692	0.963
Dissolved oxygen (DO), field	mg/L	1.16	1.02	0.67	0.67	5.28
Oxidation reduction potential (ORP), field	millivolts	-57	-64	-99	-99	79
pH, field	s.u.	7.55	7.50	7.60	7.60	7.6
Temperature, field	Deg C	12.39	11.61	9.71	9.71	12.44
Turbidity (field)	NTU	1000 U	1000 U	1000 U	1000 U	216
Pump Intake	ft bgs	36	41	46	46	46
Pumping Rate	mg/min	200	200	200	200	200

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-C
Cleanup Criteria - applicable with the time VAS sampling was comple

a Residential and Commercial I Drinking Water.

b Industrial and Commercial II, III, IV Drinking Water.

c Feet below ground surface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Feet below ground surface.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 110*	*MW 110*	*MW 110*	*MW 110*	*MW 110*
Sample Identification:					*VAS-56393-111910-DD-096*	*VAS-56393-111910-DD-094*	*VAS-56393-111910-DD-092*	*VAS-56393-111910-DD-090*	*VAS-56393-111910-DD-088*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs	(32-37) ft bgs	(37-42) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [(1)]				*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50		12.9	211[ab]	5.1	72.7[ab]	18.5
Antimony	µg/L	6	6	130	0.035 J,N	0.057 N	0.033 J,N	0.043 J,N	0.044 J,N
Arsenic	µg/L	10	10	150	0.2 J,N	0.8 N	0.1 J,N	0.5 N	0.2 J,N
Barium	µg/L	2000	2000	1400	72.0	80.5	76.7	81.0	89.1
Beryllium	µg/L	4	4	41	0.020 U	0.006 J	0.020 U	0.020 U	0.020 U
Cadmium	µg/L	5	5	5.1	0.018 J	0.036	0.016 J	0.022	0.008 J
Chromium	µg/L	100	100	11	0.38	1.57	0.62	1.88	0.33
Cobalt	µg/L	40	100	100	0.312	0.873	0.430	0.648	0.759
Copper	µg/L	1000	1000	23	0.74	3.30	0.81	1.60	0.89
Iron	µg/L	300	300		70.3	1610[ab]	73.2	666[ab]	273
Lead	µg/L	4	4	34	0.055	0.953	0.020 J	0.378	0.080
Magnesium	µg/L	400000	1100000		26800	29000	25700	26200	25300
Manganese	µg/L	50	50	5200	98.2[ab]	202[ab]	130[ab]	203[ab]	79.8[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	2.49	24.6	3.97	9.60	2.43
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.005 J	0.007 J
Sodium	µg/L	120000	350000		23400	23000	23000	23200	23400
Thallium	µg/L	2	2	3.7	0.045	0.066	0.058	0.053	0.022
Vanadium	µg/L	4.5	62	12	0.11 J	0.91	0.08 J	0.33	0.15 J
Zinc	µg/L	2400	5000	310	3.5	14.5	4.7	13.4	6.7
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1221 (PCB-1221)	µg/L	0.5	0.5	0.2	0.039 U	0.040 U	0.039 U	0.039 U	0.040 U
Aroclor-1232 (PCB-1232)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1242 (PCB-1242)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1248 (PCB-1248)	µg/L	0.5	0.5	0.2	0.0024 J	0.0036 J	0.0020 JP	0.020 U	0.020 U
Aroclor-1254 (PCB-1254)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Aroclor-1260 (PCB-1260)	µg/L	0.5	0.5	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	20 U	20 U	20 U	20 U	20 U
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	20 U	20 U	20 U	20 U	20 U
N-Butylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	800	2300	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	µg/L	100	100	47	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 110*	*MW 110*	*MW 110*	*MW 110*	*MW 110*
Sample Identification:					*VAS-56393-111910-DD-096*	*VAS-56393-111910-DD-094*	*VAS-56393-111910-DD-092*	*VAS-56393-111910-DD-090*	*VAS-56393-111910-DD-088*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs	(32-37) ft bgs	(37-42) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* [1]				*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*					
Chlorobromomethane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	µg/L	430	1700	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
Chloroform (Trichloromethane)	µg/L	80	80	170	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 U	0.080 J	0.50 U	0.50 U	0.50 U
2-Chlorotoluene	µg/L	150	420	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chlorotoluene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Cymene (p-Isopropyltoluene)	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	80	80	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	0.2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dibromomethane	µg/L	80	230		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichlorobenzene	µg/L	600	600	16	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	µg/L	6.6	19	38	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	µg/L	75	75	13	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	µg/L	880	2500	740	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	µg/L	5	5	360	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	µg/L	7	7	65	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	µg/L	5	5	290	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethylbenzene	µg/L	74	74	18	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	µg/L	15	42	0.05	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	µg/L	1000	2900		20 U	20 U	20 U	20 U	20 U
Isopropyl benzene	µg/L	800	2300	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	1800	5200	ID	20 U	20 U	20 U	20 U	20 U
Methylene chloride	µg/L	5	5	940	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Naphthalene	µg/L	520	1500	13	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
N-Propylbenzene	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	µg/L	100	100	80	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	µg/L	80	230		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID,X	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	µg/L	5	5	45	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	µg/L	790	790	140	0.080 J	0.080 J	0.060 J	0.080 J	0.070 J
1,2,4-Trichlorobenzene	µg/L	70	70	30	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichlorobenzene	µg/L				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:					*MW 110*	*MW 110*	*MW 110*	*MW 110*	*MW 110*
Sample Identification:					*VAS-56393-111910-DD-096*	*VAS-56393-111910-DD-094*	*VAS-56393-111910-DD-092*	*VAS-56393-111910-DD-090*	*VAS-56393-111910-DD-088*
Sample Date:					*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*	*11/19/2010*
Sample Depth:					(17-22) ft bgs	(22-27) ft bgs	(27-32) ft bgs	(32-37) ft bgs	(37-42) ft bgs
Screen Depth:	*Groundwater Cleanup Criteria* (1)				*(18.4-22) ft bgs*	*(23.4-27) ft bgs*	*(28.4-32) ft bgs*	*(33.4-37) ft bgs*	*(38.4-42) ft bgs*
	Units	*a*	*b*	*c*					
1,1,1-Trichloroethane	µg/L	200	200	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Volatile Organic Compounds - Continued									
1,2,3-Trichloropropane	µg/L	42	120		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	2	2	15	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	µg/L	280	280	35	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m&p-Xylenes	µg/L				0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Field Parameters									
Conductivity, field	mS/cm				0.741	0.718	0.716	0.704	0.618
Dissolved oxygen (DO), field	mg/L				2.21	3.04	2.67	2.16	2.74
Oxidation reduction potential (ORP), field	millivolts				86	49	54	38	-38
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	6.5 - 9.0	7.23	7.27	7.29	7.42	7.63
Temperature, field	Deg C				11.35	11.78	10.25	10.32	8.43
Turbidity (field)	NTU				6.56	75.9	3.91	39.4	1000 U
Pump Intake	ft bgs				21	26	31	36	41
Pumping Rate	mg/min				200	300	220	300	200

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-Commercial Generic Cleanup Criteria - applicable with the time VAS sampling was completed performed.
a Feet below ground surface.
b Industrial and Commercial II, III, IV Drinking Water.
c Groundwater Surface Water Interface.
ft bgs Feet below ground surface.
U Not present at or above the associated value.
J Laboratory qualified as an estimated value.
Concentration exceeds cleanup criteria (1).
Highest concentration observed for associated analyte.

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 110*	*MW 110*	*MW 110*	*MW 110*	*Highest Value*
Sample Identification:		*VAS-56393-111810-DD-082*	*VAS-56393-111810-DD-083*	*VAS-56393-111810-DD-080*	*VAS-56393-111810-DD-078*	
Sample Date:		*11/18/2010*	*11/18/2010*	*11/18/2010*	*11/18/2010*	
Sample Depth:		(42-47) ft bgs	(42-47) ft bgs	(47-52) ft bgs	(52-57) ft bgs	
Screen Depth:	*Groundwater Units*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	*(48.4-52) ft bgs*	*(53.4-57) ft bgs*	
Metals						
Aluminum	µg/L	5.8	5.0	17.7	1440[ab]	1440
Antimony	µg/L	0.053 N	0.054 N	0.042 J,N	0.191 N	0.191
Arsenic	µg/L	0.2 J,N	0.2 J,N	0.1 J,N	4.2	4.2
Barium	µg/L	88.5	88.0	88.6	114	114
Beryllium	µg/L	0.020 U	0.020 U	0.020 U	0.109	0.109
Cadmium	µg/L	0.008 J	0.010 J	0.007 J	0.118	0.118
Chromium	µg/L	0.45	0.42	0.82	18.1[c]	18.1
Cobalt	µg/L	0.787	0.797	1.810	4.660	4.66
Copper	µg/L	0.60	0.66	0.88	17.6	17.6
Iron	µg/L	88.3	78.7	202	11900[ab]	11900
Lead	µg/L	0.024	0.026	0.105	7.660[ab]	7.66
Magnesium	µg/L	24800	24600	24800	34300	34300
Manganese	µg/L	82.8[ab]	80.1[ab]	122[ab]	762[ab]	762
Mercury	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	N/A
Nickel	µg/L	2.97	2.60	2.64	19.1	24.6
Selenium	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	N/A
Silver	µg/L	0.020 U	0.020 U	0.020 U	0.012 J	0.012
Sodium	µg/L	22700	22100	22700	22500	23400
Thallium	µg/L	0.018 J	0.017 J	0.016 J	0.152	0.152
Vanadium	µg/L	0.13 J	0.13 J	0.16 J	4.61[a]	4.61
Zinc	µg/L	3.7	7.9	7.6	191	191
PCBs						
Aroclor-1016 (PCB-1016)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1221 (PCB-1221)	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	N/A
Aroclor-1232 (PCB-1232)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1242 (PCB-1242)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1248 (PCB-1248)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.0036
Aroclor-1254 (PCB-1254)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Aroclor-1260 (PCB-1260)	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	N/A
Volatile Organic Compounds						
Acetone	µg/L	20 U	20 U	20 U	20 U	N/A
Benzene	µg/L	0.50 U	0.50 U	0.50 U	0.080 J	0.08
Bromobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Bromodichloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromoform	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Bromomethane (Methyl bromide)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	20 U	20 U	20 U	20 U	N/A
N-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Carbon disulfide	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Carbon tetrachloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 110*	*MW 110*	*MW 110*	*MW 110*	*Highest Value*
Sample Identification:		*VAS-56393-111810-DD-082*	*VAS-56393-111810-DD-083*	*VAS-56393-111810-DD-080*	*VAS-56393-111810-DD-078*	
Sample Date:		*11/18/2010*	*11/18/2010*	*11/18/2010*	*11/18/2010*	
Sample Depth:		(42-47) ft bgs	(42-47) ft bgs	(47-52) ft bgs	(52-57) ft bgs	
Screen Depth:	*Ground*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	*(48.4-52) ft bgs*	*(53.4-57) ft bgs*	
	Units					
Chlorobromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
Chloroform (Trichloromethane)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Chloromethane (Methyl chloride)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.08
2-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Chlorotoluene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Cymene (p-Isopropyltoluene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromochloromethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Dibromomethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,4-Dichlorobenzene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,2-Dichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,3-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
2,2-Dichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
cis-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
trans-1,3-Dichloropropene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Ethylbenzene	µg/L	0.50 U	0.50 U	0.50 U	0.060 J	0.06
Hexachlorobutadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Hexanone	µg/L	20 U	20 U	20 U	20 U	N/A
Isopropyl benzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	20 U	20 U	20 U	20 U	N/A
Methylene chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Naphthalene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
N-Propylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
2-Phenylbutane (sec-Butylbenzene)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Styrene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
tert-Butylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,1,2,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,1,2-Tetrachloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Tetrachloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Toluene	µg/L	0.080 J	0.090 J	0.070 J	0.20 J	0.2
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,2,3-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A

TABLE 7.10

MW-110
VAS ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location:		*MW 110*	*MW 110*	*MW 110*	*MW 110*	*Highest Value*
Sample Identification:		*VAS-56393-111810-DD-082*	*VAS-56393-111810-DD-083*	*VAS-56393-111810-DD-080*	*VAS-56393-111810-DD-078*	
Sample Date:		*11/18/2010*	*11/18/2010*	*11/18/2010*	*11/18/2010*	
Sample Depth:		(42-47) ft bgs	(42-47) ft bgs	(47-52) ft bgs	(52-57) ft bgs	
Screen Depth:	*Groundi*	*(43.4-47) ft bgs*	*(43.4-47) ft bgs*	*(48.4-52) ft bgs*	*(53.4-57) ft bgs*	
	Units					
1,1,1-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,1,2-Trichloroethane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichloroethene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Trichlorofluoromethane (CFC-11)	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Volatile Organic Compounds - Continued						
1,2,3-Trichloropropane	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
1,3,5-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	N/A
Vinyl chloride	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
o-Xylene	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
m&p-Xylenes	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	N/A
Field Parameters						
Conductivity, field	mS/cm	0.647	0.647	0.668	0.649	0.741
Dissolved oxygen (DO), field	mg/L	1.88	1.88	2.43	0.42	3.04
Oxidation reduction potential (ORP), field	millivolts	11	11	6	-79	86
pH, field	s.u.	7.44	7.44	7.46	7.58	7.63
Temperature, field	Deg C	9.51	9.51	9.91	9.85	11.78
Turbidity (field)	NTU	5.94	5.94	20.3	1000 U	75.9
Pump Intake	ft bgs	46	46	51	56	56
Pumping Rate	mg/min	250	250	200	200	300

Notes:

(1) Michigan Act 451, Part 201 Groundwater: Residential and Industrial-C
Cleanup Criteria - applicable with the time VAS sampling was comple

a Feet below ground surface.

b Industrial and Commercial II, III, IV Drinking Water.

c Groundwater Surface Water Interface.

ft bgs Feet below ground surface.

U Not present at or above the associated value.

J Laboratory qualified as an estimated value.

Concentration exceeds cleanup criteria (1).

Highest concentration observed for associated analyte.

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 691.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type		*Groundwater Cleanup Criteria* [1]				*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Metals										
Aluminum	µg/L	50	50	-	8.7	9.6	**185**[ab]	**65.6**[ab]	43.1	**67.2**[ab]
Antimony	µg/L	6	6	130	0.05 U	0.02 J	0.11	0.05 U	0.05 U	0.05 U
Arsenic	µg/L	10	10	10	0.19 J	0.25 J	1.10	0.44 J	0.18 J	0.44 J
Barium	µg/L	2000	2000	1400	73.1	72.7	78.9	81.8	68.8	83.4
Beryllium	µg/L	4	4	41	0.004 J	0.020 U	0.022	0.005 J	0.004 J	0.004 J
Cadmium	µg/L	5	5	5.1	0.005 J	0.005 J	0.021	0.023	0.006 J	0.025
Chromium	µg/L	100	100	11	0.41	0.49	1.11	0.34 U	0.26 U	0.31 U
Cobalt	µg/L	40	100	100	0.124	0.128	1.040	0.515	0.153 J	0.506 J
Copper	µg/L	1000	1000	23	0.77	0.79	2.94	0.93	0.78	0.94
Iron	µg/L	300	300	-	80.8	68.5	**1510**[ab]	**426 J**[ab]	171 J	**430 J**[ab]
Lead	µg/L	4	4	34	0.041	0.048	1.200	0.207	0.183	0.208
Magnesium	µg/L	400000	1100000	-	25300	24900	24300	29000	24200	28900
Manganese	µg/L	50	50	5200	2.94	2.90	**65.8**[ab]	**579**[ab]	8.35 J	**577 J**[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.03	1.07	2.41	2.15	0.92	2.11
Selenium	µg/L	50	50	5	0.3 J	0.4 J	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	23400	23000	24900	20000	20900	19900
Thallium	µg/L	2	2	3.7	0.003 J	0.003 J	0.020 J	0.051	0.020 U	0.051
Vanadium	µg/L	4.5	62	12	0.17 J	0.16 J	1.08	0.36	0.26	0.34
Zinc	µg/L	2400	5000	310	0.78	1.21	52.4	1.27	1.46	1.43
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.041 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.021 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds										
Acetone	µg/L	730	2100	1700	R	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.58	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 691.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type	*Groundwater Cleanup Criteria* [1]					*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Volatile Organic Compounds - Continued										
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	1.1	0.50 UJ	0.090 J	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.080 J	0.080 J	0.080 J
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	R	R	R	2.0 UJ	2.0 UJ	2.0 UJ
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.24 J	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	R	R	R	20 UJ	20 UJ	20 UJ
Isopropyl benzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-101S*	*MW-101S*	*MW-101D*	*MW-102S*	*MW-102D*	*MW-102D*
Sample Identification					*GW-56393-040611-EV-002*	*GW-56393-040611-EV-003*	*GW-56393-040611-EV-001*	*GW-56393-040811-EV-017*	*GW-56393-040811-EV-015*	*GW-56393-040811-EV-016*
Sample Date					*4/6/2011*	*4/6/2011*	*4/6/2011*	*4/8/2011*	*4/8/2011*	*4/8/2011*
Sample Elevation (feet AMSL)					*702.35 - 663.35*	*702.35 - 663.35*	*664.33 - 589.33*	*701.18 - 691.18*	*664.43 - 619.43*	*664.43 - 619.43*
Screen Depth (feet bgs)					*32-39*	*32-39*	*70-75*	*3-10*	*40-45*	*40-45*
Sample Type		*Groundwater Cleanup Criteria* [1]				*Duplicate*				*Duplicate*
	Units	*a*	*b*	*c*						
Volatile Organic Compounds - Continued										
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters										
Conductivity, field	mS/cm	-	-	-	0.67	0.67	0.676	0.699	0.595	0.595
Dissolved oxygen (DO), field	mg/L	-	-	-	4.07	4.07	3.82	0.58	0.76	0.76
Oxidation reduction potential (ORP), field	millivolts	-	-	-	84	84	91	154	139	139
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	8.21	8.21	8.21	8.5	8.34	8.34
Temperature, field	Deg C	-	-	-	7.96	7.96	9.25	6.6	8.27	8.27
Turbidity, field	NTU	-	-	-	6.33	6.33	56.9	46.9	14.4	14.4

Notes:
Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]
(1) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.
a - Residential drinking water criteria.
b - Non-Residential drinking water criteria.
c - Groundwater surface water interface.
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
feet AMSL - Feet above mean sea level.
feet bgs - Feet below ground surface.

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Metals										
Aluminum	µg/L	50	50	-	10.5	**97.4**[ab]	18.4	33.1	7.6	27.8
Antimony	µg/L	6	6	130	0.05 U	0.05 U	0.07 U	0.05 U	0.05 U	0.11 U
Arsenic	µg/L	10	10	10	0.50 U	0.43 J	0.28 J	0.25 J	0.50 U	**15.3**[abc]
Barium	µg/L	2000	2000	1400	67.3	73.4	79.1	146	74.4	538
Beryllium	µg/L	4	4	41	0.020 U	0.005 J	0.020 U	0.020 U	0.020 U	0.003 J
Cadmium	µg/L	5	5	5.1	0.011 J	0.010 J	0.017 J	0.013 J	0.005 J	0.009 J
Chromium	µg/L	100	100	11	0.29 U	0.35 U	0.60	0.24 U	0.22 U	0.40
Cobalt	µg/L	40	100	100	0.117	0.302	0.293	0.608	0.126	0.760
Copper	µg/L	1000	1000	23	0.62	0.92	0.76	0.76	0.92	1.68
Iron	µg/L	*300*	*300*	-	*19.6 J*	***474 J***[ab]	*34.4 J*	***419 J***[ab]	*16.8 J*	***20800 J***[ab]
Lead	µg/L	4	4	34	0.032	0.323	0.080	0.111	0.070	0.330
Magnesium	µg/L	400000	1100000	-	25300	25500	25600	31800	26000	37000
Manganese	µg/L	50	50	5200	5.05	13.5	**83.7**[ab]	**208**[ab]	2.12	**483**[ab]
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.15	1.24	1.43	1.92	0.98	1.87
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	22400	24800	24900	25000	21900	21500
Thallium	µg/L	2	2	3.7	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Vanadium	µg/L	4.5	62	12	0.18 J	0.48	0.25	0.18 J	0.14 J	0.29
Zinc	µg/L	2400	5000	310	1.52	1.50	2.48	0.92	1.23	4.82
PCBs										
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds										
Acetone	µg/L	730	2100	1700	R	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.45 J	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type	*Groundwater Cleanup Criteria* [1]									
	Units	*a*	*b*	*c*						
Volatile Organic Compounds - Continued										
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	0.58	0.50 UJ	0.090 J	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.12 J	0.50 UJ	0.29 J	0.50 UJ	0.50 UJ	0.50 UJ
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.38 J	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ
Isopropyl benzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.50 UJ	0.060 J	0.060 J	0.50 UJ	0.50 UJ	0.090 J
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-103D*	*MW-104S*	*MW-104D*	*MW-105S*	*MW-105D*	*MW-106S*
Sample Identification					*GW-56393-040711-EV-014*	*GW-56393-040711-EV-012*	*GW-56393-040711-EV-013*	*GW-56393-040711-EV-010*	*GW-56393-040711-EV-011*	*GW-56393-040711-EV-008*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*
Sample Elevation (feet AMSL)					*674.37 - 639.37*	*684.86 - 658.86*	*663.48 - 618.48*	*699.89 - 687.89*	*662.79 - 615.79*	*701.89 - 692.89*
Screen Depth (feet bgs)					*30-35*	*20-25*	*40-45*	*5-12*	*42-47*	*2-9*
Sample Type		*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*						
Volatile Organic Compounds - Continued										
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters										
Conductivity, field	mS/cm	-	-	-	0.626	0.64	0.648	0.813	0.656	1.171
Dissolved oxygen (DO), field	mg/L	-	-	-	1.33	1.17	0.96	0.23	2.32	0.2
Oxidation reduction potential (ORP), field	millivolts	-	-	-	40	13	40	-12	9	0.84
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	8.22	8.17	8.18	7.94	8.14	7.75
Temperature, field	Deg C	-	-	-	10.68	10.88	10.39	9.75	11.34	8.25
Turbidity, field	NTU	-	-	-	2.94	5	20.5	7.99	4.16	15.6

Notes:
Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]
(1) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.
a - Residential drinking water criteria.
b - Non-Residential drinking water criteria.
c - Groundwater surface water interface.
U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
feet AMSL - Feet above mean sea level.
feet bgs - Feet below ground surface.

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*664.66 - 620.66*	*695.76 - 682.76*	*701.32 - 692.32*	*663.39 - 618.39*	*689.41 - 666.41*
Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Metals									
Aluminum	µg/L	50	50	-	6 3	5.2	**74.0[ab]**	28.8	10.7
Antimony	µg/L	6	6	130	0.18	0.06 U	0.07 U	0.08 U	0.03 J
Arsenic	µg/L	10	10	10	0.09 J	0.48 J	0.30 J	0.52	0 16 J
Barium	µg/L	2000	2000	1400	95.9	86.1	78.7	331	74.8
Beryllium	µg/L	4	4	41	0.020 U	0.020 U	0.008 J	0.004 J	0.020 U
Cadmium	µg/L	5	5	5.1	0.012 J	0.111	0.010 J	0.018 J	0.008 J
Chromium	µg/L	100	100	11	0.50	0.22 U	0.46	0.20 U	0.43
Cobalt	µg/L	40	100	100	0.138	0.344	0.238	0.553	0.136
Copper	µg/L	1000	1000	23	0.95	1.37	1.60	1.59	1.33
Iron	µg/L	300	300	-	14.9 J	**830 J[ab]**	275 J	240 J	31.7
Lead	µg/L	4	4	34	0.059	0.058	0.263	0.275	0.079
Magnesium	µg/L	400000	1100000	-	24700	30700	23300	31900	24300
Manganese	µg/L	50	50	5200	36.4	**268[ab]**	24.3	**201[ab]**	2.16
Mercury	µg/L	2	2	0.0013	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	100	100	130	1.40	3.91	1.33	2.13	1.17
Selenium	µg/L	50	50	5	1.0 U	1.0 U	1.0 U	1.0 U	0.4 J
Silver	µg/L	34	98	0.2	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Sodium	µg/L	120000	350000	-	30000	21900	20600	54300	21300
Thallium	µg/L	2	2	3.7	0.026	0.213	0.020 U	0.098	0.006 J
Vanadium	µg/L	4.5	62	12	0.13 J	0.09 J	0.30	0.19 J	0.15 J
Zinc	µg/L	2400	5000	310	1.62	4.20	2.90	3.28	1.56
PCBs									
Aroclor-1016 (PCB-1016)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1221 (PCB-1221)	µg/L	-	-	-	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ	0.040 UJ
Aroclor-1232 (PCB-1232)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1242 (PCB-1242)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0 020 UJ	0.020 UJ
Aroclor-1248 (PCB-1248)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ	0.020 UJ
Aroclor-1254 (PCB-1254)	µg/L	-	-	-	0.0083 J	0.020 UJ	0 0056 J	0.020 UJ	0.020 UJ
Aroclor-1260 (PCB-1260)	µg/L	-	-	-	0.020 UJ	0.020 UJ	0 020 UJ	0.020 UJ	0.020 UJ
Total PCBs	µg/L	0.5	0.5	0.2	0.0083 J	ND	0.0056 J	ND	ND
Volatile Organic Compounds									
Acetone	µg/L	730	2100	1700	R	R	R	R	R
Benzene	µg/L	5	5	200	0.50 U	0.50 U	0.50 U	0.50 U	0.50 UJ
Bromobenzene	µg/L	18	50	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Bromodichloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromoform	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Bromomethane (Methyl bromide)	µg/L	10	29	35	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	13000	38000	2200	R	R	R	R	R
N-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Carbon disulfide	µg/L	800	2300	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Carbon tetrachloride	µg/L	5	5	45	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobenzene	µg/L	100	100	25	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chlorobromomethane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloroethane	µg/L	430	1700	1100	0 50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
Sample Elevation (feet AMSL)					*664.66 - 620.66*	*695.76 - 682.76*	*701.32 - 692.32*	*663.39 - 618.39*	*689.41 - 666.41*
Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type	*Groundwater Cleanup Criteria* [1]								
	Units	*a*	*b*	*c*					
Volatile Organic Compounds - Continued									
Chloroform (Trichloromethane)	µg/L	80	80	350	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Chloromethane (Methyl chloride)	µg/L	260	1100	ID	0.10 J	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2-Chlorotoluene	µg/L	150	420	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Chlorotoluene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Cymene (p-Isopropyltoluene)	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.2	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	R
Dibromochloromethane	µg/L	80	80	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	0.05	5.7	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Dibromomethane	µg/L	80	230	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichlorobenzene	µg/L	600	600	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichlorobenzene	µg/L	6.6	19	28	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,4-Dichlorobenzene	µg/L	75	75	17	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Dichlorodifluoromethane (CFC-12)	µg/L	1700	4800	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethane	µg/L	880	2500	740	0.50 UJ	0.50 UJ	0.50 UJ	0.14 J	0.50 UJ
1,2-Dichloroethane	µg/L	5	5	360	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloroethene	µg/L	7	7	130	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,2-Dichloroethene	µg/L	70	70	620	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,2-Dichloroethene	µg/L	100	100	1500	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,3-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2-Dichloropropane	µg/L	5	5	230	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
2,2-Dichloropropane	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
cis-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
trans-1,3-Dichloropropene	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Ethylbenzene	µg/L	74	74	18	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Hexachlorobutadiene	µg/L	15	42	0.053	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Hexanone	µg/L	1000	2900	ID	20 UJ	20 UJ	20 UJ	20 UJ	R
Isopropyl benzene	µg/L	800	2300	28	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
4-Methyl-2-pentanone(MIBK)	µg/L	1800	5200	ID	R	R	R	R	R
Methylene chloride	µg/L	5	5	1500	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Naphthalene	µg/L	520	1500	11	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
N-Propylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
2-Phenylbutane (sec-Butylbenzene)	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Styrene	µg/L	100	100	80	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
tert-Butylbenzene	µg/L	80	230	ID	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,2,2-Tetrachloroethane	µg/L	8.5	35	78	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,1,2-Tetrachloroethane	µg/L	77	320	ID	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Tetrachloroethene	µg/L	5	5	60	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Toluene	µg/L	790	790	270	0.060 J	0.50 UJ	0.50 UJ	0.070 J	0.50 UJ
1,2,4-Trichlorobenzene	µg/L	70	70	99	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,2,3-Trichlorobenzene	µg/L	-	-	-	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,1,1-Trichloroethane	µg/L	200	200	89	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,1,2-Trichloroethane	µg/L	5	5	330	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichloroethene	µg/L	5	5	200	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Trichlorofluoromethane (CFC-11)	µg/L	2600	7300	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
1,2,3-Trichloropropane	µg/L	42	120	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ

TABLE 7.11

APRIL 2011 FOLLOW-UP GROUNDWATER MONITORING ANALYTICAL RESULTS
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO TOWNSHIP, MICHIGAN

Sample Location					*MW-106D*	*MW-107S*	*MW-108S*	*MW-108D*	*MW-109D*
Sample Identification					*GW-56393-040711-EV-009*	*GW-56393-040711-EV-007*	*GW-56393-040711-EV-005*	*GW-56393-040711-EV-006*	*GW-56393-040611-EV-004*
Sample Date					*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/7/2011*	*4/6/2011*
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Screen Depth (feet bgs)					*40-45*	*8-13*	*2-9*	*40-45*	*22-27*
Sample Type		*Groundwater Cleanup Criteria* [1]							
	Units	*a*	*b*	*c*					
Volatile Organic Compounds - Continued									
1,2,4-Trimethylbenzene	µg/L	63	63	17	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
1,3,5-Trimethylbenzene	µg/L	72	72	45	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ	2.0 UJ
Vinyl chloride	µg/L	2	2	13	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
o-Xylene	µg/L	280	280	41	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
m&p-Xylenes	µg/L	-	-	-	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ	0.50 UJ
Field Parameters									
Conductivity, field	mS/cm	-	-	-	--	0.806	0.642	0.905	0.662
Dissolved oxygen (DO), field	mg/L	-	-	-	--	0.22	2.68	0.3	3.18
Oxidation reduction potential (ORP), field	millivolts	-	-	-	--	0.32	98	92	92
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5	-	--	8.04	8.27	8.1	8.15
Temperature, field	Deg C	-	-	-	--	9.77	9.96	10.54	10.36
Turbidity, field	NTU	-	-	-	--	3.79	13.7	10.3	3.27
					--				

Notes:
Michigan Act 451, Part 201 Cleanup Criteria and Part 213 Risk-based Screening Levels: Residential and Non-Residential Generic Cleanup Criteria [1]
(1) Cleanup criteria identified by MDEQ RRD Op Memo No. 1, updated 3/25/2011, pursuant to 1994 PA 451 as amended.
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U - Not present at or above the associated value.
J - Estimated concentration.
UJ - Estimated reporting limit.
R - Rejected as noted in data validation memorandum provided in Appendix E.
feet AMSL - Feet above mean sea level.
feet bgs - Feet below ground surface.

TABLE 7.12

MONITORING LOCATION COMPLETION DATA
12TH STREET LANDFILL CERTIFICATION OF COMPLETION OF OU-4 RA REPORT
OTSEGO, MICHIGAN

Monitoring Locations	*Ground Surface Elevation (feet AMSL)*	*Reference Elevation (feet AMSL)*	*Well Depth (feet)*	*Screen Length (feet)*	*Depth to Top of Screen (feet)*	*Top of Screen Elevation (feet AMSL)*
Groundwater Monitoring Wells						
MW-101S	734.35	737.46	39	7	32	702.35
MW-101D	734.33	737.14	75	5	70	664.33
MW-102S	704.18	707.36	10	7	3	701.18
MW-102D	704.43	707.43	45	5	40	664.43
MW-103D	704.37	707.36	35	5	30	674.37
MW-104S	703.86	706.55	25.5	7	19	684.86
MW-104D	703.48	706.42	45	5	40	663.48
MW-105S	704.89	707.86	12	7	5	699.89
MW-105D	704.78	707.89	47	5	42	662.78
MW-106S	703.88	706.96	9	7	2	701.88
MW-106D	703.66	706.36	45	5	39	664.66
MW-107S	703.76	706.73	13	5	8	695.76
MW-108S	703.32	706.21	9	7	2	701.32
MW-108D	703.39	706.16	45	5	40	663.39
MW-109D	707.41	710.46	23	5	18	689.41
Gas Probes						
GP-1	707.35	709.88	4	2	2	705.35
GP-2	732.88	736.12	35	25	5	727.88
GP-3	703.51	706.47	5	2	3	700.51
Staff Gauge	N/A	703.05	-	-	-	-

Notes:
N/A = Not applicable
feet AMSL - Feet above mean sea level.

SOURCE: GOOGLE MAPS

KEY MAP
1:1000

DRAWING INDEX

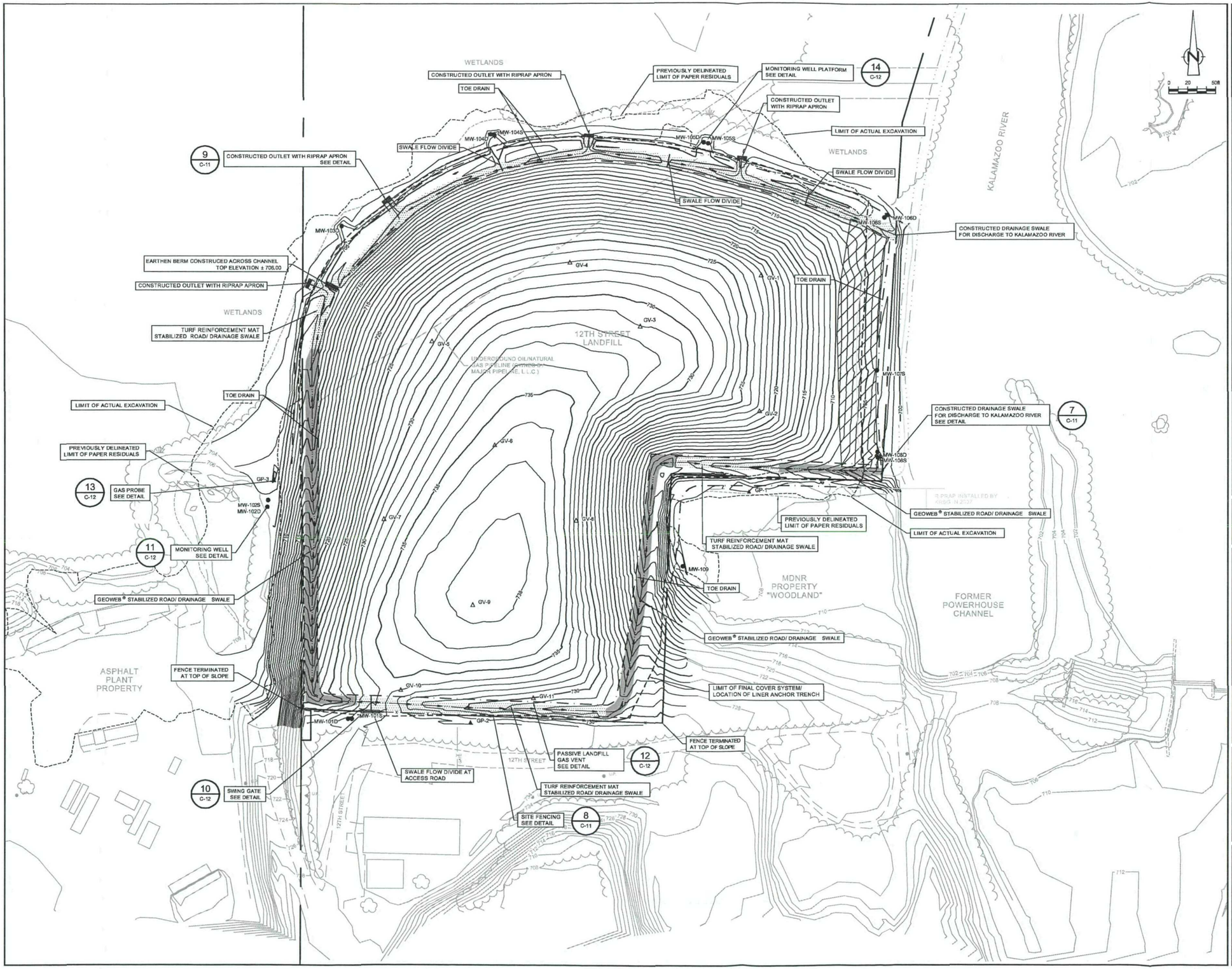
DWG. No.	DATE	TITLE
C-01	SEPTEMBER 2012	OVERALL SITE PLAN
C-02	SEPTEMBER 2012	SUBGRADE CONTOURS
C-03	SEPTEMBER 2012	PASSIVE GAS MANAGEMENT SYSTEM
C-04	SEPTEMBER 2012	LINER PLACEMENT
C-05	SEPTEMBER 2012	FINAL CONTOURS
C-06	SEPTEMBER 2012	CROSS SECTIONS I
C-07	SEPTEMBER 2012	CROSS SECTIONS II
C-08	SEPTEMBER 2012	TOE OF SLOPE DETAILS
C-09	SEPTEMBER 2012	EROSION CONTROL MEASURES
C-10	SEPTEMBER 2012	EXCAVATION AREAS
C-11	SEPTEMBER 2012	TPICAL DETAILS I
C-12	SEPTEMBER 2012	TYPICAL DETAILS II

AS-BUILT DRAWINGS

12th STREET LANDFILL
Otsego Township, Michigan

CRA ENGINEERING INC.

56393-07(008)GN-WA006 SEP 10 2012



N2	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- 700 GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- PREVIOUSLY DELINEATED LIMIT OF PAPER RESIDUALS
- 718 FINAL ELEVATION CONTOURS (BASED ON SURVEY DATED 4/15/2011)
- LIMIT OF ACTUAL EXCAVATION (BASED ON SURVEY DATED 10/14/2010)
- TOE DRAIN
- LIMIT OF FINAL COVER SYSTEM/ LOCATION OF LINER ANCHOR TRENCH
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- DRAINAGE SWALE OUTFALLS
- MW-106B MONITORING WELL
- GV-1 GAS VENT
- GP-2 GAS PROBE

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 8/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

OVERALL SITE PLAN

CRA ENGINEERING INC.

Source References:

BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-01

56393-07(008)CI-WA001 SEP 10/2012

NO	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- 700 GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- 718 SUBGRADE ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- AREA OF PLACED EXCAVATION MATERIAL

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/7/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT 18, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

SUBGRADE CONTOURS

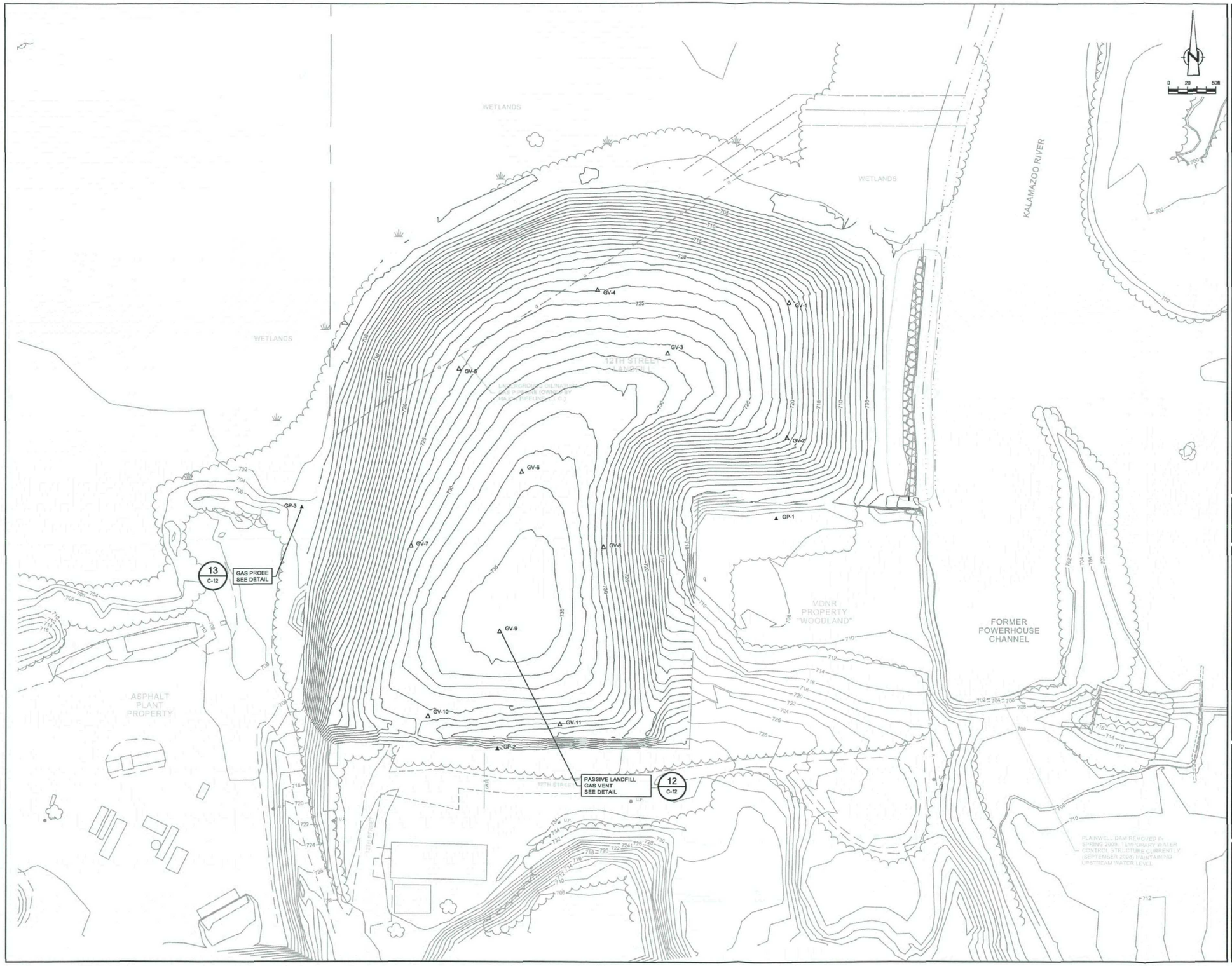
CRA ENGINEERING INC.

Source References:

BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-02

56393-07(008)CI-WA002 SEP 10 2012



No	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- 700 GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- 718 SUBGRADE ELEVATION CONTOURS
- GV-1 GAS VENT
- GP-2 GAS PROBE

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

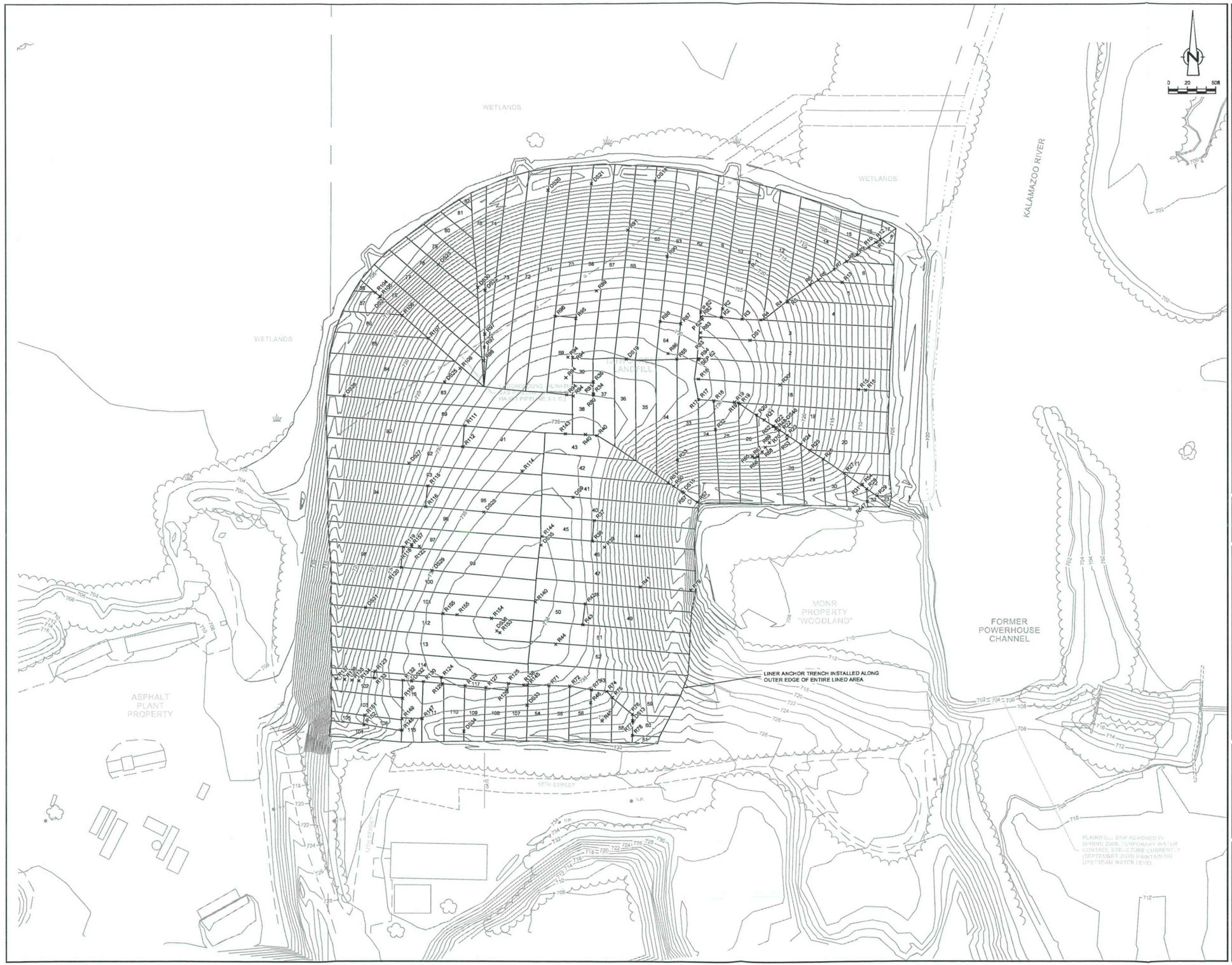
PASSIVE GAS MANAGEMENT SYSTEM

CRA ENGINEERING INC.

Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project No: 56393-07	Report No: 008	Drawing No: C-03

56393-07(008)CI-WA003 SEP 10/2012



N2	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- 700 GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- 718 FINAL ELEVATION CONTOURS
- + R-1 REPAIR LOCATION
- + DS1 DESTRUCT LOCATION

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

09.11.2012

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

LINER PLACEMENT

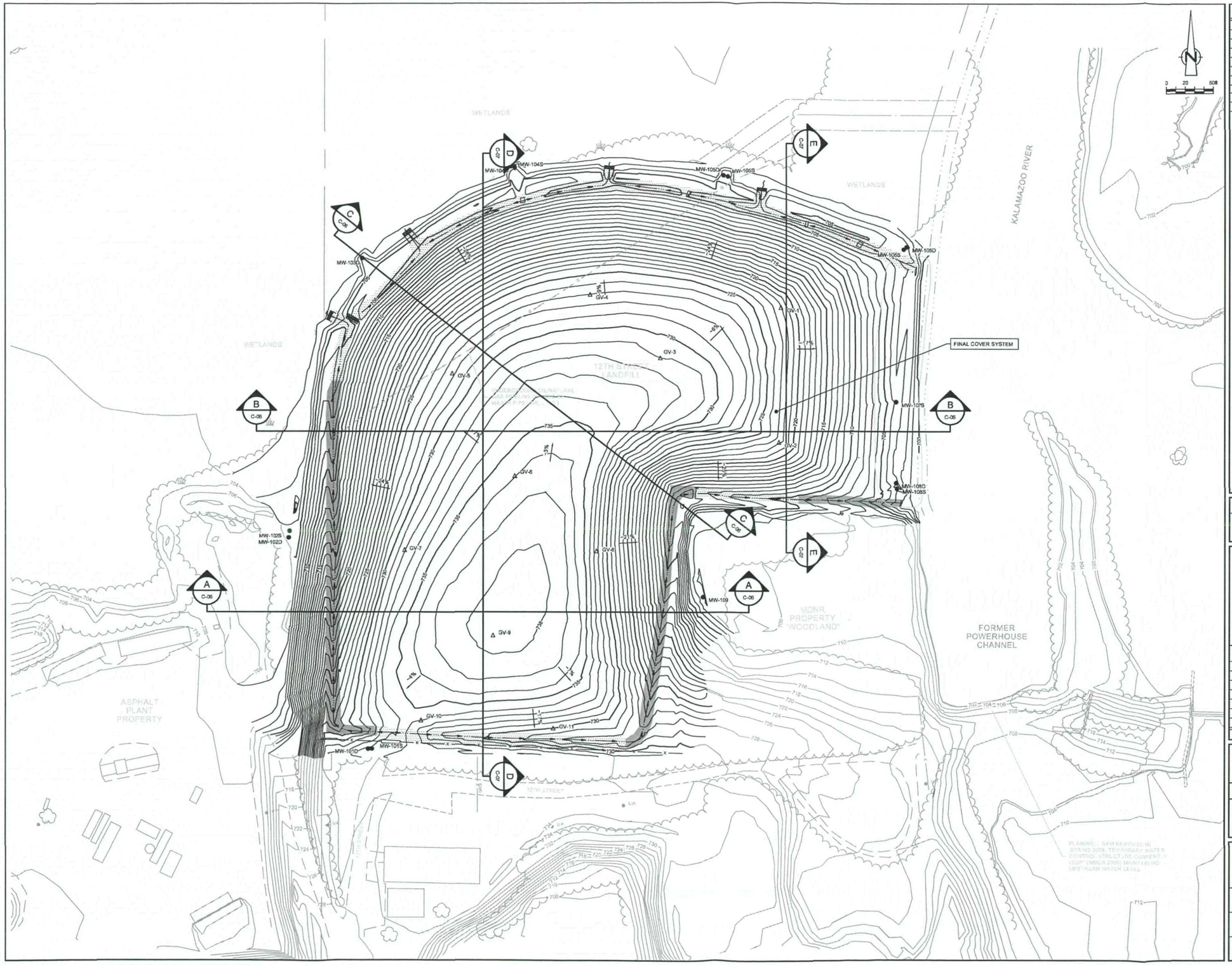
CRA ENGINEERING INC.

Source Reference:

BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale:	Project N #:	Report N #:	Drawing N #:
1" = 50'-0"	56393-07	008	C-04

56393-07(008)CI-WA004 SEP 10/2012



NO	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- 700 GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- 718 FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- MW-100B MONITORING WELL
- GV-1 GAS VENT
- GP-2 GAS PROBE

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

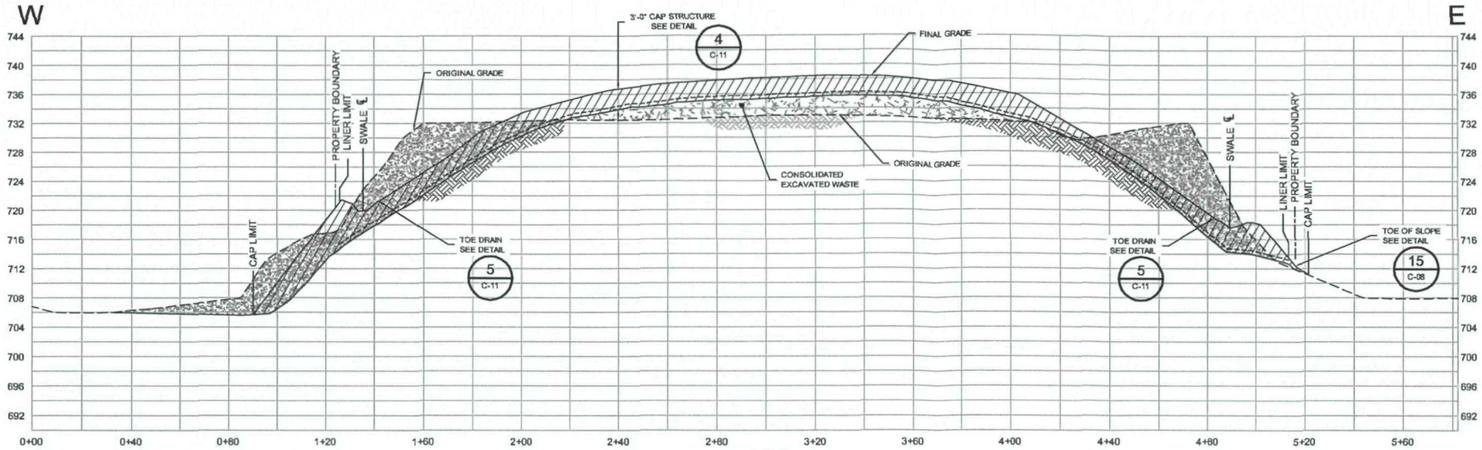
FINAL CONTOURS AND CROSS-SECTION LOCATIONS

CRA ENGINEERING INC.

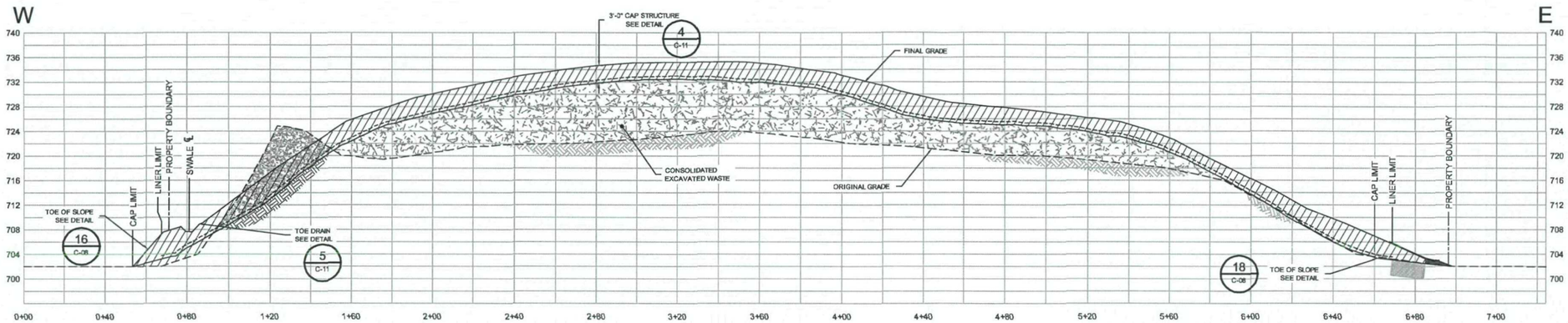
Source Reference:
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-05

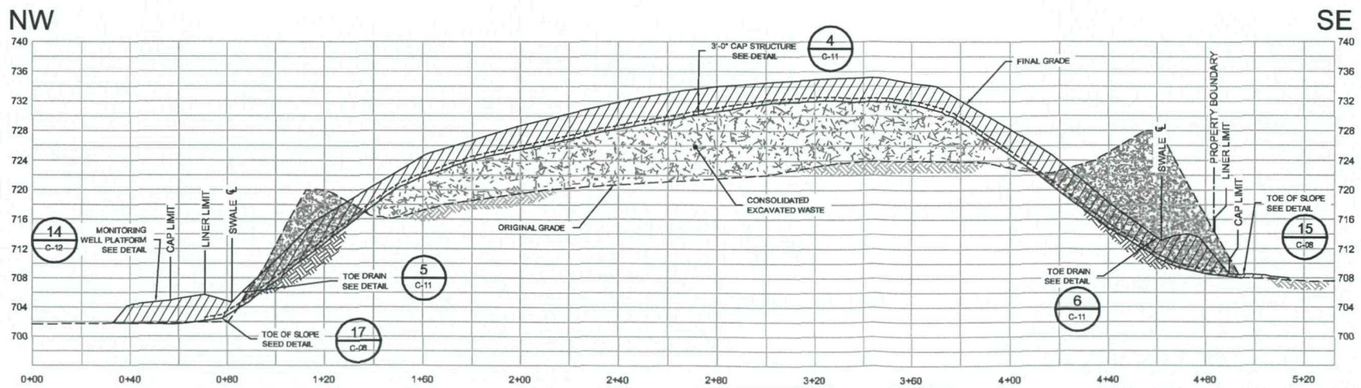
56393-07(008)CI-WA005 SEP 10/2012



SECTION A C-05
HORZ: 1"=30'
VERT: 1"=10'



SECTION B C-05
HORZ: 1"=30'
VERT: 1"=10'



SECTION C C-05
HORZ: 1"=30'
VERT: 1"=10'

Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

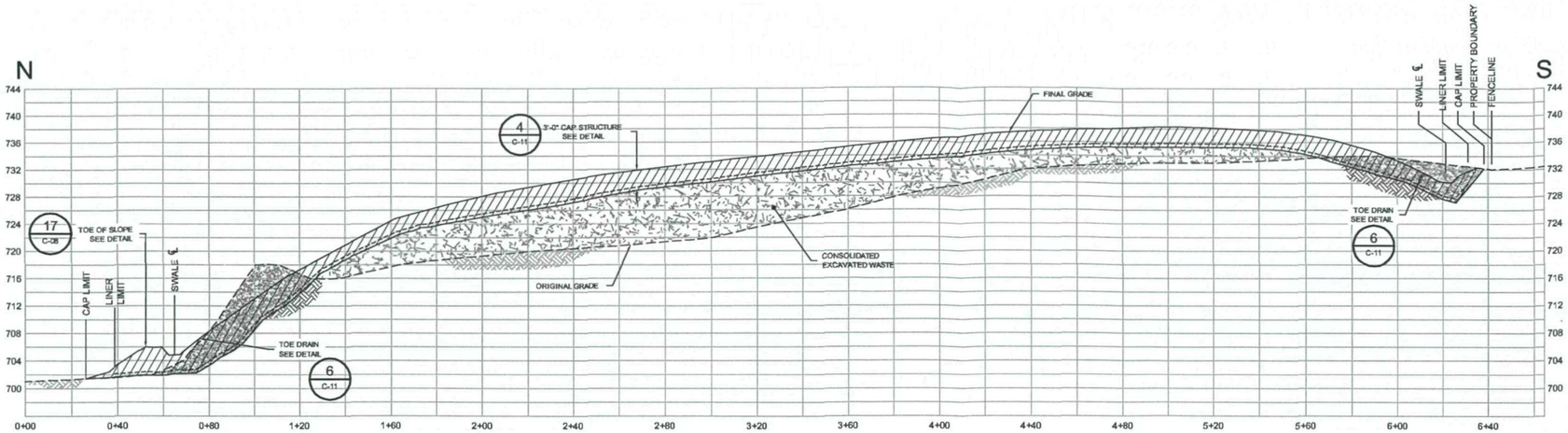
CROSS
SECTIONS I

CRA ENGINEERING INC.

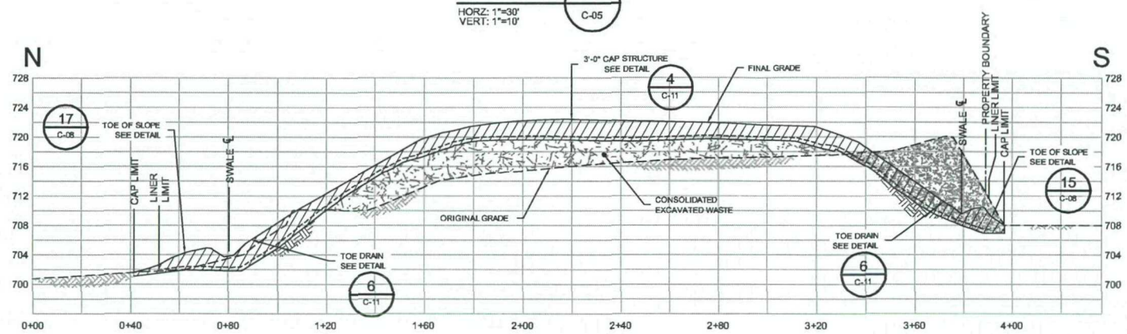
Source References:

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTEMBER 2012	
Scale: 1" = 50'-0"	Project N.º: 56393-07	Report N.º: 008	Drawing N.º: C-06

56393-07(008)CI-WA008 SEP 10/2012



SECTION D
C-05
HORZ: 1"=30'
VERT: 1"=10'



SECTION E
C-07
HORZ: 1"=30'
VERT: 1"=10'

N2	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

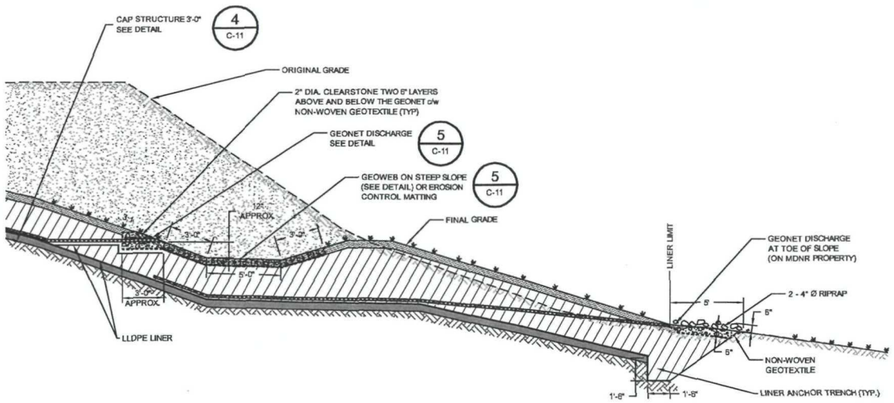
CROSS
SECTIONS II

CRA ENGINEERING INC.

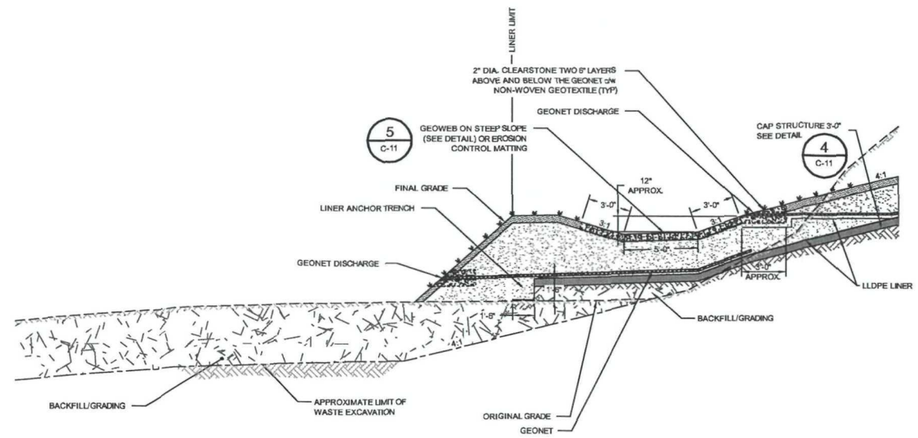
Source References:

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTEMBER 2012	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-07

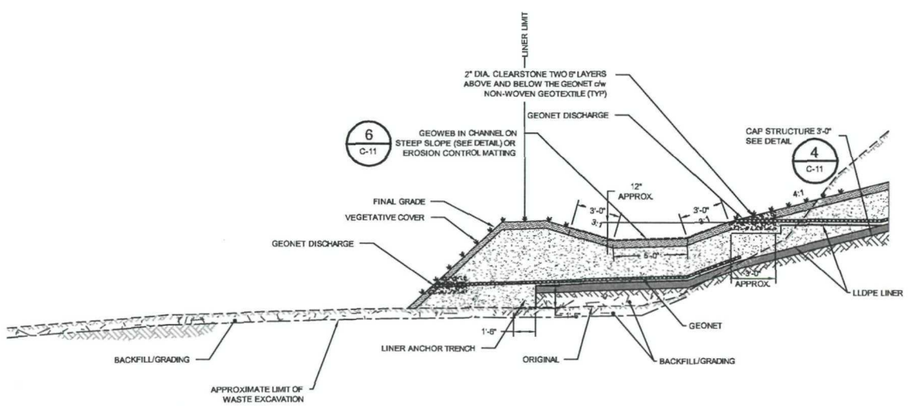
56393-07(008)CI-WA009 SEP 10/2012



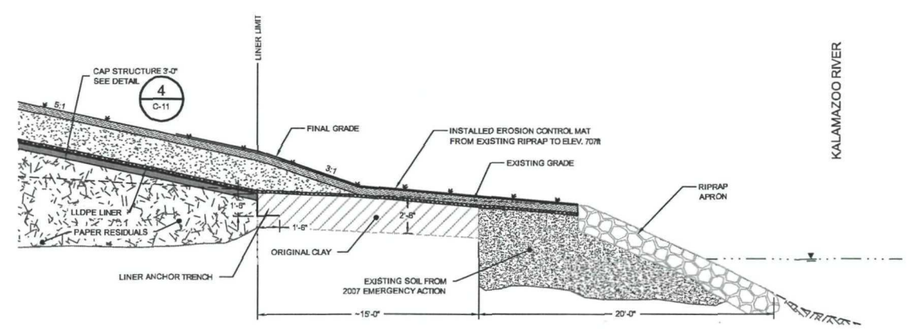
DETAIL 15 (C-06, C-07) TYPICAL TOE OF SLOPE - MDNR PROPERTY
N.T.S.



DETAIL 16 (C-06) TYPICAL TOE OF SLOPE - ASPHALT PLANT PROPERTY
N.T.S.



SECTION 17 (C-08, C-07) TYPICAL TOE OF SLOPE - NORTH WETLAND
N.T.S.



DETAIL 18 (C-06) TYPICAL TOE OF SLOPE - KALAMAZOO RIVER
N.T.S.

N°	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

09/17/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

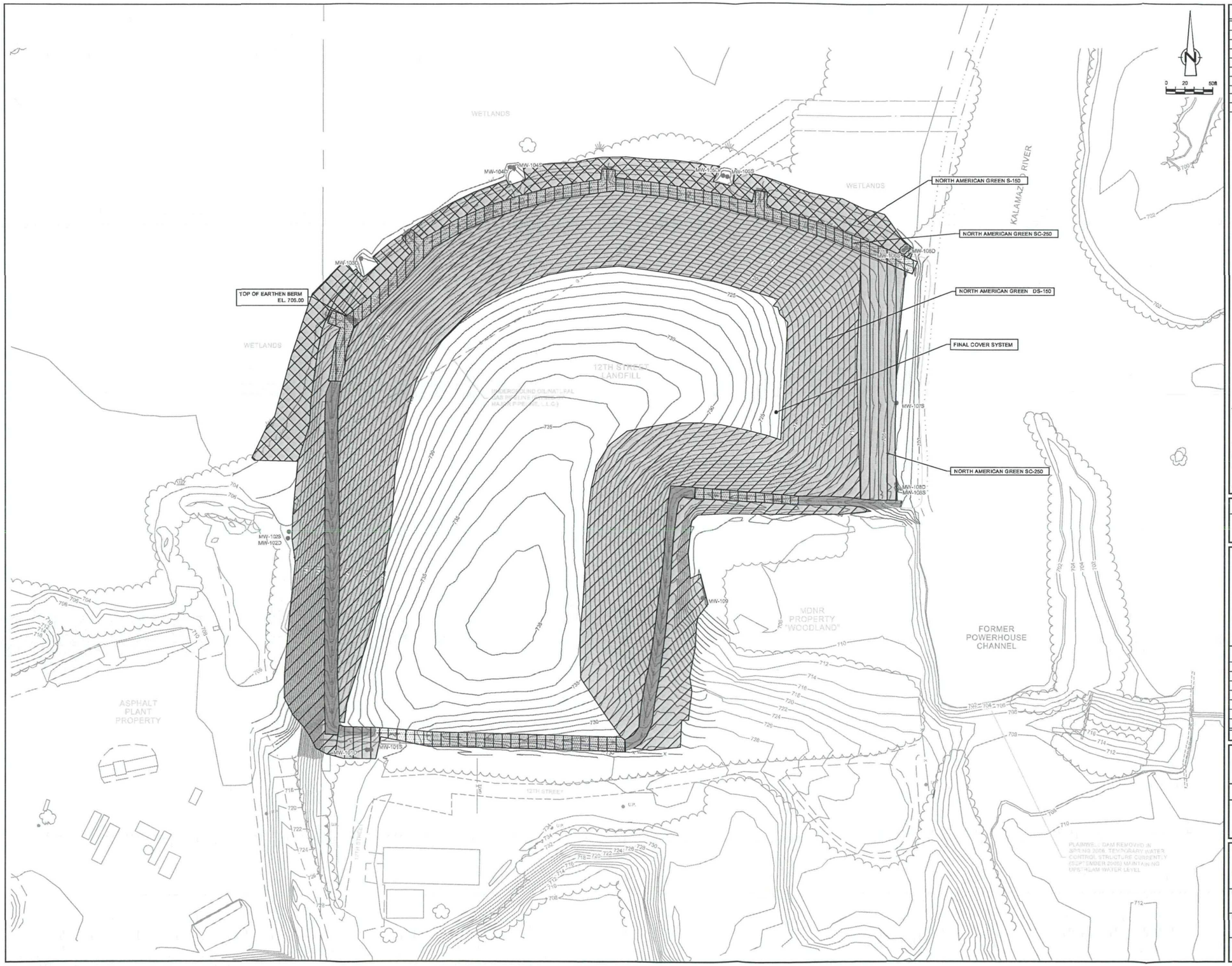
TOE OF SLOPE DETAILS

CRA ENGINEERING INC.

Source Reference:

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTEMBER 2012	
Scale: 1" = 50'-0"	Project N°: 56393-07	Report N°: 008	Drawing N°: C-08

56393-07(008)CI-WA009 SEP 10/2012



No	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- FINAL ELEVATION CONTOURS
- ROAD/DRAINAGE SWALE c/w TURF REINFORCEMENT MAT
- ROAD/DRAINAGE SWALE STABILIZED WITH GEOWEB
- NORTH AMERICAN GREEN-DS-150 (ON 4H:1V SLOPES)
- NORTH AMERICAN GREEN-SC-250 (EMERGENCY ACTION AREA AND DRAINAGE SWALES)
- NORTH AMERICAN GREEN-S-150 (FROM TOP OF DRAINAGE SWALE TO WETLAND)

SURVEY DATA:

1. EXCAVATION: AREAS 1-6: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010.
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011, THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

09/27/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

EROSION CONTROL MEASURES

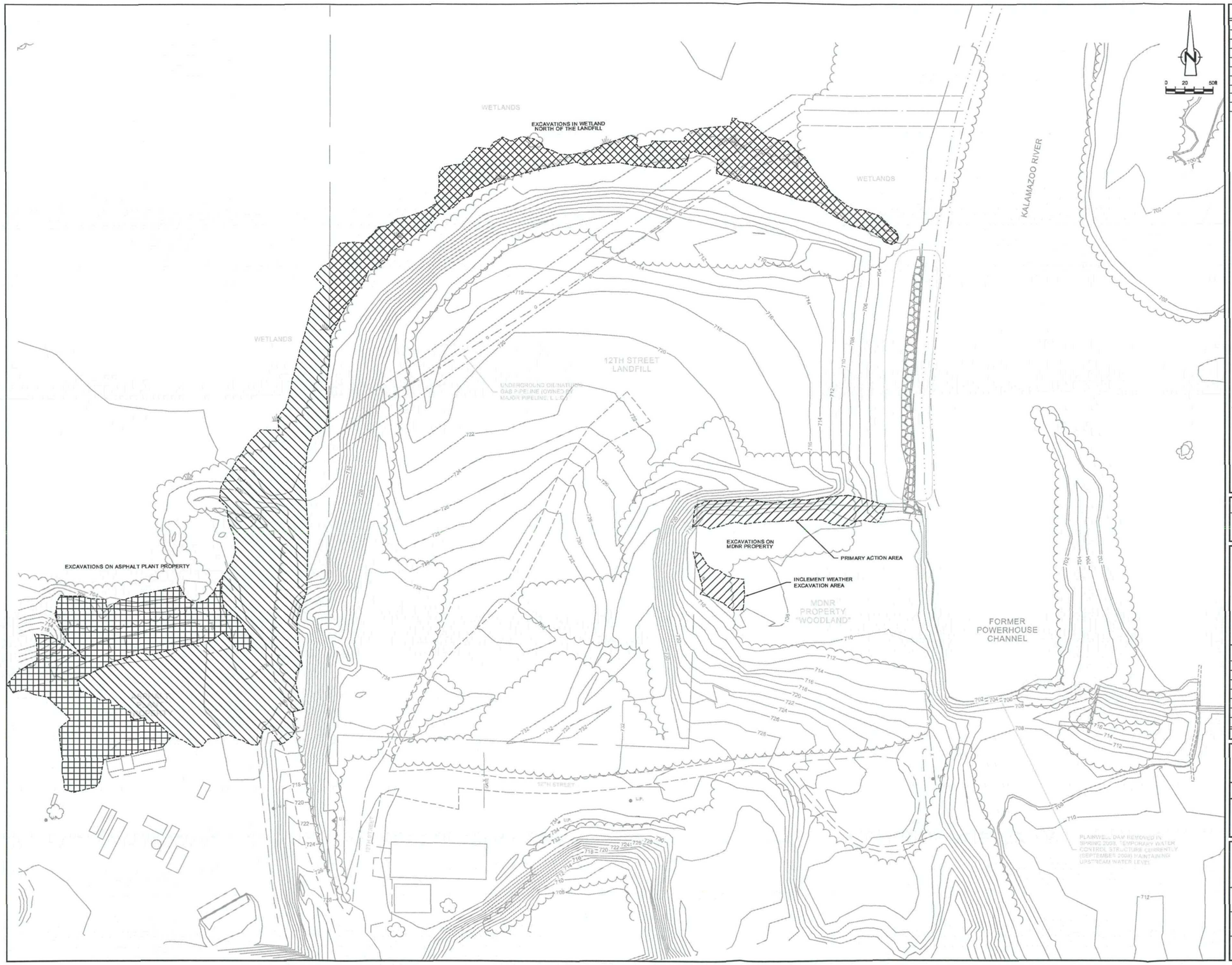
CRA ENGINEERING INC.

Source References:

BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-09

56393-07(008)CI-WA006 SEP 10/2012



Nº	Revision	Date	Initial

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- FENCE
- BUILDING
- GROUND ELEVATION CONTOUR
- TREES AND/OR BRUSH
- WET AREA AND WETLAND
- EDGE OF WATER
- LIMIT OF ACTUAL EXCAVATION (MDNR PROPERTY)
- LIMIT OF ACTUAL EXCAVATION (WETLAND NORTH OF LANDFILL)
- LIMIT OF ACTUAL EXCAVATION (ASPHALT PLANT PROPERTY - AUGUST 2010)
- LIMIT OF ACTUAL EXCAVATION (ASPHALT PLANT PROPERTY - JANUARY 2011)

SURVEY DATA:

1. EXCAVATION: AREAS 1-8: FIELD DATE 6/1/10; AREAS 8-9: FIELD DATE 7/1/10; AREA 10: FIELD DATE 7/27/10; OVERALL RANGE OF DATES 6/1 - 7/27, 2010.
2. EXCAVATION: AREAS 11,12: FIELD DATE 7/27/10; AREA 13: FIELD DATE 8/11/10; AREA 14 (MAJOR PORTION IN FRONT OF ASPHALT PLANT OFFICES): FIELD DATE 8/24/10; OVERALL RANGE OF DATES 7/27 - 8/24, 2010.
3. EXCAVATION: AREA 7: FIELD DATE 7/1/10; WASH OUT AREA: FIELD DATE 7/30/10; OVERALL RANGE OF DATES 7/1 - 7/30, 2010
4. ASPHALT PLANT WINTER EXCAVATION: OVERALL RANGE OF DATES 12/20/2010 - 1/18/2011.
5. FINAL CONTOUR SURVEY: OVERALL RANGE OF DATES 12/17/2010 - 4/15/2011. THAT INCLUDES ALL GROUND SURFACE SHOTS TOGETHER WITH MONITOR WELLS, GAS VENTS, STRAW MAT, ROCK, AND FENCE.
6. SUB-GRADE SURVEY : 9/1/2011

SCALE VERIFICATION

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

Approved

9/11/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH
RE-ISSUED FOR EPA SUBMISSION	JUNE 5, 2012	CRH
ISSUED FOR EPA SUBMISSION	DEC. 23, 2011	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

EXCAVATION AREAS

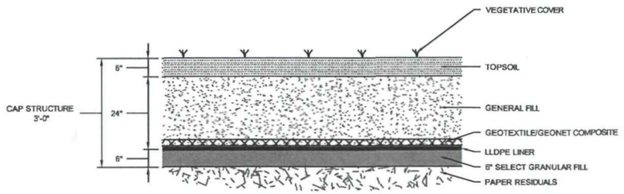
CRA ENGINEERING INC.

Source References:

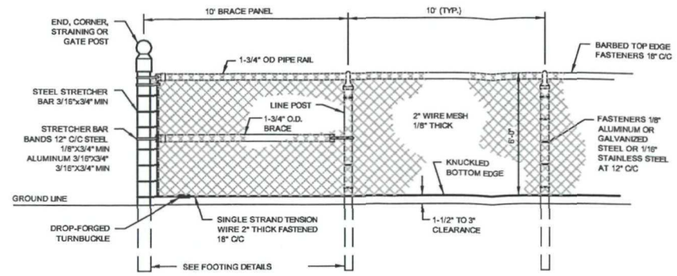
BASE ADAPTED FROM PREVIOUS RMT DESIGN

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	DECEMBER 2011	
Scale: 1" = 50'-0"	Project Nº: 56393-07	Report Nº: 008	Drawing Nº: C-10

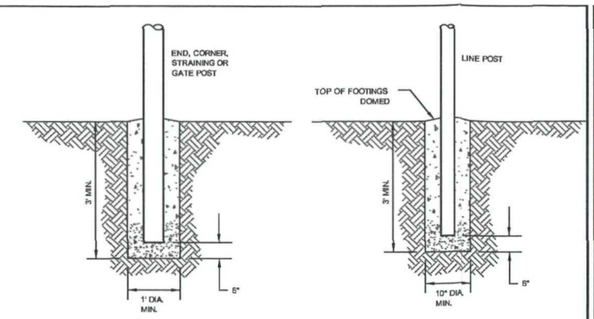
56393-07(008)CI-WA007 SEP 10/2012



DETAIL 4 (C-06, C-07, C-08, C-11) TYPICAL FINAL COVER SYSTEM
1" = 2'-0"



CORNER BRACE

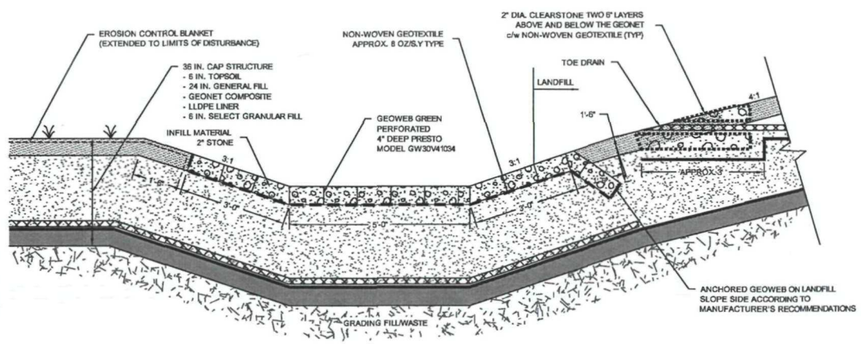


POST DETAILS

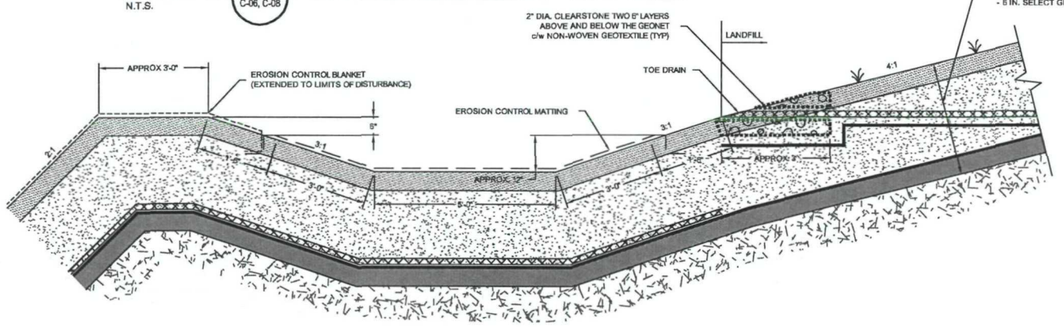
POST AND RAIL SIZES - FENCE			
USE	FABRIC HEIGHT	O.D.*	LBS/FT
INTERMEDIATE POSTS	BELOW 9'	2-3/8"	3.65
CORNER, END, GATE AND BRACE POSTS	BELOW 9'	2-7/8"	5.79
RAILS	ALL	1-5/8"	2.27

* CARBON STEEL PIPE - ASTM A-20, SCH 40

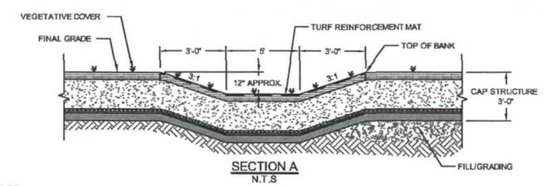
DETAIL 8 (C-01) TYPICAL SITE FENCING
N.T.S.



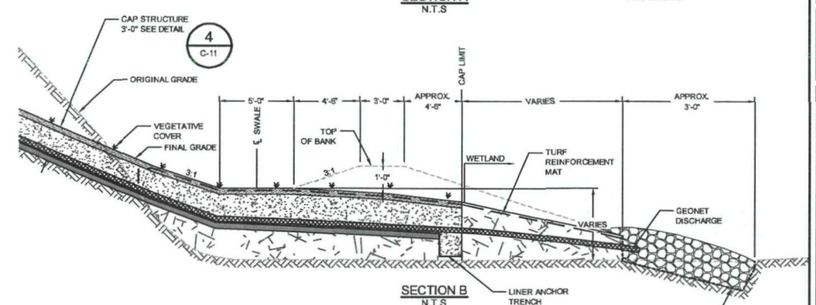
DETAIL 5 (C-06, C-08) TYPICAL GEOWEB STABILIZED SWALE
N.T.S.



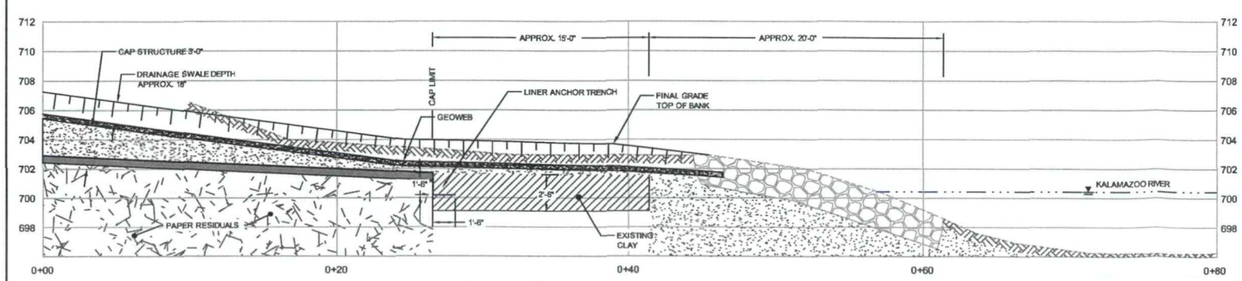
DETAIL 6 (C-06, C-07, C-08) TYPICAL TURF REINFORCEMENT MAT STABILIZED SWALE
N.T.S.



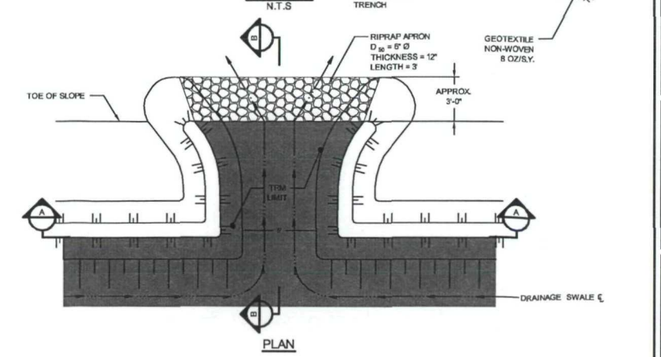
SECTION A
N.T.S



SECTION B
N.T.S



DETAIL 7 (C-01) TYPICAL DRAINAGE SWALE TO KALAMAZOO RIVER DISCHARGE
1"=5'-0"



PLAN

DETAIL 9 (C-01) TYPICAL DRAINAGE OUTLET
N.T.S.

Nº	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

6/11/12

DRAWING STATUS

Status	Date	Initial
RE-ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

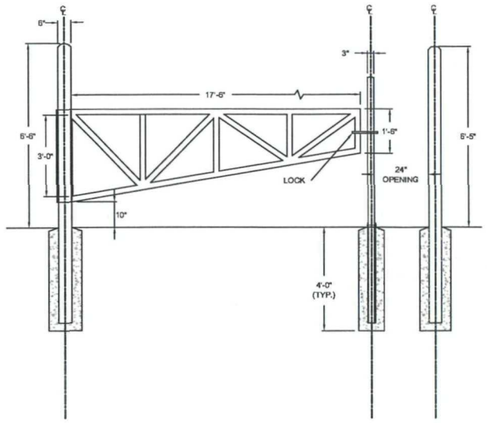
TYPICAL DETAILS I

CRA ENGINEERING INC.

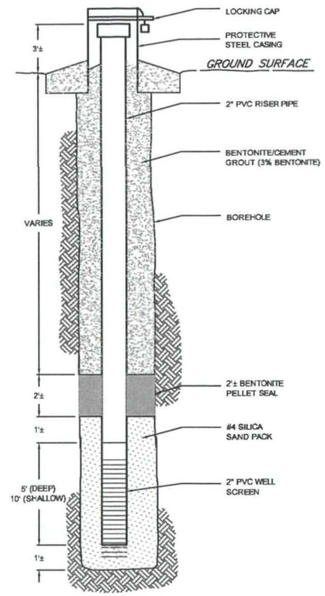
Source Reference:

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTEMBER 2012	
Scale: 1" = 50'-0"	Project Nº: 56393-07	Report Nº: 008	Drawing Nº: C-11

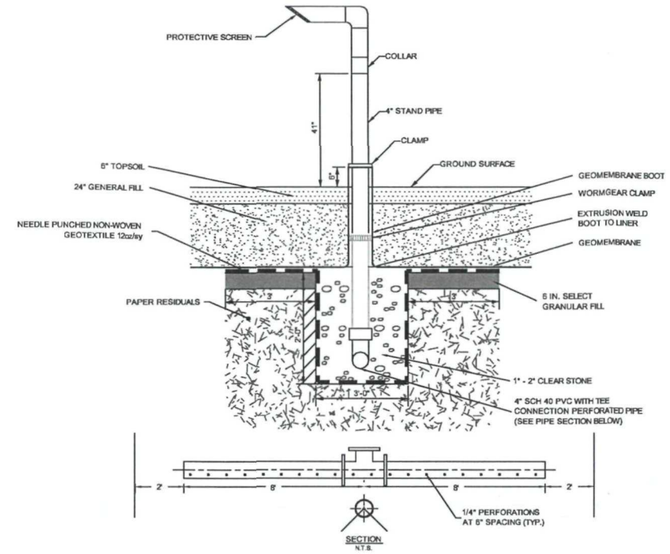
56393-07(008)CI-WA010 SEP 10/2012



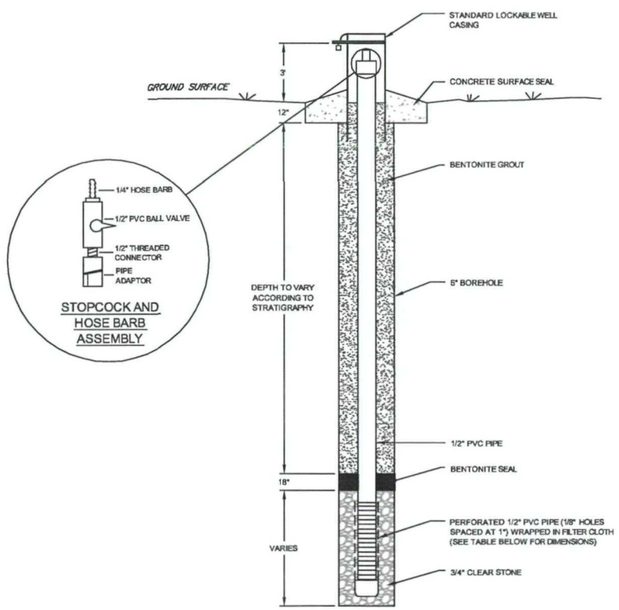
DETAIL 10 (C-01) SWING GATE
N.T.S.



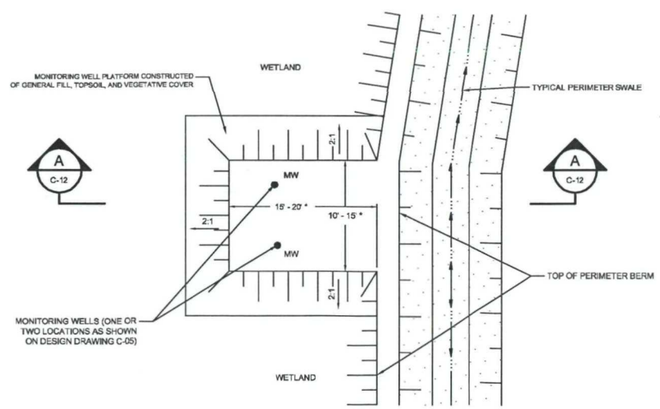
DETAIL 11 (C-01) TYPICAL MONITORING WELL
N.T.S.
(SEE TABLE FOR AS-BUILT ELEVATIONS)



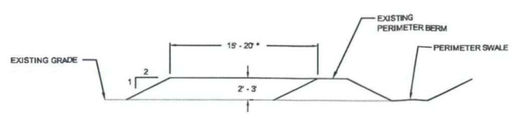
DETAIL 12 (C-01, C-03) TYPICAL GAS VENT
N.T.S.
(SEE TABLE FOR AS-BUILT ELEVATIONS)



DETAIL 13 (C-01, C-03) TYPICAL GAS PROBE
N.T.S.
(SEE TABLE FOR AS-BUILT ELEVATIONS)



PLAN



SECTION A (C-12)
N.T.S

* AS-BUILT DIMENSIONS VARIED FOR EACH PLATFORM DEPENDING UPON NUMBER OF WELLS AND SURROUNDING CONDITIONS.

DETAIL 14 (C-01) TYPICAL MONITORING WELL PLATFORM
N.T.S.

MONITORING LOCATIONS	GROUND SURFACE ELEVATION (FEET AMSL)	REFERENCE ELEVATION (FEET MSL)	WELL DEPTH (FEET)	VERTICAL SCREEN LENGTH (FEET)	DEPTH TO TOP OF SCREEN (FEET)	TOP OF SCREEN ELEVATION (FEET AMSL)
GROUNDWATER MONITORING WELLS						
MW-101S	734.35	737.46	39	7	32	702.35
MW-101D	734.33	737.14	75	5	70	664.33
MW-102S	704.18	707.36	10	7	3	701.18
MW-102D	704.43	707.43	45	5	40	664.43
MW-103D	704.37	707.36	35	5	30	674.37
MW-104S	703.86	706.65	25.5	7	19	684.86
MW-104D	703.48	706.42	45	5	40	663.48
MW-105S	704.89	707.86	12	7	5	699.89
MW-105D	704.78	707.89	47	5	42	662.78
MW-106S	703.88	706.96	9	7	2	701.88
MW-106D	703.66	706.36	45	5	39	664.66
MW-107S	703.76	706.73	13	5	8	695.76
MW-108S	703.32	706.21	9	7	2	701.32
MW-108D	703.39	706.16	45	5	40	663.39
MW-109	707.41	710.46	23	5	18	689.41

MONITORING LOCATIONS	GROUND SURFACE ELEVATION (FEET AMSL)	REFERENCE ELEVATION (FEET MSL)	PROBE DEPTH (FEET)	SCREEN LENGTH (FEET)	DEPTH TO TOP OF SCREEN (FEET)	TOP OF SCREEN ELEVATION (FEET AMSL)
GAS PROBES						
GP-1	707.35	709.88	4	2	2	705.35
GP-2	732.88	735.12	35	25	5	727.88
GP-3	703.51	706.47	5	2	3	700.51

MONITORING LOCATIONS	GROUND SURFACE ELEVATION (FEET AMSL)	SCREEN DEPTH (FEET)	HORIZONTAL SCREEN LENGTH (FEET)	TOP OF VENT ELEVATION (FEET AMSL)
GAS VENTS				
GV-1	722.12	5	16	728.45
GV-2	722.09	5	16	728.42
GV-3	731.04	5	16	737.37
GV-4	727.06	5	16	733.39
GV-5	727.74	5	16	734.07
GV-6	735.97	5	16	742.30
GV-7	731.90	5	16	738.23
GV-8	732.44	5	16	738.77
GV-9	738.35	5	16	744.68
GV-10	733.99	5	16	740.32
GV-11	729.92	5	16	736.25

No	Revision	Date	Initial

SCALE VERIFICATION

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

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR EPA SUBMISSION	SEPT. 15, 2012	CRH

12th STREET LANDFILL
Otsego Township, Michigan

AS-BUILT DRAWINGS

TYPICAL DETAILS II

CRA ENGINEERING INC.

Source Reference:

Project Manager:	Reviewed By:	Date:	
G. CARLI	R. HOEKSTRA	SEPTMEBER 2012	
Scale: 1" = 50'-0"	Project N #: 56393-07	Report N #: 008	Drawing N #: C-12

56393-07(008)CI-WA010 SEP 10/2012