

REPORT

*Remedial Investigation Report
REALM, Inc.
Peninsula Area Property
Saginaw, Michigan*

General Motors Corporation and
Delphi Automotive Systems
Corporation
Saginaw, Michigan

April 2000



Transmitted Via FedEx

April 14, 2000

Ms. Rhonda Klann
Michigan Department of Environmental Quality
Environmental Response Division
Saginaw Bay District
503 North Euclid Street
Bay City, MI 48706

Re: REALM Inc. Peninsula Area Property, Saginaw, Michigan
Remedial Investigation Report
Project #: 0276 276.06 #2.0

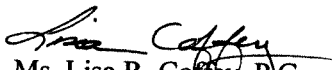
Dear Ms. Klann:

Please find enclosed, one copy of the Remedial Investigation (RI) Report prepared for the Remediation and Liability Management Company, Inc. (REALM) Peninsula Area Property in Saginaw, Michigan. This property was formerly part of the Delphi Automotive Systems Saginaw Steering Gear Plant 2 Property; however, the Peninsula Area has been transferred to REALM, a subsidiary of the General Motors Corporation (GM). The northern part of the Plant 2 property is now owned by Delphi Automotive Systems LLC (DAS), and the RI report for the DAS property was submitted in August 1999.

Please contact us if you have any questions regarding the enclosed report.

Sincerely,

BLASLAND, BOUCK & LEE, INC.


Ms. Lisa R. Coffey, P.G.
Manager, Hydrogeology

LRC/plf

j:\doc00\27606\00700157.WPD

cc: Ms. Cheryl Hiatt, GM Remediation
Mr. Edward Peterson, GM Remediation
Tony Thrubis, Esq., GM Legal
Ms. Karen Goldenberg, Blasland, Bouck & Lee, Inc.

***Remedial Investigation Report
REALM, Inc.
Peninsula Area Property
Saginaw, Michigan***

General Motors Corporation and
Delphi Automotive Systems
Corporation
Saginaw, Michigan

April 2000



6723 Towpath Road, P.O. Box 66
Syracuse, New York, 13214-0066
(315) 446-9120

Table of Contents

	Executive Summary	
Section 1	Introduction	1-1
	1.1 Overview	1-1
	1.2 Report Organization	1-2
	1.3 Remedial Investigation Objectives	1-2
	1.4 Site Description	1-3
	1.4.1 Physical Setting	1-3
	1.4.2 Historic Property Use	1-3
	1.4.3 Previous and Current Investigations at Adjacent Properties	1-3
	1.4.4 Regional and Site Geology	1-4
	1.4.5 Regional and Site Hydrogeology	1-5
	1.4.6 Regional Climate	1-6
Section 2	Remedial Investigation and Supplemental Assessments	2-1
	2.1 General	2-1
	2.2 Scope of Field Investigations	2-1
	2.3 Data Comparison to Adjacent Properties Perimeter Monitoring Wells	2-5
	2.4 Supplemental Assessments	2-6
	2.4.1 Background Groundwater Quality Assessment	2-6
	2.4.2 Preliminary Pathways and Receptors Assessment	2-7
	2.4.3 Preliminary Ecological Assessment	2-7
Section 3	Site Geology and Hydrogeology	3-1
	3.1 General	3-1
	3.2 Description of Geologic Units	3-1
	3.3 Site Hydrogeology	3-2
	3.3.1 Collection and Interpretation of Potentiometric Surface Elevation Data	3-2
	3.3.2 Hydraulic Conductivity Testing	3-3
Section 4	Investigation Results	4-1
	4.1 General	4-1
	4.1.1 QA/QC Review	4-1
	4.1.2 MDEQ Generic Criteria	4-2
	4.1.2.1 Groundwater Criteria	4-2
	4.1.2.2 Soil Criteria	4-4
	4.2 Investigation Results	4-5
	4.2.1 Soil Analytical Results	4-6
	4.2.2 Groundwater Analytical Results	4-8

	4.3	Analytical Data Comparison to Adjacent Property Perimeter Monitoring Wells	4-10
	4.4	Supplemental Assessments	4-13
	4.4.1	Background Groundwater Quality Assessment	4-13
	4.4.2	Preliminary Ecological Assessment	4-15
	4.4.2.1	General	4-15
	4.4.2.2	Description of Ecological Habitat and Potential Receptors	4-15
	4.4.2.3	Preliminary Pathways and Potential Receptors Assessment	4-16
Section 5		Summary and Conclusions	5-1
Section 6		References	6-1
Section 7		Acronyms & Abbreviations	7-1
TABLES			
	1	Soil Boring and Soil Sample Analytical Summary	
	2	Groundwater Elevations and Monitoring Well Construction Summary	
	3	Soil Sample Analytical Summary for Volatile Organic Compounds	
	4	Soil Sample Analytical Summary for Semi-Volatile Organic Compounds	
	5	Soil Sample Analytical Summary for Metals and Polychlorinated Biphenyls	
	6	Groundwater Sample Analytical Summary for Volatile Organic Compounds	
	7	Groundwater Sample Analytical Summary for Semi-Volatile Organic Compounds	
	8	Groundwater Sample Analytical Summary for Metals and Polychlorinated Biphenyls	
	9	Summary of Organic and Metals Criteria Exceedences in Soil	
	10	Summary of Organic and Dissolved Metals Criteria Exceedences in Groundwater	
FIGURES			
	1	Site Location Map	
	2	Soil Boring and Monitoring Well Location Map	
	3	Geologic Cross-Section Location Map	
	4	Geologic Cross-Section B' - B"	
	5	Water Table Elevation Contour Map, December 8, 1997	
	6	Water Table Elevation Contour Map, February 25-26, 1998	
	7	Water Table Elevation Contour Map, July 15-16, 1998	
	8	Water Table Elevation Contour Map, November 5-6, 1998	
	9	Potentiometric Surface Elevation Contour Map for the Lower Sand Unit, November 5-6, 1998	

APPENDIX

Provided Upon Request

- 10 Volatile Organic Compound and PCB Detections in Soil
- 11 Semi-Volatile Organic Compound Detections in Soil
- 12 Inorganic Compound Detections in Soil
- 13 Organic Compound Detections in Groundwater
- 14 Inorganic Compound Detections in Groundwater
- 15 Vegetative Cover Type Map

A Boring and Monitoring Well Construction Logs

Analytical Data Validation Summary Reports

Executive Summary

This Remedial Investigation (RI) Report presents the results of voluntary investigation activities completed by Blasland, Bouck & Lee, Inc. (BBL) on behalf of the Remediation and Liability Management Company, Inc. (REALM), to address the "Peninsula Area" or the "Peninsula Area Property" (the "site"), located in Saginaw, Michigan. The RI has been completed in accordance with the Michigan Department of Environmental Quality- (MDEQ-) approved *Delphi Saginaw Steering Systems Plant 2 RI Work Plan* (BBL, 1997b), and several addenda to the Work Plan, to characterize the nature and extent of environmental contamination at the site.

This summary presents the key points presented in each section of the report.

Introduction

The site is located on a 3.69-acre parcel of property due south of the Delphi Automotive Systems Corporation (Delphi) Plant 2 Property. The parcel was originally part of the Delphi Plant 2 Property, but was transferred to GM's subsidiary company, REALM, on January 1, 1999. The site is bordered by industrial properties on all sides: the Delphi Plant 2 Property to the north, the GM SMI Plant Property to the east, and the REALM Green Point Landfill Property to the southeast, south, and west. The site is covered by fill material and underlain by a sequence of glacial and lacustrine deposits of sand and silty clay. A lower confining unit of silty clay and a discontinuous unit of glacial till overlie bedrock, which was encountered at a depth of 86 feet at a deep boring on the Delphi Plant 2 Property. No operational areas are present at the site. The ground surface is flat across the site, and then drops steeply for approximately three to five feet at the western property edge, due to the placement of fill material associated with the historic operations of the Delphi Plant 2 Facility.

Remedial Investigation Field Activities

Investigation efforts are discussed in general terms in this section; additional details are found in the main body of the report.

Soil Boring and Monitoring Well Installation

A total of 4 temporary and 8 permanent monitoring wells were installed at 6 cluster locations as part of the RI during two separate phases of well installation. Monitoring wells were installed at the water table and at the base of the sand unit.

Four soil borings were also installed, two of which extended five feet into the silty clay unit, the remaining two were installed to approximately 10 feet bgs.

Collection and Analysis of Soil Samples

Soil samples were collected for laboratory analysis during two drilling mobilizations. Initially, four soil samples were collected and analyzed for USEPA Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and the 12 "site-specific" metals. During subsequent soil sampling, 12 soil samples were collected and analyzed for USEPA TCL VOCs, SVOCs, PCBs, and the 12 "site-specific metals". Additionally, during the subsequent soil sampling, 6 soil samples were also methanol preserved and analyzed for TCL VOCs.

Collection and Analysis of Groundwater Samples

Groundwater samples were collected for laboratory analysis during two sampling events. The first sampling event was completed in December 1997 and involved the collected of four groundwater samples. The samples were analyzed for USEPA TCL VOCs, SVOCs, PCBs (total and dissolved), and the 12 "site-specific" metals (dissolved). A total of 12 wells were sampled during the second sampling event in November 1998. Samples from newly installed monitoring wells were analyzed for TCL VOCs, SVOCs, PCBs (total and dissolved), and the 12 "site-specific metals"(dissolved). The analyte lists for the remaining samples were determined for each location individually based on the previous sampling data and the location of each monitoring point.

Preliminary Ecological Assessment

A preliminary ecological assessment, prepared based on a field visit, was completed to describe site areas, and to characterize ecological habitat.

Elevation and Horizontal Survey of Monitoring Wells and Soil Borings

Sampling points were surveyed by a Michigan licensed surveyor relative to the National Geodetic Vertical Datum (NGVD) of 1929, and the North American Datum of 1983 (NAD 83) State Plan Coordinate System, South Michigan Zone.

Collection of Potentiometric Data

Water-level measurements were collected from on-site and Delphi Plant 2 monitoring wells on four dates at approximate quarterly intervals from December 1997 to December 1998.

Site Geology and Hydrogeology

RI activities focused on both the physical and chemical characterization of the site. This section describes the results of the physical characterization of the site, including the site geology and hydrogeology.

Site Geology

The site geology was characterized during the RI through the visual description of shallow overburden deposits. The overburden deposits at the site are comprised of the following primary units (in descending order): fill materials, fine- to medium-grained sand, and silty clay. The fill materials range in thickness from approximately 6 to 12 feet. The sand unit ranged in thickness from 3 to 12 feet. The deeper borings completed at the site generally penetrated the silty clay unit only a few feet, and the exact thickness of this unit is not known. However, based on observations made at a deep boring placed approximately 2,000 feet north of the Peninsula Area, a till layer overlies bedrock, which was encountered at a depth of 86 feet (BBL, 1999).

Site Hydrogeology

Groundwater is present at the site in an unconfined or "water table" condition encountered within the fill unit. Groundwater flow patterns at the site were investigated during the RI through the collection of groundwater level measurements to evaluate vertical and horizontal gradients, and interpreted groundwater flow directions.

- *Interpretation of Potentiometric Surface Elevation Data*

Water table maps and potentiometric surface elevation maps for the sand unit were constructed based on the collected groundwater elevation data. The general direction of groundwater flow at the water table is toward the west to southwest. The sand unit potentiometric surface also shows flow generally to the west/southwest.

- *Horizontal and Vertical Hydraulic Gradients*

The horizontal hydraulic gradient of the water table is 0.0065 to 0.0076 feet/foot (ft/ft) and of the sand unit potentiometric surface is 0.0033 to 0.0044 ft/ft. The vertical hydraulic gradient is primarily neutral, with the exception of a slight upward gradient at the MW97-105 cluster and a slight downward gradient at the MW/TW98-111 cluster.

Investigation Results

Samples of soil and groundwater were collected as part of the RI to characterize the site. The data are discussed in general terms in this section. Additional details of investigation efforts are found in the main body of the report.

MDEQ Criteria

The RI analytical data have been compared to the generic MDEQ criteria to provide a screening level evaluation of the collected data. The criteria and screening levels used for this evaluation are presented in MDEQ Environmental Response Division Interim Operational Memorandum #18, dated May 28, 1999 (MDEQ, 1999).

Each of the generic criteria established by the MDEQ corresponds to a specific potential exposure pathway based on land use. Industrial/Commercial II, III, and IV generic criteria for protection of inhalation, ingestion, and direct contact were used for comparison to the soil and groundwater to complete a screening level evaluation. In addition, Statewide Default Soil Background Levels (SDBLs) were used in the evaluation if the generic criteria were lower. The Generic Flammability and Explosivity Screening Level (FESL) values and Water Solubility Screening Level (WSSL) values were also used to screen the groundwater analytical data.

Soil Investigation

Analytical results indicate that a number of VOCs, SVOCs, PCBs, and metals were detected in site soils at concentrations above the laboratory detection limit. None of the observed soil concentrations exceeded Generic Soil Criteria Protective for Groundwater Contact (GCCP), Generic Industrial Direct Contact (IDC), Generic Industrial Infinite Source Volatile Soil Inhalation Criteria (IVSIC), Generic Industrial Particulate Soil Inhalation Criteria (IPSIC), or Generic Industrial Soil Volatilization to Indoor Air Inhalation Criteria (ISVIIC) values. A

limited number of VOCs and metals exceeded generic Industrial Drinking Water Protection (IDWP) criteria , as summarized below:

- TCE exceeded generic IDWP criteria at two sampling locations.
- Concentrations of arsenic (1 location), chromium (9 locations), nickel (5 locations), and silver (1 location) exceeded the MDEQ generic IDWP criteria. Concentrations of iron (9 locations) and lead (12 locations) exceeded the SDBLs.

Slight differences were noted between the results of the methanol preserved samples and the corresponding non-preserved samples. In general, where there were detections in the preserved samples, the corresponding non-preserved samples were non-detect or had lower detections (Table 3).

Groundwater Investigation

Analytical results indicate that a number of VOCs, SVOCs, and metals were detected in site groundwater at concentrations above the laboratory detection limit. None of the groundwater concentrations exceeded GCC, Acute Inhalation Screening Level (AISL), FESL, or WSSL values. A limited number of VOCs and metals exceeded other Generic MDEQ Criteria, as summarized below:

- Concentrations of total-1,2-dichloroethene, benzene, chlorobenzene, chloroform, trichloroethene, and vinyl chloride exceeded MDEQ generic Industrial Drinking Water (IDW) values.
- Analytical data for monitoring wells MW98-109S1, TW98-109WT, MW98-111S1, and TW98-111WT were compared to MDEQ Generic Groundwater/Surface Water Interface (GSI) Criteria due to the presence of a small area of ponded water west of the site, located on property that is also owned by REALM. Concentrations of chlorobenzene, chloroform, ethylbenzene, toluene, vinyl chloride, and xylenes exceeded generic GSI criteria.
- Concentrations of iron exceeded site-specific background levels at two locations: MW97-105WT and MW97-105S1. Concentrations of barium exceeded site-specific background levels at two locations: MW98-111S1 and TW98-111WT.

Analytical Data Comparison to Adjacent Property Perimeter Monitoring Wells

Groundwater analytical results from select adjacent property perimeter wells sampled as part of either the GM SMI Plant Property RI or the Delphi Plant 2 Property RI were reviewed to assist in the characterization of the Peninsula Area Property.

The source of the VOCs detected in the majority of the site monitoring wells that screen the sand unit has not been identified. The halogenated VOCs may either be related to the fill materials or to groundwater migration from an off-site source. The low level benzene exceedences at MW-144WT and the X-1 cluster may be related to a source located on the northwest side of the Green Point Landfill or in the southeast corner of the Peninsula Area.

Background Groundwater Quality Assessment Summary

Calculated site-specific background values were determined for barium (990 ppb), iron (13,000 ppb), lead (6.0 ppb), and zinc (20,000 ppb). These values were higher than one or more of the MDEQ Generic Criteria used.

Preliminary Ecological Assessment

The preliminary ecological assessment included the completion of a site visit by BBL personnel in June 1996 to observe site habitat. The Peninsula Area is comprised of one basic covertime; a Field Vegetative Covertime characterized by herbaceous vegetation.

A pathway analysis for each media of potential on-site exposure was completed. The surface soil exposure pathway could not be ruled out based on this analysis; however, due to the features of the area, the potential exposure is expected to be limited.

1. Introduction

1.1 Overview

This document presents the results of a voluntary Remedial Investigation (RI) conducted for the Remediation and Liability Management Company, Inc. (REALM) "Peninsula Area" or the "Peninsula Property" (the "site"), located in Saginaw, Michigan (Figure 1), pursuant to Part 201 of Michigan's Natural Resources and Environmental Protection Act 451 (NREPA), as amended. This 3.69-acre parcel of property was previously part of the adjacent Delphi Saginaw Steering Systems Plant 2 Property (Delphi), but was transferred to the General Motors Corporation's (GM's) subsidiary company REALM, on January 1, 1999. For this reason, a separate *Peninsula Area RI Report* has been prepared for this property.

As discussed in the Michigan Department of Environmental Quality- (MDEQ-) approved *Delphi Saginaw Steering Systems Plant 2 RI Work Plan* (BBL, 1997b) (the "*RI Work Plan*"), filling activities have been conducted in this area. This RI was designed to assess whether contamination is present in the Peninsula Area, and if present, to characterize the nature and extent of the contamination.

The final *RI Work Plan* (BBL, 1997b) included a response to requests and comments made by the MDEQ (Klann, 1996a) on previous versions of the *RI Work Plan* and potential environmental issues at the Delphi Plant 2 Property identified by GM (Peterson, 1995; Hiatt, 1996).

The scope of work was also conducted pursuant to a site-specific *Quality Assurance Project Plan (QAPP)* and a site-specific *Health and Safety Plan (HASP)* which were included with the final *RI Work Plan* (BBL, 1997b).

During the course of implementing the RI for the Peninsula Area property, two additional scopes of work were conducted pursuant to Addenda to the *RI Work Plan*, and presented to the MDEQ for approval. The addenda which pertained to the Peninsula Area are:

- *Remedial Investigation Work Plan Addendum No. 3* (Saroff, 1998b, 1998c, 1998d, and 1998e); approved by the MDEQ on September 24, 1998 (Brouillet, 1998a).
- *Remedial Investigation Proposed Second Groundwater Sampling Event* (Saroff, 1998f, 1998g), approved by the MDEQ on November 5, 1998 (Brouillet, 1998b).

All work conducted for the RI was discussed and agreed upon with the MDEQ prior to implementation. Project status and interim findings of the field activities were discussed during three project progress meetings (September 7, 1996; November 19, 1996; March 19, 1998) attended by representatives of the MDEQ, GM, and Delphi.

1.2 Report Organization

This *RI Report* is organized into the following sections:

Section	Content
1 - Introduction	Background information along with the objectives and scope of this RI.
2 - Remedial Investigations and Supplemental Assessments	Summary of the RI field activities.
3 - Site Geology and Hydrogeology	Summary of the physical data collected during the RI, and description of the site geology and hydrogeology.
4 - Results of Analytical Sampling	Summary of analytical data collected during the RI.
5 - Summary and Conclusions	Summary of the findings of the RI.
6 - References	List of the references cited in the <i>Peninsula Area RI Report</i> .
Acronyms and Abbreviations	List and definitions of the acronyms and abbreviations referred to in the <i>Peninsula Area RI Report</i> .

1.3 Remedial Investigation Objectives

Specific objectives of the RI process were to:

- Collect information necessary to characterize the nature and extent of environmental contamination at the site; and
- Develop data to support the preparation of site-specific cleanup criteria based on land-use scenarios that will allow a Feasibility Study (FS), if needed, to be rapidly focused on an appropriate set of alternatives (the FS, if needed, would be conducted to determine what remedial actions, if any, will be required.

1.4 Site Description

1.4.1 Physical Setting

The site is located on a 3.69-acre parcel of undeveloped property due south of the Delphi Plant 2 Property which is located at 1400 Holmes Street, Saginaw, Michigan. The site is situated within the western half of Section 34, T12 N, R4E, Saginaw County, Michigan (Figure 1). The site is bordered by the Delphi Plant 2 Property to the north, the GM Saginaw Malleable Iron (SMI) Plant Property to the east, and the REALM Green Point Landfill property to the southeast, south, and west (Figure 2).

The site topography is relatively flat. Ground surface elevations across the property range from approximately 590.3 to 591.4 feet above mean sea level (referenced to the National Geodetic Vertical Datum [NGVD] of 1929). At the western property edge, there is a steep drop in grade of approximately 3 to 5 feet. There are no buildings or paved areas in the Peninsula Area.

1.4.2 Historic Property Use

No plant buildings or structures were ever constructed on the property. A review of aerial photographs from 1965 and 1973 suggest that filling operations were occurring in this area. No specific records pertaining to the nature and volume of fill placed in this area are available.

1.4.3 Previous and Current Investigations at Adjacent Properties

Significant field investigations have been conducted at the adjacent GM SMI Plant Property and REALM Green Point Landfill Property, either as part of that site's RI, or earlier during other environmental investigations. Additionally, a separate *RI Report* has been completed at the Delphi Plant 2 Property and was submitted to the MDEQ in August 1999. Below is a summary of investigations conducted at adjacent properties.

GM SMI Plant Property and REALM Green Point Landfill Property Sitewide RI

Between 1994 and 1998, as specified in the MDEQ-approved *GM SMI Plant Property, Green Point Landfill, and Drum Remediation Area RI Work Plan* (the "*GM SMI RI Work Plan*") (BBL, 1997a), BBL investigated soil and/or

groundwater quality conditions at the GM SMI Plant Property and Delphi Plant 2 Property (Figure 3). Groundwater data for samples collected along the boundaries of adjacent properties have been assessed as part of this RI. Relevant offsite groundwater data are discussed in more detail in Sections 2 and 4.

Delphi Plant 2 Property Sitewide RI

In 1997 and 1998, pursuant to the Delphi Plant 2 Property *RI Work Plan* (BBL, 1997b), specific areas of the Delphi Plant 2 Property (including the Peninsula area) were investigated (BBL, 1999b). Soil and groundwater samples were collected from the Delphi Plant 2 Property, and evaluated against relevant MDEQ criteria. Relevant data from the August 1999 Delphi Plant 2 RI are discussed in more detail in Sections 2 and 4, respectively, of this report.

Coordination of Results from Adjacent Property RIs

As requested by the MDEQ and agreed upon with REALM, relevant analytical and water level data from each of the RIs completed on the adjacent properties were used in the interpretation of conditions at the Peninsula Area. Where appropriate and relevant, Delphi Plant 2 and GM SMI Plant Property RI data for locations bordering the Peninsula Area Property were considered during completion of this RI.

1.4.4 Regional and Site Geology

The Peninsula Property is located within the Central Lowland geomorphic province of North America. The property overlies bedrock units of the Michigan basin, which is a roughly circular geosynclinal structure in which the youngest formations subcrop beneath overlying glacial drift at the center of the basin, with progressively older formations occurring outward in concentric rings. The Peninsula Property overlies a subcrop of bedrock units of the central part of the basin, which consist of Pennsylvanian age bedrock of the Grand River and Saginaw Formations. The Grand River Formation consists primarily of sandstones, which are unconformably overlain by the Saginaw Formation, which consists of interbedded sandstone, shale, and limestone, with frequent coal seams (Martin, 1957; MDNR, 1964, 1968). The depth to bedrock at this property is approximately 86 feet below grade. This measurement is based on a boring log for monitoring well MW-139, which was installed during the GM SMI Plant Property RI in the northwest portion of the Delphi Plant 2 Property. Bedrock at monitoring well MW-139 was described as dark gray weathered shale with faint laminations. This field description is consistent with the above general description of Saginaw Formation bedrock units. During a previous Geotechnical Investigation in the area of the Delphi Plant 2 Wastewater

Treatment Plant (WWTP) (GM, 1967), a “clay pan” was encountered between 81 and 84 feet below grade. The “clay pan” appears to be shale bedrock (similar depth to top of shale encountered in the deep boring MW-139).

Overburden deposits at the site have been characterized by continuous soil sampling at several boring and monitoring well locations (Figure 2). The geologic cross-section location is shown on Figure 3 and the north-south cross section (B'-B"; continuation of B-B' contained in the *Delphi Automotive Systems Corporation Plant 2 Property RI Report*) is presented on Figure 4.

The overburden deposits consist of three predominant stratigraphic units consisting of fill material (i.e., light brown sand, silt and clay, with some concrete, glass, wire, and trace amounts of gravel, pebbles, and slag), a sand unit consisting of fluvial and glacio-fluvial deposits, and a silty clay unit, referred to as the “lower silty clay”.

As shown on the B'-B" cross section (Figure 4), the fill unit is approximately 6 to 12 feet thick, and contains miscellaneous materials, however, the primary fill component is reworked sand, silt, and clay. The sand unit is composed of fine- to medium-grained sand with occasional seams or lenses of glaciolacustrine silt, silty sand, and silty clay. Below this sand unit is a unit that consists of a silty clay with minor amounts of sand and gravel. The silty clay unit is found at depths ranging from approximately 9 feet to 22 feet below grade. The thickness of the sand unit varies with the depth of the silty clay unit and the fill thickness, from 3 to 12 feet across the site. Based on data collected at the adjacent site properties, the sand unit pinches out west of the Peninsula Area. The overall thickness of the silty clay unit at the site is approximately 60 feet to 85 feet based on the depth of bedrock encountered in boring MW-139 (northwest side of Delphi Plant 2 Property) and borings completed at the Delphi Plant 2 Property WWTP Area.

1.4.5 Regional and Site Hydrogeology

The Saginaw Formation bedrock is potentially confined by the overlying, and apparently continuous, lower silty clay unit. Studies of bedrock groundwater quality for this unit in the Saginaw area indicate that bedrock groundwater is heavily mineralized and would generally be unfit for use as an aquifer due to high concentrations of chlorides, iron, total and dissolved solids, and other minerals (Cummings, 1989; USGS, 1980). Saginaw and the surrounding communities use water obtained from Lake Huron for their drinking water supply (USEPA, 1981; Saginaw County Health Department, 1997).

Where observed, shallow groundwater at the site exists in an unconfined or water table condition (or perched above the silty clay layer). The depth to groundwater varies from 5.7 feet to 6.8 feet (November 5-6, 1998), and depends on the proximity of recharge areas and seasonal influences. Saturated conditions occur predominately in the fill materials. The primary natural stratigraphic units include the sand unit and the underlying silty clay unit (also called the lower silty clay unit to be consistent with the *GM SMI and REALM GPC and DRA RI Report* [BBL, 1999a]). The sand unit acts as the primary pathway for groundwater flow at the property. The underlying silty clay unit appears to act as a downward flow barrier or lower confining unit. Groundwater flow direction below the Peninsula Area is typically west/southwest.

1.4.6 Regional Climate

Historic meteorological data recorded for the region were gathered at the Saginaw Airport, with the exception of relative humidity, wind speed, and wind direction, which were measured in Flint, Michigan. In winter, the average temperature is 23.1°F, and the average daily minimum temperature is 16.6°F. The lowest temperature on record for the area is -23°F, which occurred on February 5, 1918. In summer, the average temperature is 68.7°F, and the average daily maximum temperature is 79.3°F. The highest recorded temperature, which occurred on July 13, 1936, was 111°F.

Approximately one-half of the average precipitation of 30.31 inches usually falls between May and September. Thunderstorms occur during the early summer, generally in June and July. The heaviest 24-hour rainfall during the period of record was 5.51 inches, which occurred on September 10, 1986.

The average seasonal snowfall is 40.7 inches. The average relative humidity at midday is 71 percent. The prevailing wind is from the southwest, and the highest monthly average wind speed is recorded for January at 9.8 miles per hour (Midwest Climate Center, 1993).

2. Remedial Investigation and Supplemental Assessments

2.1 General

As set forth in the *RI Work Plan* (BBL, 1997b), BBL investigated soil and groundwater quality conditions at the Peninsula Area (which was originally part of the Delphi Plant 2 Property). The Peninsula Area investigation was conducted in accordance with the specifications outlined in the *QAPP* (BBL, 1997b). A summary of the soil and groundwater samples collected from the Peninsula Area are discussed in Section 2.2 of this report. A summary of the groundwater samples collected from adjacent property perimeter monitoring wells, which border the current Peninsula Area, are discussed in Section 2.3 of this report.

2.2 Scope of Field Investigations

Field investigations were conducted pursuant to the *RI Work Plan* (BBL, 1997b), the *RI Work Plan Addendum No. 3* (Saroff, 1998b, 1998c, 1998d, and 1998e), the *RI Proposed Second Groundwater Sampling Event* (Saroff, 1998f, 1998g), and the *QAPP* (BBL, 1997b).

Monitoring Well and Soil Boring Installations

In November 1997, two soil borings (SB97-110 and SB97-111) were installed with BBL oversight in the Peninsula Area to assess the depth of the silty clay unit and to evaluate the thickness of the sand unit. Soil boring SB97-110 was extended to 24 feet below grade. Soil boring SB97-111 was extended to 26 feet below grade. Two monitoring wells were installed adjacent to each of the soil borings to monitor groundwater quality at the water table (MW97-104WT and MW97-105WT) and across the vertical extent of the sand unit (MW97-104S1 and MW97-105S1).

In September 1998, six soil borings (MW98-108S1, MW98-109S1, MW98-110S1, MW98-111S1, SB98-119, and SB98-120) were installed with BBL oversight in the Peninsula Area to assess the extent of VOCs in soils in the lower sand unit. The soil borings ranged in depth from 8 feet below grade to 24 feet below grade (Table 1).

Due to the presence of dissolved-phase VOCs in monitoring well MW97-104S1, additional groundwater investigation activities were conducted in September 1998. Four additional deep monitoring wells (MW98-108S1, MW98-109S1, MW98-110S1, MW98-111S1), three temporary water table monitoring wells (TW98-109WT, TW98-110WT, TW98-111WT), one permanent water table monitoring well (MW98-108WT), and two soil borings (SB98-119 and SB98-

120) were installed to further assess the source and the lateral and vertical extent of the VOCs detected at MW97-104S1 (Figure 2).

All drilling activities for the RI were completed by Rau Drilling of Bay City, Michigan. During the investigations, continuous split-spoon soil samples were collected for lithologic characterization from each soil boring. Additionally, all soil borings were abandoned with a cement-bentonite grout. All soil samples were field screened for headspace VOCs using a portable photoionization detector (PID). Observations of stained soils, obvious odors, and other unusual features were also recorded, and are noted in the site boring logs (Appendix A). Monitoring wells were constructed with two-inch diameter, flush threaded, polyvinyl chloride (PVC) Schedule-40 risers with 5- or 10- foot long, 0.010-inch slotted PVC screens, as described in the *RI Work Plan* and *QAPP* (BBL, 1997b). All water table wells (designated with "WT" suffix) were constructed with 10-foot long screens and all monitoring wells set at the silty clay interface at the base of the sand unit (designated with an "S1" suffix) were constructed with 5-foot long screens (Table 2). The vertical screening approach employed by BBL during the area-specific investigations was consistent with *RI Work Plan* specifications. In this approach, if the saturated thickness of a particular area exceeded 10 feet (i.e., an area where a monitoring well was proposed), the need for an additional monitoring well was assessed. Due to the limited thickness of the sand unit, a maximum of two monitoring wells were installed at each cluster location.

Soil and Groundwater Sampling Activities

During drilling activities in November 1998, two soil samples were collected from both SB97-110 and SB97-111 and submitted to Encotec Laboratories (Encotec) of Ann Arbor, Michigan for laboratory analysis. The samples selected for analysis were the deepest soil sample at each location and the sample with the highest PID headspace response. The soil samples were submitted for analysis of United States Environmental Protection Agency (USEPA) SW-846 Target Compound List (TCL) VOCs, SVOC, and PCBs. The soil samples were also analyzed for the "site-specific 12 metals": arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc.

Additional soil samples were collected during September 1998 from above the water table at each of the four additional deep monitoring wells (MW98-108S1, MW98-109S1, MW98-110S1, MW98-111S1) and both of the additional soil borings (SB98-119 and SB98-120). Two samples were collected from each location and submitted to CT&E Laboratories (CT&E) of Ludington, Michigan for analysis of TCL VOCs, SVOCs, and PCBs and the site-

specific metals. One sample was taken from the highest PID headspace reading and the other from within the top 6 inches to 1 foot to evaluate potential worker exposure. As required by the MDEQ, a duplicate of the soil sample with the highest PID headspace response [collected from MW98-108S1 (0.5-1.0 foot depth), MW98-109S1 (6-8 feet depth), MW98-110S1 (4-6 feet depth), MW98-111S1 (0.5-1.0 feet depth), SB-119 (2-4 feet depth), and SB98-120 (4-6 feet depth)] was collected using an EnCore™ sampler, subjected to methanol preservation by the laboratory (USEPA Method 5035), and analyzed for VOCs using USEPA Method 8260.

Groundwater samples were collected from the MW97-104 and MW97-105 clusters in December 1997. The samples were submitted to Encotec for analysis of TCL VOCs, SVOCs, and PCBs (unfiltered and filtered) and the “site-specific 12 metals” (filtered). The MDEQ collected split samples from each well for each of the proposed analyses (VOCs, SVOCs, unfiltered PCBs, filtered PCBs, and filtered metals).

In November 1998, additional groundwater sampling activities occurred. Groundwater samples were collected from the MW97-104, MW97-105, and MW98-108 clusters, from permanent monitoring wells MW98-109S1, MW98-110S1, and MW98-111S1, and from temporary monitoring wells MW98-109WT, MW98-110WT, and MW98-111WT and were submitted to CT&E for laboratory analysis. The groundwater sample from MW97-104S1 was submitted for analysis of TCL VOCs and SVOCs. The groundwater sample from MW97-104WT was submitted for analysis of TCL VOCs, SVOCs, and select filtered metals (iron and lead). The groundwater samples from MW97-105WT and MW97-105S1 were submitted for analysis of TCL VOCs and select filtered metals (iron and selenium and iron and lead, respectively). Samples collected from the eight new monitoring wells (MW98-108WT, MW98-108S1, TW98-109WT, MW98-109S1, TW98-110WT, MW98-110S1, TW98-111WT, and MW98-111S1) were submitted for analysis of TCL VOCs, SVOCs, unfiltered and filtered PCBs, and filtered site-specific metals. The MDEQ collected split samples from each well only for analysis of VOCs (Method 8260 plus) and unfiltered PCBs (Method 8082).

Due to an inadvertent laboratory misunderstanding, there was insufficient sample volume available for the SVOC analysis on the groundwater sample collected from MW98-104S1. Therefore, BBL collected a second groundwater sample from the well on December 8, 1998. The groundwater sample was submitted to CT&E for the proposed SVOC analysis. [Please also note that BBL confirmed with CT&E that the chemical abstract service registry number (CAS #) listed on the laboratory data reports is correct for bis(2-chloroisopropyl)ether].

All soil and groundwater samples collected by BBL were submitted for analysis of TCL VOCs by Method 8260B, SVOCs by Method 8270C, PCBs by Method 8081, and/or the following the "site-specific 12 metals" (except as otherwise noted) using USEPA SW-846 Methods (6010/7000 Series): arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc. As noted, select TCL VOC soil samples were preserved/extracted by USEPA Method 5035.

These analyses and methods were consistent throughout the RI unless noted otherwise in the text and/or analytical summary tables (see Section 4). Target detection limits for laboratory analyses were consistent with the MERA Operational Memorandum #6, Revision #4 (MDNR, 1995c). Data quality objectives (DQOs) were specified in the *QAPP* (BBL, 1997b) and approved by the MDEQ prior to initiating the field activities to ensure that the analytical data generated during the RI was adequate to support the RI objectives. BBL personnel completed a QA/QC review of analytical results for all BBL samples.

For groundwater sampling activities, disposal polyethylene bailers or disposable high density polyethylene tubing and a peristaltic pump were used. All monitoring well development, purging, and sampling activities were completed in accordance with the site *QAPP* (BBL, 1997b). All groundwater samples collected for dissolved metal analysis or dissolved PCB analysis were filtered in the field using disposable 0.45-micron filters.

Monitoring Well Gauging Activities

The monitoring wells were gauged during the Delphi Plant 2 Property sitewide groundwater sampling events (December 1997 and November 1998). In addition, two other combined gauging events (February 1998 and July 1998) were completed to assess potential site-wide seasonal changes in groundwater levels and/or flow directions.

Site Survey Activities

Surveyors from the Spicer Group of Saginaw, Michigan, and Atwell-Hicks of Utica, Michigan, were used to complete the elevation surveys at each BBL soil boring, monitoring well, and temporary monitoring well locations at the site and at adjacent properties (Atwell Hicks surveyed elevations for monitoring wells and soil borings installed as part of the GM SMI Plant Property RI). All the elevations measured during the survey activities are relative to the National Geodetic Vertical Datum (NGVD) of 1929. The elevations of the top of the protective casing and top of the inner casing of all wells were measured to the nearest 0.01 foot. The elevation of the ground surface at each well

and soil boring location was measured to the nearest 0.1 foot. Elevations were tied to the previous work done at the GM SMI Plant Property, the REALM Green Point Landfill and Drum Remediation Area, and the Delphi Plant 2 Property (NGVD of 1929; using the GM SMI Plant Property RI survey monument system).

2.3 Data Comparison to Adjacent Properties Perimeter Monitoring Wells

As part of the GM SMI Plant Property RI, BBL sampled several existing and/or temporary monitoring wells located on the Delphi Plant 2 Property, GM SMI Plant Property, and REALM Green Point Landfill and Drum Remediation Area Property that border the Peninsula Area. The groundwater analytical results from 10 of these adjacent property perimeter wells were reviewed to assist in the characterization of the Peninsula Area Property. One of these perimeter monitoring wells was located on the SMI Plant Property (MW-143WT), three perimeter monitoring wells were located on the Plant 2 Property (MW-142WT, MW-144WT, and MW97-106WT), and six perimeter monitoring wells were located on the REALM Green Point Landfill Property (MW-129WT, X-1A, X-1B, X-1CR, X-1CR2, and X-20) (Figure 2).

Samples from MW97-106WT (Delphi Plant 2 RI) were collected using the same methods as for the Peninsula Area under the RI Work Plan and QAPP (BBL, 1997b). MW97-106WT was sampled in December 1997 for TCL VOCs, SVOCs, and PCBs (unfiltered and filtered) and filtered site-specific metals. The well was sampled again in November 1998 for TCL SVOCs and PCBs (unfiltered and filtered).

Samples from the remaining locations were collected per the *GM SMI RI Work Plan* (BBL, 1997a) and *QAPP* (BBL, 1996). In July 1995 samples were collected from MW-129WT, MW-142WT, MW-143WT, MW-144WT, X-1A, X-1B, X-1CR2 and X-20 and submitted to Quanterra Environmental Services (Quanterra) of North Canton, Ohio for analysis of TCL VOCs, SVOCs, PCBs (unfiltered and filtered), and filtered Target Analyte List (TAL) inorganics. Additionally, a sample was collected from X-1CR and submitted to Quanterra for analysis of Appendix IX VOCs, SVOCs, PCBs (unfiltered and filtered) and filtered Appendix IX inorganics. In June 1996 samples were collected from MW-129WT, MW-142WT, MW-143WT, MW-144WT, X-1A, X-1B, X-1CR, and X-1CR2 and submitted to Quanterra for analysis of TCL VOCs (excluding MW-143WT and X-1B), SVOCs (excluding X-1B), PCBs (unfiltered and filtered; excluding MW-142WT, MW-143WT, and MW-144WT), and select TAL inorganics (excluding MW-143WT and MW-144WT).

2.4 Supplemental Assessments

As part of the RI, supplemental activities were conducted to characterize the nature and extent of potential contamination in the Peninsula Area. The assessments conducted as part of the RI are as follows:

- Background Groundwater Quality Assessment;
- Preliminary Ecological Assessment; and
- Preliminary Pathways and Receptors Assessment.

Additional details from these assessments are presented below and the results are presented in Section 4.4.

2.4.1 Background Groundwater Quality Assessment

A Background Groundwater Quality Assessment (BGQA) was performed as part of the GM SMI Plant Property RI and by agreement with the MDEQ, this BGQA was also used as part of the Delphi Plant 2 RI. The objective of the BGQA was to characterize the background levels of those constituents of interest that were analyzed for and detected in groundwater samples at the site, which also may be naturally occurring or present in groundwater at the site from upgradient sources unrelated to activities conducted at the site. To accomplish this assessment, BBL implemented an approach using existing and historical groundwater quality data consistent with USEPA guidance documents (USEPA, 1989, 1992), as specified in the *Plan to Determine Representative Background Groundwater Quality* (Saroff, 1996a), as modified in response to comments made by the MDEQ (Stone, 1996a, 1996b). The key components of the approach included developing a database of representative background groundwater quality data from on- and off-site sources, summarizing the data using appropriate statistical methods, and providing 95 percent tolerance intervals to be used for any future monitoring of constituents in groundwater at the site. A more detailed description of the approach and methods used in the BGQA are provided in the *Background Groundwater Quality Assessment Report* (BBL, 1998b). Due to the proximity of the SMI Plant, Delphi Plant 2, and Peninsula Area Properties, the similarity of geologic materials encountered, the use of boring MW-139WT (located on Delphi Plant 2 Property) as a background location, and the groundwater flow patterns for the three sites, the results of the BGQA completed for the GM SMI Plant Property are also relevant for the Peninsula Area Property.

2.4.2 Preliminary Pathways and Receptors Assessment

A preliminary pathways and receptors assessment for the Delphi Plant 2 Property (including the Peninsula Area) was conducted as part of the site-wide RI. The purpose of the assessment was to identify the potential contaminant migration pathways and receptors present at each potential source area identified in the RI, and to assess the potential for receptor exposure based on the characterized pathways. The assessment used the appropriate Part 201 regulatory criteria to screen the results of the various investigations.

Results of the Preliminary Pathways and Receptors Assessment are presented in Section 4.4.3.

2.4.3 Preliminary Ecological Assessment

A preliminary ecological assessment of the site was conducted as part of the RI. The ecological assessment consisted of the problem formulation step of assessment, as described in USEPA's *Proposed Guidelines for Ecological Risk Assessment* (USEPA, 1996).

In keeping with USEPA's Guidelines, the purpose of the assessment was to evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more site-related chemical stressors. Results of the Preliminary Ecological Assessment are presented in Section 4.4.4.

3. Site Geology and Hydrogeology

3.1 General

The subsurface geology at the site was characterized by soil samples collected from exploratory borings installed by BBL during the GM SMI Plant Property RI (BBL, 1999), and exploratory borings installed by Harding Lawson Associates (HLA) and BBL during the Delphi Plant 2 Property RI. Typically, the deep soil borings completed at the Delphi Plant 2 and GM SMI Plant Properties were extended approximately five feet into the lower silty clay layer. At an upgradient location (MW-139) on the Delphi Plant 2 Property, one boring was drilled to the top of weathered shale (i.e., bedrock), which was encountered at 86 feet below grade.

3.2 Description of Geologic Units

Three distinct stratigraphic units were encountered during drilling activities at the site. These units include surficial fill material, fine- to medium-grained sand, and silty clay. A thin till layer and shale bedrock were encountered during drilling activities for the GM SMI RI at a location (MW-139) on the Delphi Plant 2 Property. As described below, the composition and thickness of the overburden units varied across the site. The relationship between these units is presented in geologic cross section B'-B'' (Figure 4).

The composition of the fill material varied from a black, fine- to medium-grained, poorly-sorted sand, to well-sorted mixtures of sand, silt, clay, and slag with fragments of concrete, brick, glass, and/or metal debris.

The fine- to medium-grained sand unit is typically brown or gray in color with occasional seams or lenses of glaciolacustrine silt, silty sand, and silty clay. The unit also contains small calcareous shell fragments at depth. The B'-B'' cross-section presents the sand unit extent to depths of 20 to 22 feet below grade. Depending on the location, the fill material is typically saturated starting at 6 to 8 feet below grade.

The silty clay unit is typically brown or gray (or a combination of the two) with minor amounts of sand and gravel. Its consistency varies from soft to hard with some fractures noted in the stiff clay. The silty clay unit is present across the entire site and was found at depths ranging from approximately 8 to 20 feet below grade (at MW-144WT and SB97-111, respectively). At most locations in the Peninsula Area the depth to clay was greater than 15 feet below grade. The silty clay unit appears to act as a downward flow boundary or lower confining unit to the overlying sand unit.

The bedrock encountered at upgradient boring MW-139 (located on the Delphi Plant 2 Property) was described as dark gray weathered shale with faint laminations. This field description is consistent with the general description of Saginaw Formation bedrock units (Martin, 1957; MDNR, 1964, 1968). The geotechnical borings previously completed in the vicinity of the Delphi Plant 2 Property WWTP identified a "claypan" (probably shale) between 81 and 82 feet below grade (GM, 1967).

3.3 Site Hydrogeology

Groundwater is present at the site in an unconfined or "water table" condition encountered within the fill unit described in Section 3.2. Depth to water measurements collected from the water table wells ("WT") and deep "S1" wells installed in the Peninsula Area are presented in Table 2. The depth to groundwater ranges from approximately 5.7 to 6.8 feet below grade (November 1998, at TW98-110WT and MW97-105WT, respectively). Water level fluctuations throughout the year ranged from 0.3 to 1.8 feet (MW97-105S1 and MW97-104WT, respectively).

3.3.1 Collection and Interpretation of Potentiometric Surface Elevation Data

Static water level elevations collected during the four gauging events conducted during the RI have been plotted and contoured in Figures 5, 6, 7, 8, and 9. Figure 5 shows water table elevations from the initial gauging event (December 8, 1997), where static water levels were only collected from newly installed monitoring wells. The water table elevation contour data in Figures 6, 7, and 8 represent interpreted data collected in the Peninsula Area and site-wide Delphi Plant 2 Property gauging events conducted on February 25, 1998; July 15 and 16, 1998; and November 5 and 6, 1998, respectively. Figure 9 presents the sand unit potentiometric elevation contour map for November 5 and 6, 1998.

Based on the measurement points, the water table and sand unit potentiometric elevation contour maps suggest the groundwater flow direction in the Peninsula Area is southwest to west. The figures (as well as those included in the *GM SMI Plant Property RI Report* [BBL, 1999a] and *Delphi Plant 2 RI Report* [BBL, 1999b]) also show that the groundwater flow direction is controlled in large part by the Green Point Landfill (located on the other REALM Property) and the Central Terminated Type III Landfill (located on the SMI Plant Property).

Using the November 1998 gauging data, the horizontal hydraulic gradient of the water table across the Peninsula Area was calculated to be between 0.0065 and 0.0076 feet per foot (ft/ft). The hydraulic gradient of the sand unit

potentiometric surface was estimated to range from 0.0033 to 0.0044 ft/ft. The vertical hydraulic gradient using the November 1998 water level data for the six well clusters indicated that groundwater flow is predominantly horizontal, except at the MW97-105WT/S1 cluster which indicated a slight upward vertical hydraulic gradient of 0.011 ft/ft, and at the TW98-111WT/MW98-111S cluster where a slight downward vertical hydraulic gradient of 0.017 ft/ft was observed.

3.3.2 Hydraulic Conductivity Testing

More than 200 in-situ hydraulic conductivity (slug) tests were completed at the well installations located on the adjacent GM SMI property during completion of the RI for that site (BBL, 1999). The tests were used to measure responsiveness to changes in static water levels and to provide estimates of the hydraulic conductivities of the hydrostratigraphic units at the Delphi Plant 2 Property (Bouwer and Rice, 1976; Bouwer, 1989; and Hvorslev, 1951).

The estimated hydraulic conductivity (K) values were determined by averaging the geometric mean K values calculated for the GM SMI Plant Property units of similar grain size and origin (e.g., upper and lower silty clay units, upper and lower sand units). These K values are presented below.

Lithologic Unit	Hydraulic Conductivity (ft/min)	Hydraulic Conductivity (cm/sec)
Fill	3.03E-03	1.54E-03
Sand	5.60E-03	2.80E-03
Silty Clay	3.36E-06	1.71E-06

Note:

ft/min = Feet per minute.

cm/sec = Centimeters per second.

4. Investigation Results

4.1 General

This section of the report presents a summary of the analytical results for the soil and groundwater samples collected from the Peninsula Area sampling locations and the off-site perimeter well locations described in Sections 2.2 and 2.3. Analytical results for MDEQ split samples (Klann, 1998, 1999) collected during the investigations are not discussed in the text; however, are presented in the tables. This section also presents results of the various supplemental assessments described in Section 2.4.

4.1.1 QA/QC Review

Results obtained from laboratory analysis of the samples collected by BBL during the Delphi Plant 2 Property RI (including the Peninsula Area) were reviewed by BBL's data validation staff in accordance with the Quality Assurance/Quality Control (QA/QC) review approach specified in the *QAPP* (BBL, 1997b). Data review processes and objectives are summarized below.

Laboratory analytical data packages for all of the sample delivery groups (SDGs) containing sample data collected from the site were assessed for compliance with method guidelines and project specific requirements. Specifically, evaluations of holding times, blank contamination, calibration requirements (initial and continuing), surrogate spike recovery, matrix spike and duplicate recoveries, instrument performance, and compound identification were completed, as applicable.

The following steps were included as part of the data review process:

- An evaluation of completeness for each data package.
- Verification that field chain-of-custody forms were completed and that samples were handled properly.
- Verification that holding times were met for each parameter. Holding time exceedences were documented. Data for all samples exceeding holding time requirements were flagged as either estimated or rejected. The decision as to which qualifier is more appropriate was made on a case-by-case basis.

-
- Verification that parameters were analyzed according to the methods specified.
 - Completion of QA/QC data reviews (e.g., assurance that duplicates, blanks, and spikes were analyzed on the required number of samples as specified in the method; verification that duplicate and matrix spike recoveries were acceptable).
 - Investigation of anomalies identified during review.
 - Investigation of suspect data. Calculations for specific data of concern were traced back to raw data and sources of calculation errors were determined and corrected.

The corrected data resulting from QA/QC review is shown in the report tables.

4.1.2 MDEQ Generic Criteria

To provide an initial screening of the RI data, the data have been compared to relevant MDEQ generic criteria. Each MDEQ generic criteria corresponds to a specific exposure pathway based on land use. The potential site exposure pathways and the generic criteria selected to screen the data are presented below. The criteria and screening levels used to compare to site data are summarized in the MDEQ Interim Environmental Response Division Operational Memorandum #18, dated May 28, 1999 (MDEQ, 1999).

4.1.2.1 Groundwater Criteria

Drinking Water Usage

Groundwater sample analytical data were compared to Generic Industrial Drinking Water (IDW) Cleanup Criteria. The generic IDW criteria identify drinking water concentrations that are safe for long-term, daily consumption while at work. Adverse aesthetic impacts are taken into account for select hazardous substances. Site groundwater at this industrial property is not, and will not be used as a source of drinking water in the future (based on the presence of limited quantities of water and future restrictions to be recorded on the property deed preventing groundwater use for drinking water purposes). Therefore, ingestion is not a relevant exposure pathway; however, generic IDW criteria were used to provide a conservative screening level of comparison.

For the industrial drinking water comparison scenarios, the higher of the site-specific background level (see Section 4.4.1) and the reported MDEQ groundwater criteria are used, as allowed by MDEQ guidance (MDEQ, 1999).

Dermal Exposure

To assess potential dermal exposure, all groundwater sampling data were compared to the Generic Groundwater Contact Criteria (GCC). MDEQ Operational Memorandum #18 (MDEQ, 1999) recognizes that certain constituents detected in groundwater preferentially adsorb to particulates rather than dissolve in water, and suggests that for these constituents, filtered samples may be more appropriate for comparison to the generic GCC. PCBs are listed as an example of these constituents. For screening purposes, results from filtered PCB samples have been compared to the generic GCC value.

Impacts to Surface Water

Groundwater analytical data for monitoring wells MW98-109S1, TW98-109WT, MW98-111S1, and TW98-111WT were compared to the Generic Groundwater/Surface Water Interface (GSI) Criteria (MDEQ, 1999), as a conservative screening step, since it appears from the water table and sand unit potentiometric maps (Figures 5 to 9) that the groundwater flow direction is generally westerly towards a small area of ponded water located due west of the Peninsula Area, on another REALM property. The generic GSI criteria identify groundwater concentrations which are protective of the receiving surface water. For the generic GSI comparison, the higher of the site-specific background level and the reported MDEQ generic GSI criteria value are used, as allowed by MDEQ guidance (MDEQ, 1999).

Indoor Air Hazards

Although there are currently no buildings in the Peninsula Area, sampling locations were compared to the Generic Acute Inhalation Screening Level (AISL) and the Generic Industrial and Commercial II, III, and IV Groundwater Volatilization to Indoor Air Inhalation Criteria (IGVIIC) to assess potential risks within future buildings at the site.

Other Hazards

Additionally, all groundwater sampling data were compared to the Generic Flammability and Explosivity Screening Level (FESL) values (MDEQ, 1999) to identify any areas of the site with flammability or explosivity risks, and to the Water Solubility Screening Level (WSSL) values (MDEQ, 1999) to identify areas where NAPL may be present. PCB analytical data for filtered samples only have been compared to the WSSL values due to preferential adsorption to particulates, as discussed above.

4.1.2.2 Soil Criteria

Hazards to Drinking Water

Soil analytical data were compared to Generic Soil Criteria Protective of Industrial and Commercial II, III, & IV Drinking Water (IDWP) (MDEQ, 1999). The generic IDWP values identify soil concentrations that are not expected to leach and cause groundwater impacts at levels greater than generic IDW criteria.

Dermal Contact

The potential dermal exposure pathway was assessed using two sets of criteria. All soil sampling results were compared to the Generic Soil Criteria Protective for Groundwater Contact (GCCP) (MDEQ, 1999). The generic GCCP values identify soil concentrations that are not expected to cause groundwater impacts at levels greater than the generic GCC.

Additionally, soil sampling results were compared to Generic Industrial and Commercial II Direct Contact (IDC) Criteria (MDEQ, 1999). The generic IDC criteria identify soil concentrations that are protective against adverse health effects due to long-term ingestion of and dermal exposure to contaminated soil in an Industrial or Commercial II land use.

Ambient Air Hazards

Outdoor air (ambient air) inhalation hazards were assessed using Generic Industrial and Commercial II, III and IV Infinite Source Volatile Soil Inhalation Criteria (IVSIC) for Ambient Air and Generic Industrial and Commercial II,

III, and IV Particulate Soil Inhalation Criteria (IPSIC) for Ambient Air values. (MDEQ, 1999). The generic IVSIC values identify soil concentrations that are protective against adverse health effects from inhalation in an Industrial or Commercial II, III or IV land use. The generic IPSIC identify soil concentrations that are protective against adverse health effects from inhalation of contaminated particulates in an Industrial or Commercial II, III, or IV land use.

Indoor Air Hazards

Although there are currently no buildings in the Peninsula Area, sampling locations were compared to the Generic Industrial and Commercial II, III, and IV Soil Volatilization to Indoor Air Inhalation Criteria (ISVIIC) to assess potential risks within future buildings at the site.

Statewide Default Background Levels

The MDEQ has established Statewide Default Soil Background Levels (SDBLs) for inorganic hazardous constituents that are present in soil on a statewide basis. These levels are used as default cleanup criteria whenever the applicable risk-based criteria are lower (MDEQ, 1999). Therefore, for the inorganic constituent soil comparison scenarios, the higher of the SDBL and the reported MDEQ generic soil criteria are used. Concentrations that may have exceeded generic IDWP criteria but were below MDEQ SDBLs are not included in the criteria exceedence discussions in Section 4.2.

4.2 Investigation Results

Sixteen soil samples were collected by BBL from soil borings SB97-110, SB97-111, MW98-108S1, MW98-109S1, MW98-110S1, MW98-111S1, SB98-119, and SB98-120 (Figure 2) for analysis of TCL VOCs (USEPA Method 8260 or 8260B), TCL SVOCs (USEPA Method 8270 or 8270C), TCL PCBs (USEPA Method 8081), and the 12 Delphi Plant 2 Property "site-specific metals" (arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc) by USEPA Method 6010/7000 series. At the MDEQ's request, a duplicate of the soil sample with the highest PID headspace response [collected from MW98-108S1 (0.5-1.0 feet depth), MW98-109S1 (6-8 feet depth), MW98-110S1 (4-6 feet depth), MW98-111 (0.5-1.0 feet depth), SB-119 (2-4 feet depth), SB98-120 (4-6 feet depth)] was collected using an EnCore™ sampler, subjected to methanol preservation by the laboratory (USEPA Method 5035), and analyzed for VOCs using USEPA Method 8260 or 8260B (Table 3).

Groundwater samples were collected by BBL from monitoring wells MW97-104S1, MW97-104WT, MW97-105S1, MW97-105WT, MW98-108S1, MW98-108WT, MW98-109S1, TW98-109WT, MW98-110S1, TW98-110WT, MW98-111S1, TW98-111WT (Figure 2) for analysis of TCL VOCs (USEPA Method 8260 or 8260B), TCL SVOCs (USEPA Method 8270 or 8270C), unfiltered and filtered TCL PCBs (USEPA Method 8081), and the 12 site-specific filtered metals (USEPA Methods 6010/7000 series).

4.2.1 Soil Analytical Results

As presented below, analytical results indicate that eight VOCs, seventeen SVOCs, three PCBs, and twelve metals were detected at concentrations above the laboratory detection limit.

VOCs in Soil: VOCs detected in soils in the Peninsula Area include 1,2-dichlorobenzene, acetone, benzene, chlorobenzene, total-1,2-dichloroethene, methylene chloride, tetrachloroethene, and trichloroethene. None of the detected analyte concentrations exceeded generic GCCP, IDC, ISVIIC, IVSIC, or IPSIC values. Trichloroethene in soils at two sampling locations (MW98-108S1 [0.5-1.0 foot depth] and SB98-119 [2-4 feet depth]) exceeded IDWP criteria as noted below (Table 3; Figure 10):

PENINSULA AREA - SOILS					
VOCs	Number of Times			Concentration Range (ug/kg)	Generic IDWP Criteria (ug/kg)
	Analyzed	Detected	Exceeded		
Trichloroethene	23	5	2	ND - 120	100

Notes:

ND = Not detected.

Both samples with exceedences of trichloroethene were preserved and extracted using Method 5035. Trichloroethene was not detected in the corresponding non-preserved samples. In two cases, compounds (methylene chloride and tetrachloroethene) were detected in the non-preserved samples (12 ug/kg), but not in the methanol preserved samples due to the increased detection limits (< 25 J ug/kg) associated with methanol preservation. In one sample pair (MW98-110S1 [4 - 6']), acetone was detected in the unpreserved sample (at 540 J ug/kg), but not in the preserved sample (< 250 J), although the detection limit was lower than the detected value.

SVOCs in Soil: SVOCs detected in soils in the Peninsula Area included: anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. However, none of the detected analyte concentrations exceeded generic GCCP, IDC, IDWP, ISVIIC, IVSIC, or IPSIC values (Table 4; Figure 11).

PCBs in Soil: Aroclor 1248, Aroclor 1254, and Aroclor 1260 were detected in soils in the Peninsula Area, however, the concentrations did not exceed generic GCCP, IDC, IDWP, ISVIIC, IVSIC, or IPSIC values (Table 5; Figure 10).

Metals in Soil: Metals detected in soils in the Peninsula Area included: arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc. None of these compounds exceeded the GCCP, IDC, ISVIIC, IVSIC, or IPSIC values. As presented below (and as presented in Table 12; and Figure 5), the concentrations of arsenic, chromium, nickel, and silver exceeded the generic IDWP criteria at one or more locations. Concentrations of iron and lead exceeded the MDEQ SDBLs of 12,000,000 and 21,000 ug/kg, respectively.

PENINSULA AREA - SOILS					
Inorganics	Number of Times			Concentration Range (ug/kg)	Generic IDWP/SDBL Criteria (ug/kg)
	Analyzed	Detected	Exceeded		
Arsenic	17	16	1	ND - 38,000 MD	23,000
Chromium	17	16	9	ND - 730,000	30,000
Iron	17	17	9	2,900,000 - 270,000,000 D	12,000,000
Lead	17	17	12	2,200 - 640,000	21,000
Nickel	17	17	5	6,100 J - 380,000	100,000
Silver	17	11	1	ND - 14,000	13,000

Notes:

ND = Not detected.

Refer to Table 5 for MDEQ criteria qualifiers.

State Default Background Levels have been substituted for IDWP criteria for iron and lead.

4.2.2 Groundwater Analytical Results

As presented below, analytical results indicate that eleven VOCs, four SVOCs, no PCBs, and seven metals were detected at concentrations above the laboratory detection limit. Split samples collected and analyzed by the MDEQ are presented with the RI groundwater analytical data in Tables 6 to 8. Analytical data for monitoring well clusters MW97-104 and MW97-105, monitoring wells MW98-108S1 and MW98-110S1, and temporary monitoring wells TW98-108WT and TW98-110WT were compared to generic IDW criteria values while data for monitoring wells MW98-107S1 and MW98-111S1 and temporary monitoring wells TW98-107WT and TW98-111WT were compared to generic GSI criteria value. All groundwater analytical data were also compared to generic GCC, IGVIIC, AISL, FESL, and WSSL values.

VOCs in Groundwater: VOCs detected in groundwater in the Peninsula Area included: 1,1-dichloroethene, total 1,2-dichloroethene, benzene, chlorobenzene, chloroethane, chloroform, ethylbenzene, toluene, trichloroethene, vinyl chloride, and xylenes. None of the detected compound concentrations exceeded generic GCC, AISL, FESL, or WSSL values.

Concentrations of total 1,2-dichloroethene, benzene, chlorobenzene, chloroform, trichloroethene, and vinyl chloride exceeded generic IDW values (Table 6; Figure 13). The IGVIIC for vinyl chloride (690 ug/L) was exceeded in samples from MW97-104S1, MW98-108S1, MW98-109S1, MW98-110S1, and MW98-111S1.

PENINSULA AREA - GROUNDWATER					
VOCs	Number of Times			Concentration Range (ug/L)	Generic IDW Criteria (ug/L)
	Analyzed	Detected	Exceeded		
total 1,2-DCE	13	9	4	ND - 17,000 DJ	70
benzene	13	2	2	ND - 6.1 J	5
chlorobenzene	13	4	1	ND - 200	100
chloroform	13	2	1	ND - 1,500 J	100
TCE	13	3	1	ND - 720 D	5
vinyl chloride	13	8	7	ND - 3,400	2

Notes:

ND = Not detected.

Refer to Table 6 for MDEQ criteria qualifiers.

Concentrations of chlorobenzene, chloroform, ethylbenzene, toluene, vinyl chloride, m,p-xylenes, and o-xylene exceeded generic GSI criteria in samples collected from one or more of the monitoring wells in the MW98-109 and MW98-111 well clusters (Table 6; Figure 13).

PENINSULA AREA - GROUNDWATER					
VOCs	Number of Times			Concentration Range (ug/L)	GSI Criteria (ug/L)
	Analyzed	Detected	Exceeded		
chlorobenzene	5	3	2	ND - 370 EJ	47
chloroform	5	2	1	ND - 330 DJ	170
ethylbenzene	5	2	2	ND - 1,500 EJ	18
toluene	5	2	1	ND - 810 EJ	140
vinyl chloride	5	5	5	3 - 5,800 DJ	15
m,p-xylenes	5	2	2	ND - 4,200 EJ	35
o-xylene	5	2	1	ND - 2,000 EJ	35

Notes:

ND = Not detected.

Refer to Table 6 for MDEQ criteria qualifiers.

SVOCs in Groundwater: SVOCs detected in groundwater in the Peninsula area included: 1,2-dichlorobenzene; 1,4-DCB; bis(2-chloroisopropyl)ether; and naphthalene (Table 7) were compared to GCC, IDW or GSI, IGVIIC, AISL, FESL, and WSSL values. There were no exceedences at any of the monitoring wells for those samples collected by BBL. None of the detected analyte concentrations exceeded generic GCC, IDW, or GSI, IGVIIC, AISL, FESL, and WSSL values (Table 7, Figure 11).

PCBs in Groundwater: No PCBs were detected in groundwater samples collected from the Peninsula Area monitoring wells (Table 8).

Metals in Groundwater: As summarized below and presented in Table 5 and Figure 14, metals detected in filtered groundwater samples collected in the Peninsula Area included: arsenic, barium, iron, lead, selenium, and zinc. These constituents were compared to generic GCC, IDW or GSI, IGVIIC, AISL, FESL, and WSSL values (Table 8). No constituents exceeded the generic GCC, IGVIIC, AISL, FESL, or WSSL values (Table 10, Figure 14). Iron exceeded generic IDW criteria and background at two locations, monitoring well MW97-105WT (sample and duplicate) and MW97-105S1, during the December 1997 groundwater sampling event, as summarized below:

PENINSULA AREA - GROUNDWATER					
Metals (Filtered)	Number of Times			Concentration Range (ug/L)	Background Value ¹ (ug/L)
	Analyzed	Detected	Exceeded		
Iron	12	12	3	640 - 26,000	13,000

Notes:

¹Site-specific background values were substituted for MDEQ criteria for iron.

Barium exceeded generic GSI criteria and background at two locations (MW98-111S1 and TW98-111S1), as summarized below:

PENINSULA AREA - GROUNDWATER (GSI)					
Metals (Filtered)	Number of Times			Concentration Range (ug/L)	Background Value ¹ (ug/L)
	Analyzed	Detected	Exceeded		
Barium	5	5	5	300 - 2,800	990

Notes:

¹Site-specific background values were substituted for MDEQ criteria for barium.

4.3 Analytical Data Comparison to Adjacent Property Perimeter Monitoring Wells

As part of the GM SMI Plant Property RI, BBL sampled several existing and/or temporary monitoring wells located on the Delphi Plant 2, GM SMI Plant, and Green Point Landfill properties that bordered the Peninsula Area Property. One of these adjacent property perimeter monitoring wells was located on the GM SMI Plant Property (MW-143WT),

two monitoring wells were located on the Delphi Plant 2 Property (MW-142WT and MW97-106WT), and six wells were located on the REALM Property (MW-129WT, X-1A, X-1B, X-1CR, X-1CR2, and X-20). Analyses consisted of the following:

Summary of Adjacent Property Perimeter Monitoring Well Groundwater Analyses

WELL ID DATE	TCL VOCs	TCL SVOCs	TCL PCBs, Filtered	TCL PCBs, Unfiltered	TAL Inorganics, Filtered	TAL Inorganics, Unfiltered	Cyanide	Select Metals	Appendix IX
MW-129WT 7/95	X	X	X	X	X		X		
MW-129WT 6/96	X	X	X	X	X**	X**			
MW-142WT 7/95	X	X	X	X	X	X	X		
MW-142WT 6/96	X	X			X				
MW-143WT 7/95	X	X	X	X	X		X		
MW-143WT 6/96	X	X							
MW-144WT+ 7/95	X	X	X	X	X		X		
MW-144WT+ 6/96	X	X							
MW97-106WT 12/97	X	X	X	X	X*				
MW97-106WT 11/98		X	X	X					
X-1A 7/95	X	X	X	X	X		X		
X-1A 6/96	X	X	X	X	X**	X**		X	
X-1B 7/95	X	X	X	X	X		X		

Summary of Adjacent Property Perimeter Monitoring Well Groundwater Analyses (Continued)

WELL ID DATE	TCL VOCs	TCL SVOCs	TCL PCBs, Filtered	TCL PCBs, Unfiltered	TAL Inorganics, Filtered	TAL Inorganics, Unfiltered	Cyanide	Select Metals	Appendix IX
X-1B 6/96			X	X	X**	X**		X	
X-1CR 7/95									X
X-1CR 6/96	X	X	X	X	X**	X**		X	
X-1CR2 7/95	X	X	X	X	X		X		
X-1CR2 6/96	X	X	X	X	X**	X**		X	
X-20 7/95	X	X	X	X	X				

Notes:

Select Metals include aluminum, antimony, barium, lead, magnesium, and nickel.

* - Delphi Plant 2 Property 12 site-specific filtered "metals" (arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc) only.

** - GM SMI site-wide inorganic constituents only (iron, manganese, sodium, and zinc).

+ - Monitoring Well MW-144WT located on the Peninsula Area Property was installed as part of the GM SMI Plant Property RI.

Groundwater

Analytical results indicate that one VOC (benzene), no SVOCs, two PCB Aroclors (1242 and 1248), and two metals (iron and lead) were detected above relevant criteria (GCC, IDW, IGVIIC, or GSI, and background) in the collected groundwater samples from off-site property perimeter monitoring wells.

VOCs in Groundwater: Benzene was detected in two Green Point Landfill (off-site) perimeter monitoring wells (X-1A and X-1CR) and one on-site perimeter monitoring well (MW-144WT) above generic IDW criteria. No compounds exceeded generic GCC, IGVIIC, AISL, FESL, or WSSL values.

SVOCs in Groundwater: Bis(2-ethylhexyl)phthalate was detected in groundwater above generic IDW criteria at Green Point Landfill perimeter monitoring well X-1CR2. No SVOCs exceeded generic GCC, IGVIIC, AISL, FESL, or WSSL values.

PCBs in Groundwater: PCBs were detected in unfiltered groundwater samples above generic IDW values at three off-site perimeter monitoring well locations: Delphi Plant 2 Property monitoring well MW97-106WT (Aroclor-1248, X-1A (Aroclor-1248 and Aroclor-1254), and Green Point X-1B Landfill monitoring well (Aroclor-1248). No PCBs were detected in the filtered off-site groundwater samples or in any on-site groundwater samples.

Metals in Groundwater: The metals detected above IDW or site-specific background levels in filtered groundwater samples from off-site perimeter monitoring well locations included barium in Delphi Plant 2 Property monitoring well (MW-142WT), iron (on-site perimeter monitoring well MW-144WT, and Green Point Landfill monitoring wells X-1A, X-1B, X-1CR, and X-20), and lead (X-1CR2).

Based on the spatial location of these groundwater samples (Figures 13 and 14) and the groundwater flow direction (Figure 5 to 9), and excluding the southeastern corner of the property (MW-144WT) and the adjacent well cluster (X-1A, X-1B, X-1CR, X-1CR2), none of the off-site exceedences are apparently related to the Peninsula Area. The low level benzene exceedences at the Green Point Landfill X-1 cluster may be related to a source located on the northwest side of the Green Point Landfill or in the southeast corner of the Peninsula Area.

4.4 Supplemental Assessments

This section presents the results of the supplemental assessment activities described in Section 2.4.

4.4.1 Background Groundwater Quality Assessment

The following conclusions are presented regarding background groundwater quality at the site:

- Based on a review of published regional background groundwater quality values, median background groundwater quality values at the site are generally consistent (within one order of magnitude) with the groundwater quality reported for bedrock of the Saginaw Formation (USGS, 1980; Cummings, 1989) with the following exception:

-- Median background groundwater manganese concentrations (221 ug/L) were 3.7 times greater than regional median bedrock groundwater concentrations (60 ug/L).

- Background groundwater quality at the site could not be determined for chromium due to non-detects, therefore the background value defaults to the detection limit of 50 ppb.
- Background groundwater concentrations can be substituted for the generic land-use based criteria if background concentrations are higher (MDEQ, August 1998). The following table presents a list of the calculated SMI property site-specific background values for inorganic constituents and a comparison of those values with the generic IDW and generic GSI screening criteria. The calculated site-specific background values listed in the following table have been used in the evaluation of site groundwater quality in cases where the background value is greater than the other listed criteria.

Constituent	Generic MDEQ Criteria		Site-Specific Background* (ug/L)
	IDW value (ug/L)	GSI value (ug/L)	
Arsenic	50	150	7.0
Barium	2,000	190	990
Cadmium	5.0	{G,X}	3.0
Copper	1,000	{G}	26
Iron	300	NA	13,000
Lead	4.0	{G,X}	6.0
Nickel	100	{G}	3.0
Zinc	5,000	{G}	20,000

Notes:

NA = Not available.

* = The Site-Specific Background values have been rounded to two significant figures for use in data comparison.

4.4.2 Preliminary Ecological Assessment

4.4.2.1 General

A preliminary ecological assessment (EA) was conducted as part of the RI, following the approach described in the *RI Work Plan* (BBL, 1997b). The objectives of the preliminary EA were to identify the fish and wildlife resources present, and to identify potential exposure pathways and receptors at the site, if any. This analysis establishes the foundation for the "problem formulation step" of the ecological risk assessment, as provided for in USEPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final* (USEPA, 1997) and *Framework for Ecological Risk Assessments* (USEPA, 1992b). The results of the preliminary EA will be used as the basis to determine if further ecological assessment is necessary.

A field visit to the Delphi Plant 2 Property (including the Peninsula Area) and adjacent areas to assess habitat value, vegetative cover type, and associated fish and wildlife species was completed June 5 to 8, 1996, by a BBL ecologist.

4.4.2.2 Description of Ecological Habitat and Potential Receptors

A description of the site physical setting and surrounding environments is provided in Section 1. From an ecological perspective, significant nearby features include the wetlands area located due west of the Peninsula Area on the adjacent REALM property.

Within the Peninsula Area property, terrestrial areas are limited to field areas that are partially surrounded by chain link fencing. There are no areas of surface water present within the site boundaries.

The quality and extent of a terrestrial area and habitat area is the primary factor in determining which ecological receptors may be present and potentially exposed to site-related chemicals. The Field Vegetative Cover Types identified at the Peninsula Area, which correspond to the habitats of specific wildlife resources, are shown on Figure 15. The terrestrial areas and potential ecological receptors are discussed in the following sections.

Terrestrial Areas

The Field Vegetative Cover Type is the only habitat located at the Peninsula Area Property. The Peninsula Area is not currently associated with Delphi Plant 2 or GM SMI plant production activities or regular maintenance activities. This cover type is characterized by herbaceous vegetation that grows in open field areas, with a few scattered trees present. Vegetative species typical of this cover type include grasses, goldenrod, asters, Queen Anne's lace, and fleabane.

Threatened/Endangered Species

No threatened/endangered species were observed in the assessment area during the site visit.

4.4.2.3 Preliminary Pathways and Potential Receptors Assessment

The objective of the pathway analysis is to identify constituents of interest associated with the site and potential pathways by which fish and wildlife receptors may be exposed to site-related constituents of interest. A complete pathway of exposure exists if the following conditions are present:

- A contaminant source;
- A potential point of exposure; and
- A viable route of exposure and receptor at the exposure point.

If any one of these elements is missing, then the pathway is not complete and exposure cannot occur.

Potential sources of constituents of interest associated with the site are discussed in detail in Sections 4.2 and 5.4 of this report. Potential media evaluated at the site include groundwater and surface soil. Groundwater and surface soil sampling locations are depicted on Figures 10 through 15. Potential pathways of exposure and receptors associated with each sampling media of interest are discussed in the following subsections. If complete exposure pathways for a media are present, pathways and receptors will be more fully characterized in a future ecological assessment. No underground utilities are present in the Peninsula Area.

Surface Soil

Certain VOCs, SVOCs, PCBs, and metal constituents were detected in surface and shallow soils in the assessment area and exposure of terrestrial organisms could potentially occur. The location and concentration of the detected constituents are discussed in Sections 4.2 and 5.3.

Expected receptors would include mice, voles, and small passerine birds that inhabit open fields. Larger mammals could also access the site due to the removal of the fencing along the south and part of the eastern property boundaries. Due to the limited cover and the presence of partial fencing, which limits transient wildlife movement, it is expected that ecological exposure would be limited.

Groundwater

Although certain VOCs, SVOCs, and dissolved metal constituents were detected in groundwater in the assessment area, exposure of terrestrial organisms is unlikely to occur. The location and concentration of the detected constituents are discussed in Sections 4.2 and 5.3.

Exposure of terrestrial organisms to groundwater is unlikely to occur because burrowing animals (such as fox and striped skunk) will avoid placing burrows down to the water table. Given the depth to groundwater beneath the site (5.7 to 6.8 feet below grade), neither herbaceous vegetation, or mice and voles are likely to root or burrow deep enough to be exposed to groundwater. The few trees present at the site could root deep enough to be exposed to groundwater; however, no signs of stress were observed in any vegetation at the site.

Given the above considerations, no pathway of exposure is present for on-site receptors to groundwater.

5. Summary and Conclusions

Site Geology

- Based on split-spoon sampling at nine locations in the Peninsula Area, and at a significantly larger number of locations at the adjacent Delphi Plant 2 Property (BBL, 1999b), the GM SMI Plant Property, and the REALM Green Point Landfill and Drum Remediation Area (located on the former GM SMI Plant Property) (BBL, 1999a), the overburden stratigraphy at the site has been well-characterized.

Site Hydrogeology

- The groundwater flow direction in the Peninsula Area is southwest to west toward a small area of ponded water and stream located due west of the Peninsula Area on the other REALM property. Groundwater flow is influenced by mounding of the water table associated with the Green Point Landfill (located on the REALM Green Point Landfill and Drum Remediation Area Property) and the Central Terminated Type III Landfill (located on the GM SMI Plant Property).
- There is no measurable vertical gradient across most of the site between the water table and the base of the sand unit. A slight upward gradient was detected at the MW97-105 cluster and a slight downward vertical gradient was detected at TW98-111WT/MW98-111S1. The lack of significant vertical gradients is expected due to the shallow nature of the sand unit, and the hydraulic connection between the fill and sand.

Preliminary Ecological Assessment

- A potential ecological exposure pathway may be present for surface soil.

Soil Analytical Data

- Based on a comparison of site soil data to the Generic MDEQ criteria, no worker exposure risk was identified. There were no exceedences of GCCP or IDC criteria. Additionally, none of the soil samples contained concentrations that exceeded air-related criteria (IVSIC, ISVIIC, or IPSIC). Soil analyses indicated the presence of trichloroethene, arsenic, chromium, iron, lead, nickel, and silver in one or more samples at concentrations above

IDWP and SDBL criteria. However, the IDWP criteria was used for comparison purposes only, as the groundwater at this site is not used for drinking water and will not be in the future.

Groundwater Analytical Data

- The generic MDEQ AISL, FESL, and WSSL criteria were not exceeded in groundwater at the site.
- Vinyl chloride exceeded generic GCC and IGVIIC values at five locations (MW98-104S1, MW98-108S1, MW98-109S1, MW98-110S1, and MW98-111S1). The exceedences are limited to the base of the sand unit, therefore, there is no pathway for groundwater contact (GCC). There are currently no buildings on the property, so the exceedence of the IGVIIC values does not pose an immediate risk. However, the IGVIIC criteria would be of concern if a building were placed on the property in the future.
- VOCs (aromatic and aliphatic hydrocarbons) and dissolved metals concentrations were detected in groundwater at concentrations above IDW or GSI criteria. The aromatic hydrocarbons detected above criteria were benzene, chlorobenzene, ethylbenzene, toluene, and xylenes. The aliphatic hydrocarbons detected above criteria were chloroform, 1,2-dichloroethene, trichloroethene, and vinyl chloride. The IDW criteria were used for comparison purposes only, as the groundwater at this site is not used for drinking water and will not be in the future.
- BTEX constituents have been detected above generic IDW or GSI values in the northwest corners of the site. In the northwest corner of the site, benzene (MW97-104WT), ethylbenzene (TW98-111WT/MW98-111S1), toluene (TW98-111WT/MW98-111S1), and xylenes (TW98-111WT/MW98-111S1) were detected above IDW or GSI criteria. No BTEX compounds were detected in MW-129WT (located due west of this area on the other REALM property) or in TW98-110WT/MW98-110S1 (located east of this area). Low levels of benzene were detected below IDW criteria in MW-142WT (located north of this area, on the Delphi Plant 2 Property). The source of the BTEX constituents in this area of the site has not been identified.
- BTEX constituents were also detected above generic IDW criteria in the southeast corner of the site, in wells installed during the SMI RI. Benzene was detected above generic IDW criteria in MW-144WT (located within the Peninsula Area) and in the X-1 cluster (located south of MW-144WT, on the other REALM property). Low levels of xylenes were also detected (below IDW criteria) in these wells. No ethylbenzene or toluene was detected. None of the BTEX constituents in the southeast corner of the site exceeded GCC, IGVIIC, AISL, FESL, or WSSL

values. The source of the detected BTEX constituents in the southeast corner of the site may be the Green Point Landfill or an on-site source.

- Chlorobenzene was detected above IDW criteria at MW97-104S1 and above GSI criteria at MW98-111S1, TW98-109WT, and MW98-109S1. Chlorobenzene was not detected at the MW97-105 cluster (located south of TW98-109WT/MW98-109S1) or at TW98-110WT/MW98-110S1 (east of MW98-111S1). Low levels of chlorobenzene were detected below IDW criteria at TW98-108WT (located east of TW98-109WT/MW98-109S1). Chlorobenzene did not exceed the GCC, IGVIIC, AISL, FESL, or WSSL values at any locations.
- Vinyl chloride was present above IDW or GSI, GCC, and IGVIIC criteria in most of the S1 wells (sand/silty clay interface) in the Peninsula Area (with the exception of MW97-105S1, the southernmost S1 well). Vinyl chloride also exceeded IDW or GSI criteria at three water table wells (MW97-104WT, MW97-105WT, and TW98-109WT). Additionally, 1,2-dichloroethene was present above IDW criteria at MW98-110S1 and MW98-108S1 (the easternmost S1 wells) and trichloroethene was present above IDW criteria at only one location, MW98-110S1 (located in the northeast corner of the site). The highest concentration of total chlorinated VOCs (1,2-dichloroethene, trichloroethene, and vinyl chloride) was found at MW98-110S1 (18,920 ug/L). No VOCs were detected at MW-129WT (located west of the Peninsula Area, on the REALM Green Point Landfill Property). The source of the vinyl chloride and associated VOCs in the deep sand has not been identified.
- Dissolved barium exceeded GSI (site-specific background) criteria at two monitoring wells (TW98-111WT and MW98-111S1). Barium also exceeded IDW criteria at MW-142WT (located north of the Peninsula Area on the Delphi Plant 2 Property).
- Dissolved iron was detected above IDW (site-specific background substituted) at three wells within the Peninsula Area: MW97-105WT, MW97-105S1, and MW-144WT (installed during the GM SMI RI). In addition, iron exceeded IDW (site-specific background substituted) at the X-1 cluster located south of MW-144WT.

The RI activities described in this report have provided the data needed to characterize soil and groundwater quality at the site. No specific sources of the detected constituents have been identified onsite.

6. References

- Blasland, Bouck & Lee, Inc. (BBL), 1996. General Motors Corporation Saginaw Malleable Iron Plant Property, Green Point Landfill, and Drum Remediation Area, Saginaw, Michigan, *Remedial Investigation/Feasibility Study Quality Assurance Project Plan (QAPP)*, May 1996. [A previous version was submitted to the MDEQ prior to RI field activities. This version represents the final MDEQ-approved QAPP].
- Blasland, Bouck & Lee, Inc. (BBL), 1997a. General Motors Corporation Saginaw Malleable Iron Plant, Green Point Landfill, and Drum Remediation Area, Saginaw, Michigan, *Remedial Investigation/Feasibility Study Work Plan*, October 1997; [schedule tables revised January 1998].
- Blasland, Bouck & Lee, Inc. (BBL), 1997b. *Remedial Investigation Work Plan/Quality Assurance Project Plan/Addendum to the Remedial Investigation Work Plan*, General Motors Corporation Delphi Saginaw Steering Systems Plant 2 Property, Saginaw, Michigan, November 1997.
- Blasland, Bouck & Lee, Inc. (BBL), 1998. *Background Groundwater Quality Assessment Report*, October 1998.
- Blasland, Bouck & Lee, Inc. (BBL), 1999a. *Draft Remedial Investigation Report*, General Motors Saginaw Malleable Iron Plant Property and REALM, Inc. Green Point Landfill, and Drum Remediation Area, January 1999.
- Blasland, Bouck & Lee, Inc. (BBL), 1999b. *Draft Remedial Investigation Report*, Delphi Automotive Systems Plant 2 Property, Saginaw, Michigan, August 1999.
- Bouwer, H., 1989. The Bouwer and Rice Slug Test - An Update, *Ground Water*, Vol 27, No. 3, (May-June 1989), p. 304-309.
- Bouwer, H. and R.C. Rice, 1976. *A Slug Test for Determining Hydraulic Conductivity for Unconfined Aquifers with Completely or Partially Penetrating Wells*, *Water Resource Research*, vol. 12, No. 3 (1976), p. 423-428.
- Brouillet, B.J., 1998a. Letter to Ms. Cheryl Hiatt (GM), regarding *GM Delphi Saginaw Steering Systems Plant 2, RI Addendum No. 3 Implementation Schedule and Modification*, September 24, 1998.

-
- Brouillet, B.J., 1998b. Letter to Ms. Cheryl Hiatt (GM), regarding *Proposed Scope of Work for Second Groundwater Sampling Event*, GM Delphi Saginaw Steering System Plant 2 Property, Saginaw, Michigan, November 5, 1998.
- Cummings, T.R., 1989. *Natural Ground-Water Quality in Michigan, 1974 - 87*. United States Geological Survey (USGS) Open - File Report 89 - 259, July 1989.
- General Motors Corporation (GM), 1967. *Geotechnical Investigation Soil Boring Location Plan*, January 1967.
- Hiatt, C. (GM Remediation), 1996. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Proposed Work Plans and Environmental Investigations - Response to MDEQ Letter Dated January 11, 1996*, March 15, 1996.
- Hvorslev, M.J., 1951. *Time Lag and Soil Permeability in Groundwater Observations*, U.S. Army Corps of Engineers, Waterways Experiment Station, Bull. No. 36, Vicksburg, Mississippi: April 1951.
- Klann, Rhonda (MDNR ERD), 1996b. Letter to Mr. Ed Peterson (GM Remediation), regarding *Summary of the Monitoring and Maintenance Program, Site Investigation Activities Near Underground Storage Tanks #13 and #14, Supplemental Separate-Phase Petroleum Product Investigation Tanks #1 - #10, Supplemental Investigation in the Area of Underground Storage Tanks #9 and #10, Soil investigation Storm Sewer Manhole and Assembly Line Basement/Southeast Building Corner, Chip House Operations Summary, and Remedial Investigation Work Plan*, Delphi Saginaw Steering Systems, Plant 2, General Motors Corporation, Saginaw, Michigan, January 11, 1996.
- Klann, Rhonda (MDNR ERD), 1997a. Letter to Mr. W. Willard (GM Delphi Systems), September 2, 1997.
- Klann, Rhonda (MDNR ERD), 1997b. Letter to Mr. W. Willard (GM Delphi Systems), regarding *Approval, with modification, of the Plant 2 Property Remedial Investigation Work Plan and Addendum*, November 24, 1997.
- Klann, Rhonda (MDEQ ERD), 1998. Letter to Mr. B. Willard, (GM Delphi Systems), regarding *Analytical Results for GM Delphi Plant 2*, February 11, 1998.
- Klann, Rhonda (MDEQ ERD), 1999. Letter to Ms. Cheryl Hiatt (GM), regarding *GM Delphi Saginaw Steering Systems Plant 2, Analytical Split-Sample Results for MW97-100WT and MW97-112WT*, January 19, 1999.

-
- Martin, Helen C., 1957. Outline of the geologic history of Saginaw County, Michigan Department of Conservation, Geological Survey.
- Michigan Administrative Code, Rules of the Department of Public Health, Bureau of Environmental and Occupational Health, R325.10102, November 1991.
- Michigan Department of Conservation, Geological Survey (MDNR), 1964. Stratigraphic succession in Michigan.
- Michigan Department of Conservation, Geological Survey (MDNR), 1968. Bedrock of Michigan.
- Michigan Department of Natural Resources (MDNR), 1995b. Interim Environmental Response Division Operational Memorandum #14, Revision #2: Remedial Action Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements, June 5, 1995.
- Michigan Department of Natural Resources (MDNR), 1995c. Environmental Response Division Operational Memorandum #6, Revision #4: Analytical Detection Level Guidance for Environmental Contamination Response Activities under Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, September 13, 1995.
- Michigan Department of Environmental Quality (MDEQ), 1998. Interim Environmental Response Division Operational Memorandum #18: Part 201 Generic Cleanup Criteria Tables, August 31, 1998.
- Midwest Climate Center, University of Illinois, 1993. Data Summary prepared by Robert W. Scott, April 28, 1993.
- Peterson, Edward (GM Remediation), 1995. Letter to Ms. Rhonda Klann (MDNR ERD), regarding *Responses to MDEQ correspondence of May 10, 1995 and July 14, 1995*, August 4, 1995.
- Ryan, Lisa (BBL), 1995. Letter to Ms. Susan Kaelber-Matlock (MDNR ERD), September 8, 1995.
- Saginaw County Health Department, 1997. Telephone communication with Ms. Lisa Coffey (BBL) regarding *Saginaw drinking water source*, October 7, 1997.

-
- Saroff, Scott T. (BBL), 1995a. Letter to Ms. Rhonda Klann (MDNR ERD), regarding *Transmittal of Draft Remedial Investigation Work Plan*, September 21, 1995.
- Saroff, Scott T. (BBL), 1995b. Letter to Ms. Rhonda Klann (MDNR ERD), regarding *Transmittal of draft subsurface logs and monitoring wells completed at or adjacent to the GM Delphi Systems Plant 2 Property*, November 27, 1995.
- Saroff, Scott T. (BBL), 1996a. Letter to Ms. Susan Kaelber-Matlock (MDEQ-ERD), regarding *Plan to Determine Representative Background Groundwater Quality*, April 17, 1996.
- Saroff, Scott T. (BBL), 1998a-1999. *Delphi Saginaw Systems Plant 2 RI Monthly Status Reports (January 1998 to January 1999)*, submitted to Ms. Rhonda Klann (MDEQ ERD).
- Saroff, Scott T. (BBL), 1998b. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Remedial Investigation Work Plan Addendum No. 3*, GM Delphi Saginaw Steering Systems Plant 2 Property, Saginaw, Michigan, April 22, 1998.
- Saroff, Scott T. (BBL), 1998c. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Clarifications to Remedial Investigation Work Plan Addendum No. 3*, June 5, 1998.
- Saroff, Scott T. (BBL), 1998d. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Addendum No. 3, Implementation Schedule and Modification*, GM Delphi Saginaw Steering Systems Plant 2 Property, Saginaw, Michigan, July 28, 1998.
- Saroff, Scott T. (BBL), 1998e. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Remedial Investigation Work Plan Addendum No. 3 Supplemental Field Activities*, September 10, 1998.
- Saroff, Scott T. (BBL), 1998f. Letter to Ms. Rhonda Klann (MDEQ ERD), regarding *Proposed Scope of Work for Second Groundwater Sampling Event, Remedial Investigation*, GM Delphi Saginaw Steering Systems Plant 2 Property, Saginaw, Michigan, October 23, 1998.

-
- Saroff, Scott T. (BBL), 1998g Letter to Ms. R. Klann, regarding Scope of Work for the *Second Groundwater Sampling Event, Responses to Approval Letter dated November 5, 1998*, December 16, 1998.
- Stone, Ronald (MDEQ WMD), 1996a. Memorandum to Susan Kaelber-Matlock (MDEQ ERD), regarding *General Motors Saginaw Malleable Iron Plant Remedial Investigation, Study Plan to Determine Background Groundwater Quality*, May 22, 1996.
- Stone, Ronald (MDEQ WMD), 1996b. Memorandum to Susan Kaelber-Matlock (MDEQ ERD), regarding *General Motors Saginaw Malleable Iron Plant Study Plan to Determine Background Groundwater Quality*, September 10, 1996; *Response to BBL May 22, 1996; Comments*, October 18, 1996.
- United States Environmental Protection Agency (USEPA), 1981. *Underground Injection Control Program, Hydrogeology for Underground Injection Control in Michigan, Part I*, prepared by the Department of Geology, Western Michigan University, 1981.
- United States Environmental Protection Agency (USEPA), 1989. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Interim Final Guidance*, July 1989. (Note: The Peninsula Area Property is not a RCRA facility; use of this guidance is to develop background data only.)
- United States Environmental Protection Agency (USEPA), 1992b. *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Addendum to Interim Final Guidance*, July 1992. (Note: The Peninsula Area Property is not a RCRA facility; use of this guidance is to develop background data only.)
- United States Environmental Protection Agency (USEPA), 1996. *Proposed Guidelines for Ecological Risk Assessment*, Federal Register, Volume 61, No. 175, September 9, 1996.
- United States Environmental Protection Agency (USEPA), 1992b. *Framework for Ecological Risk Assessments*.
- United States Environmental Protection Agency (USEPA), 1997. *Designing and Conducting Ecology Risk Assessments, Interim Final*.

United States Geological Survey (USGS), 1980. *Chemical and Physical Characteristics of Natural Groundwaters in Michigan: A Preliminary Report*, 1980.

7. Acronyms & Abbreviations

ABB-ES	ABB Environmental Services
AISL	Acute Inhalation Screening Level
BBL	Blasland, Bouck & Lee, Inc.
bgs	below ground surface
cm/s	centimeters per second
Delphi	Delphi Automotive Systems Corporation
DRA	Drum Remediation Area
ERD	Environmental Response Division
° F	degrees Fahrenheit
FESL	Flammability and Explosivity Screening Level; values used to evaluate groundwater data with respect to potential flammability and explosivity.
FS	Feasibility Study
ft	feet
ft/min	feet per minute
GCC	Groundwater Contact Criteria
GCCP	Soil Criteria Protective for Groundwater Contact
GM	General Motors Corporation
GSI	Groundwater/Surface -Water Interface
IDC	Industrial Direct Contact Criteria
IDW	Industrial Drinking Water Cleanup Criteria
IDWP	Industrial and Commercial II, III, and IV Drinking Water Protection Criteria
IGVIIC	Industrial Groundwater Volatilization to Indoor Air Inhalation Criteria
IPSIC	Industrial Particulate Soil Inhalation Criteria
ISVIIC	Industrial Soil Volatilization to Indoor Air Inhalation Criteria
IVSIC	Industrial Infinite Source Volatile Soil Inhalation Criteria
K	hydraulic conductivity
MDEQ	Michigan Department of Environmental Quality
MERA	Michigan Environmental Response Act
MDNR	Michigan Department of Natural Resources
MW	monitoring well; well identifier prefix.
NAPL	non-aqueous phase liquid
NGVD	National Geodetic Vertical Datum

NREPA	Michigan Natural Resources and Environmental Protection Act of 1994
OVA	organic vapor analyzer
PCB	polychlorinated biphenyl
PID	photoionization detector
ppb	parts per billion
Plant 2	Delphi Saginaw Steering Systems Plant 2
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
REALM, Inc.	Remediation and Liability Management Company, Inc.
RI	Remedial Investigation
SB	soil boring; sample identifier prefix.
SDBL	State Default Background Level
SDG	sample delivery group
SMI	Saginaw Malleable Iron
SVOC	semivolatile organic compound
SW	surface water; sample identifier prefix.
TCL	Target Compound List
TW	temporary well; well identifier prefix.
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
VOC	volatile organic compound
WSSL	Water Solubility Screening Level; values established as possible indicators of the presence of NAPL.
WWTP	Wastewater Treatment Plant

Notes:

Acronyms for the various MDEQ criteria are shown in bold.

Tables

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

TABLE 1
SOIL BORING AND SOIL SAMPLE ANALYTICAL SUMMARY

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Area of Investigation	Soil Boring ID	Date Boring Completed (m/d/yr)	Soil Boring Depth (ft)	Depth to Top of Clay (ft bgs)	Samples Selected for Analysis (Interval)	PID Field Reading (ppm)	Soil Sample Classific. (USCS)	Soil Sample Analytical Summary						Monitoring Wells Installed in Area
								VOCs	SVOCs	PCBs	Metals	TOC	Perm.	
Peninsula Area	SB97-110	11/17/97	24	19	12'-14'	3.1	SP	--	--	--	--	1	--	MW97-104WT MW97-104S1
	SB97-110	11/17/97	24	19	18'-20'	56	SP	1	1	1	1	--	--	
	SB97-110	11/17/97	24	19	22'-24'	42	CL	1	1	1	1	--	--	
	SB97-111	11/18/97	26	19.7	2'-4'	64	Fill	1	1	1	1	1	--	MW97-105WT MW97-105S1
	SB97-111	11/18/97	26	19.7	24'-26'	<1	CL	1	1	1	1	1	--	
	SB98-119	9/23/98	8	NA	0.5'-1.0'	1.8	Fill	1	1	1	1	--	--	
	SB98-119	9/23/98	8	NA	2'-4'	5.6	Fill	2	1	1	1	--	--	MW98-108S1 TW98-108WT
	SB98-120	9/23/98	8	NA	0.5'-1.0'	<1	Fill	1	1	1	1	--	--	
	SB98-120	9/23/98	8	NA	4'-6'	4.5	Fill	1	1	1	1	--	--	
	MW98-108S1	9/24/98	24	19.4	0.5'-1.0'	<1	Fill	2	1	1	1	--	--	
	MW98-108S1	9/21/98	24	19.4	4'-6'	2	Fill	1	1	1	1	--	--	
	MW98-109S1	9/23/98	20	17	0.5'-1.0'	104	Fill	1	1	1	1	--	--	
	MW98-109S1	9/23/98	20	17	6'-8'	<1	Fill	2	1	1	1	--	--	
	MW98-110S1	9/22/98	22	17.4	0.5'-1.0'	2.2	Fill	1	1	1	1	--	--	MW98-110S1 TW98-110WT
	MW98-110S1	9/22/98	22	17.4	4'-6'	<1	Fill	2	1	1	1	--	--	
	MW98-110S1	9/22/98	22	17.4	20'-22'	NA	CL	--	--	--	--	--	1	
	MW98-111S1	9/22/98	18	16	0.5'-1.0'	10.4	Fill	2	1	1	1	--	--	MW98-111S1 TW98-111WT
	MW98-111S1	9/22/98	18	16	2'-4'	13.7	Fill	1	1	1	1	--	--	
FIELD SAMPLE SUBTOTAL:								21	16	16	16	3	1	
QA/QC Samples Field Duplicates	SB97-110	11/17/97	24	19	12'-14'	3.1	SP	--	--	--	--	1	--	
	SB97-110	11/17/97	24	19	18'-20'	56	SP	1	1	1	1	--	--	
QA/QC SAMPLE SUBTOTAL:								1	1	1	1	1	0	
INVESTIGATION TOTALS:								22	17	17	17	4	1	

Notes:

1. SB = Soil Boring
2. HAB = Hand Auger Boring.
3. Metals = Ag, As, Ba, Cd, Cr, Cu, Fe, Hg, Ni, Pb, Se, Zn (SW-846 Series 6010/7000).
4. PCBs = Polychlorinated Biphenyls (SW-846 Method 8080 or 8081).
5. Perm = Permeability Analysis (ASTM Method D5084).
6. SVOCs = Target Compound List Semivolatile Organic Compounds (SW-846 Method 8270).
7. TOC = Total Organic Carbon (SW-846 Method 9060).
8. VOCs = Target Compound List Volatile Organic Compounds (SW-846 Method 8260 and/or Method 5035).
9. Fill = Fill Material

10. CL = Silty Clay
11. SP = Poorly graded sand
12. All soil samples collected by Blasland, Bouck & Lee, Inc. (BBL) of Syracuse, New York between November 1997 and September 1998.
13. -- = No samples collected per QAPP.
14. bgs = Below ground surface
15. PID = Photoionization detector
16. ppm = Parts per million
17. NA = Not applicable

TABLE 2
GROUNDWATER ELEVATIONS AND MONITORING WELL CONSTRUCTION SUMMARY

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

Monitoring Well Construction and Elevation Data																						
Well ID Dated Installed Well Construction Screen Material/Slot/Diameter Screen Length (in feet) Total Depth (in feet from TOC) Bottom/Invert Elev. of Screen Ground Surface Elevation Top-of-Casing (TOC) Elevation	Peninsula Area Monitoring Wells												Adjacent Property Monitoring Wells									
	MW97-104WT	MW97-104S1	MW97-105WT	MW97-105S1	TW98-108WT	MW98-108S1	TW98-109WT	MW98-109S1	TW98-110WT	MW98-110S1	TW98-111WT	MW98-111S1	MW97-106WT	MW-129WT	MW-142WT	MW-143WT	MW-144WT	X-1A	X-1B	X-1CR	X-1CR2	X-20
	11/17/97	11/17/97	11/18/97	11/18/97	09/21/98	09/21/98	09/21/98	09/23/98	09/21/98	09/22/98	09/23/98	09/22/98	11/20/97	01/17/95	02/08/95	06/06/95	06/07/95	06/02/80	06/02/80	01/10/95	05/26/95	02/21/79
	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	AG	FM	AG	AG	AG	AG	AG	AG	AG	AG	AG
	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/10/2	PVC/NA/NA	PVC/NA/NA	PVC/10/2	PVC/10/2	PVC/10/2
	10	5	10	5	10	5	10	5	10	5	10	5	10	10	10	10	10	3	3	10	5	3
	15.88	21.50	16.15	23.09	15.10	24.70	15.20	20.30	15.10	20.20	13.80	20.00	13.50	12.00	13.40	18.96	13.00	NA	NA	14.82	52.03	NA
	578.12	572.06	577.72	570.41	578.36	569.53	578.01	572.83	578.61	572.66	580.01	573.73	577.84	575.38	581.18	577.96	580.25	577.34	566.74	578.26	541.45	576.71
	591.3	591.2	591.3	591.4	591.2	590.9	591.0	591.0	590.7	590.7	591.0	591.0	591.6	584.6	592.07	593.96	590.34	590.04	590.44	590.26	590.15	584.41
	594.00	593.56	593.87	593.50	593.46	594.23	593.21	593.13	593.71	592.86	593.81	593.73	591.34	587.38	594.58	596.52	593.25	592.31	592.19	592.68	593.08	586.33
Date	Depth to Water Measurements (from Top-of-Casing elevations)																					
December 8, 1997	8.90	8.43	9.26	8.80	NM	NM	NM	NM	NM	NM	NM	NM	5.38	NM	NM	NM	NM	NM	NM	NM	NM	NM
February 25-26, 1998	7.48	7.95	8.19	8.75	NM	NM	NM	NM	NM	NM	NM	NM	4.11	NM	7.39	NM	6.10	NM	NM	NM	NM	NM
July 15-16, 1998	8.66	8.16	9.10	8.59	NM	NM	NM	NM	NM	NM	NM	NM	4.68	3.45	8.14	8.31	8.37	6.11	6.52	5.52	4.22	NM
November 5-6, 1998	9.34	8.89	9.37	8.89	8.94	9.70	8.85	8.77	8.68	7.79	8.87	8.89	6.99	4.63	9.31	9.60	7.62	NM	NM	NM	NM	NM
Date	Groundwater Elevations																					
December 8, 1997	585.10	585.13	584.61	584.70	NM	NM	NM	NM	NM	NM	NM	NM	585.96	NM	NM	NM	NM	NM	NM	NM	NM	NM
February 25-26, 1998	586.52	585.61	585.68	584.75	NM	NM	NM	NM	NM	NM	NM	NM	587.23	NM	587.19	NM	587.15	NM	NM	NM	NM	NM
July 15-16, 1998	585.34	585.40	584.77	584.91	NM	NM	NM	NM	NM	NM	NM	NM	586.66	NM	586.44	588.21	584.88	586.20	585.67	587.16	588.86	NM
November 5-6, 1998	584.66	584.67	584.50	584.61	584.52	584.53	584.36	584.36	585.03	585.07	584.94	584.84	584.35	NM	585.27	586.92	585.63	NM	NM	NM	NM	NM
Notes																						
1. All top-of-casing elevations surveyed by Black & Veatch, Inc. in 1997.																						

- Notes
1. All top-of-casing elevations surveyed by Blasland, Bouck & Lee, Inc. (BBL) of Syracuse, New York ; Atwell-Hicks Inc. of Utica, Michigan; Spicer Group of Saginaw, Michigan using N.G.V.D datum of 1929 from U.S.G.S. benchmark.
 2. PVC - Polyvinyl chloride.
 3. SS - Stainless Steel
 4. NM - Not Measured.
 5. FM - Flush-mount
 6. AG - Above Grade.
 7. NA - Not available.

TABLE 3

SOIL SAMPLE ANALYTICAL SUMMARY FOR VOLATILE ORGANIC COMPOUNDS

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Depth	Analyte Concentrations in Micrograms Per Kilogram (Parts Per Billion)						
					Acetone	Benzene	Chlorobenzene	Total-1,2-Dichloroethene	Methylene Chloride	Tetrachloroethene	Trichloroethene
Peninsula Area Soil Sampling Locations											
SB97-110	11/17/97	BBL	CT&E	(18.0 - 20.0')	<100 J	<10	16	<10	<10	<10	<10
SB97-110 DUP	11/17/97	BBL	CT&E	(18.0 - 20.0')	<100 J	<10	10	<10	<10	<10	<10
SB97-110	11/17/97	BBL	CT&E	(22.0 - 24.0')	<100 J	<10	<10 J	37	<10	<10 J	<10
SB97-111	11/17/97	BBL	CT&E	(2.0 - 4.0')	<100	<10	<10	<10 J	<10	<10	<10
SB97-111	11/18/97	BBL	CT&E	(24.0 - 26.0')	<100 J	<10	<10	<10	<10	<10	<10
MW98-108S1	09/24/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	12	<10	<10
MW98-108S1 MEOH	09/24/98	BBL	CT&E	(0.5 - 1.0')	<250 J	<25	<25	<50	<25 J	<25	120
MW98-108S1	09/21/98	BBL	CT&E	(4.0 - 6.0')	<100 J	<10	<10	<10	<12	<10	<10
MW98-109S1	09/23/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	<11	<10	<10
MW98-109S1	09/23/98	BBL	CT&E	(6.0 - 8.0')	<100 J	<10	31	<10	<13	<10	<10
MW98-109S1 MEOH	09/23/98	BBL	CT&E	(6.0 - 8.0')	<250 J	<25	340	<50	<25 J	<25	<25
MW98-110S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	<10	<10	<10
MW98-110S1	09/22/98	BBL	CT&E	(4.0 - 6.0')	540 J	<10	<10	76	<16	<10	22
MW98-110S1 MEOH	09/22/98	BBL	CT&E	(4.0 - 6.0')	<250 J	89	<25	96	<250 J	<25	92
MW98-111S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	<10	<10	<10
MW98-111S1 MEOH	09/22/98	BBL	CT&E	(0.5 - 1.0')	<250 J	<25	<25	<25	<250 J	<25	<25
MW98-111S1	09/22/98	BBL	CT&E	(2.0 - 4.0')	<100 J	<10	<10	<10	<11	<10	<10
SB98-119	09/23/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	<11	<10	<10
SB98-119	09/23/98	BBL	CT&E	(2.0 - 4.0')	<100 J	<10	<10	<10	<10	<10	<10
SB98-119 MEOH	09/23/98	BBL	CT&E	(2.0 - 4.0')	<250 J	<25	<25	<50	<25 J	<25	110
SB98-120	09/23/98	BBL	CT&E	(0.5 - 1.0')	<100 J	<10	<10	<10	<10	<10	<10
SB98-120	09/23/98	BBL	CT&E	(4.0 - 6.0')	<100 J	<10	<10	<10	<10	12	<10
SB98-120 MEOH	09/23/98	BBL	CT&E	(4.0 - 6.0')	<250 J	<25	<25	<25	<25 J	<25	50
MDEQ Part 201 Criteria											
Industrial and Commercial Drinking Water Protection Criteria (IDWP)					42,000	100	2,000	1,400	100	100	100
Groundwater Contact Protection Criteria (GCCP)					110,000,000	190,000	260,000	6,400,000	2,200,000	88,000	220,000
Industrial and Commercial II Direct Contact Criteria (IDC)					74,000,000	400,000	260,000	640,000	2,300,000	88,000	500,000
Industrial and Commercial II, III, and IV Soil Volatilization to Indoor Air Inhalation Criteria (ISV/IIC)					110,000,000	8,400	220,000	640,000	240,000	88,000	37,000
Industrial and Commercial II, III, and IV Infinite Source Volatile Soil Inhalation Criteria (IVSIC)					160,000,000	45,000	920,000	47,000,000	700,000	600,000	260,000
Industrial and Commercial II, III, and IV Particulate Soil Inhalation Criteria (IPSIC)					170,000,000,000	470,000,000	2,100,000,000	230,000,000,000	8,300,000,000	6,800,000,000	2,300,000,000

Notes:

- All soil samples analyzed by CT&E Environmental Services, Inc. (CT&E) Anatech Division of Ludington, Michigan, for TCL VOCs by USEPA Method 8260 or 8260B.
 - MEOH = Soil sample collected using an EnCore sampler and preserved/extracted by USEPA Method 5035.
 - Data are shown only for those analytes detected in one or more samples for TCL compounds.
 - < = Analyte concentration less than method detection limit.
 - = Not analyzed for.
 - D = Concentration is based on a diluted sample analysis.
 - J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - M = Matrix Interference.
 - Bold indicates detection; Shading indicates concentration above one or more listed criteria.
 - ID = Inadequate Data to formulate criteria.
 - NA = Not Applicable.
 - NLL = Not likely to leach.
 - Criteria given for total-1,2-Dichloroethene applies to cis-1,2-Dichloroethene.
- Criteria Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Soil, May 28, 1999.
Criteria Qualifiers were not included on this table.

TABLE 4

SOIL SAMPLE ANALYTICAL SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Depth	Analyte Concentrations in Micrograms per Kilogram (Parts Per Billion)																	
					Semivolatile Organic Compounds																	
					1,2-Dichloro benzene	Anthracene	Benzo(a) Anthracene	Benzo(a) Pyrene	Benzo(b) Fluoranthene	Benzo(g,h,i) Perylene	Benzo(k) Fluoranthene	Bis(2-ethylhexyl) Phthalate	Butyl-Benzyl Phthalate	Carbazole	Chrysene	Dibenzo(a,h) Anthracene	Dibenzo Furan	Fluoranthene	Fluorene	Indeno(1,2,3-cd) Pyrene	Phenanthrene	Pyrene
Peninsula Area Soil Sampling Locations																						
SB97-110	11/17/97	BBL	CT&E	(18.0 - 20.0')	<10 J	<330	<330	<330	<330	<330	<330	<330	<330 J	<330	<330	<330	<330	<330	<330	<330	<330	
SB97-110 DUP	11/17/97	BBL	CT&E	(18.0 - 20.0')	11	<330	<330	<330	<330	<330	<330	<330	<330 J	<330	<330	<330	<330	<330	<330	<330	<330	
SB97-110	11/17/97	BBL	CT&E	(22.0 - 24.0')	<10 J	<330	<330	<330	<330	<330	<330	<330	<330 J	<330	<330	<330	<330	<330	<330	<330	<330	
SB97-111	11/17/97	BBL	CT&E	(2.0 - 4.0')	<10	<330	<330	<330	380	<330	<330	<330	<330	380	<330	<330	520	520	<330	<330	<330	
SB97-111	11/18/97	BBL	CT&E	(24.0 - 26.0')	<10 J	<330	<330	<330	<330	<330	<330	<330 J	<330 J	<330	<330	<330	520	520	<330	<330	400	
MW98-108S1	09/24/98	BBL	CT&E	(0.5 - 1.0')	<890 DM	2,200 DM	6,200 DM	5,600 DM	7,200 DM	2,900 DM	4,400 DMJ	<890 DM	1,900 DMJ	8,200 DM	1,500 DM	1,500 DM	15,000 DM	15,000 DM	3,200 DM	3,200 DM	7,800 DM	
MW98-108S1	09/21/98	BBL	CT&E	(4.0 - 6.0')	<330	<330	500	500	580	<330	500 J	<330	<330	610	<330	<330	1,200	1,200	<330	<330	580	
MW98-109S1	09/23/98	BBL	CT&E	(0.5 - 1.0')	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	870	
MW98-109S1	09/23/98	BBL	CT&E	(6.0 - 8.0')	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	
MW98-110S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<330	
MW98-110S1	09/22/98	BBL	CT&E	(4.0 - 6.0')	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	<330	
MW98-111S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	24,000 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	<2,100 DM	
MW98-111S1	09/22/98	BBL	CT&E	(2.0 - 4.0')	<4,100 DM	<4,100 DM	<4,100 DM	<4,100 DM	<4,100 DM	<4,100 DM	<4,100 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	<4,500 DM	
SB98-119	09/23/98	BBL	CT&E	(0.5 - 1.0')	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	
SB98-119	09/23/98	BBL	CT&E	(2.0 - 4.0')	<880 DM	2,700 DM	<880 DM	<880 DM	<880 DM	<880 DM	<880 DM	350	<330	<330	<330	<330	<330	<330	<330	<330	<330	
SB98-120	09/23/98	BBL	CT&E	(0.5 - 1.0')	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<930 DM	<880 DM	<880 DM	1,700 DM	
SB98-120	09/23/98	BBL	CT&E	(4.0 - 6.0')	<980 DM	<980 DM	2,700 DM	3,000 DM	2,700 DM	1,100 DM	2,700 DMJ	<980 DM	<980 DM	2,900 DM	<980 DM	<980 DM	4,200 DM	4,200 DM	1,100 DM	1,100 DM	1,800 DM	
MDEQ Part 201 Criteria																						
Industrial and Commercial Drinking Water Protection Criteria (IDWP)					13,000	41,000	NLL	NLL	NLL	NLL	NLL	NLL	310,000	19,000	NLL	NLL	ID	720,000	890,000	NLL	34,000	470,000
Groundwater Contact Protection Criteria (GCCP)					210,000	41,000	NLL	NLL	NLL	NLL	NLL	NLL	310,000	320,000	NLL	NLL	ID	720,000	890,000	NLL	450,000	470,000
Industrial and Commercial II Direct Contact Criteria (IDC)					210,000	1,000,000,000	210,000	21,000	210,000	16,000,000	2,100,000	10,000,000	310,000	1,200,000	21,000,000	21,000	ID	540,000,000	540,000,000	210,000	16,000,000	340,000,000
Industrial and Commercial II, III, and IV Soil Volatilization to Indoor Air Inhalation Criteria (IS)					210,000	1,000,000,000	NLV	NLV	ID	NLV	NLV	NLV	NLV	NLV	ID	NLV	ID	1,000,000,000	1,000,000,000	NLV	28,000,000	1,000,000,000
Industrial and Commercial II, III, and IV Infinite Source Volatile Soil Inhalation Criteria (IVSIC)					46,000,000	1,600,000,000	NLV	NLV	ID	NLV	NLV	NLV	NLV	NLV	ID	NLV	ID	880,000,000	150,000,000	NLV	150,000	770,000,000
Industrial and Commercial II, III, and IV Particulate Soil Inhalation Criteria (IPSIC)					44,000,000,000	29,000,000,000	ID	1,900,000	ID	350,000,000	ID	890,000,000	21,000,000,000	ID	ID	ID	ID	4,100,000,000	4,100,000,000	ID	59,000,000	2,900,000,000

Notes:

1. All soil samples analyzed by CT&E Environmental Services, Inc. (CT&E) Anatech Division of Ludington, Michigan for TCL SVOCs by USEPA Methods 8270 or 8270C.
2. Data are shown only for those analytes detected in one or more samples for TCL compounds.
3. < = Analyte concentration less than method detection limit.
4. -- = Not analyzed for.
5. D = Concentration is based on a diluted sample analysis.
6. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
7. M = Matrix Interference.
8. Bold indicates detection; Shading indicates concentration above one or more listed criteria.
9. ID = Inadequate Data to formulate criteria.
10. NLL = Not likely to leach.
11. NLV = Not likely to volatilize under most conditions.

Criteria Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Soil, May 28, 1999.

Criteria Qualifiers were not included on this table.

TABLE 5

SOIL SAMPLE ANALYTICAL SUMMARY FOR METALS AND POLYCHLORINATED BIPHENYLS

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Depth	Analyte Concentrations in Micrograms Per Kilogram (Parts Per Billion)													PCBs		
					Inorganics													Aroclor-1248	Aroclor-1254	Aroclor-1260
					Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Selenium	Silver	Zinc				
Peninsula Area Soil Sampling Locations																				
SB97-110	11/17/97	BBL	CT&E	(18.0 - 20.0')	1,400	9,200 J	260	2,800 J	6,000 J	2,900,000	11,000	<100	6,100 J	<500 J	<500	14,000 J	<330	<330	<330	
SB97-110 DUP	11/17/97	BBL	CT&E	(18.0 - 20.0')	480	22,000 J	<52 M	<10,000 JM	<10,000 JM	3,300,000	2,200	<100	15,000 J	<500 J	<500	15,000 J	<330	<330	<330	
SB97-110	11/17/97	BBL	CT&E	(22.0 - 24.0')	3,400	49,000 J	67	12,000 J	14,000 J	12,000,000	5,600	<100	15,000 J	<500 J	<500	31,000 J	<330	<330	<330	
SB97-111	11/17/97	BBL	CT&E	(2.0 - 4.0')	8,100	1,200,000 J	1,100	110,000 J	540,000 J	62,000,000	310,000	<100	86,000 J	<500 J	<500	120,000 J	<330	<330	<330	
SB97-111	11/18/97	BBL	CT&E	(24.0 - 26.0')	1,700	44,000 J	84	12,000 J	16,000 J	10,000,000	5,900	<100	15,000 J	<500 J	<500	26,000 J	<330	<330	<330	
MW98-108S1	09/24/98	BBL	CT&E	(0.5 - 1.0')	2,000 MD	93,000	270	45,000	85,000	20,000,000	140,000	<20	34,000	3,000 MD	1,000	65,000	<330	<330	<330	
MW98-108S1	09/21/98	BBL	CT&E	(4.0 - 6.0')	2,000 MD	69,000	90	13,000	25,000	8,800,000	59,000	30	14,000	<4,000 MD	<500	86,000	<330	<330	<330	
MW98-109S1	09/23/98	BBL	CT&E	(0.5 - 1.0')	4,000 MD	82,000	220	79,000	310,000	110,000,000 D	120,000	50	110,000	<2,000 MD	5,400	35,000	<330	<330	<330	
MW98-109S1	09/23/98	BBL	CT&E	(6.0 - 8.0')	38,000 MD	53,000	110	14,000	25,000	11,000,000	22,000	40	17,000	<2,000 MD	600	73,000	<330	<330	<330	
MW98-110S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	2,000 MD	160,000	120	51,000	140,000	21,000,000	340,000	40	50,000	<4,000 MD	1,300	52,000	<330	<330	<330	
MW98-110S1	09/22/98	BBL	CT&E	(4.0 - 6.0')	2,000 MD	460,000	2,700	610,000	3,500,000	270,000,000 D	280,000	200	380,000	<4,000 MD	14,000	410,000	1,300	3,000 J	900 J	
MW98-111S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	2,000 MD	41,000	110	23,000	19,000	12,000,000	15,000	20	18,000	<2,000 MD	700	32,000	<330 D	<330 D	6,700 D	
MW98-111S1	09/22/98	BBL	CT&E	(2.0 - 4.0')	4,000 MD	66,000	4,000	190,000	140,000	66,000,000 D	88,000	30	110,000	<2,000 MD	3,800	360,000	<330 D	<330 D	8,800 D	
SB98-119	09/23/98	BBL	CT&E	(0.5 - 1.0')	2,000 MD	79,000	<50	15,000	30,000	12,000,000	50,000	40	19,000	<2,000 MD	500	36,000	<330	<330	<330	
SB98-119	09/23/98	BBL	CT&E	(2.0 - 4.0')	3,000 MD	91,000	240	69,000	170,000	31,000,000	390,000	160	70,000	<2,000 MD	2,000	220,000	<330	<330	<330	
SB98-120	09/23/98	BBL	CT&E	(0.5 - 1.0')	8,000 MD	960,000	3,000 D	730,000	2,400,000	250,000,000 D	200,000	90	230,000	<4,000 MD	12,000	250,000	<330	<330	<330	
SB98-120	09/23/98	BBL	CT&E	(4.0 - 6.0')	<1,000 MD	300,000	1,000 D	200,000	670,000	83,000,000 D	640,000	130	200,000	<4,000 MD	4,000	250,000	<330	<330	<330	
MDEQ Part 201 Criteria																				
Statewide Default Background Concentrations (SDBL)					5,800	75,000	1,200	18,000	32,000	12,000,000	21,000	130	20,000	410	1,000	47,000	NA	NA	NA	
Industrial and Commercial Drinking Water Protection Criteria (IDWP)					23,000	1,300,000	6,000	30,000	160,000,000	6,000	1,000	1,700	100,000	4,000	13,000	5,000,000	NLL	NLL	NLL	
Groundwater Contact Protection Criteria (GCCP)					2,200,000	1,000,000,000	250,000,000	300,000,000	1,000,000,000	ID	ID	47,000	1,000,000,000	88,000,000	230,000,000	1,000,000,000	NLL	NLL	NLL	
Industrial and Commercial II Direct Contact Criteria (IDC)					100,000	320,000,000	2,300,000	22,000,000	170,000,000	ID	900,000	1,400,000	340,000,000	23,000,000	21,000,000	1,000,000,000	9,900	9,900	9,900	
Industrial and Commercial II, III, and IV Soil Volatilization to Indoor Air Inhalation Criteria (ISVIIC)					NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	16,000,000	16,000,000	16,000,000	
Industrial and Commercial II, III, and IV Infinite Source Volatile Soil Inhalation Criteria (IVSIC)					NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	820,000	820,000	820,000	
Industrial and Commercial II, III, and IV Particulate Soil Inhalation Criteria (IPSIC)					910,000	150,000,000	2,200,000	330,000	59,000,000	ID	44,000,000	ID	16,000,000	59,000,000	2,900,000	ID	6,500,000	6,500,000	6,500,000	

Notes:

- All soil samples analyzed by CT&E Environmental Services, Inc. (CT&E) Anatech Division of Ludington, Michigan, by USEPA Methods 6000/7000 series for inorganics and USEPA Method 8081 for PCBs.
- Data are shown only for those analytes detected in one or more samples for TCL PCBs and Plant 2 site-specific TAL metals (Arsenic, Barium, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Selenium, Silver, and Zinc).
- < = Analyte concentration less than method detection limit.
- = Not analyzed for.
- D = Concentration is based on a diluted sample analysis.
- J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- M = Matrix Interference.
- Bold indicates detection; Shading indicates concentration above one or more listed criteria. Concentrations of select constituents above Drinking Water Protection Criteria, but below Statewide Default Background Concentrations are not shaded.
- ID = Inadequate Data to formulate criteria.
- NA = Not applicable.
- NLL = Not likely to leach.
- NLV = Not likely to volatilize under most conditions.

Criteria Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Soil, May 28, 1999.

Criteria Qualifiers were not included on this table.

TABLE 6

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Type	Analyte Concentrations in Micrograms Per Liter (Parts Per Billion)																
					1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethene, Total	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Acetone	Benzene	Chlorobenzene	Chloroethane	Chloroform	Ethylbenzene	Toluene	Trichloroethene	Vinyl chloride	m,p-Xylene	o-Xylene	Xylenes, Total
Peninsula Area Monitoring Well Locations																					
MW97-104S1	12/10/97	BBL	CT&E	FS	<100	5.2	3,900	--	--	<1,000	<500	200	<100	<100	12	7.9	<100	3,400	--	--	4.2
MW97-104S1	12/10/97	MDEQ	MDEQ	SPLIT	<10	3.9	--	2,300 DL	13	<25	1.9	160	<100	<100	12	7.9	<100	3,400	--	--	4.2
MW97-104S1	11/05/98	BBL	CT&E	FS	<100 D	<100 D	4,300 D	--	--	<10,000 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	3,400 DL	2.4	1.6	--
MW97-104WT	12/10/97	BBL	CT&E	FS	<10	5.6	--	4,500 DL	15	<25	1.7	190	<100 D	<100 D	<100 D	<100 D	<100 D	3,400 DL	2.7	2.1	--
MW97-104WT	12/10/97	MDEQ	MDEQ	SPLIT	<10	<10	7.7	--	--	<100 J	6.1 J	34	<10	<10	13	9.2	<10	3,400 DL	<200 DJ	<100 D	--
MW97-104WT	11/05/98	BBL	CT&E	FS	<10	<10	--	8.3	<10	<25	4.5	35	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-104WT	11/05/98	MDEQ	MDEQ	FS	<10	<10	3.0	--	--	<100	4.5	35	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105S1	12/10/97	BBL	CT&E	SPLIT	<10	<10	--	1.8	<10	<25	6.0	9.0	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105S1	12/10/97	MDEQ	MDEQ	FS	<10	<10	2.7	--	--	<100 J	4.6	7.3	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105S1	11/05/98	BBL	CT&E	SPLIT	<10	<10	--	<10	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105S1	11/05/98	MDEQ	MDEQ	FS	<10	<10	<20	--	--	<100	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105WT	12/10/97	BBL	CT&E	SPLIT	<10	<10	--	<10	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105WT(DUP)	12/10/97	BBL	CT&E	FS	<10	<10	2.4	--	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105WT	11/05/98	BBL	CT&E	DUP	<10	<10	2.0	--	--	<100 J	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW97-105WT	11/05/98	MDEQ	MDEQ	FS	<10	<10	<20	--	--	<100	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-108S1	11/05/98	MDEQ	MDEQ	SPLIT	<10	<10	--	--	--	<100	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-108S1	11/05/98	BBL	CT&E	FS	<100 D	<100 D	4,300 DJ	<10	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-108WT	11/05/98	MDEQ	MDEQ	SPLIT	<10	2.8	--	--	<10,000 D	<500 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	3,400 DL	2.7	2.1	--
MW98-108WT	11/05/98	BBL	CT&E	FS	<10	<10	--	3,400 DL	12	<25	1.3	2.7	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-108WT	11/05/98	MDEQ	MDEQ	SPLIT	<10	<10	<20	--	--	<100	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-109S1**	11/05/98	BBL	CT&E	FS	<100 D	<100 D	--	<10	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
MW98-109S1(DUP)**	11/05/98	BBL	CT&E	DUP	<100	<100	3,700 DJ	--	<10,000 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	3,400 DL	2.7	2.1	--
MW98-109S1**	11/05/98	MDEQ	MDEQ	SPLIT	<10	<100	4,200	--	<10,000	<500	<100	<100	<100	<100	<100	<100	<100	3,400 DL	2.7	2.1	--
MW98-109S1**	11/05/98	MDEQ/DUP	MDEQ/DUP	SPLIT/DUP	<10	3.4	--	4,700 DL	15	<25	6.3	65	<10	<10	<10	<10	<10	3,400 DL	2.7	2.1	--
TW98-109WT**	11/05/98	BBL	CT&E	FS	<10	2.3	--	5,100 DL	11	<25	6.4	72	<10	<10	15	26	<10	3,400 DL	6.2	4.6	--
TW98-109WT**	11/05/98	MDEQ	MDEQ	SPLIT	<10	<10	14 J	--	<100	<100	7.0 J	82	<10	<10	14	24	<10	3,400 DL	6.0	4.3	--
MW98-110S1	11/05/98	BBL	CT&E	FS	<100 D	<100 D	--	12	<10	<25	6.2	63	<10	<10	7.0 J	<10	<10	3,400 DL	47 J	<20 J	--
MW98-110S1	11/05/98	MDEQ	MDEQ	SPLIT	<10	25	--	--	<10,000 D	<500 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	<100 D	3,400 DL	49	1.3	--
TW98-110WT	11/05/98	BBL	CT&E	FS	<10	<10	<20	--	<100	<100	<10	<10	<10	<10	1.2	1.2	<10	3,400 DL	1,200 D	<200 DJ	--
MW98-111S1**	11/06/98	BBL	CT&E	SPLIT	<10	<10	--	<10	<10	<25	<10	<10	<10	<10	<10	<10	<10	3,400 DL	1,100 DL	<20	--
MW98-111S1**	11/06/98	MDEQ	MDEQ	FS	<10	2.0 J	3,200 EJ	--	<100	<100	1.7	<10	<10	<10	<10	<10	<10	3,400 DL	<20 J	<10	--
TW98-111WT**	11/06/98	BBL	CT&E	SPLIT	<10	3.5	--	3,300 DL	15	<25	35 J	378 EJ	<10	<10	1,500 EJ	818 EJ	<10	3,400 DL	4,200 EJ	2,000 EJ	--
TW98-111WT**	11/06/98	MDEQ	MDEQ	SPLIT	<10	<10	<20	--	<100	<100	22	300 DL	<10	<10	1,900 DL	550 DL	<10	3,400 DL	1,700 DL	1,200 DL	--
Off-Site Perimeter Plant 2 Property Monitoring Well Locations																					
MW-142WT	07/30/95	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<50 J	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--
MW-142WT	06/11/96	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
MW-144WT	07/29/95	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<100	2.4 J	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
MW-144WT(DUP)	07/29/95	BBL	Quanterra	DUP	<10	<10	<10	<10	<10	6.6 J	6.3	<10	<10	<10	<10	<10	<10	<10	0.43 J	--	--
MW-144WT	06/08/96	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<50	7.6	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
MW97-106WT	12/09/97	BBL	CT&E	FS	<10	<10	<10	<10	<10	<100	5.6	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
MW97-106WT	12/09/97	MDEQ	MDEQ	SPLIT	<10	<10	1.1	--	<100 J	<100 J	<50	<10	<10	<10	<10	<10	<10	<10	--	--	1.0 J
MW97-106WT	11/06/98	MDEQ	MDEQ	SPLIT*	<10	<10	--	1.0	<10	<25	1.5	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
Off-Site Perimeter GM SMI Monitoring Well Locations																					
MW-143WT	07/25/95	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<50	1.5	<10	<10	<10	<10	<10	<10	<10	<10	<10	--
MW-143WT	06/08/96	BBL	Quanterra	FS	--	--	--	<10	<10	<50	1.5	<10	<10	<10	<10	<10	<10	<10	--	--	<1.8
MW-129WT	07/28/95	BBL	Quanterra	FS	<10	<10	1.9	1.9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--
MW-129WT	06/12/96	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<50 J	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--
X-1A	07/29/95	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<100	<50	<10	<10	<10	<10	<10	<10	<10	--	--	--
X-1A	06/10/96	BBL	Quanterra	FS	<3.6	<3.6	<3.6	<3.6	<3.6	<180	9.5	<10	<10	<10	<10	<10	<10	<10	--	--	<3.0
X-1A	03/08/97	BBL	Quanterra	FS	<2.1	<2.1	<2.1	<2.1	<2.1	<210	8.7 J	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	--	--	<3.0
X-1B	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	--	--	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	--	--	<11
X-1B	06/10/96	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	<6.2
X-1B	03/09/97	BBL	Quanterra	FS	--	--	--	--	--	5.5 J	1.9	<10	13	<10	<10	<10	<10	<10	--	--	--
X-1CR	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<3.0
X-1CR	06/10/96	BBL	Quanterra	FS	<8.3	--	--	--	--	<83 J	10	--	--	--	--	--	--	--	--	--	--
X-1CR	03/11/97	BBL	Quanterra	FS	0.51 J	<1.2	<1.2	<1.2	<1.2	<120	9.3	<1.2	43	<1.2	<1.2	<1.2	<1.2	<1.2	--	--	21
X-1CR2	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12
X-1CR2	06/11/96	BBL	Quanterra	FS	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--
X-1CR2	03/12/97	BBL	Quanterra	FS	--	--	--	--	--	5.0 J	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--
X-20	07/25/95	BBL	Quanterra	FS	<10	<10	<10	<10	<10	5.8 J	<10	<10	<10	<10	<10	<10	<10	<10	--	--	2.2 J
MDEQ Part 201 Criteria																					
Groundwater Surface Water Interface Criteria (GSI)					ID	65 (X)	ID	ID	ID	1,700 (I)	200 (X)	47 (I)	ID	170 (X)	18 (I)	140 (I)	200 (X)	15	35 (I)*	35 (I)*	35 (I)
Industrial and Commercial II, III, and IV Drinking Water Criteria (IDW)					2,500 (I)	70 (A,I)	70 (A,I)	70 (A,I)	100 (A)	2,100 (I)	50 (A,I)	100 (A,I)	910 (I)	100 (A,W)	74 (E,I)	790 (E,I)	50 (A)	20 (A)	280 (E,I)*	280 (E,I)*	280 (E,I)
Groundwater Contact Criteria (GCC)					2,100,000 (I)	9,000 (I)	170,000 (I)	170,000 (I)	190,000	31,000,000 (I)	9,400 (I)	68,000 (I)	200,000 (I)	96,000	170,000 (I,S)	530,000 (I,S)	11,000	290	190,000 (I,S)*	190,000 (I,S)*	190,000 (I,S)
Industrial and Commercial II, III, and IV Groundwater Volatilization to Indoor Air Inhalation Criteria (IGVHC)					5,100,000 (I,S)	1,500 (I)	3,500,000 (I,S)	3,500,000 (I,S)	6,300,000 (S)	1,000,000,000 (D,I)	36,000 (I)	470,000 (I,S)	5,700,000 (I,S)	180,000	170,000 (I,S)	530,000 (I,S)	97,000	690	190,000 (I,S)*	190,000 (I,S)*	190,000 (I,S)
Acute Inhalation Screening Level (AISL)					ID	140,000 (I)	ID	ID	ID</												

Notes:

1. Data are shown only for those analytes detected in one or more samples for TCL compounds.
2. FS = Primary Field Sample.
3. SPLIT = MDEQ Split Sample.
4. SPLIT* = MDEQ sample is not a "true split", since additional parameters were analyzed by MDEQ.
5. DUP = Duplicate Field Sample.
6. < = Analyte concentration less than method detection limit.
7. -- = Not analyzed for.
8. D = Concentration is based on a diluted sample analysis.
9. E = The compound was quantitated above the calibration range.
10. I = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
11. T = MDEQ qualifier indicates value reported is less than the criteria of detection.
12. DL = MDEQ qualifier indicates sample analyzed using a dilution.
13. Bold indicates detection; Shading indicates concentration above one or more listed criteria.
14. ID = Inadequate Data to formulate criteria.
15. NA = Not applicable.
16. NLL = Not likely to leach.
17. NLV = Not likely to volatilize under most conditions.
- Criteria Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Soil, January 29, 1999.
- Criteria Qualifiers were not included on this table.

Criteria Qualifiers:

- (A) Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act. No. 399 of the Public acts of 1976.
(D) Calculated criterion exceeds 100%, hence it is reduced to 100% (i.e. 1.0E+9 ppb). Evaluation of free phase contaminant, environmental impacts, adverse aesthetics and acute or local toxicity is required.
(E) Criterion is the aesthetic drinking water value, as required by Sec. 12020(1)(5).
(F) Chemical may exhibit the characteristic of ignitability as defined in 40 CFR 261.21. Contact an ERD toxicologist for further direction.
(J) Chemical may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria. Contact an ERD toxicologist if further explanation is needed.
(S) Criterion defaults to the chemical-specific water solubility limit.
(W) Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/L. Concentrations of trihalomethanes in surface water are not added together.
(X) The GSI criterion shown is not protective for surface water that is used as a drinking water source.
ID = Inadequate data to develop criterion.
NLV = Chemical is not likely to volatilize under most conditions.
Criteria given for Total-1,2-Dichloroethene applies to cis-1,2-Dichloroethene.
* - Criteria presented is for Xylenes, Total.
** - Analytical results for wells MW98-109S1, TW98-109WT, MW98-111S1, TW98-111WT are compared to GSI criteria, not IDW criteria.

TABLE 7
GROUNDWATER SAMPLE ANALYTICAL SUMMARY FOR SEMI-VOLATILE ORGANIC COMPOUNDS

REALM, INC.
PENINSULA PROPERTY
REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Type	Analyte Concentrations in Micrograms Per Liter (Parts Per Billion)												
					1,2-Dichlorobenzene	1,4-Dichlorobenzene	2-Methyl Naphthalene	Acenaphthene	Anthracene	bis(2-Chloroethyl) ether	bis(2-Chloroisopropyl) ether	bis(2-Ethylhexyl) phthalate	Carbazole	Di-n-butyl phthalate	Naphthalene	Phenanthrene	Phenol
Peninsula Area Monitoring Well Locations																	
MW97-104S1	12/10/97	BBL	ENC	FS	12	14	<5.0	<5.0	<5.0	<5.0	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW97-104S1	12/10/97	MDEQ	MDEQ	SPLIT	12	13	<5.0	--	--	--	--	--	--	--	--	--	--
MW97-104S1	12/08/98	BBL	CT&E	FS	9.0	7.0	<5.0	--	--	--	--	--	--	--	--	--	--
MW97-104S1	11/05/98	MDEQ	MDEQ	SPLIT	18	17	<5.0	<5.0	<5.0	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW97-104WT	12/10/97	BBL	ENC	FS	2.4	5.3	<5.0	--	--	--	--	--	<5.0 J	--	<5.0	--	--
MW97-104WT	12/10/97	MDEQ	MDEQ	SPLIT	2.9	5.2	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0
MW97-104WT	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	5.5	<5.0	<5.0	--	<5.0	<5.0	--
MW97-104WT	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	--	<5.0	<5.0	<5.0
MW97-105S1	12/10/97	BBL	ENC	FS	<1.0	3.1	<5.0	--	--	--	<5.0	<5.0	<5.0	--	<5.0	--	--
MW97-105S1	12/10/97	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	--	--	<5.0	<5.0	<5.0
MW97-105S1	11/05/98	MDEQ	MDEQ	SPLIT*	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	--	--
MW97-105WT	12/10/97	BBL	ENC	FS	<1.0	<1.0	<5.0	--	--	--	--	--	--	--	<5.0	<5.0	<5.0
MW97-105WT(DUP)	12/10/97	BBL	ENC	DUP	<1.0	<1.0	<5.0	<5.0	<5.0	--	--	--	--	--	<5.0	--	--
MW97-105WT	11/05/98	MDEQ	MDEQ	SPLIT*	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
MW98-108S1	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	--	--	<5.0	<5.0	<5.0	<5.0	<5.0
MW98-108S1	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0
TW98-108WT	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	--	<5.0	<5.0	--	<5.0	<5.0	<5.0
TW98-108WT	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0
MW98-109S1**	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
MW98-109S1(DUP)**	11/05/98	BBL	CT&E	DUP	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	--	--	<5.0	<5.0	<5.0
MW98-109S1**	11/05/98	MDEQ	MDEQ	SPLIT/DUP	<1.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW98-109S1**	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	4.4	<5.0	--	--	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TW98-109WT**	11/05/98	BBL	CT&E	FS	<5.0	6.0	<5.0	--	--	--	--	--	--	--	<5.0	<5.0	<5.0
TW98-109WT**	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	16	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
MW98-110S1	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW98-110S1	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
TW98-110WT	11/05/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
TW98-110WT	11/05/98	MDEQ	MDEQ	SPLIT	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
MW98-111S1**	11/06/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW98-111S1**	11/06/98	MDEQ	MDEQ	SPLIT	68	6.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0
TW98-111WT**	11/06/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	31	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TW98-111WT**	11/06/98	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	7.0	<5.0	<5.0	--	85	<5.0	<5.0
Off-Site Perimeter Plant 2 Monitoring Well Locations																	
MW-142WT	07/30/95	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-142WT	06/11/96	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	23	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0
MW-144WT	07/29/95	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	12	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0
MW-144WT(DUP)	07/29/95	BBL	Quanterra	DUP	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 J	<10.0	<5.0	<5.0	<5.0	<5.0
MW-144WT	06/08/96	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	5	<10.0	<10.0	<5.0	<5.0	<5.0	<5.0
MW97-106WT	12/09/97	BBL	ENC	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0
MW97-106WT	12/09/97	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0
MW97-106WT	11/06/98	BBL	CT&E	FS	<5.0	<5.0	<5.0	--	--	--	19	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW97-106WT	11/06/98	MDEQ	MDEQ	SPLIT	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	7.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Off-Site Perimeter GM SMI Monitoring Well Locations																	
MW-143WT	07/25/95	BBL	Quanterra	FS	<1.0	<1.0	3.4 J	0.52 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-143WT	06/08/96	BBL	Quanterra	FS	<5.0	<5.0	6.8 JN	1.0 JN	<5.0	<5.0	<5.0	<5.0	<10	0.55 J	19	<5.0	<5.0
MW-129WT	07/28/95	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
MW-129WT	06/12/96	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	26 JN	<5.0	<5.0
X-1A	07/29/95	BBL	Quanterra	FS	<3.6	<3.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1A	06/10/96	BBL	Quanterra	FS	<2.1	<2.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1A	03/08/97	BBL	Quanterra	FS	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1B	07/29/95	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1B	06/10/96	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1B	03/09/97	BBL	Quanterra	FS	--	--	--	--	<5.0	<5.0	<5.0	<5.0	<10	<5.0	--	--	--
X-1CR	07/29/95	BBL	Quanterra	FS	<8.3	<8.3	3.8 J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1CR	06/10/96	BBL	Quanterra	FS	<1.2	<1.2	1.2 J	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1CR	03/11/97	BBL	Quanterra	FS	--	--	--	--	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	1.9 J	<5.0
X-1CR2	07/29/95	BBL	Quanterra	FS	<1.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1CR2	06/11/96	BBL	Quanterra	FS	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0
X-1CR2	03/12/97	BBL	Quanterra	FS	--	--	--	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	100 D
X-20	07/25/95	BBL	Quanterra														

TABLE 8
GROUNDWATER SAMPLE ANALYTICAL SUMMARY FOR METALS AND POLYCHLORINATED BIPHENYLS

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Type	Analyte Concentrations in Micrograms per Liter (Parts Per Billion)															
					Inorganics										PCBs					
					Arsenic, Filtered	Barium, Filtered	Cadmium, Filtered	Chromium, Filtered	Copper, Filtered	Iron, Filtered	Lead, Filtered	Nickel, Filtered	Selenium, Filtered	Zinc, Filtered	Aroclor-1016, Unfiltered	Aroclor-1242, Unfiltered	Aroclor-1248, Unfiltered	Aroclor-1254, Unfiltered		
Peninsula Area Monitoring Well Locations																				
MW97-104WT	10-Dec-97	BBL	ENC	FS	<5.0	260	<0.50	<50	38	640	3.1	<50	<5.0	21	<0.20	<0.20	<0.20	<0.20		
MW97-104WT	10-Dec-97	MDEQ	MDEQ	SPLIT	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW97-104WT	05-Nov-98	BBL	CT&E	FS	--	--	--	--	--	1,200	<1.0	--	--	--	<0.10 *	<0.10	<0.10 *	<0.10		
MW97-104SI	10-Dec-97	MDEQ	ENC	FS	<5.0	540	<0.50	<50	<25	3,500	<3.0	<50	5.6	21	--	--	--	--		
MW97-105WT	10-Dec-97	MDEQ	MDEQ	SPLIT	--	--	--	--	--	--	--	<50	5.6	21	<0.20	<0.20	<0.20	<0.20		
MW97-105WT	10-Dec-97	BBL	ENC	FS	8.2	870	<0.50	<50	<25	--	--	--	--	--	<0.10 *	<0.10	<0.10 *	<0.10		
MW97-105WT Dup.	10-Dec-97	BBL	ENC	DUP	8.6	880	<0.50	<50	<25	25,000	<3.0	<50	27	23	<0.20	<0.20	<0.20	<0.10		
MW97-105WT	05-Nov-98	BBL	CT&E	FS	--	--	--	--	--	26,000	<3.0	<50	28	20	<0.20	<0.20	<0.20	<0.20		
MW97-105SI	10-Dec-97	BBL	ENC	FS	<5.0	--	--	--	--	11,000	--	--	<5.0	--	--	<0.20	<0.20	<0.20		
MW97-105SI	10-Dec-97	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<25	17,000	3.5	<50	9.7	<20	<0.20	<0.20	--	--		
MW97-105SI	05-Nov-98	BBL	CT&E	FS	--	--	--	--	--	--	--	--	--	--	--	<0.20	<0.20	<0.20		
TW98-108WT	05-Nov-98	BBL	CT&E	FS	6.0	600	<0.50	<50	--	9,000	<1.0	--	--	--	<0.10 *	<0.10	<0.10 *	<0.20		
TW98-108WT	05-Nov-98	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<25	5,000	<1.0	<50	<5.0	<20	--	--	--	<0.10		
MW98-108SI	05-Nov-98	BBL	CT&E	FS	<5.0	--	--	--	--	--	--	--	--	--	<0.10	<0.10	<0.10	--		
MW98-108SI	05-Nov-98	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<25	--	--	--	<5.0	<20	<0.10	<0.10	<0.10	<0.10		
TW98-109WT**	05-Nov-98	BBL	CT&E	FS	<5.0	300	<0.50	<50	<25	4,600	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
TW98-109WT**	05-Nov-98	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<25	--	--	--	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-109SI**	05-Nov-98	BBL	CT&E	FS	<5.0	400	<0.50	<50	<25	1,200	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-109SI**	05-Nov-98	MDEQ	MDEQ	SPLIT	<5.0	400	<0.50	<50	<25	--	--	--	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-109SI Dup.**	05-Nov-98	BBL	CT&E	DUP	<5.0	400	<0.50	<50	<25	3,800	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-109SI**	05-Nov-98	MDEQ	MDEQ	SPLIT	--	400	<0.50	<50	<25	3,800	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-109SI Dup.**	05-Nov-98	MDEQ	MDEQ	SPLIT/DUP	--	--	--	--	--	--	--	<5.0	<5.0	<20	<0.10	<0.10	<0.10	<0.10		
MW98-110WT	05-Nov-98	BBL	CT&E	FS	5.0	--	<0.50	<50	<25	--	--	--	--	--	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-110WT	05-Nov-98	MDEQ	MDEQ	SPLIT	--	<200	<0.50	<50	<25	1,300	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-110SI	05-Nov-98	BBL	CT&E	FS	--	--	--	--	--	--	--	--	--	--	<0.10	<0.10	<0.10	<0.10		
MW98-110SI	05-Nov-98	MDEQ	MDEQ	SPLIT	<5.0	400	<0.50	<50	<25	4,600	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
TW98-111WT**	06-Nov-98	BBL	CT&E	FS	<5.0	--	<0.50	<50	<25	--	--	--	--	--	<0.10 *	<0.10	<0.10 *	0.13		
TW98-111WT**	06-Nov-98	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<25	4,600	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
TW98-111WT**	06-Nov-98	BBL	CT&E	FS	<5.0	1,400	<0.50	<50	<25	1,500	<1.0	<50	<5.0	<20	<0.10 *	<0.10	<0.10 *	0.38		
MW98-111SI**	06-Nov-98	MDEQ	MDEQ	SPLIT	--	--	--	--	--	--	--	--	--	--	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-111SI**	06-Nov-98	BBL	CT&E	FS	<5.0	2,800	<0.50	<50	<20	34,000	<1.0	<50	5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
MW98-111SI**	06-Nov-98	MDEQ	MDEQ	SPLIT	--	--	<0.50	<50	<20	--	--	--	5.0	<20	<0.10 *	<0.10	<0.10 *	<0.10		
Off-Site Perimeter Plant 2 Monitoring Well Locations																				
MW-143WT	07/30/95	BBL	Quanterra	FS	4.1	7,650	<0.20 J	<50	<25	--	--	--	--	--	<0.10 *	<0.10	<0.10 *	<0.10		
MW-142WT	06/11/96	BBL	Quanterra	FS	<5.0	511	<0.50	<50	<25	2,870	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
MW-144WT	07/29/95	BBL	Quanterra	FS	5.5	281	<0.20 J	<50	<25	7,420	<3.0	<50	<5.0	<22	--	--	<0.20	<0.20		
MW-144WT(DUP)	07/29/95	BBL	Quanterra	DUP	5.8	314	<0.20 J	<50	<25	16,400	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	--		
MW-144WT	06/08/96	BBL	Quanterra	FS	--	--	<0.20 J	<50	<25	18,600	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
MW97-106WT	12/09/97	BBL	ENC	FS	12	340	0.55	<50	--	--	--	--	--	--	<0.20	<0.20	<0.20	<0.20		
MW97-106WT	12/09/97	MDEQ	MDEQ	SPLIT	--	--	--	<50	<25	790	<3.0	<50	9.7	26	<0.20	<0.20	--	--		
MW97-106WT	11/06/98	BBL	CT&E	FS	--	--	--	--	--	--	--	--	--	--	<0.10 *	<0.10	0.53	<0.20		
MW97-106WT	11/06/98	MDEQ	MDEQ	SPLIT	--	--	--	--	--	--	--	--	--	--	<0.10 *	1.1	<0.10 *	0.17		
Off-Site Perimeter Plant 2 Monitoring Well GM SMI Monitoring Well Locations																				
MW-143WT	07/25/95	BBL	Quanterra	FS	<1.0 J	<200	<0.20 J	<50	<25	--	--	--	--	--	0.25 J*	<0.10	<0.10 *	<0.10		
MW-143WT	06/08/96	BBL	Quanterra	FS	--	--	<0.20 J	<50	<25	657	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
MW-129WT	07/28/95	BBL	Quanterra	FS	22	<200	--	--	--	--	--	--	--	--	--	--	--	--		
MW-129WT	06/12/96	BBL	Quanterra	FS	7.3	<200	<0.20 J	<50	<25	4,210	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
X-1A	07/29/95	BBL	Quanterra	FS	3.6	535	<0.20 J	<50	<25	2,960 J	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
X-1A	06/10/96	BBL	Quanterra	FS	--	515	<0.20 J	<50	<25	7,120	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
X-1A	03/08/97	BBL	Quanterra	FS	--	--	--	--	--	30,000 J	<3.0	<50	--	<20	<0.40	<0.40	1.9	1.1		
X-1B	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	19,420	--	<50	--	<20	<0.20	<0.20	<0.20	<0.20		
X-1B	06/10/96	BBL	Quanterra	FS	3.1	887	0.38 J	<50	<25	22,900	<3.0	<50	--	--	--	--	--	--		
X-1B	03/09/97	BBL	Quanterra	FS	--	870	--	--	--	21,290 J	<3.0	<50	<5.0	143	<0.20	<0.20	0.57	<0.20		
X-1CR	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	831.8	--	<50	--	<42.5	<0.20	<0.20	0.21	<0.20		
X-1CR	06/10/96	BBL	Quanterra	FS	2.2	531	<0.20 J	<50	<25	--	--	--	--	--	--	--	--	--		
X-1CR	03/11/97	BBL	Quanterra	FS	--	507	--	--	--	--	<3.0	<50	<5.0	<20	<0.20	<0.20	0.31 JN	<0.20		
X-1CR2	07/29/95	BBL	Quanterra	FS	--	--	--	--	--	30,700 J	<3.0	<50	--	<20	<0.20 J	<0.20	0.4	<0.20		
X-1CR2	06/11/96	BBL	Quanterra	FS	2.4	<200	<0.20 J	<50	<25	42,800	--	--	--	--	--	--	--	--		
X-1CR2	03/12/97	BBL	Quanterra	FS	--	<200	--	--	--	<100	6.9	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
X-20	07/25/95	BBL	Quanterra	FS	--	--	--	--	--	<100	<3.0	<50	<5.0	<20	<0.20	<0.20	<0.20	<0.20		
X-20	07/25/95	BBL	Quanterra	FS	15.8	224	<0.20 J	<50	<25	240	--	--	--	--	--	--	--	--		
X-20	07/25/95	BBL	Quanterra	FS	--	--	<0.20 J	<50	<25	18,400	<3.0	<50	<5.0	41	<0.20	<0.20	<0.20	<0.20		
Site-Specific Background Groundwater Quality Values																				
MDEQ Part 201 Criteria					7.0	990	3.0	NA	26	13,000	6.0	3.0	NA	20,000	NA	NA	NA	NA		
Groundwater Surface Water Interface Criteria (GSI)					150 (X)	190 (B)	(B,G,X)	11 (B,H)	(B,G)	NA	(B,G,X)	(B,G)	5.0 (B)	(B,G)	0.2 (J,M,T)	0.2 (J,M,T)	0.2 (J,M,T)	0.2 (J,M,T)		
Industrial & Commercial II, III & IV Drinking Water Criteria (IDW)					50 (A,B)	2,000 (A,B)	5.0 (A,B)	100 (A,B,H)	1,000 (B,E)	300 (B,E)	4.0 (B,L)	100 (A,B)	50 (A,B)	5,000 (B,E)	0.50 (A,J,T)	0.50 (A,J,T)	0.50 (A,J,T)	0.50 (A,J,T)		
Groundwater Contact Criteria (GCC)					4,700 (B)	15,000,000 (B)	210,000 (B)	1,000,000 (B,H)	8,100,000 (B,E)	ID	ID	16,000,000 (B)	1,100,000 (B)	70,000,000 (B)	2.3 (J,T)	2.3 (J,T)	2.3 (J,T)	2.3 (J,T)		
Industrial & Commercial Groundwater Volatilization to Indoor Air Criteria (IGVIC)					NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	45 (J,S,T)	45 (J,S,T)	45 (J,S,T)	45 (J,S,T)		
MDEQ Part 201 Screening Levels																				
Acute Inhalation Screening Level (AISL)					ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	
Flammability and Explosivity Screening Level (FESL)					ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	
Water Solubility Screening Level (WSSL)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Notes:																				

Notes:

1. FS = Primary Field Sample.
2. SPLIT = MDEQ Split Sample.
3. DUP = Duplicate Field Sample.
4. D = Concentration is based on a diluted sample analysis.
5. -- = Not analyzed for.
6. Bold indicates detection; Shading indicates concentration above one or more criteria listed. For inorganics, where the GM SMI Site-Specific Background Groundwater Quality Values were higher than MDEQ criteria, the background value was used for comparison.
7. < - Analyte concentration less than method detection limit.
8. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
9. * - MDEQ qualifier indicates results and detection limit reported semi-quantitatively.
10. DL = MDEQ qualifier indicates sample analyzed using a dilution.
11. Data are shown only for those analytes detected in one or more samples for TCL PCBs and TAL inorganics.
Criteria Reference: Michigan Department of Environmental Quality. Part 201 Generic Cleanup Criteria and Screening Levels for Groundwater. May 28, 1999.
R - Rejected.
JN - Compound tentatively identified.
** - Analytical data for wells MW98-109S1, TW98-109WT, MW98-111S1, and TW98-111WT are compared to GSI Criteria, not IDW Criteria.

Criteria Qualifiers:

- (A) Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public acts of 1976.
- (B) Background, as defined in Rule 299.5701(c), may be substituted if higher than the calculated cleanup criteria. Background levels may not exceed criteria for all inorganic compounds.
- (C) Calculated criterion exceeds 100%, hence it is reduced to 100% (i.e. 1.0E+9 ppb). Evaluation of free phase contaminant, environmental impacts, adverse aesthetics and acute or local toxicity is required.
- (D) Criterion is the aesthetic drinking water value, as required by Sec. 20120(1)(5).
- (G) GSI value is pH or water hardness dependent.
- (H) Valence-specific chromium data (Cr III and Cr VI) must be compared to corresponding valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for Cr VI must be applied as the cleanup criteria. Cr III cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future.
- (I) Chemical may exhibit the characteristic of ignitability as defined in 40 CFR 261.21. Contact an ERD toxicologist for further direction.
- (J) Chemical may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria. Contact an ERD toxicologist if further explanation is needed.
- (L) Higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.
- (M) Calculated criterion is below the analytical Target Detection Limit (TDL), therefore, the criterion defaults to the TDL.
- (S) Criterion defaults to the chemical-specific water solubility limit.
- (T) Refer to the Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.
- (W) Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/L. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.
- (X) The GSI criterion shown is not protective for surface water that is used as a drinking water source.
- ID - Inadequate data to develop criterion.
- IP - Development of generic GSI value in process, but not yet complete.
- NLV - Chemical is not likely to volatilize under most conditions.
- NA - Not applicable.

TABLE 9

SUMMARY OF ORGANIC AND INORGANIC CRITERIA EXCEEDENCES IN SOIL

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

Sample ID	Sample Date	Sampled By	Analyzed By	Sample Depth	Analyte Concentrations in Micrograms per Kilogram (Parts Per Billion)						
					Volatile Organic Compounds	Inorganics					
						Trichloroethene	Arsenic	Chromium	Iron	Lead	Nickel
Peninsula Area Soil Sampling Locations											
SB97-111	11/17/97	BBL	CT&E	(2.0 - 4.0')	--	--	110,000 J	62,000,000	310,000	--	--
MW98-108S1	09/24/98	BBL	CT&E	(0.5 - 1.0')	--	--	45,000	20,000,000	140,000	--	--
MW98-108S1 MEOH	09/24/98	BBL	CT&E	(0.5 - 1.0')	120	NT	NT	NT	NT	NT	NT
MW98-108S1	09/21/98	BBL	CT&E	(4.0 - 6.0')	--	--	--	--	59,000	--	--
MW98-109S1	09/23/98	BBL	CT&E	(0.5 - 1.0')	--	--	79,000	110,000,000 D	120,000	110,000	--
MW98-109S1	09/23/98	BBL	CT&E	(6.0 - 8.0')	--	38,000 MD	--	--	22,000	--	--
MW98-110S1	09/22/98	BBL	CT&E	(0.5 - 1.0')	--	--	51,000	21,000,000	340,000	--	--
MW98-110S1	09/22/98	BBL	CT&E	(4.0 - 6.0')	--	--	610,000	270,000,000 D	280,000	380,000	14,000
MW98-111S1	09/22/98	BBL	CT&E	(2.0 - 4.0')	--	--	190,000	66,000,000 D	88,000	110,000	--
SB98-119	09/23/98	BBL	CT&E	(0.5 - 1.0')	--	--	--	--	50,000	--	--
SB98-119	09/23/98	BBL	CT&E	(2.0 - 4.0')	--	--	69,000	31,000,000	390,000	--	--
SB98-119 MEOH	09/23/98	BBL	CT&E	(2.0 - 4.0')	110	NT	NT	NT	NT	NT	NT
SB98-120	09/23/98	BBL	CT&E	(0.5 - 1.0')	--	--	730,000	250,000,000 D	200,000	230,000	--
SB98-120	09/23/98	BBL	CT&E	(4.0 - 6.0')	--	--	200,000	83,000,000 D	640,000	200,000	--
MDEQ Part 201 Criteria											
Statewide Default Background Concentrations (SDBL)					NA	5,800	18,000	12,000,000	21,000	20,000	1,000
Industrial and Commercial Drinking Water Protection Criteria (IDWP)					100	23,000	30,000	6,000	1,000	100,000	13,000
Groundwater Contact Protection Criteria (GCCP)					220,000	2,200,000	300,000,000	ID	ID	1,000,000,000	230,000,000
Industrial and Commercial II Direct Contact Criteria (IDC)					500,000	100,000	22,000,000	ID	900,000	340,000,000	21,000,000
Industrial and Commercial II, III, and IV Soil Volatilization to Indoor Air Inhalation Criteria (ISVIIC)					37,000	NLV	NLV	NLV	NLV	NLV	NLV
Industrial and Commercial II, III, and IV Infinite Source Volatile Soil Inhalation Criteria (IVSIC)					260,000	NLV	NLV	NLV	NLV	NLV	NLV
Industrial and Commercial II, III, and IV Particulate Soil Inhalation Criteria (IPSIC)					2,300,000,000	910,000	330,000	id	44,000,000	16,000,000	2,900,000

Notes

- All soil samples analyzed by CT&E Environmental Services, Inc. (CT&E) Anatech Division of Ludington, Michigan for TCL VOCs by USEPA Method 8260 OR 8260B and for inorganics by USEPA Methods 6000/7000 series.
- MEOH - Soil sample collected using an Encore sampler and analyzed by USEPA Method 5035.
- Bolded values indicate concentrations above one or more of the listed criteria. For inorganics, concentrations of select constituents above Drinking Water Protection Criteria, but below Statewide Default Background Concentrations are not shown.
- NT - Not analyzed for.
- Analyte not detected at or above the relevant screening value.
- J - The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- NA - Not applicable.
- NLV - Not likely to volatilize under most conditions.
- ID - Inadequate data to formulate criteria.
- D - Concentration is based on a diluted sample analysis.
- M - Matrix interference.

Criterion Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Soil, May 28, 1999.

SUMMARY OF ORGANIC AND METALS CRITERIA EXCEEDENCES IN GROUNDWATER

REMEDIAL INVESTIGATION REPORT

[illegible]

1. FS = Primary Field Sample; SPL11 = MDEQ Split Sample; DUP = Duplicate Field Sample
2. VOCs: 1,1-DCE = 1,1-Dichloroethene; cis-1,2-DCE = cis-1,2-Dichloroethene; total-1,2-DCE = total 1,2-Dichloroethene; TCE = Trichloroethene
3. SVOCs: Bis (2-E) Phthalate = Bis-(2-Ethylhexyl) Phthalate.
4. Metals: Only exceedances of Plant 2 Property site-specific metals are shown.
5. DL = Dilution run NA = Not Applicable; J = Approximate Value; NT = Not analyzed for
6. Bold indicates concentration above one or more criteria listed. For inorganics, where Site-Specific Background Groundwater Quality values were higher than the MDEQ criteria, the background value was used for comparison.
7. -- = Analyte not detected above the relevant screening value.
8. Concentrations in micrograms per liter (ug/L) equivalent to parts per billion (ppb).
* = Criteria presented is for Xylenes, Total.
** = Analytical results for wells MW98-109S1, TW98-109WT, MW98-111S1, and TW98-111WT are compared to GSI criteria, not IDW criteria.
= MDEQ sample is not a "true split" since additional parameters were analyzed by MDEQ.
= Located on Peninsula Area Property.
Criteria Reference: Michigan Department of Environmental Quality, Part 201 Generic Cleanup Criteria and Screening Levels for Groundwater, May 28, 1998.

(A) Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

(B) Background, as defined in Rule 299.5701(c), may be substituted if higher than the calculated cleanup criteria. Background levels may not exceed criteria for all inorganic compounds.

(E) Criterion is the aesthetic drinking water value, as required by Sec. 20120(1)(5).

(G) GSI value is pH or water hardness dependent.

(I) Chemical may exhibit the characteristic of ignitability as defined in 40 CFR 261.21. Contact an ERD toxicologist for further direction.

(J) Chemical may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria. Contact an ERD toxicologist if further explanation is needed.

(L) Higher groundwater concentrations (up to 15 ug/L) may be acceptable if the soil concentration is less than 400 ppm and groundwater migrating off-site will not result in unacceptable exposures. Contact an ERD toxicologist if further explanation is needed.

(M) Calculated criterion is below the analytical Target Detection Limit (TDL), therefore, the criterion defaults to the TDL.

(S) Criterion defaults to the chemical-specific water solubility limit.

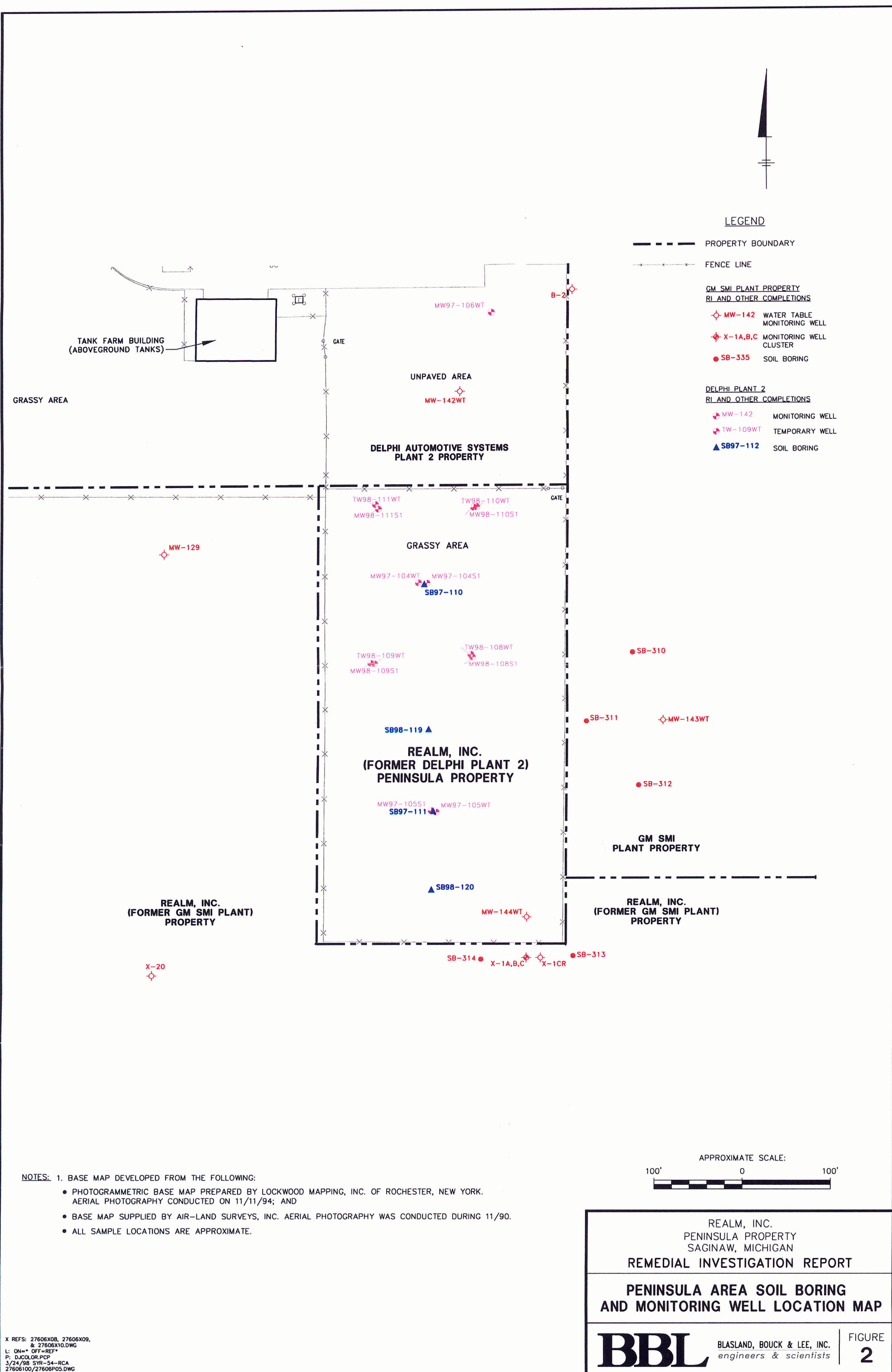
(T) Refer to the Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended to determine the applicability of TSCA cleanup standards. Alternatives to compliance with the standards listed below are possible under Subpart D. New releases may be subject to the standards identified in Subpart G. Use Part 201 soil direct contact criteria in the table below where TSCA standards are not applicable.

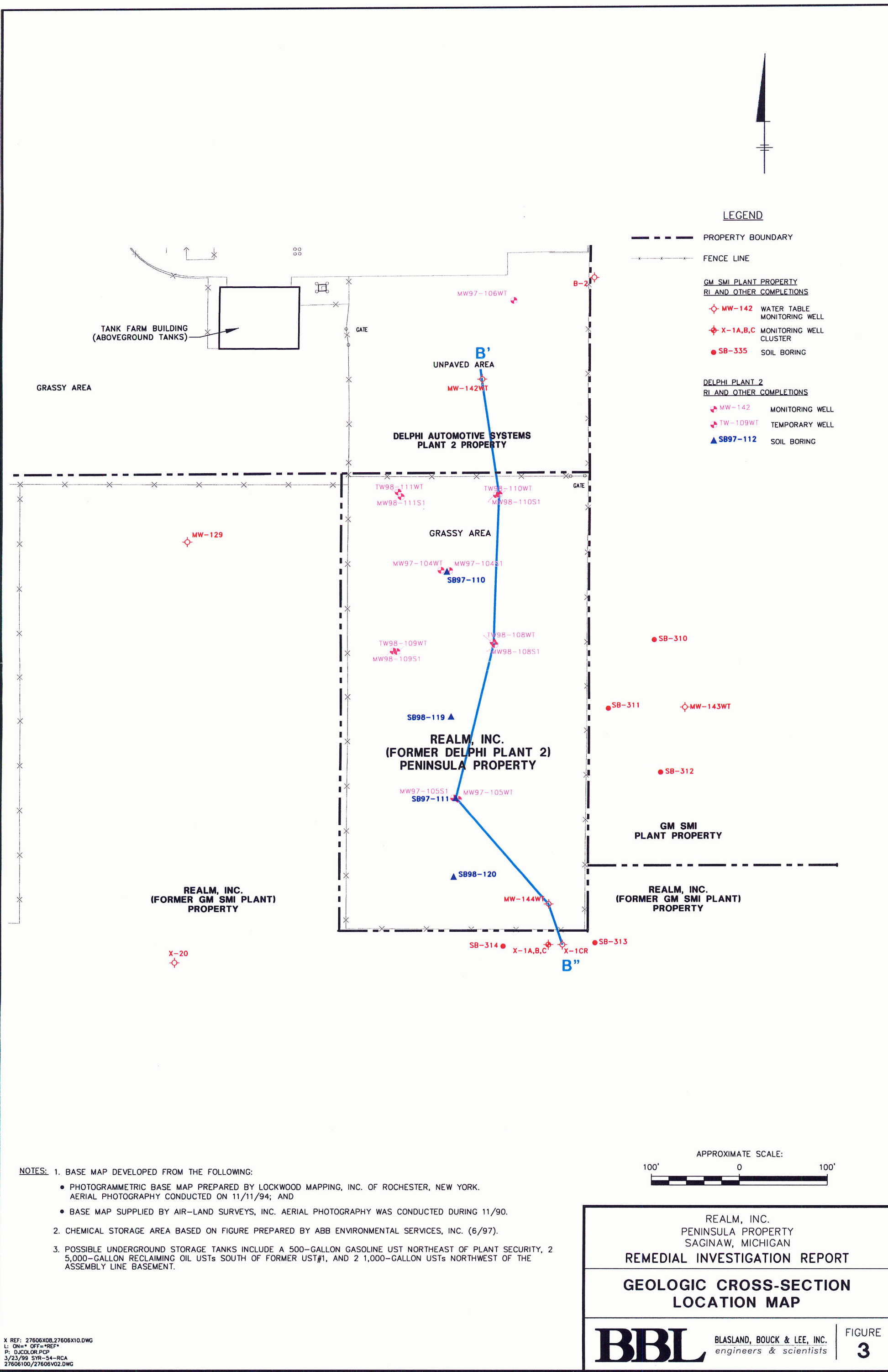
(W) Concentrations of trihalomethanes in groundwater must be added together to determine compliance with the State of Michigan Drinking Water Standard of 100 ug/L. Concentrations of trihalomethanes in soil must be added together to determine compliance with the drinking water protection criterion of 2,000 ug/kg.

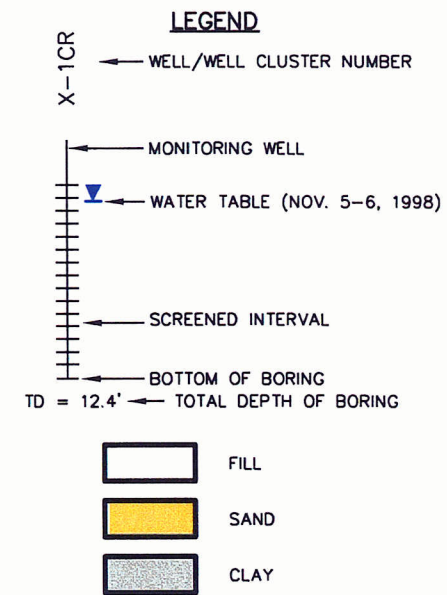
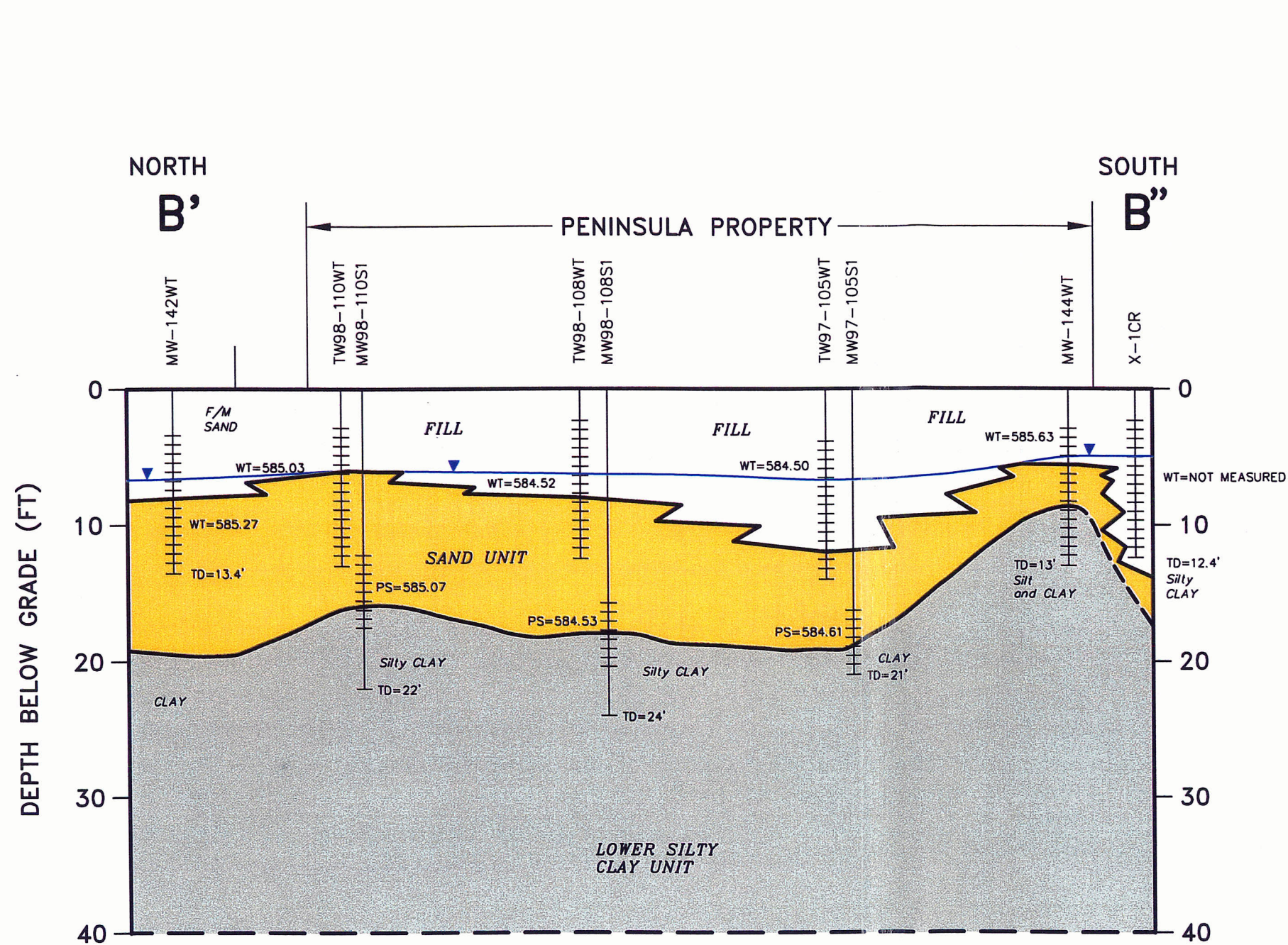
(X) The GSI criterion shown is not protective for surface water that is used as a drinking water source.

Figures

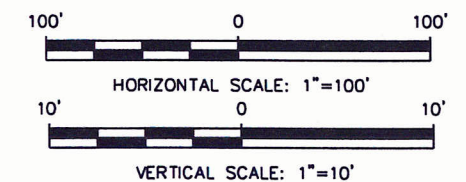
BLASLAND, BOUCK & LEE, INC.
e n g i n e e r s & s c i e n t i s t s







- NOTES:**
- LITHOLOGIES DEPICTED ARE THOSE DESCRIBED IN SUBSURFACE LOGS PREPARED BY BLASLAND, BOUCK & LEE, INC. (1994,1995,1997) SERVICES, INC.
 - WATER LEVEL DATA COLLECTED BY BLASLAND, BOUCK, & LEE, INC. AS PART OF A PLANT 2 SITE-WIDE GAUGING EVENT.
 - A ZERO DEPTH BELOW GRADE USED IN THIS FIGURE IS APPROXIMATELY 592.5 FT. AMSL.
 - WT = WATER TABLE ELEVATION (FT. AMSL)
PS = POTENTIOMETRIC SURFACE ELEVATION (FT. AMSL)
 - FILL CONSISTS OF LIGHT BROWN SAND, SILT AND CLAY, SOME CONCRETE, GLASS, WIRE, WITH TRACE GRAVEL, PEBBLES AND SLAG, AND TO THE SOUTH AT X-1, FOUNDRY SAND, SLAG, CINDERS, METAL, WOOD AND "MISCELLANEOUS ORGANICS" (ASSOCIATED WITH THE GREENPOINT LANDFILL).



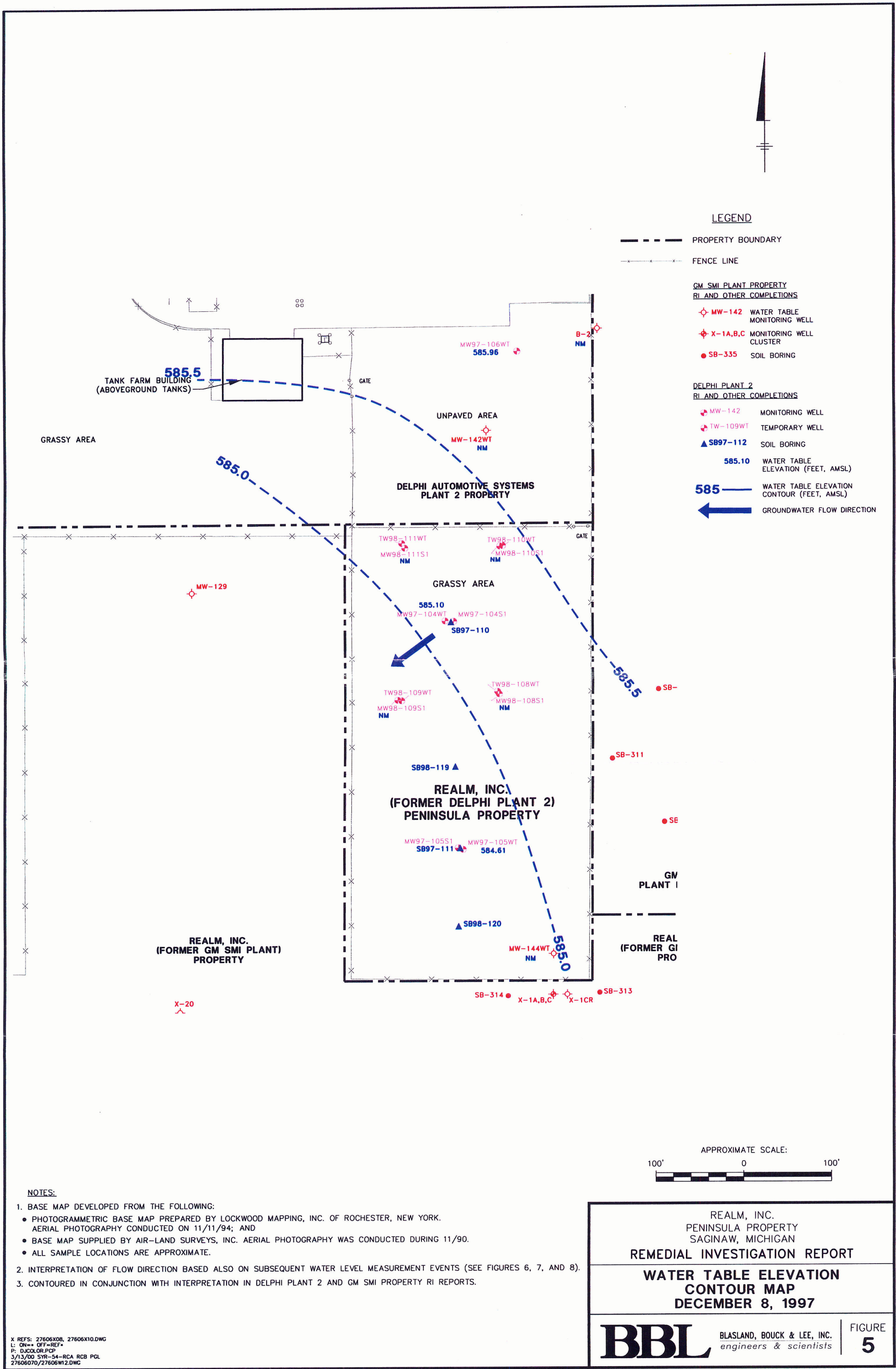
REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

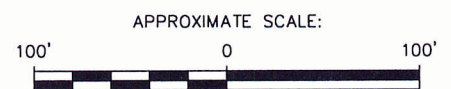
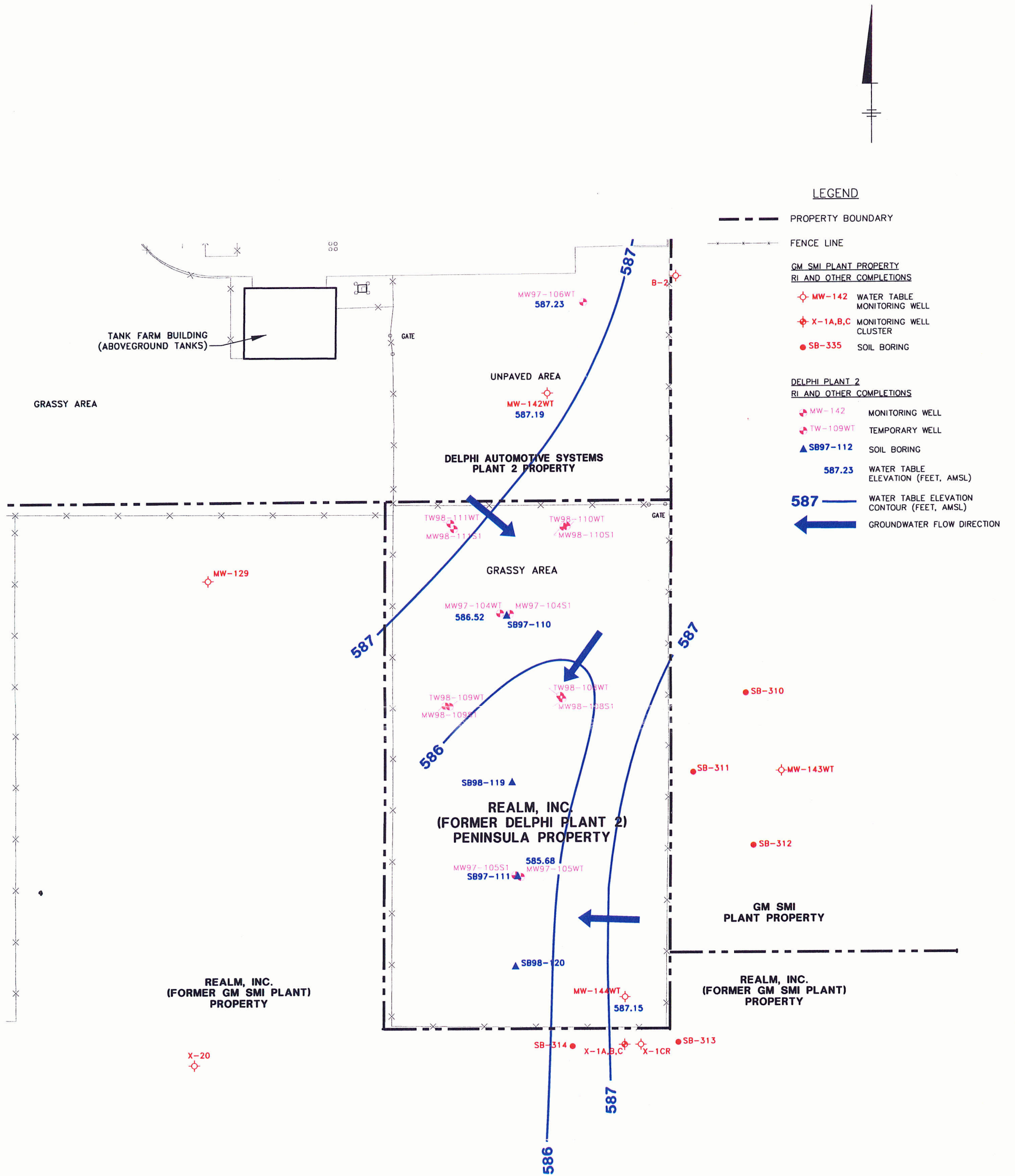
REMEDIAL INVESTIGATION REPORT

GEOLOGIC CROSS-SECTION
B' - B''

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
4



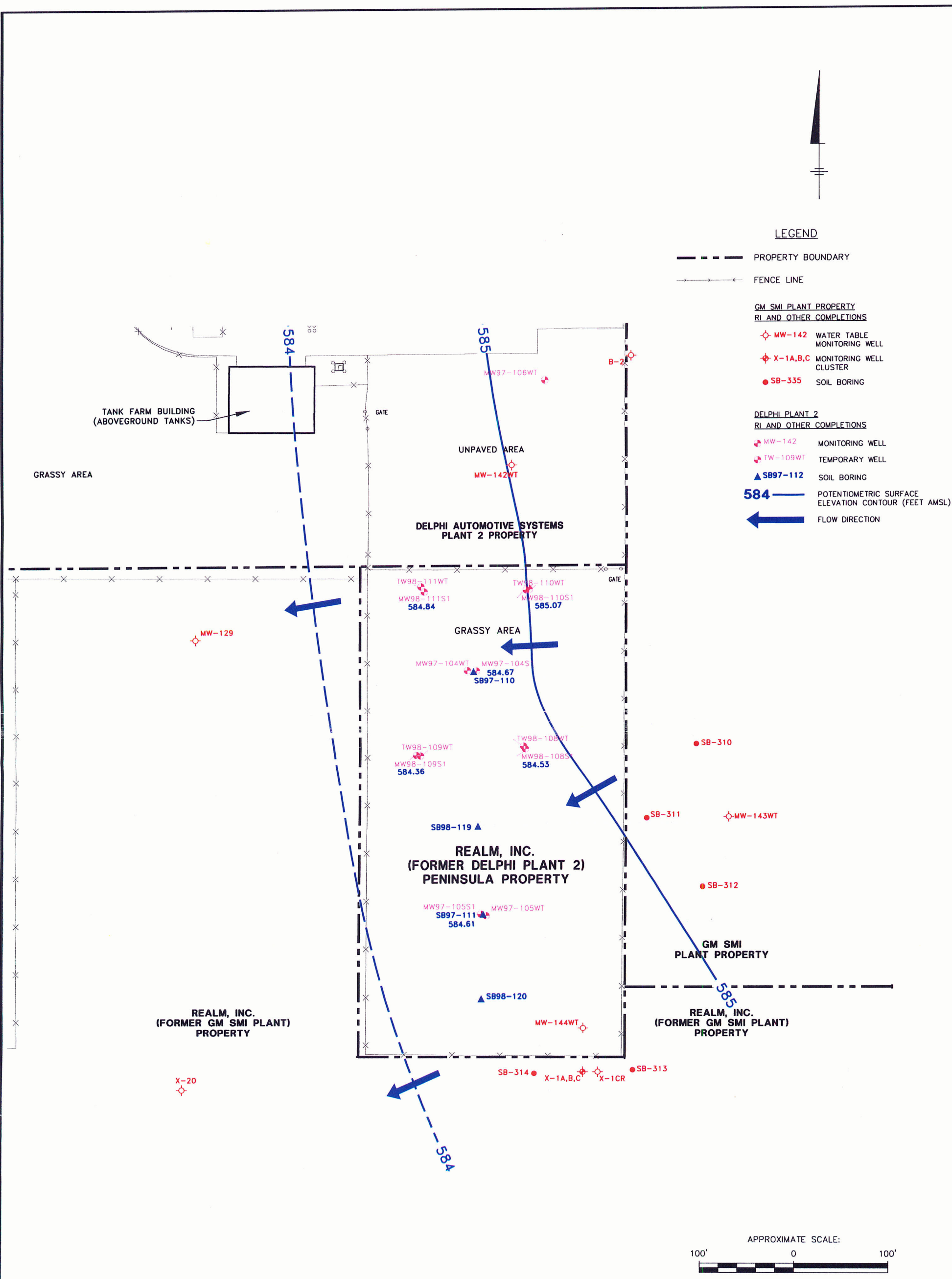


REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT
**WATER TABLE ELEVATION
CONTOUR MAP**
FEBRUARY 25-26 1998

BBL

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
6



NOTES: 1. BASE MAP DEVELOPED FROM THE FOLLOWING:

- PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
- BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
- ALL SAMPLE LOCATIONS ARE APPROXIMATE.

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN

REMEDIAL INVESTIGATION REPORT

POTENTIOMETRIC SURFACE ELEVATION
CONTOUR MAP FOR THE LOWER
SAND UNIT, NOVEMBER 5-6, 1998

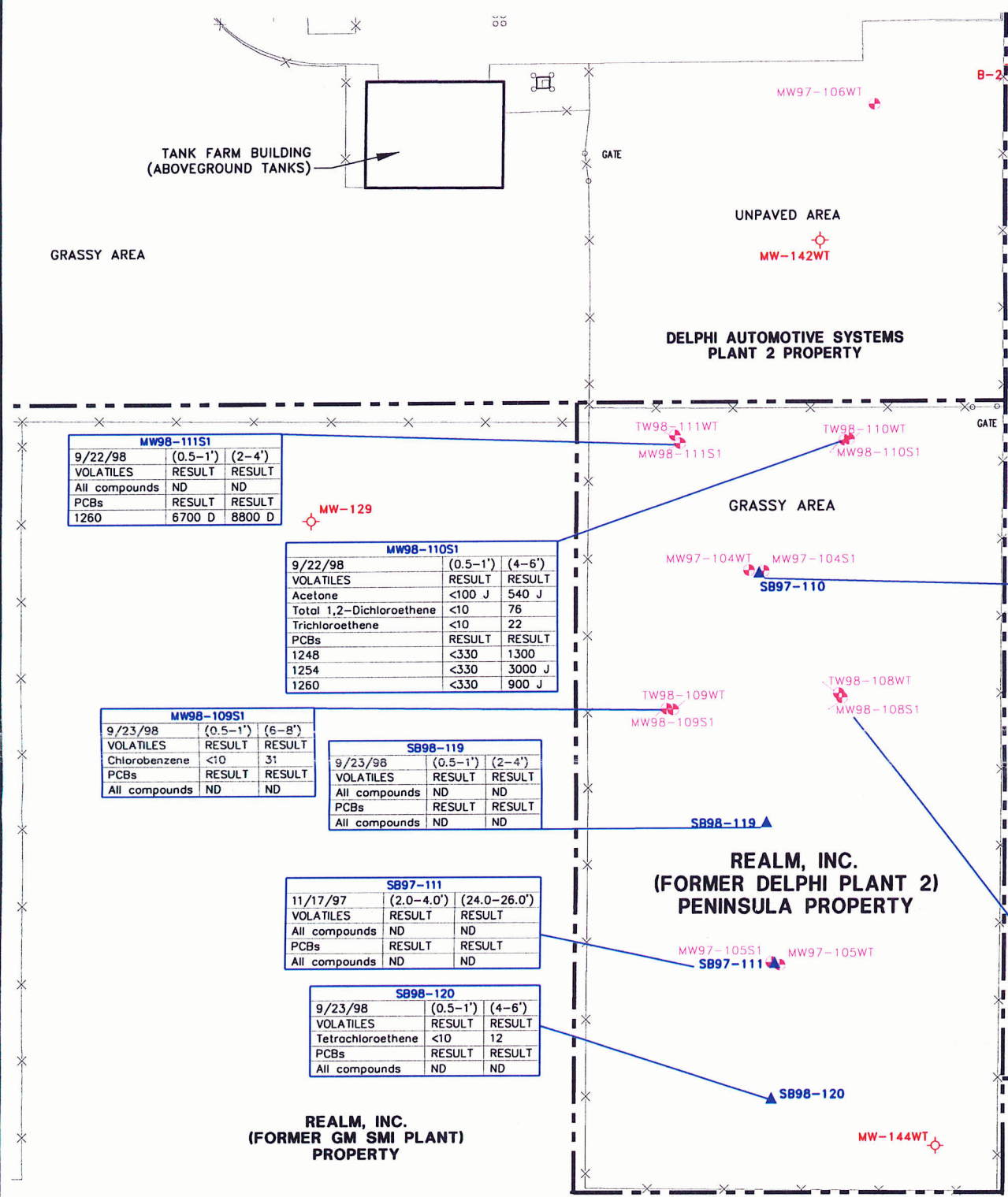
BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
9

X REFS: 27606X08, 27606X10.DWG
L: ONI=*, OFF=REF*
P: DJCOLOR.PCP
4/7/99 SYR-54-RCA JMS
27606100/27606W11.DWG

LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- SHADED VALUES EXCEED GENERIC MDEQ IDWP CRITERIA (JANUARY 1999)
- GM SMI PLANT PROPERTY
RI AND OTHER COMPLETIONS
- MW-142 WATER TABLE MONITORING WELL
- X-1A,B,C MONITORING WELL CLUSTER
- SB-335 SOIL BORING
- DELPHI PLANT 2
RI AND OTHER COMPLETIONS
- MW-142 MONITORING WELL
- TW-109WT TEMPORARY WELL
- SB97-112 SOIL BORING



MW98-111S1			
9/22/98	(0.5-1')	(2-4')	
VOLATILES	RESULT	RESULT	
All compounds	ND	ND	
PCBs	RESULT	RESULT	
1260	6700 D	8800 D	

MW98-110S1			
9/22/98	(0.5-1')	(4-6')	
VOLATILES	RESULT	RESULT	
Acetone	<100 J	540 J	
Total 1,2-Dichloroethene	<10	76	
Trichloroethene	<10	22	
PCBs	RESULT	RESULT	
1248	<330	1300	
1254	<330	3000 J	
1260	<330	900 J	

MW98-109S1			
9/23/98	(0.5-1')	(6-8')	
VOLATILES	RESULT	RESULT	
Chlorobenzene	<10	31	
PCBs	RESULT	RESULT	
All compounds	ND	ND	

SB98-119			
9/23/98	(0.5-1')	(2-4')	
VOLATILES	RESULT	RESULT	
All compounds	ND	ND	
PCBs	RESULT	RESULT	
All compounds	ND	ND	

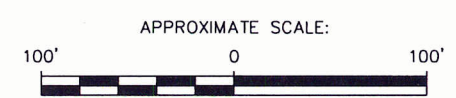
SB97-111			
11/17/97	(2.0-4.0')	(24.0-26.0')	
VOLATILES	RESULT	RESULT	
All compounds	ND	ND	
PCBs	RESULT	RESULT	
All compounds	ND	ND	

SB98-120			
9/23/98	(0.5-1')	(4-6')	
VOLATILES	RESULT	RESULT	
Tetrachloroethene	<10	12	
PCBs	RESULT	RESULT	
All compounds	ND	ND	

SB97-110			
11/17/97	(18.0-20.0')	(18.0-20.0')	(22.0-24.0')
VOLATILES	RESULT	DUPLICATE	RESULT
1,2-Dichlorobenzene	<10 J	11	<10 J
Chlorobenzene	16	10	<10 J
Total 1,2-Dichloroethene	<10	<10	37
PCBs	RESULT	DUPLICATE	RESULT
All compounds	ND	ND	ND

MW98-108S1			
9/24/98	(0.5-1')	(4-6')	
VOLATILES	RESULT	RESULT	
Methylene Chloride	12	>12	
PCBs	RESULT	RESULT	
All compounds	ND	ND	

- NOTES:
1. BASE MAP DEVELOPED FROM THE FOLLOWING:
 - PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
 - BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
 - ALL SAMPLE LOCATIONS ARE APPROXIMATE.
 2. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
 3. ND = NOT DETECTED.
 4. < = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
 5. D = IDENTIFIES ALL COMPOUNDS ANALYZED AT A SECONDARY DILUTION.
 6. ALL CONCENTRATIONS IN MICROGRAMS PER KILOGRAM (ug/kg); EQUIVALENT TO PARTS PER BILLION (ppb).
 7. IDWP = INDUSTRIAL DRINKING WATER PROTECTION CRITERIA.



REALM, INC. PENINSULA PROPERTY SAGINAW, MICHIGAN REMEDIAL INVESTIGATION REPORT **VOLATILE ORGANIC COMPOUNDS AND PCB DETECTIONS IN SOIL**

TANK FARM BUILDING
(ABOVEGROUND TANKS)

GRASSY AREA

UNPAVED AREA

DELPHI AUTOMOTIVE SYSTEMS
PLANT 2 PROPERTY

GRASSY AREA

REALM, INC.
(FORMER DELPHI PLANT 2)
PENINSULA PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

GM SMI
PLANT PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- SHADED VALUES EXCEED THE
GENERIC MDEQ IDWP CRITERIA
(JANUARY 1999)

GM SMI PLANT PROPERTY RI AND OTHER COMPLETIONS

- MW-142 WATER TABLE
MONITORING WELL
- X-1A,B,C MONITORING WELL
CLUSTER
- SB-335 SOIL BORING

DELPHI PLANT 2 RI AND OTHER COMPLETIONS

- MW-142 MONITORING WELL
- TW-109WT TEMPORARY WELL
- SB97-112 SOIL BORING

MW98-111S1			
9/22/98	(0.5-1')	(2-4')	
SEMI-VOLATILES	RESULT	RESULT	
All Compounds	ND	ND	

SB97-110			
11/17/97	(18.0-20.0')	(18.0-20.0')	(22.0-24.0')
SEMI-VOLATILES	RESULT	DUPLICATE	RESULT
All Compounds	ND	ND	ND

MW98-109S1			
9/23/98	(0.5-1')	(6-8')	
SEMI-VOLATILES	RESULT	RESULT	
All Compounds	ND	ND	

MW98-108S1		
9/24/98	(0.5-1')	(4-6')
SEMI-VOLATILES	RESULT	RESULT
Anthracene	2200 DM	<330
Benzo(a)anthracene	6200 DM	500
Benzo(a)pyrene	5600 DM	500
Benzo(b)fluoranthene	7200 DM	580
Benzo(g,h,i)perylene	2900 DM	<330
Benzo(k)fluoranthene	4400 DMJ	500 J
Butyl-Benzyl phthalate	1900 DMJ	<330
Carbazole	8200 DM	610
Chrysene	1500 DM	<330
Dibenzo(a,h)anthracene	1500 DM	<330
Dibenzofuran	15000 DM	1200
Fluoranthene	15000 DM	1200
Fluorene	3200 DM	<330
Indeno(1,2,3c,o)pyrene	3200 DM	<330
Phenanthrene	2800 DM	580
Pyrene	10000 DM	870

MW98-110S1			
9/22/98	(0.5-1')	(4-6')	
SEMI-VOLATILES	RESULT	RESULT	
Bis(2-Ethylhexyl)phthalate	<880 DM	24000 DM	

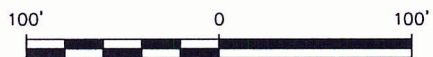
SB98-119			
9/23/98	(0.5-1')	(2-4')	
SEMI-VOLATILES	RESULT	RESULT	
Anthracene	<330	2700 DM	
Bis(2-Ethylhexyl)phthalate	350	<880 DM	
Butyl-Benzyl phthalate	<330	2400 DMJ	
Carbazole	<330	1200 DM	
Phenanthrene	<330	1700 DM	

SB98-120			
9/23/98	(0.5-1')	(4-6')	
SEMI-VOLATILES	RESULT	RESULT	
Benzo(a)anthracene	<930 DM	2700 DM	
Benzo(a)pyrene	<930 DM	3000 DM	
Benzo(b)fluoranthene	<930 DM	2700 DM	
Benzo(g,h,i)perylene	<930 DM	1100 DM	
Benzo(k)fluoranthene	<930 DM	2700 DMJ	
Carbazole	<930 DM	2900 DM	
Dibenzofuran	<930 DM	4200 DM	
Fluoranthene	<930 DM	4200 DM	
Fluorene	<930 DM	1100 DM	
Indeno(1,2,3c,o)pyrene	<930 DM	1100 DM	
Phenanthrene	<930 DM	1800 DM	
Pyrene	<930 DM	4100 DM	

NOTES:

- BASE MAP DEVELOPED FROM THE FOLLOWING:
 - PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
 - ALL SAMPLE LOCATIONS ARE APPROXIMATE.
 - BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
- J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
- ND = NOT DETECTED.
- < = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
- D = IDENTIFIES ALL COMPOUNDS ANALYZED AT A SECONDARY DILUTION.
- M = THE CONCENTRATION IS ESTIMATED DUE TO MATRIX INTERFERENCE.
- ALL CONCENTRATIONS IN MICROGRAMS PER KILOGRAM (ug/kg); EQUIVALENT TO PARTS PER BILLION (ppb).
- IDWP = INDUSTRIAL DRINKING WATER PROTECTION CRITERIA.

APPROXIMATE SCALE:



REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

SEMI-VOLATILE ORGANIC
COMPOUND DETECTIONS IN SOIL

BBL

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE

11



LEGEND

- PROPERTY BOUNDARY
x x x x x FENCE LINE

SHADED VALUES EXCEED THE HIGHER OF
GENERIC MDEQ IDWP CRITERIA (JANUARY
1999) OR SDBL (SEPTEMBER 1993)

GM SMI PLANT PROPERTY
RI AND OTHER COMPLETIONS

- ⊕ MW-142 WATER TABLE
MONITORING WELL
⊕ X-1A,B,C MONITORING WELL
CLUSTER
● SB-335 SOIL BORING

DELPHI PLANT 2
RI AND OTHER COMPLETIONS

- ⊕ MW-142 MONITORING WELL
⊕ TW-109WT TEMPORARY WELL
▲ SB97-112 SOIL BORING

TANK FARM BUILDING
(ABOVEGROUND TANKS)

GRASSY AREA

UNPAVED AREA

DELPHI AUTOMOTIVE SYSTEMS
PLANT 2 PROPERTY

MW98-111S1			
9/22/98	(0.5 - 1.0')	(2.0 - 4.0')	
Arsenic	2,000 MD	4,000 MD	
Barium	41,000	66,000	
Cadmium	110	4,000	
Chromium	23,000	190,000	
Copper	19,000	140,000	
Iron	12,000,000	66,000,000 D	
Lead	15,000	88,000	
Mercury	20	30	
Nickel	18,000	110,000	
Silver	700	3,800	
Zinc	32,000	360,000	

SB98-119			
9/23/98	(0.5 - 1.0')	(2.0 - 4.0')	
Arsenic	2,000 MD	3,000 MD	
Barium	79,000	91,000	
Cadmium	<50	240	
Chromium	15,000	69,000	
Copper	30,000	170,000	
Iron	12,000,000	31,000,000	
Lead	50,000	390,000	
Mercury	40	160	
Nickel	19,000	70,000	
Silver	500	2,000	
Zinc	36,000	220,000	

MW98-109S1			
9/23/98	(0.5 - 1.0')	(6.0 - 8.0')	
Arsenic	4,000 MD	38,000 MD	
Barium	82,000	53,000	
Cadmium	220	110	
Chromium	79,000	14,000	
Copper	310,000	25,000	
Iron	110,000,000 D	11,000,000	
Lead	120,000	22,000	
Mercury	50	40	
Nickel	110,000	17,000	
Silver	5,400	600	
Zinc	35,000	73,000	

SB97-111			
11/18/97	(2.0 - 4.0')	(24.0 - 26.0')	
Arsenic	8,100	1,700	
Barium	1,200,000 J	44,000 J	
Cadmium	1,100	84	
Chromium	110,000 J	12,000 J	
Copper	540,000 J	16,000 J	
Iron	62,000,000	10,000,000	
Lead	310,000	5,900	
Nickel	86,000 J	15,000 J	
Zinc	120,000 J	26,000 J	

SB98-120			
9/23/98	(0.5 - 1.0')	(4.0 - 6.0')	
Arsenic	8,000 MD	<1,000MD	
Barium	960,000	300,000	
Cadmium	3,000 D	1,000 D	
Chromium	730,000	200,000	
Copper	2,400,000	670,000	
Iron	250,000,000 D	83,000,000 D	
Lead	200,000	640,000	
Mercury	90	130	
Nickel	230,000	200,000	
Silver	12,000	4,000	
Zinc	250,000	250,000	

MW98-110S1			
9/22/98	(0.5 - 1.0')	(4.0 - 6.0')	
Arsenic	2,000 MD	2,000 MD	
Barium	160,000	460,000	
Cadmium	120	2,700	
Chromium	51,000	610,000	
Copper	140,000	3,500,000	
Iron	21,000,000	270,000,000 D	
Lead	340,000	280,000	
Mercury	40	200	
Nickel	50,000	380,000	
Silver	1,300	14,000	
Zinc	52,000	410,000	

SB97-110			
11/17/97	(18.0 - 20.0')	(22.0 - 24.0')	
Arsenic	1,400	3,400	
Barium	9,200 J	49,000 J	
Cadmium	260	67	
Chromium	2,800 J	12,000 J	
Copper	6,000 J	14,000 J	
Iron	2,900,000	12,000,000	
Lead	11,000	5,600	
Nickel	6,100 J	15,000 J	
Zinc	14,000 J	31,000 J	

MW98-108S1			
9/21-9/24/98	(0.5 - 1.0')	(4.0 - 6.0')	
Arsenic	2,000 MD	2,000 MD	
Barium	93,000	69,000	
Cadmium	270	90	
Chromium	45,000	13,000	
Copper	85,000	25,000	
Iron	20,000,000	8,800,000	
Lead	140,000	59,000	
Mercury	<20	30	
Nickel	34,000	14,000	
Selenium	3,000 MD	<4,000MD	
Silver	1,000	--	
Zinc	65,000	86,000	

REALM, INC.
(FORMER DELPHI PLANT 2)
PENINSULA PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

GM SMI
PLANT PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

- NOTES: 1. BASE MAP DEVELOPED FROM THE FOLLOWING:
• PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK.
AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
• ALL SAMPLE LOCATIONS ARE APPROXIMATE.
• BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
2. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED
CONCENTRATION ONLY.
3. ND = NOT DETECTED.
4. < = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND
QUANTITATION LIMIT.
5. D = IDENTIFIES ALL COMPOUNDS ANALYZED AT A SECONDARY DILUTION.
6. M = THE CONCENTRATION IS ESTIMATED DUE TO MATRIX INTERFERENCE.
7. ALL CONCENTRATIONS IN MICROGRAMS PER KILOGRAM (ug/kg); EQUIVALENT TO PARTS PER BILLION (ppb).
8. -- = NOT ANALYZED.
9. IDWP = INDUSTRIAL DRINKING WATER PROTECTION CRITERIA.
10. SDBLS = STATEWIDE DEFAULT SOIL BACKGROUND LEVELS.

APPROXIMATE SCALE:



REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

INORGANIC COMPOUND
DETECTIONS IN SOIL

BBL

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
12

MW97-104WT			
CONSTITUENT	12/10/97	11/5/98	
VOLATILES	RESULT	RESULT	
1,2-Dichlorobenzene	2.4	ND	
1,2-Dichloroethene, Total	7.7	3.0	
1,4-Dichlorobenzene	5.3	ND	
Benzene	6.1 J	6.0	
Chlorobenzene	34	9.0	
Trichloroethene	4.4	3.0	
Vinyl chloride	8.9	ND	
SEMI-VOLATILES	RESULT	RESULT	
bis(2-chloroisopropyl)ether	5.5	ND	
PCBs	RESULT	RESULT	
All Compounds	ND	ND	

MW97-104S1			
CONSTITUENT	12/10/97	11/5/98	
VOLATILES	RESULT	RESULT	
1,1-Dichloroethene	5.2	ND	
1,2-Dichlorobenzene	11.7	9.0	
1,2-Dichloroethene, Total	3,900	4,300 D	
1,4-Dichlorobenzene	13.7	7.0	
Chlorobenzene	200	ND	
Ethylbenzene	12.2	ND	
Toluene	7.9	ND	
Vinyl chloride	3,400	1,700 D	
Xylenes, Total	4.2	---	
SEMI-VOLATILES	RESULT	RESULT	
bis(2-chloroisopropyl)ether	12	ND	
bis(2-chloroethyl)ether	ND	5.0	
PCBs	RESULT	RESULT	
All Compounds	ND	ND	

MW-142WT			
CONSTITUENT	7/30/95	6/11/96	
VOLATILES	RESULT	RESULT	
Benzene	<1.0	2.4 J	
Vinyl chloride	<1.0	0.43 J	
SEMI-VOLATILES	RESULT	RESULT	
bis(2-chloroisopropyl)ether	23	12	
PCBs	RESULT	RESULT	
All Compounds	ND	---	

MW97-106WT		12/9/97	
CONSTITUENT		RESULT	
VOLATILES		RESULT	
1,2-Dichloroethene, Total		1.1	
SEMI-VOLATILES		RESULT	
bis(2-chloroisopropyl)ether		19	
PCBs		RESULT	
Aroclor-1248		0.53	

TW98-111WT		11/6/98	
CONSTITUENT		RESULT	
VOLATILES		RESULT	
Benzene		22	
Chlorobenzene		5.0	
Ethylbenzene		27	
M,P-Xylene		80	
O-Xylene		33	
Toluene		3.0	
Vinyl chloride		3.0	
SEMI-VOLATILES		RESULT	
bis(2-chloroisopropyl)ether		7.0	
PCBs		RESULT	
All Compounds		ND	

MW98-111S1		11/6/98	
CONSTITUENT		RESULT	
VOLATILES		RESULT	
1,1-Dichloroethene		2.0 J	
1,2-Dichloroethene		3,200 EJ	
Benzene		35 J	
Chlorobenzene		370 EJ	
Ethylbenzene		1,500 EJ	
M,P-Xylene		4,200 EJ	
O-Xylene		2,000 EJ	
Toluene		810 EJ	
Vinyl chloride		4,900 EJ	
SEMI-VOLATILES		RESULT	
bis(2-chloroisopropyl)ether		31	
PCBs		RESULT	
All Compounds		ND	

MW-129WT			
CONSTITUENT	7/28/95	6/12/96	
VOLATILES	RESULT	RESULT	
cis-1,2-Dichloroethene	1.9	<1.0	
SEMI-VOLATILES	RESULT	RESULT	
bis(2-ethylhexyl)phthalate	1.2 J	<5.0	
PCBs	RESULT	RESULT	
All Compounds	ND	ND	

MW98-109S1			
CONSTITUENT	11/5/98	DUPLICATE	
VOLATILES	RESULT	RESULT	
1,2-Dichloroethene	3,700 DJ	4,200	
Chloroform	330 DJ	ND	
Vinyl chloride	5,800 DJ	6,600	
SEMI-VOLATILES	RESULT	RESULT	
All Compounds	ND	ND	
PCBs	RESULT	RESULT	
All Compounds	ND	ND	

TW98-109WT		11/5/98	
CONSTITUENT		RESULT	
VOLATILES		RESULT	
1,2-Dichloroethene		14 J	
Benzene		7.0 J	
Chlorobenzene		82	
Chloroform		7.0 J	
Vinyl chloride		47 J	
1,4-Dichlorobenzene		6.0	
SEMI-VOLATILES		RESULT	
All Compounds		ND	
PCBs		RESULT	
All Compounds		ND	

MW97-105S1			
CONSTITUENT	12/10/97	11/5/98	
VOLATILES	RESULT	RESULT	
1,2-Dichloroethene, Total	2.7	ND	
Chloroethane	1.5 J	ND	
Vinyl chloride	1.8	ND	
SEMI-VOLATILES	RESULT	RESULT	
All Compounds	ND	ND	
PCBs	RESULT	RESULT	
All Compounds	ND	---	

REALM, INC.
(FORMER GM SMI P
PROPERTY

MW-144WT			
CONSTITUENT	7/29/95	7/29/95(DUP)	6/8/96
VOLATILES	RESULT	RESULT	RESULT
Acetone	6.6 J	<5.0	<100
Benzene	6.3	7.6	5.6
Chloroethane	17	19	16
Xylenes, Total	<3.0	1.0 J	<3.0
SEMI-VOLATILES	RESULT	RESULT	RESULT
bis(2-ethylhexyl)phthalate	5	<5.0	<5.0
PCBs	RESULT	RESULT	RESULT
All Compounds	ND	ND	---

X-1B			
CONSTITUENT	7/29/95	6/10/96	
VOLATILES	RESULT	RESULT	
Acetone	5.5 J	---	
Benzene	1.9	---	
Chloroethane	13	---	
SEMI-VOLATILES	RESULT	RESULT	
All Compounds	ND	---	
PCBs	RESULT	RESULT	
Aroclor-1248	0.57	0.21	

X-1A			
CONSTITUENT	7/29/95	6/10/96	
VOLATILES	RESULT	RESULT	
Benzene	9.5	8.7 J	
Chloroethane	66	65	
SEMI-VOLATILES	RESULT	RESULT	
2-Methylnaphthalene	1.0 J	<5.0	
Anthracene	0.58 J	<5.0	
Carbazole	2.6 J	1.6 J	
Phenanthrene	0.7 J	<5.0	
PCBs	RESULT	RESULT	
Aroclor-1248	1.9	<0.20	
Aroclor-1254	1.1	<0.20	

X-1CR2			
CONSTITUENT	7/29/95	6/10/96	
VOLATILES	RESULT	RESULT	
Acetone	5 J	---	
Xylenes, Total	2.2 J	---	
SEMI-VOLATILES	RESULT	RESULT	
Bis(2-ethylhexyl)phthalate	<5.0	7.0 J	
PCBs	RESULT	RESULT	
All Compounds	ND	ND	

MW-143WT			
CONSTITUENT	7/25/95	6/8/96	
VOLATILES	RESULT	RESULT	
Benzene	1.5	---	
SEMI-VOLATILES	RESULT	RESULT	
2-Methylnaphthalene	3.4 J	6.8 JN	
Acenaphthene	0.52 J	1 JN	
Di-n-butylphthalate	0.55 J	<5.0	
Naphthalene	19	26 JN	
PCBs	RESULT	RESULT	
All Compounds	ND	---	

MW97-105WT			
CONSTITUENT	12/10/97	12/10/97	11/5/98
VOLATILES	RESULT	DUPLICATE	RESULT
1,2-Dichloroethene, Total	2.4	2	ND
Vinyl chloride	2	2.1	ND
Chloroform	ND	ND	13
SEMI-VOLATILES	RESULT	DUPLICATE	RESULT
All Compounds	ND	ND	ND
PCBs	RESULT	DUPLICATE	RESULT
All Compounds	ND	---	ND

X-1CR			
CONSTITUENT	7/29/95	6/10/96	
VOLATILES	RESULT	RESULT	
1,1-Dichloroethene	<8.3	0.51 J	
Benzene	10	9.3	
Chloroethane	40	43	
Xylenes, Total	21	12	
SEMI-VOLATILES	RESULT	RESULT	
2-Methylnaphthalene	3.8 J	1.2 J	
PCBs	RESULT	RESULT	
Aroclor-1248	0.31 JN	0.40	

NOTES: 1. BASE MAP DEVELOPED FROM THE FOLLOWING:

- PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK.
- AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
- BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
- ALL SAMPLE LOCATIONS ARE APPROXIMATE.
- 2. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
- 3. E = THE COMPOUND WAS QUANTITATED ABOVE THE CALIBRATION RANGE.
- 4. ND = NOT DETECTED.
- 5. < = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
- 6. D = IDENTIFIES ALL COMPOUNDS ANALYZED AT A SECONDARY DILUTION.
- 7. M = THE CONCENTRATION IS ESTIMATED DUE TO MATRIX INTERFERENCE.
- 8. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L); EQUIVALENT TO PARTS PER BILLION (ppb).
- 9. --- = NOT ANALYZED.
- 10. IDW = INDUSTRIAL DRINKING WATER CRITERIA.
- 11. GSI = GROUNDWATER SURFACE WATER INTERFACE CRITERIA.
- 12. GROUNDWATER QUALITY DATA FROM MONITORING WELLS MW98-111S1, TW98-111WT, MW98-109S1, TW98-109WT WERE COMPARED TO GSI CRITERIA ONLY.
- 13. JN = COMPOUND TENTATIVELY IDENTIFIED.

X REF: 27605X08, 27606X10.DWG
L: ON* OFF=REF*
P: DJCOLOR.PCP
4/12/99 SYR-54-RCA JMS
27606100/27606C03.DWG

BBL

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
13

MW-142WT		
CONSTITUENT	7/30/95	6/11/96
Aluminum	<100	148
Arsenic	4.1	<5.0
Barium	7,650	511
Calcium	87,800	92,400
Iron	2,870	7,420
Magnesium	12,300	30,800
Manganese	499	4,080
Potassium	15,300	15,700
Sodium	2,150,000	674,000

MW97-106WT		
CONSTITUENT	12/9/97	
Arsenic	12	
Barium	340	
Cadmium	0.55	
Iron	790	
Selenium	9.7	
Zinc	26	

LEGEND

--- PROPERTY BOUNDARY

--- FENCE LINE

SHADED VALUES EXCEED THE HIGHER OF GENERIC MDEQ IDW OR GSI CRITERIA (JANUARY 1999) OR GM SMI SITE SPECIFIC BACKGROUND GROUNDWATER QUALITY VALUES (BBL, 1998). SEE NOTE 12.

GM SMI PLANT PROPERTY RI AND OTHER COMPLETIONS

- ⊕ MW-142 WATER TABLE MONITORING WELL
- ⊕ X-1A,B,C MONITORING WELL CLUSTER
- SB-335 SOIL BORING

DELPHI PLANT 2 RI AND OTHER COMPLETIONS

- ⊕ MW-142 MONITORING WELL
- ⊕ TW-109WT TEMPORARY WELL
- ▲ SB97-112 SOIL BORING

TANK FARM BUILDING
(ABOVEGROUND TANKS)

GRASSY AREA

DELPHI AUTOMOTIVE SYSTEMS
PLANT 2 PROPERTY

GRASSY AREA

REALM, INC.
(FORMER DELPHI PLANT 2)
PENINSULA PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

GM SMI
PLANT PROPERTY

REALM, INC.
(FORMER GM SMI PLANT)
PROPERTY

MW-129WT		
CONSTITUENT	7/28/95	6/12/96
Arsenic	22	7.3
Calcium	225,000	195,000
Iron	4,210	2,960 J
Magnesium	66,900	46,300
Manganese	485	680
Sodium	182,000	229,000

TW98-111WT		
CONSTITUENT	11/6/98	
Barium	1,400	
Iron	1,500	

MW98-111S1		
CONSTITUENT	11/6/98	
Barium	2,800	
Iron	34,000	
Selenium	5.0	

MW97-104WT		
CONSTITUENT	12/10/97	11/5/98
Barium	260	--
Copper	38	--
Iron	640	1,200
Lead	3.1	--
Zinc	21	--

MW98-109S1		
CONSTITUENT	11/5/98	DUPLICATE
Barium	400	400
Iron	3,800	3,800
Lead	ND	1.0

TW98-109WT		
CONSTITUENT	11/5/98	
Barium	300	
Iron	1,200	

MW97-105S1		
CONSTITUENT	12/10/97	11/5/98
Barium	210	--
Iron	17,000	9,000
Lead	3.5	ND
Selenium	9.7	--

MW97-105WT		
CONSTITUENT	12/10/97	DUPLICATE 11/5/98
Arsenic	8.2	8.6
Barium	870	880
Iron	25,000	26,000
Selenium	27	28
Zinc	23	20

X-20		
CONSTITUENT	7/25/95	
Arsenic	15.8	
Barium	224	
Calcium	364,000	
Iron	18,400	
Magnesium	128,000	
Manganese	734	
Sodium	171,000	
Zinc	41	

X-1CR2		
CONSTITUENT	7/29/95	6/11/96
Aluminum	<100	188
Arsenic	2.4	--
Calcium	75,400	--
Lead	6.9	<3.0
Magnesium	<5000	23,200
Potassium	18,900	--
Sodium	176,000	123,000

X-1CR		
CONSTITUENT	6/10/96	
Barium	507	
Iron	30,700 J	
Magnesium	105,000	
Manganese	1660 J	
Sodium	410,000	

TW98-110WT		
CONSTITUENT	11/5/98	
Arsenic	5.0	
Iron	1,300	

MW98-110S1		
CONSTITUENT	11/5/98	
Barium	400	
Iron	4,600	

MW97-104S1		
CONSTITUENT	12/10/97	
Barium	540	
Iron	3,500	
Selenium	5.6	
Zinc	21	

TW98-108WT		
CONSTITUENT	11/5/98	
Arsenic	6.0	
Barium	600	
Iron	5,000	

TW98-108S1		
CONSTITUENT	11/5/98	
Barium	200	
Iron	4,600	

MW-143WT		
CONSTITUENT	7/25/95	
Calcium	55,600	
Iron	657	
Magnesium	26,400	
Manganese	310	
Potassium	27,200	
Sodium	275,000	

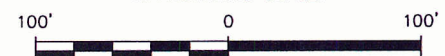
MW-144WT		
CONSTITUENT	7/29/95	7/29/95 (DUP)
Arsenic	5.5	5.8
Barium	281	314
Calcium	156,000	170,000
Iron	16,400	18,600
Magnesium	78,300	87,000
Manganese	617	686
Potassium	117,000	128,000
Sodium	305,000	333,000

X-1B		
CONSTITUENT	7/29/95	6/10/96
Arsenic	3.1	--
Barium	887	870
Cadmium	0.38 J	--
Calcium	371,000	--
Iron	22,900	21,200 J
Magnesium	124,000	121,000
Manganese	1,030	838 J
Potassium	53,700	--
Sodium	758,000	831,000
Zinc	143	<42.5

NOTES:

1. BASE MAP DEVELOPED FROM THE FOLLOWING:
 - PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK.
 - AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
 - BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.
 - ALL SAMPLE LOCATIONS ARE APPROXIMATE.
2. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
3. E = THE COMPOUND WAS QUANTITATED ABOVE THE CALIBRATION RANGE.
4. ND = NOT DETECTED.
5. < = THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
6. D = IDENTIFIES ALL COMPOUNDS ANALYZED AT A SECONDARY DILUTION.
7. M = THE CONCENTRATION IS ESTIMATED DUE TO MATRIX INTERFERENCE.
8. ALL CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L); EQUIVALENT TO PARTS PER BILLION (ppb).
9. -- = NOT ANALYZED.
10. IDW = INDUSTRIAL DRINKING WATER CRITERIA.
11. GSI = GROUNDWATER SURFACE WATER INTERFACE CRITERIA.
12. GROUNDWATER QUALITY DATA FOR MONITORING WELLS MW98-111S1, TW98-111WT, MW98-109S1, TW98-109WT WERE COMPARED TO GSI CRITERIA ONLY.

APPROXIMATE SCALE:



REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

INORGANIC COMPOUND DETECTIONS IN GROUNDWATER

BBL

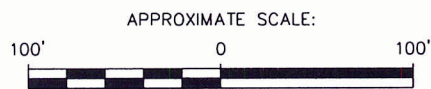
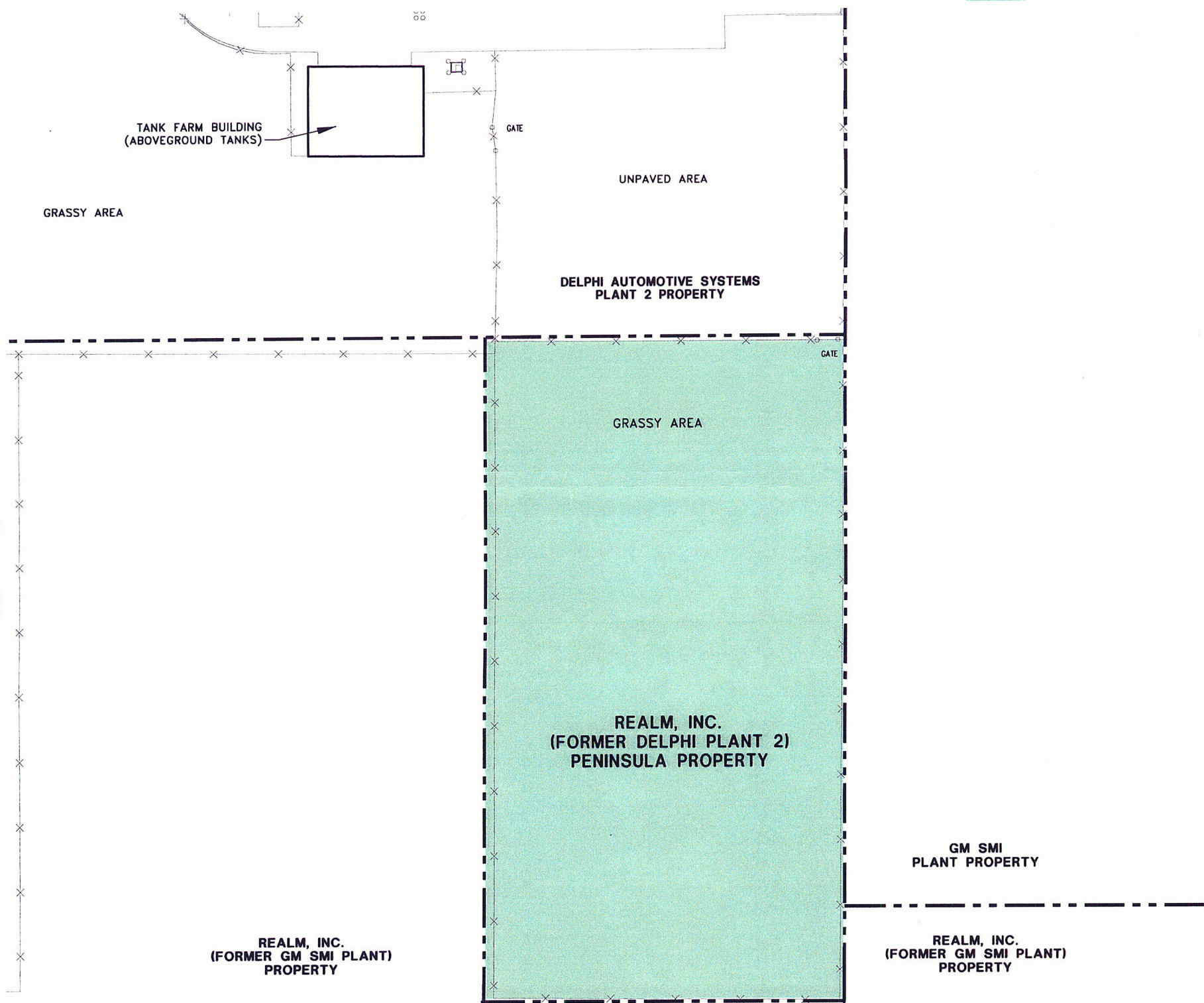
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
14



LEGEND

- PROPERTY BOUNDARY
- x-x-x- FENCE LINE
- FIELD



- NOTES: 1. BASE MAP DEVELOPED FROM THE FOLLOWING:
- PHOTOGRAMMETRIC BASE MAP PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY CONDUCTED ON 11/11/94; AND
 - BASE MAP SUPPLIED BY AIR-LAND SURVEYS, INC. AERIAL PHOTOGRAPHY WAS CONDUCTED DURING 11/90.

REALM, INC.
PENINSULA PROPERTY
SAGINAW, MICHIGAN
REMEDIAL INVESTIGATION REPORT

VEGETATIVE COVER
TYPE MAP

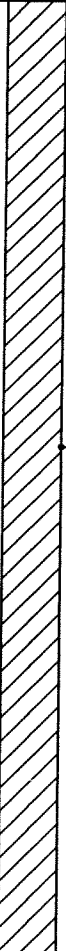
Appendix

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix A

Boring and Monitoring Well Construction Logs

Date Start/Finish: 11-17-97 / 11-17-97 Drilling Company: Rau Drilling Driller's Name: Rick Rau Drilling Method: Hollow Stem Auger Auger Size: ID 3.25 in. Rig Type: CME 45-B Spoon Size: 2 and 3 in.	Borehole Depth: 24.0 ft. Ground Surface: 591.1 feet Geologist: Matthew Erbe	Soil Boring No: SB97-110 Client: REALM, Inc. Location: Former Delphi Plant 2 Peninsula Property, Saginaw, Michigan
---	--	--

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 591 ft										GROUND SURFACE	
590		(0-2)	S-1 3" sp.	2 6 10 11	16	1.0	<1.0/ 14.0			TOPSOIL to 0.5' bgs, then Brown fine to medium SAND, little slag, rootlets, iron staining, dry. (FILL) As above with fine to coarse SAND, dry to moist. Red brown fine to medium SAND, slag, highly oxidized, dry to moist. (FILL) Light brown to orange fine to coarse SAND, some fine to medium Gravel sized slag, highly oxidized, moist to dry. (FILL) Brown fine to coarse rounded SAND, little slag, trace Silt, rootlets, wet. (FILL)	 Backfilled hole with type I Portland cement/ 5% Bentonite grout
		(2-4)	S-2 3" sp.	3 3 3 4	6	1.0	1.2/17.0				
5		(4-6)	S-3 3" sp.	4 6 9 10	15	1.3	1.4/14.0				
585		(6-8)	S-4 3" sp.	10 14 16 8	30	1.2	<1.0/4.0				
		(8-10)	S-5 3" sp.	3 4 4 3	8	2.0	<1.0/2.0			Dark gray fine SAND, trace to little Silt, trace rootlets, wet.	
10		(10-12)	S-6 3" sp.	4 5 7 8	12	2.0	<1.0/<1.0			Light gray fine SAND, trace rootlets, wet.	
		(12-14)	S-7 3" sp.	7 10 13 14	23	1.8	<1.0/3.1			As above with trace silt, trace vegetation, little shell fragments, medium dense.	
5		(14-16)	S-8 2" sp.	3 4	8	2.0	<1.0/4.7			As above, loose.	

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

Sampled for VOC, SVOC, PCB, 12 metals analyses, 18'-20' and 22'-24' bgs. Sampled for TOC analysis, 12'-14' bgs. bgs - Below Ground Surface.

Saturated Zones

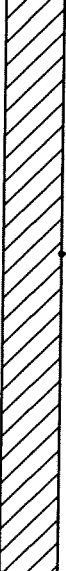
Date / Time	Elevation	Depth

Client:
REALM, Inc.

Soil Boring No: SB97-110

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 24.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
575		(14-16)	S-8 2" sp.	4 5	8	2.0	<1.0/4.7			Gray fine SAND, little shell fragments, trace Silt.	 Backfilled hole with type I Portland cement/ 5% Bentonite grout
		(16-18)	S-9 2" sp.	7 4 7 10	11	2.0	<1.0/30.0			As above, trace to little Silt, medium dense.	
		(18-20)	S-10 2" sp.	4 8 16 16	24	2.0	<1.0/56.0			Gray CLAY, little medium to coarse subrounded Sand.	
570		(20-22)	S-11 2" sp.	5 8 13 15	21	1.3	3.9/34.0			As above, with highly weathered fine Gravel.	
		(22-24)	S-12 2" sp.	5 8 15 21	23	1.6	<1.0/42.0			Boring terminated at 24.0' bgs.	
565											
560											
555											
550											
545											
540											
535											
530											
525											
520											
515											
510											
505											
500											
495											
490											
485											
480											
475											
470											
465											
460											
455											
450											
445											
440											
435											
430											
425											
420											
415											
410											
405											
400											
395											
390											
385											
380											
375											
370											
365											
360											
355											
350											
345											
340											
335											
330											
325											
320											
315											
310											
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											
255											
250											
245											
240											
235											
230											
225											
220											
215											
210											
205											
200											
195											
190											
185											
180											
175											
170											
165											
160											
155											
150											
145											
140											
135											
130											
125											
120											
115											
110											
105											
100											
95											
90											
85											
80											
75											
70											
65											
60											
55											
50											
45											
40											
35											
30											
25											
20											
15											
10											
5											
0											



BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 11-17-97 / 11-18-97
Drilling Company: Rau Drilling
Driller's Name: Rick Rau
Drilling Method: Hollow Stem Auger

Auger Size: ID 3.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Borehole Depth: 26.0 ft.
Ground Surface: 591.2 feet

Geologist: Matthew Erbe

Soil Boring No: SB97-III

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
gs elevation 591.2 ft										GROUND SURFACE	
590		(0-2)	S-1 3" sp.	2 5 6 8	11	1.0	<1.0/<1.0			Topsoil, 0 to 0.5'bgs, then Yellow-brown Silty SAND, little concrete, medium to coarse Sand, rootlets, medium dense, dry. (FILL)	
		(2-4)	S-2 3" sp.	6 15 20 45	35	2.0	5.0/64.0				
5		(4-6)	S-3 3" sp.	15 12 7 8	19	1.1	2.1/62.0			Black fine to medium SAND, trace slag, rootlets, odor, dry. (FILL) Light brown to tan fine SAND, medium dense. CONCRETE at 4.2'bgs. Black fine to medium SAND, slag, glass, dry. (FILL)	
585		(6-8)	S-4 3" sp.	11 10 12 15	22	0.3	<1.0/ 100.0			As above with color change to dark brown. Becomes wet, metal debris on augers, odor.	
		(8-10)	S-5 3" sp.	6 6 6 7	12	1.2	<1.0/32.0			Black fine to coarse SAND, little Silt. (FILL)	
10		(10-12)	S-6 3" sp.	5 8 8 9	16	1.0	<1.0/2.0			Black to dark gray fine SAND, little Silt, trace copper electrical wire pieces, odor. (FILL)	
580		(12-14)	S-7 3" sp.	7 7 6 8	13	0.5	<1.0/7.2			Gray fine SAND, trace shell fragments, decomposed organics, medium dense.	
5		(14-16)	S-8 3" sp.	5 6	11	1.1	<1.0/<1.0				

Backfilled hole with type
1 Portland cement/ 5%
Bentonite grout

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Sampled for TOC, VOC, SVOC, PCB, 12 metals analyses, 2'-4' and 24'-26' bgs. Sampled for MS/MSD, 2'-4' bgs. bgs - Below Ground Surface.

Saturated Zones

Date / Time	Elevation	Depth

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Soil Boring No: SB97-III

Total Depth = 26.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
575		(14-16)	S-8 3" sp.	5 4	11	1.1	<1.0/<1.0			Gray fine SAND, trace shell fragments, decomposed organics, medium dense.	 Backfilled hole with type-1 Portland cement/ 5% Bentonite grout
		(16-18)	S-9 3" sp.	2 4 6 6	10	1.7	<1.0/<1.0				
		(18-20)	S-10 3" sp.	2 4 4 6	8	1.2	<1.0/<1.0			Many shell fragments.	
570		(20-22)	S-11 3" sp.	2 4 6 6	10	1.5	<1.0/<1.0			Gray CLAY, medium to high plasticity, trace fine to coarse subrounded Sand, rootlets, stiff. Gray silty SAND, little to trace Clay, shell fragments.	
		(22-24)	S-12 3" sp.	4 7 11 13	18	1.7	<1.0/<1.0			Gray CLAY, trace medium to coarse Sand, trace decomposed vegetation.	
565		(24-26)	S-13 3" sp.	5 8 12 15	20	1.9	<1.0/<1.0			Seam of fine Sand, 1/8" thick.	
										Boring terminated at 26.0' bgs.	

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 9-23-98 / 9-23-98 Drilling Company: Rau Drilling Driller's Name: Rick Rau Drilling Method: Hollow Stem Auger Auger Size: ID 2.25 in. Rig Type: CME 45-B Spoon Size: 2 in.	Borehole Depth: 8.0 ft. Geologist: Gordon Hotchkiss	Soil Boring No: SB98-119 Client: REALM, Inc. Location: Former Delphi Plant 2 Peninsula Property, Saginaw, Michigan
---	--	--

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
										GROUND SURFACE	
		(0-2)		15 14 14 17	28	1.2	1.8			Brown fine-to-medium SAND and SILT, trace organics, dry. Concrete. Brown fine to medium SAND, trace silt, trace gravel, well graded, dry. Brown silty CLAY, dry, very stiff to hard, non-plastic. Dark brown/red fine-to-medium SAND, well-graded, trace gravel, trace clay, wood particles, dry. Light gray fine-to-medium SAND and concrete, dry. As above, but dark gray to black, well-graded. Concrete lodged in tip, poor recovery.	
		(2-4)		10 20 13 8	33	1.2	5.6				
5		(4-6)		4 32 14 3	46	0.7	NA				
		(6-8)		5 3 3 2	6	0.8	253.0			Dark brown to black fine-to-medium SAND, saturated, poorly graded, trace gravel and trace sand.	
										End of boring at 8.0' bgs.	

	Remarks: bgs - Below Ground Surface.	Saturated Zones		
		Date / Time	Elevation	Depth

Date Start/Finish: 9-23-98 / 9-23-98 Drilling Company: Rau Drilling Driller's Name: Rick Rau Drilling Method: Hollow Stem Auger Auger Size: ID 2.25 in. Rig Type: CME 45-B Spoon Size: 2 in.	Borehole Depth: 8.0 ft. Geologist: Gordon Hotchkiss	Soil Boring No: SB98-120 Client: REALM, Inc. Location: Former Delphi Plant 2 Peninsula Property, Saginaw, Michigan
---	--	--

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Soil Boring Construction
										GROUND SURFACE	
		(0-2)		11 16 16 13	32	1.2	0.8			Light brown SAND, little clay, well-graded, trace gravel, dry. Dark brown to red SAND, trace clay. 1/2 inch to 1 inch iron fragment steel bolt present, FILL, dry.	
		(2-4)		10 13 10 5	23	0.9	3.1			Brown to red medium SAND, dry, trace gravel and clay, miscellaneous clay nodules. *Collected ENCORE samples.	
5		(4-6)		10 2 10 42	12	1.0	4.5			As above, moist to saturated.	
		(6-8)		33 5 12 12	17	0.5	6.4			Dark brown to black medium SAND, trace clay, well-graded, pieces of iron debris, saturated. Concrete chips.	
										End of boring at 8.0' bgs.	Backfilled hole with type 1 Portland cement/ 5% Bentonite grout.
10											
5											

	Remarks: bgs - Below Ground Surface.	Saturated Zones		
		Date / Time	Elevation	Depth

Date Start/Finish: 11-17-97 / 11-17-97
Drilling Company: Rau Drilling
Driller's Name: Rick Rau
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 2 and 3 in.

Northing: 13227493.476
Easting: 691461.278
Well Casing: 594.00 feet

Borehole Depth: 14.0 ft.
Ground Surface: 591.30 feet

Geologist: Matthew Erbe

Well No: MW97-104WT

Client:
 REALM, Inc.

Location:
 Former Delphi Plant 2 Peninsula
 Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.30 ft.										GROUND SURFACE	4-inch diameter steel protective casing Concrete pad Type I Portland Cement/ 5% Bentonite grout (0.7' to 2.5' bgs) 2-in diameter Sch. 40 PVC well casing (approx 2.0' to 4.0' bgs) Hydrated bentonite seal (2.5' to 3.0' bgs) 2-in diameter Sch. 40 PVC 0.01-inch slot well screen (4.0' to 14.0' bgs) Global #5 sand pack (3.0' to 14.0' bgs)
590		(0-2)	S-1 3" sp.	2 6 10 11	16	1.0	<1.0/ 14.0			TOPSOIL to 0.5' bgs, then Brown fine to medium SAND, little slag, rootlets, iron staining, dry. (FILL) As above with fine to coarse SAND, dry to moist. Red brown fine to medium SAND, slag, highly oxidized, dry to moist. (FILL)	
		(2-4)	S-2 3" sp.	3 3 3 4	6	1.0	1.2/17.0			Light brown to orange fine to coarse SAND, some fine to medium Gravel sized slag, highly oxidized, moist to dry. (FILL) Brown fine to coarse rounded SAND, little slag, trace Silt, rootlets, wet. (FILL)	
585		(4-6)	S-3 3" sp.	4 6 9 10	15	1.3	1.4/14.0			Dark gray fine SAND, trace to little Silt, trace rootlets, wet.	
		(6-8)	S-4 3" sp.	10 14 16 8	30	1.2	<1.0/4.0			Light gray fine SAND, trace rootlets, wet.	
		(8-10)	S-5 3" sp.	3 4 4 3	8	2.0	<1.0/2.0			As above with trace silt, trace vegetation, little shell fragments, medium dense.	
580		(10-12)	S-6 3" sp.	4 5 7 8	12	2.0	<1.0/<1.0			End of soil descriptions from SB97-110 at 14.0' bgs. SB97-110 actually terminates at 24.0' bgs.	
		(12-14)	S-7 3" sp.	7 10 13 14	23	1.8	<1.0/3.1				

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

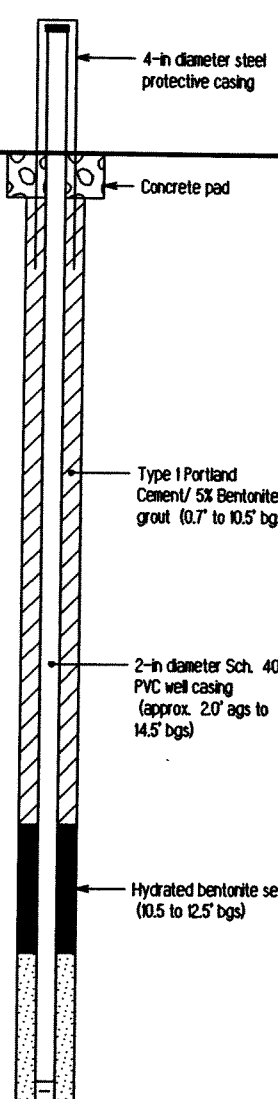
Remarks:

bgs - Below Ground Surface. NA - Not Available. Well installed adjacent to pilot hole SB97-110.

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 11-17-97 / 11-17-97 Drilling Company: Rau Drilling Driller's Name: Rick Rau Drilling Method: Hollow Stem Auger Auger Size: ID 4.25 in. Rig Type: CME 45-B Spoon Size: 2 and 3 in.	Northing: 13227499.333 Easting: 691460.955 Well Casing: 593.56 feet Borehole Depth: 19.5 ft. Ground Surface: 591.20 feet Geologist: Matthew Erbe	Well No: MW97-104S1 Client: REALM, Inc. Location: Former Delphi Plant 2 Peninsula Property, Saginaw, Michigan
---	---	---

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.20 ft.										GROUND SURFACE	
	590	(0-2)	S-1 3" sp.	2 6 10 11	16	1.0	<1.0/ 14.0			TOPSOIL to 0.5' bgs, then Brown fine to medium SAND, little slag, rootlets, Iron staining, dry. (FILL) As above with fine to coarse SAND, dry to moist. Red brown fine to medium SAND, slag, highly oxidized, dry to moist. (FILL) Light brown to orange fine to coarse SAND, some fine to medium Gravel sized slag, highly oxidized, moist to dry. (FILL) Brown fine to coarse rounded SAND, little slag, trace Silt, rootlets, wet. (FILL)	
		(2-4)	S-2 3" sp.	3 3 3 4	6	1.0	12/17.0				
5		(4-6)	S-3 3" sp.	4 6 9 10	15	1.3	1.4/14.0				
585		(6-8)	S-4 3" sp.	10 14 16 8	30	1.2	<1.0/4.0				
		(8-10)	S-5 3" sp.	3 4 4 3	8	2.0	<1.0/2.0			Dark gray fine SAND, trace to little Silt, trace rootlets, wet.	
10		(10-12)	S-6 3" sp.	4 5 7 8	12	2.0	<1.0/<1.0			Light gray fine SAND, trace rootlets, wet.	
580		(12-14)	S-7 3" sp.	7 10 13 14	23	1.8	<1.0/3.1			As above with trace silt, trace vegetation, little shell fragments, medium dense.	
		(14-16)	S-8 2" sp.	3 4	8	2.0	<1.0/4.7			As above, loose.	

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

bgs - Below Ground Surface. NA - Not Available. Well installed adjacent to pilot hole SB97-110.

Saturated Zones

Date / Time	Elevation	Depth

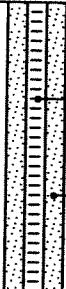
Client:
REALM, Inc.

Well No: MW97-104SI

Location:

Total Depth = 19.5 ft.

Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)	S-8 2" sp.	4 5	8	2.0	<1.0/4.7			Gray fine SAND, little shell fragments, trace Silt.	 2-in diameter Sch. 40 PVC 0.01-in slot well screen (14.5' to 19.5' bgs) Global #5 sand pack (12.5' to 19.5' bgs)
		(16-18)	S-9 2" sp.	7 4 7 10	11	2.0	<1.0/ /30.0			As above, trace to little Silt, medium dense.	
20		(18-20)	S-10 2" sp.	4 8 16 16	24	2.0	<1.0/ 56.0			Gray CLAY, little medium to coarse subrounded Sand.	
570										End soil descriptions from SB97-110 at 19.5' bgs. SB97-110 actually terminated at 24.0' bgs.	
25											
565											
30											
560											
35											

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

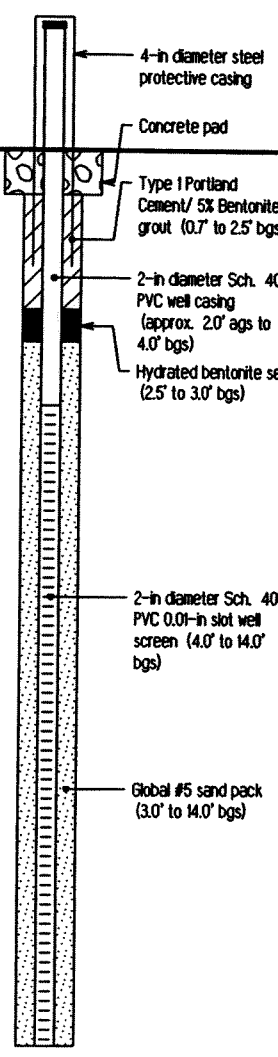
Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 11-18-97 / 11-18-97
Drilling Company: Rau Drilling
Driller's Name: Rick Rau
Drilling Method: Hollow Stem Auger
Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 13227510.282
Easting: 691199.209
Well Casing: 593.87 feet
Borehole Depth: 14.0 ft.
Ground Surface: 591.30 feet
Geologist: Matthew Erbe

Well No: MW97-105WT
Client:
 REALM, Inc.
Location:
 Former Delphi Plant 2 Peninsula
 Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.30 ft										GROUND SURFACE	
590		(0-2)	S-1 3" sp.	2 5 6 8	11	1.0	<1.0/<1.0			Topsoil, 0 to 0.5'bgs, then Yellow-brown Silty SAND, little concrete, medium to coarse Sand, rootlets, medium dense, dry. (FILL)	
		(2-4)	S-2 3" sp.	6 15 20 45	35	2.0	5.0/64.0			Black fine to medium SAND, trace slag, rootlets, odor, dry. (FILL) Light brown to tan fine SAND, medium dense. CONCRETE at 4.2'bgs.	
5		(4-6)	S-3 3" sp.	15 12 7 8	19	1.1	2.1/62.0			Black fine to medium SAND, slag, glass, dry. (FILL)	
585		(6-8)	S-4 3" sp.	11 10 12 15	22	0.3	<1.0/ 100.0			As above with color change to dark brown.	
		(8-10)	S-5 3" sp.	6 6 6 7	12	1.2	<1.0/32.0			Becomes wet, metal debris on augers, odor.	
10		(10-12)	S-6 3" sp.	5 8 8 9	16	1.0	<1.0/2.0			Black fine to coarse SAND, little Silt. (FILL)	
580		(12-14)	S-7 3" sp.	7 7 6 8	13	0.5	<1.0/7.2			Black to dark gray fine SAND, little Silt, trace copper electrical wire pieces, odor. (FILL)	
										Gray fine SAND, trace shell fragments, decomposed organics, medium dense.	
5										End of soil description from SB97-III at 14.0' bgs. SB97-III actually terminated at 26.0' bgs.	

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

bgs - Below Ground Surface. NA - Not Available. Well installed adjacent to pilot hole SB97-III.

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 11-18-97 / 11-18-97
Drilling Company: Rau Drilling
Driller's Name: Rick Rau
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 13227514.626
Easting: 691200.936
Well Casing: 593.50 feet
Borehole Depth: 21.0 ft.
Ground Surface: 591.40 feet

Geologist: Matthew Erbe

Well No: MW97-105S1

Client:
 REALM, Inc.

Location:
 Former Delphi Plant 2 Peninsula
 Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.40 ft.										GROUND SURFACE	4-in diameter steel protective casing
590		(0-2)	S-1 3" sp.	2 5 6 8	11	1.0	<1.0/<1.0			Topsoil, 0 to 0.5'bgs, then Yellow-brown Silty SAND, little concrete, medium to coarse Sand, rootlets, medium dense, dry. (FILL)	Concrete pad to 1.0' bgs
		(2-4)	S-2 3" sp.	6 15 20 45	35	2.0	5.0/64.0			Black fine to medium SAND, trace slag, rootlets, odor, dry. (FILL) Light brown to tan fine SAND, medium dense. CONCRETE at 4.2'bgs.	Type 1 Portland Cement/ 5% Bentonite grout (1.0' to 12.0' bgs)
5		(4-6)	S-3 3" sp.	15 12 7 8	19	1.1	2.1/62.0			Black fine to medium SAND, slag, glass, dry. (FILL)	
585		(6-8)	S-4 3" sp.	11 10 12 15	22	0.3	<1.0/100.0			As above with color change to dark brown.	
		(8-10)	S-5 3" sp.	6 6 6 7	12	1.2	<1.0/32.0			Becomes wet, metal debris on augers, odor.	
10		(10-12)	S-6 3" sp.	5 8 8 9	16	1.0	<1.0/2.0			Black fine to coarse SAND, little Silt. (FILL)	2-in diameter Sch. 40 PVC well casing (approx. 20' ags to 16.0' bgs)
580		(12-14)	S-7 3" sp.	7 7 6 8	13	0.5	<1.0/7.2			Black to dark gray fine SAND, little Silt, trace copper electrical wire pieces, odor. (FILL)	
		(14-16)	S-8 3" sp.	5 6	11	1.1	<1.0/<1.0			Gray fine SAND, trace shell fragments, decomposed organics, medium dense.	Hydrated bentonite seal (12.0' to 14.0' bgs)

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

bgs - Below Ground Surface. NA - Not Available
 Well installed adjacent to pilot hole
 SB97-111.

Saturated Zones

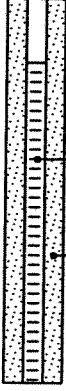
Date / Time	Elevation	Depth

Client:
REALM, Inc.

Well No: MW97-105S1

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 21.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)	S-8 3" sp.	5 4	11	1.1	<1.0/<1.0			Gray fine SAND, trace shell fragments, decomposed organics, medium dense.	 2-in diameter Sch. 40 PVC 0.01-inch slot well screen (16.0' to 21.0' bgs) Global #5 sand pack (16.0' to 21.0' bgs)
		(16-18)	S-9 3" sp.	2 4 6 6	10	1.7	<1.0/<1.0				
		(18-20)	S-10 3" sp.	2 4 4 6	8	1.2	<1.0/<1.0			Many shell fragments.	
570		(20-22)	S-11 3" sp.	2 4 6 6	10	1.5	<1.0/<1.0			Gray CLAY, medium to high plasticity, trace fine to coarse subrounded Sand, rootlets, stiff. Gray silty SAND, little to trace Clay, shell fragments.	
										End of soil descriptions from SB97-III at 21.0' bgs. SB97-III actually terminated at 26.0' bgs.	
565											
560											
555											
550											
545											
540											
535											
530											
525											
520											
515											
510											
505											
500											
495											
490											
485											
480											
475											
470											
465											
460											
455											
450											
445											
440											
435											
430											
425											
420											
415											
410											
405											
400											
395											
390											
385											
380											
375											
370											
365											
360											
355											
350											
345											
340											
335											
330											
325											
320											
315											
310											
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											
255											
250											
245											
240											
235											
230											
225											
220											
215											
210											
205											
200											
195											
190											
185											
180											
175											
170											
165											
160											
155											
150											
145											
140											
135											
130											
125											
120											
115											
110											
105											
100											
95											
90											
85											
80											
75											
70											
65											
60											
55											
50											
45											
40											
35											

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth

Date Start/Finish: 9-21-98 / 9-21-98
Drilling Company: Rau Drilling
Driller's Name: Rodd Chaperon
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 91376.98
Easting: 27551.31
Well Casing: 594.23 feet
Borehole Depth: 24.0 ft.
Ground Surface: 590.88 feet

Geologist: Gordon Hotchkiss

Well No: MW98-108S1

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 590.88 ft.										GROUND SURFACE	Riser stick-up (2.5' ags).
590		(0-2)		7 17 17 20	34	1.5	0.7			Brown to light brown silty CLAY (FILL), very dry with little Sand, trace gravel, dense, crumbles.	Concrete pad.
		(2-4)		14 11 9 7	20	1.2	1.7				Bentonite/cement slurry (0.5 to 12' bgs).
585		(4-6)		5 7 6 5	13	1.0	2.0				
		(6-8)		2 1 1 1	2	0.0	NA			No sample recovered - attempt to collect second sample from 6-8 feet, but spoon sinks to eight feet bgs under the weight of spoon and rod. So collect 8-10' sample (see below).	
		(8-10)		3 2 3 2	5	1.2	1.4			Black fine-grained SAND, trace silt, moist to saturated, poorly graded, loose (SP).	2-in diameter Sch. 40 PVC well casing (2.5' ags to 21.2' bgs).
580		(10-12)		3 5 5 4	10	1.2	3.5			Gray to dark gray fine-grained SAND, saturated, poorly graded, rope/ hair folicles at 10.2 and 1/8" silty clay seam at 10.8" (SP).	
		(12-14)		2 1 2 2	3	1.5	3.4			As above with 10-20% calcareous shell fragments, increasing silt and clay toward tip (SP).	
5		(14-16)		1 2	4	1.2	5.6			As above with trace to little silt and clay (SM).	Hydrated bentonite seal (12.0' to 14.0' bgs).

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

bgs - Below Ground Surface. NA - Not Available. ags - Above Ground Surface.

Saturated Zones

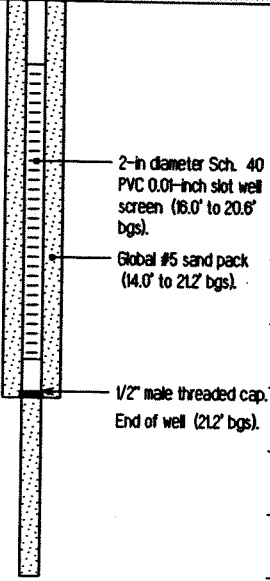
Date / Time	Elevation	Depth
9/25/98	584.44	6.44 ▼
11/5/98	584.53	6.35 ▼

Client:
REALM, Inc.

Well No: MW98-108S1

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 24.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)		2 2	4	12	5.6			As above with trace to little silt and clay (SM).	 2-in diameter Sch. 40 PVC 0.01-inch slot well screen (16.0' to 20.6' bgs). Global #5 sand pack (14.0' to 21.2' bgs). 1/2" male threaded cap. End of well (21.2' bgs).
		(16-18)		1 2 3 4	5	12	27.0				
		(18-20)		1 2 4 3	6	1.0	230.0			Dark brown highly fibrous wood fragments or peat, dry to moist from 18.2 to 18.8. Dark gray silty CLAY, dry to moist, highly plastic, medium stiff (CL).	
570		(20-22)		1 4 5 4	9	1.0	122.0			As above with trace to little fine sand and shell fragments (CL).	
		(22-24)		3 4 5 6	9	1.7	31.4			Gray, stiff, silty CLAY, low to medium plasticity, dry, trace gravel and rootlets (CL).	
End of boring at 24.0' bgs.											

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	584.44	6.44 ▼
11/5/98	584.53	6.35 ▼

Date Start/Finish: 9-21-98 / 9-21-98
Drilling Company: Rau Drilling
Driller's Name: Rodd Chaperon
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 91369.57
Easting: 27439.68
Well Casing: 593.21 feet

Borehole Depth: 13.0 ft.
Ground Surface: 591.00 feet

Geologist: Gordon Hotchkiss

Well No: TW98-109WT

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
GS elevation 591.00 ft.										GROUND SURFACE	Temporary well construction.
590		(0-2)	NA	NA	1.5	104				Brown, tan to red, fine to medium SAND, well graded, dry, trace gravel.	Native soil (0.0 to 1.0' bgs).
		(2-4)	6 20 8 4	28	1.0	5.2				Brown mottled silty CLAY, very stiff, dry, hard to medium plasticity, trace brick fragments. Concrete fragments from 2.6 to 2.9' bgs.	Bentonite seal (1.0 to 1.5' bgs).
585		(4-6)	2 3 4 5	7	1.2	3.6				Dark brown-red fine to medium SAND, little clay, little to some brick fragments 5.1 to 5.2' bgs.	2-in diameter Sch. 40 PVC well casing (2.0' ags to 12' bgs).
		(6-8)	3 1 2 4	3	1.0	0.0				Brown mottled silty CLAY, dry, highly plastic to non-plastic. 1/8" sand and gravel seam at 6.3', moist to saturated. Dark brown/black fine SAND, poorly graded moist to saturated, trace clay.	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (2.0' to 12.0' bgs).
		(8-10)	2 1 2 6	3	1.5	9.2				Gray fine to medium SAND, poorly graded, saturated, trace clay and silt, very loose. As above with darker shades of gray.	Global #5 sand pack (1.5' to 12.0' bgs).
580		(10-12)	0/MOH 1 2 4	3	1.5	3.2				As above, dark gray with trace calcareous shell fragments (<5%) from 12.0 to 12.6 and decreasing to absent in tip. Trace to little clay, saturated.	End of well (12' bgs).
		(12-13)	0/MOH 3	3	1.2	43.7				End of boring at 13.0' bgs.	

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

bgs - Below Ground Surface. ags - Above Ground Surface. NA - Not Available. No sampling performed. Soil and sampling descriptions are from MW98-109S1.

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	585.15	5.85' ↓
11/5/98	584.36	6.64' ↓

Date Start/Finish: 9-23-98 / 9-23-98 Drilling Company: Rau Drilling Driller's Name: Rodd Chaperon Drilling Method: Hollow Stem Auger Auger Size: ID 4.25 in. Rig Type: CME 45-B Spoon Size: 3 in.	Northing: 91370.09 Easting: 27435.36 Well Casing: 593.13 feet Borehole Depth: 20.0 ft. Ground Surface: 591.03 feet Geologist: Gordon Hotchkiss	Well No: MW98-109S1 Client: REALM, Inc. Location: Former Delphi Plant 2 Peninsula Property, Saginaw, Michigan
--	---	---

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.03 ft										GROUND SURFACE	
	590	(0-2)		NA	NA	1.5	104			Brown, tan to red, fine to medium SAND, well graded, dry, trace gravel. (FILL)	Riser stick-up (2' ags).
		(2-4)		6 20 8 4	28	1.0	5.2			Brown mottled silty CLAY, very stiff, dry, hard to medium plasticity, trace brick fragments. Concrete fragments from 2.6 to 2.9' bgs. (FILL)	Concrete pad.
5		(4-6)		2 3 4 5	7	1.2	3.6			Dark brown-red fine to medium SAND, little clay, little to some brick fragments 5.1 to 5.2' bgs. (FILL)	Bentonite grout (0.0 to 10' bgs).
585		(6-8)		3 1 2 4	3	1.0	0.0			Brown mottled silty CLAY, dry, highly plastic to non-plastic. 1/8" sand and gravel seam at 6.3', moist to saturated. (CL)	2-in diameter Sch. 40 PVC well casing (approx. 20' ags to 18' bgs).
		(8-10)		2 1 2 6	3	1.5	9.2			Dark brown/black fine SAND, poorly graded moist to saturated, trace clay. (SP)	Hydrated bentonite seal (10' to 11.5' bgs).
10		(10-12)		0/NOH 1 2 4	3	1.5	3.2			Gray fine to medium SAND, poorly graded, saturated, trace clay and silt, very loose. (SP)	
	580	(12-14)		0/NOH 3 1 1	4	1.2	43.7			As above with darker shades of gray.	
		(14-16)		2 3	6	1.5	35.5			As above, dark gray with trace calcareous shell fragments (<5%) from 12.0 to 12.6 and decreasing to absent in tip. Trace to little clay, saturated.	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (13.0' to 18.0' bgs).
5										Dark gray fine to medium SAND, some to trace clay. 1/2" sandy clay at 14.5' bgs, with calcareous shells from 14 to 14.5' bgs, saturated.	

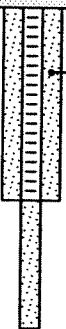
 BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists	Remarks: bgs - Below Ground Surface. NA - Not Available. WOH - Weight of Hammer. Drillers note 1 foot of heave in hole.	Saturated Zones		
		Date / Time	Elevation	Depth
		9/25/98	584.19	6.84
	11/5/98	584.36	6.87	

Client:
REALM, Inc.

Well No: MW98-109S1

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 20.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int./Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)		3 5	6	1.5	35.5			Dark gray fine to medium SAND, some to trace Clay.	 Global #5 sand pack (11.5' to 18.0' bgs). End of well (18' bgs).
		(16-18)		5 3 6 9	9	1.5	134			Dark gray silty CLAY, dry, medium plasticity. (CL)	
		(18-20)		4 10 14 20	24	2.0	167				
20										End of boring at 20.0' bgs.	
570											
25											
565											
30											
560											
35											

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	584.19	6.84 ▼
11/5/98	584.36	6.67 ▼

Date Start/Finish: 9-21-98 / 9-21-98
Drilling Company: Rau Drilling
Driller's Name: Rodd Chaperon
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 91548.01
Easting: 27555.58
Well Casing: 593.71 feet

Borehole Depth: 13.0 ft.
Ground Surface: 590.70 feet

Geologist: Gordon Hotchkiss

Well No: TW98-110WT

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
GS elevation 590.70 ft										GROUND SURFACE	Temporary well construction.
590		(0-2)		9 16 17 13	33	1.2	2.2			Brown to light brown sand, silt, and clay (FILL), dry, trace pebbles, slag.	Native soil (0.0 to 2.0' bgs).
		(2-4)		10 8 10 30	18	1.0	0.0			Black to dark brown fine to medium sand (FILL) with reddish tints, trace silt and clay, dry to moist, trace gravel.	Hydrated bentonite seal (2.0' to 2.5' bgs).
5		(4-6)		10 12 12 13	24	1.0	0.9			As above with plastic coated wire, moist to saturated at tip of spoon. Collected 5035 sample.	2-in diameter Sch. 40 PVC well casing (2.7' ags to 3.0' bgs).
585		(6-8)		5 4 4 3	8	0.0/ 0.4	3.8			Black fine to coarse SAND, well graded, saturated, trace silt and gravel (>1/2" diameter), loose, initial spoon - no recovery.	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (3.0' to 13.0' bgs).
		(8-10)		4 2 4 4	6	0.3	2.7			Black to gray fine SAND, poorly graded, saturated, trace to little clay, trace gravel, loose density results in poor sample recovery (SP)	Global #5 sand pack (2.5' to 13' bgs).
10		(10-12)		4 3 3 3	6	1.2	0.3			Gray fine SAND, poorly graded, saturated, trace white calcareous shells and fragments (5%), trace black organics, rootlets, trace to little clay towards tip of spoon (SP).	
580		(12-13)		0/MOH 0/MOH	0	1.2	1.3			Gray fine to medium SAND, poorly graded, saturated, very loose trace clay and shells (10-15%), (12-12.4' bgs).	End cap.
										Gray fine SAND, saturated, poorly graded, trace to little clay from 12.4 to 13.2, trace shells (1%).	End of well (13' bgs).
5										End of boring at 13.0' bgs.	

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

bgs - Below Ground Surface. ags - Above Ground Surface. NA - Not Available. No sampling was performed. Soil and sampling descriptions are used from MW98-110S1.

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	585.05	5.65 ▼
11/5/98	585.03	5.65 ▼

Date Start/Finish: 9-22-98 / 9-22-98
Drilling Company: Rau Drilling
Driller's Name: Rodd Chaperon
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 91547.33
Easting: 27552.48
Well Casing: 592.86 feet

Borehole Depth: 22.0 ft.
Ground Surface: 590.71 feet

Geologist: Gordon Hotchkiss

Well No: MW98-110S1

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 590.71 ft										GROUND SURFACE	
590		(0-2)		9 16 17 13	33	1.2	2.2			Brown to light brown sand, silt, and clay (FILL), dry, trace pebbles, slag.	Riser stick-up (1.8' ags).
		(2-4)		10 8 10 30	18	1.0	0.0			Black to dark brown fine to medium sand (FILL) with reddish tints, trace silt and clay, dry to moist, trace gravel.	Concrete pad.
585		(4-6)		10 12 12 13	24	1.0	0.9			As above with plastic coated wire, moist to saturated at tip of spoon. Collected sample for VOC analysis by Method 5035.	Bentonite slurry (0.0 to 10' bgs).
		(6-8)		5 4 4 3	8	0.0/0.4	3.8			Black fine to coarse SAND, well graded, saturated, trace silt and gravel (>1/2" diameter), loose, initial spoon - no recovery. (SW)	
		(8-10)		4 2 4 4	6	0.3	2.7			Black to gray fine SAND, poorly graded, saturated, trace to little clay, trace gravel, loose density results in poor sample recovery (SP)	2-in diameter Sch. 40 PVC well casing (1.8' ags to 13' bgs).
580		(10-12)		4 3 3 3	6	1.2	0.3			Gray fine SAND, poorly graded, saturated, trace white calcareous shells and fragments (5%), trace black organics, rootlets, trace to little clay towards tip of spoon (SP).	Hydrated bentonite seal (10' to 11' bgs).
		(12-14)		O/WOH O/WOH 1 1	1	1.2	1.3			Gray fine to medium SAND, poorly graded, saturated, very loose trace clay and shells (10-15%), (12-12.4' bgs). (SP)	
		(14-16)		O/WOH O/WOH	2	0.7	19.6			Gray fine SAND, saturated, poorly graded, trace to little clay from 12.4 to 13.2, trace shells (1%). (SP)	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (13.0' to 17.6' bgs).

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

bgs - Below Ground Surface. ags - Above Ground Surface. NA - Not Available. WOH - Weight of Hammer.

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	585.06	5.65 ↓
11/5/98	585.07	5.64 ↓

Client:
REALM, Inc.

Well No: MW98-110S1

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 22.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)		2 4	2	0.7	19.6			Gray fine SAND, saturated, poorly graded, trace shells. (SP)	Global #5 sand pack (14' to 18' bgs). End cap. End of well (18' bgs). Sand backfill. Hydrated bentonite seal (18' to 22' bgs).
		(16-18)		2 4 4 2	8	0.8	63.3			Gray silty CLAY, dry to moist, trace fine to medium sand and gravel, high plasticity, medium stiff. (CL)	
		(18-20)		3 3 7 8	10	1.5	158			As above, stiff.	
570		(20-22)		push	NA	1.7	NA			Collected Shelby tube for potential vertical permeability test. Bottom of sample appears to be same as above. However, 1/8" diameter braided copper wire observed/evident hanging out of the bottom of the sample (22' bgs). Must have been pushed from auger tip.	
										End of boring at 22.0' bgs.	
565											
560											
555											
550											
545											
540											
535											
530											
525											
520											
515											
510											
505											
500											
495											
490											
485											
480											
475											
470											
465											
460											
455											
450											
445											
440											
435											
430											
425											
420											
415											
410											
405											
400											
395											
390											
385											
380											
375											
370											
365											
360											
355											
350											
345											
340											
335											
330											
325											
320											
315											
310											
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											
255											
250											
245											
240											
235											
230											
225											
220											
215											
210											
205											
200											
195											
190											
185											
180											
175											
170											
165											
160											
155											
150											
145											
140											
135											
130											
125											
120											
115											
110											
105											
100											
95											
90											
85											
80											
75											
70											
65											
60											
55											
50											
45											
40											
35											

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	585.06	5.65 ↓
11/5/98	585.07	5.64 ↓

Date Start/Finish: 9-23-98 / 9-23-98
 Drilling Company: Rau Drilling
 Driller's Name: Rodd Chaperon
 Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
 Rig Type: CME 45-B
 Spoon Size: 3 in.

Northing: 91551.05
 Easting: 27440.49
 Well Casing: 593.81 feet

Borehole Depth: 13.0 ft.
 Ground Surface: 591.00 feet

Geologist: Gordon Hotchkiss

Well No: TW98-111WT

Client:
 REALM, Inc.

Location:
 Former Delphi Plant 2 Peninsula
 Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 591.00 ft.										GROUND SURFACE	Temporary well construction.
590		(0-2)		3 8 8 5	16	1.2	10.4			Brown clay and sand (FILL), dry. Black clayey sand in tip.	Native soil (0.0 to 15' bgs).
		(2-4)		12 12 20 9	32	1.3	13.7			Brown to dark brown well graded sand, silt, and clay (FILL), dry, wood and concrete fragments.	2-in diameter Sch. 40 PVC well casing (2.5' ags to 3.0' bgs).
585		(4-6)		6 4 2 1	6	0.5	5.4			Reddish-black fine to medium SAND, well graded, dry to moist, trace to little gravel and clay, loose, <1/2" piece of iron scrap. Augers grinding on concrete between 4 and 5 feet bgs.	Hydrated bentonite seal (1.5' to 2.5' bgs).
		(6-8)		2 5 5 4	10	1.3	13.5			Black fine to coarse SAND, well graded, moist to saturated, trace to little gravel and clay, slight odor. Black clayey SAND, moist, poorly graded.	
		(8-10)		2 3 2 4	5	1.2	6.6			Black fine to medium SAND, poorly graded, trace calcareous shells, saturated, trace clay, slight odor. Olive fine to medium SAND, poorly graded, saturated, slight odor. Gray fine to medium SAND.	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (3.0' to 13.0' bgs).
580		(10-12)		3 2 3 1	5	1.5	8.2			As above, olive gray. Dark gray fine to medium SAND, poorly graded, trace to little clay. 0.5' of heave in hole.	Global #5 sand pack (2.5' to 13' bgs).
		(12-13)		3 1	4	1.5	33.8			As above, olive gray. Trace calcareous shells, grades to clayey sand toward top.	
5										End of boring at 13.0' bgs.	

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

bgs - Below Ground Surface. ags - Above Ground Surface. NA - Not Available. Soil sampling was not performed at this location. Soil and sampling descriptions are from MW98-111S1

Saturated Zones

Date / Time	Elevation	Depth
9/25/98	584.92	6.08 ▼
11/5/98	584.94	6.06 ▼

Date Start/Finish: 9-22-98 / 9-22-98
Drilling Company: Rau Drilling
Driller's Name: Rodd Chaperon
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 45-B
Spoon Size: 3 in.

Northing: 91545.64
Easting: 27443.97
Well Casing: 593.73 feet

Borehole Depth: 18.0 ft.
Ground Surface: 590.95 feet

Geologist: Gordon Hotchkiss

Well No: MW98-111S1

Client:
 REALM, Inc.

Location:
 Former Delphi Plant 2 Peninsula
 Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
gs elevation 590.95 ft.										GROUND SURFACE	Riser stick-up (2' ags).
	590	(0-2)		3 8 8 5	16	1.2	10.4			Brown clay and sand (FILL), dry. Black clayey sand in tip.	Concrete pad.
		(2-4)		12 12 20 9	32	1.3	13.7			Brown to dark brown well graded sand, silt, and clay (FILL), dry, wood and concrete fragments.	Bentonite slurry (0.0 to 8' bgs).
5		(4-6)		6 4 2 1	6	0.5	5.4			Reddish-black fine to medium SAND, (FILL) well graded, dry to moist, trace to little gravel and clay, loose, <1/2" piece of iron scrap. Augers grinding on concrete between 4 and 5 feet bgs.	2-in diameter Sch. 40 PVC well casing (2.0' ags to 16.5' bgs).
585		(6-8)		2 5 5 4	10	1.3	13.5			Black fine to coarse SAND, well graded, moist to saturated, trace to little gravel and clay, slight odor. (SW) Black clayey SAND, moist, poorly graded. (SC)	Hydrated bentonite seal (8' to 9.5' bgs).
		(8-10)		2 3 2 4	5	1.2	6.6			Black fine to medium SAND, poorly graded, trace calcareous shells, saturated, trace clay, slight odor. (SP) Olive fine to medium SAND, poorly graded, saturated, slight odor. Gray fine to medium SAND. As above, olive gray. Dark gray fine to medium SAND, poorly graded, trace to little clay. 0.5' of heave in hole. As above, olive gray. Trace calcareous shells, grades to clayey sand toward top.	Global #5 sand pack (9.5' to 18' bgs).
10		(10-12)		3 2 3 1	5	1.5	8.2				
580		(12-14)		3 1 2 1	3	1.5	33.8				
		(14-16)		4 5	9	1.5	36.8			Gray medium SAND, poorly graded, saturated.	2-in diameter Sch. 40 PVC 0.01-inch slot well screen (11.5' to 16.5' bgs).
5											

BBL
 BLASLAND, BOUCK & LEE, INC.
 engineers & scientists

Remarks:

bgs - Below Ground Surface. ags - Above Ground Surface. NA - Not Available.

Saturated Zones

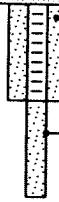
Date / Time	Elevation	Depth
9/25/98	584.71	6.24 ▼
11/5/98	584.84	6.11 ▼

Client:
REALM, Inc.

Well No: MW88-111S1

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

Total Depth = 18.0 ft.

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
575		(14-16)		4 12	9	1.5	36.8			Gray fine SAND, poorly graded, trace clay and silt. (SP)	
		(16-18)		4 9 14 20	23	2.0	157			Gray silty CLAY, very stiff, dry, trace gravel, low plasticity. (CL)	
										End of boring at 18.0' bgs.	
20	570										
25	565										
30	560										
35											

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists		Remarks:		Saturated Zones		
				Date / Time	Elevation	Depth
				9/25/98	584.71	6.24 ▼
				11/5/98	584.84	6.11 ▼

Date Start/Finish: 06/07/95 / 06/07/95
Drilling Company: Stearns
Driller's Name: Rich Bennett
Drilling Method: Hollow Stem Auger

Auger Size: ID 4.25 in.
Rig Type: CME 850 ATV
Spoon Size: 2 in.

Borehole Depth: 13 ft.

Geologist: Ron D. Kuhn

Well No: MW-144 WT

Client:
REALM, Inc.

Location:
Former Delphi Plant 2 Peninsula
Property, Saginaw, Michigan

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Blows/6 In.	N	Recovery (ft.)	Headspace	Geotechnical Test	Geologic Column	Stratigraphic Description	Well Construction
											4-in diameter steel protective casing 2.5' ags, locking cap installed. Concrete pad ground surface to 1.0' bgs
										GROUND SURFACE	
		(0-2')		9 14 9 9	23	2.0				Black/brown fine to medium SAND, little Silt, trace fine Gravel, wood, and organic material, medium dense, damp.	2-in diameter Sch. 40 PVC well casing 2.5' ags to 1.0' bgs
		(2-4')		4 31 18 7	49	1.6				Brown SILT and CLAY, trace fine Sand and fine Gravel, stiff, damp. Black/brown fine to medium SAND, little Silt, medium dense, damp.	Bentonite seal 1.0' to 1.5' bgs
										Gray concrete/brick material.	
5		(4-6')		2 3 7 7	10	0.6				Black fine to medium SAND, little fine to medium Gravel, trace glass, loose, saturated, slight odor, no sheen.	Grade #5 silica sand pack 1.5' to 13.0' bgs
		(6-8')		1 WOH 1 WOH	1	1.0				No glass, very loose.	
		(8-10')		2 3 5 4	8	1.0				Gray SILT and CLAY, little fine to medium Gravel, medium stiff, wet.	0.01" Sch. 40 PVC screen 2.0' to 12.0' bgs
10		(10-12')		2 3 3 4	6	2.0					
		(12-13')								Augered from 12.0' to 13.0' bgs.	2-in diameter Sch. 40 PVC sump 12.0' to 12.4' bgs
										Total depth of boring 13.0 ft. bgs.	

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Remarks:

WOH - Weight of Hammer; bgs - Below Ground Surface; ags - Above Ground Surface

Saturated Zones

Date / Time	Elevation	Depth



BLASLAND, BOUCK & LEE, INC.
engineers & scientists