CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Facsimile: (519) 884-0525
www.CRAworld.com

October 13, 2011 Reference No. 045285

Ms. Sue Kaelber-Matlock
Michigan Department of Environmental Quality
Environmental Response Division
Saginaw Bay District Office
401 Ketchum Street, Suite B
Bay City, Michigan
U.S.A. 48708

Dear Ms. Kaelber-Matlock:

Re: Investigation Summary and Proposed Site Closure
Revitalizing Auto Communities Environmental Response Trust
700 Garey Street, Saginaw, MI

Conestoga-Rovers & Associates, Inc. (CRA) has prepared this letter on behalf of Revitalizing Auto Communities Environmental Response (RACER) Trust for the 700 Garey Street Property (Site) in Saginaw, MI. The purpose of the letter is to present a brief summary of the investigations that have been completed to date at the Site and recommendations for remediation work prior to requesting a No Further Action Letter for the Site from the MDEQ.

The Site is approximately 3.8 acres in size and is currently vacant with grass cover and some trees along the southeastern Site boundary. The Site is bordered by railroad tracks to the south, vacated Owen Street to the west, Garey Street to the north, and Brown Street to the east. Land use to the west and south is industrial/commercial and land use to the north and east is residential. Figure 1 presents the Site plan.

BACKGROUND

The Site's first known development was between 1915 and 1935 by Nelson Brothers Company, a manufacturer of gasoline engines. The Site was occupied by Palace Corporation in 1950, and then functioned later as a warehouse utilized by Sears Roebuck & Co. The Site was acquired by GM in 1979 and it is assumed that it was utilized as a warehouse until 1984, the year that the demolition Purchase Order is dated. The buildings and foundations were removed as part of the demolition process in 1988.

A Phase I ESA was completed in September 2006. The Phase I ESA identified "recognized environmental conditions" (RECs), that are present at the Site (Former USTs, Former AST,

Former Gasoline Engine Operations, Former Outside Material Storage, Potential Subsurface Demolition Debris, Adjacent Historical Dry Cleaning Operations). Based on the Phase I ESA report, a Scope of Work was developed for the Phase II ESA. A copy of the Phase I and Phase II documents were provided to your attention on September 12, 2011.

PHASE II INVESTIGATION SUMMARY

Four sampling events have been completed, to date, as part of the Phase II ESA; December 2006, February 2007, September 2007, and November 2008. A total of 104 soil borings were advanced, with 50 borings advanced to a depth of 2 ft bgs, seven borings advanced to a depth of 4 ft bgs, 43 borings advanced to a depth of 5 ft bgs, and seven borings advanced to a depth of 10 ft bgs. The Site is underlain by a continuous extensive layer of clay typically encountered at depths ranging from 1 to 3.5 feet below ground surface and extending at least as deep as our deepest boring at 10 feet below ground surface. Attachment A presents the soil boring logs. In addition to grid sampling across the Site, soil borings were advanced at each of the 23 RECs, at the three doorways, one at the loading area, and three at the vicinity of tanks. Figure 2 presents the investigative locations. No groundwater was encountered during drilling operations; therefore, no groundwater samples were collected. In the two initial rounds of sampling (December 2006 and February 2007), samples were collected and analyzed for TCL VOCs, TCL SVOCs, TAL metals, and PCBs. The final two rounds of sampling (September 2007 and November 2008) were conducted to delineate previous exceedances of screening criteria and were analyzed for the specific parameters that were exceeded.

CRA screened the detected concentrations to the following generic soil cleanup criteria developed by the State of Michigan under Part 201 of the Natural Resources and Environmental Protection Act 451 (NREPA):

- Non-Residential – Ambient Air – Finite VSIC-2 m Source Thickness
- Non-Residential – Ambient Air – Finite VSIC – 5 m Source Thickness
- Non-Residential – Ambient Air – Infinite Source VSIC
- Non-Residential – Direct Contact
- Non-Residential – Drinking Water Protection
- Non-Residential – Soil Volatilization to Indoor Air Inhalation
- Non-Residential – Ambient Air – Particulate Soil Inhalation

In addition, the metals data were initially compared with the Residential/Non-Residential – Statewide Default Background Levels and if results exceeded the background levels, the concentrations were subsequently screened against the above criteria.

The following section presents the results of the comparison to the screening criteria for those parameters that exceeded criteria:

Arsenic

The results of the soil samples collected as part of the Phase II activities indicated that arsenic exceeded Non-Residential Drinking Water Protection criteria (4.6 mg/kg) at seven locations ranging in concentration from 5.9 mg/kg to 15.5 mg/kg. The results are summarized on Figure 3.

Total chromium

The results of soil samples collected as part of the Phase II activities indicated that total chromium exceeded Non-Residential - Drinking Water Protection criteria (30 mg/kg) at six locations ranging in concentration from 33.8 mg/kg to 56 mg/kg. The results are summarized on Figure 4.

Lead

The results of soil samples collected as part of the Phase II activities indicated that lead exceeded Non-Residential Drinking Water Protection criteria (700 mg/kg) at three locations ranging in concentration from 823 mg/kg to 5,450 mg/kg.

The results of soil samples collected as part of the Phase II activities indicated that lead exceeded Non-Residential Direct Contact criteria (900 mg/kg) at two locations in a relatively small area at concentrations of 995/897 mg/kg and 5,450 mg/kg. The results are summarized on Figure 5.

Benzo(a)pyrene

The results of the soil samples collected as part of the Phase II activities indicated that benzo(a)pyrene exceeded Non-Residential Direct Contact criteria (8 mg/kg) at two locations at concentrations of 7/8.4 mg/kg and 14 mg/kg. The results are summarized on Figure 6.

Trichloroethene

The results of soil samples collected as part of the Phase II activities indicated that trichloroethene exceeded Non-Residential Drinking Water Protection criteria (0.1 mg/kg) at three locations ranging in concentration from 0.12 mg/kg to 0.52 mg/kg. The results are summarized on Figure 7.

SUMMARY OF SEPTEMBER 8, 2011 MEETING

On September 8, 2011, RACER met with MDEQ to discuss the Site. The following were discussed and agreed upon at the meeting:

- Since groundwater was not encountered at the Site and the Site is underlain by an extensive clay unit, the Non-Residential Drinking Water Protection Criteria is not an applicable criteria
- A statistical analysis of the benzo(a)pyrene data should be completed to evaluate if no further action is necessary
- A statistical analysis of the lead data assuming the removal of the most impacted soil should be completed to evaluate if no further action is necessary beyond removal of the impacted soil
- Following completion of the work, RACER would request a No Further Action Determination from the MDEQ

CONCLUSIONS/RECOMMENDATIONS

Soil sample results exceeded the Non-Residential Drinking Water Protection Criteria for arsenic, total chromium, lead, and trichloroethene. However, since groundwater was not encountered during the investigation and the Site is underlain by a continuous extensive clay layer, the Residential Drinking Water Protection criteria is not applicable consistent with the discussion at the meeting on September 8, 2011 and no further action is warranted related to these constituents and this pathway. Furthermore, water is available to the Site by City infrastructure and should a potable well be necessary there is a significant, competent, confining layer separating the Site from groundwater and, therefore, any contamination found in the groundwater would not be attributed to the Site.

Soil sample results exceeded the Non-Residential Direct Contact Criteria for lead and benzo(a)pyrene.

The two soil samples that exceeded the Non-Residential Direct Contact criteria for benzo(a)pyrene are marginally above the criteria, are located near roads along the perimeter of the property, and are not believed to be Site related. A statistical analysis was completed for benzo(a)pyrene for all the samples collected on-Site. The 95 percent upper confidence level (UCL) for benzo(a)pyrene was calculated to be 2.6 mg/kg, which is below the Non-Residential Direct Contact Criteria of 8 mg/kg. Therefore, consistent with the discussion at the meeting on

CONESTOGA-ROVERS & ASSOCIATES

September 8, 2011 no further work is warranted to address benzo(a)pyrene impacts. Attachment B presents the statistical calculations. The statistical calculations were completed using software recommended by the MDEQ (Pro-UCL Version 4.1) in accordance with Statistical Guidesheet #19 out of the MDEQ - Sampling Strategies and Statistics Training Materials for a Part 201 cleanup criteria (2002) guidance document.

Two soil samples exceeded Non-Residential Direct Contact criteria for lead. RACER proposes to remove the impacted soil (approximately 300 cubic yards of soil) to eliminate potential direct contact exposures. The limits of the excavation have been delineated and excavation will proceed to a depth of 2-feet below ground surface and will extend to adjacent sample locations with concentrations below the screening criteria. These adjacent samples will be used as the verification samples for the excavation, therefore, no additional sampling in proposed. A statistical analysis was completed for lead for all the samples collected on-Site, with the exception of those samples that will be removed. The 95 percent upper confidence level (UCL) for lead is 119.7 mg/kg, which is below the Non-Residential Direct Contact Criteria of 900 mg/kg. Therefore, following completion of the excavation no further work is required to address lead impacts. Attachment B presents the statistical calculations. The statistical calculations were completed consistent with MDEQ guidance documents as stated above.

Consistent with our discussion on September 8, 2011 RACER proposes to proceed with the excavation work identified. Please let us know if this is acceptable to the MDEQ or if you would like more time to review this matter. Following completion of the work, RACER will provide a letter summarizing the work and requesting that the Site be issued a No Further Action determination for Non-Residential land use.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P.E.

JP/ev/1

cc: Dave Favero
Grant Trigger

SOUTH JEFFERSON AVENUE

VACANT BUILDING

WOLVERINE PATTERN & MACHINE 1716 S. JEFFERSON

ELECTRICAL SUBSTATION

RESIDENTIAL

0 40 80ft

OWEN STREET (VACATED)

(FORMER FURSTENBERG BROTHERS & CO. LUMBER YARD)

VACANT

VACANT/ GRASS COVERED

G.T.W. RAILROAD

GAREY STREET (FORMERLY MORSE)

RESIDENTIAL

HOWARD STREET

RESIDENTIAL

VEGETATION & TREES

PARTIAL FENCE LINE

BROWN STREET

RESIDENTIAL

RESIDENTIAL

LEGEND

PROPERTY BOUNDARY

FENCE

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

figure 1

SITE PLAN
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

45285-T01(RFB001)GN-WA001 SEP 27/2011

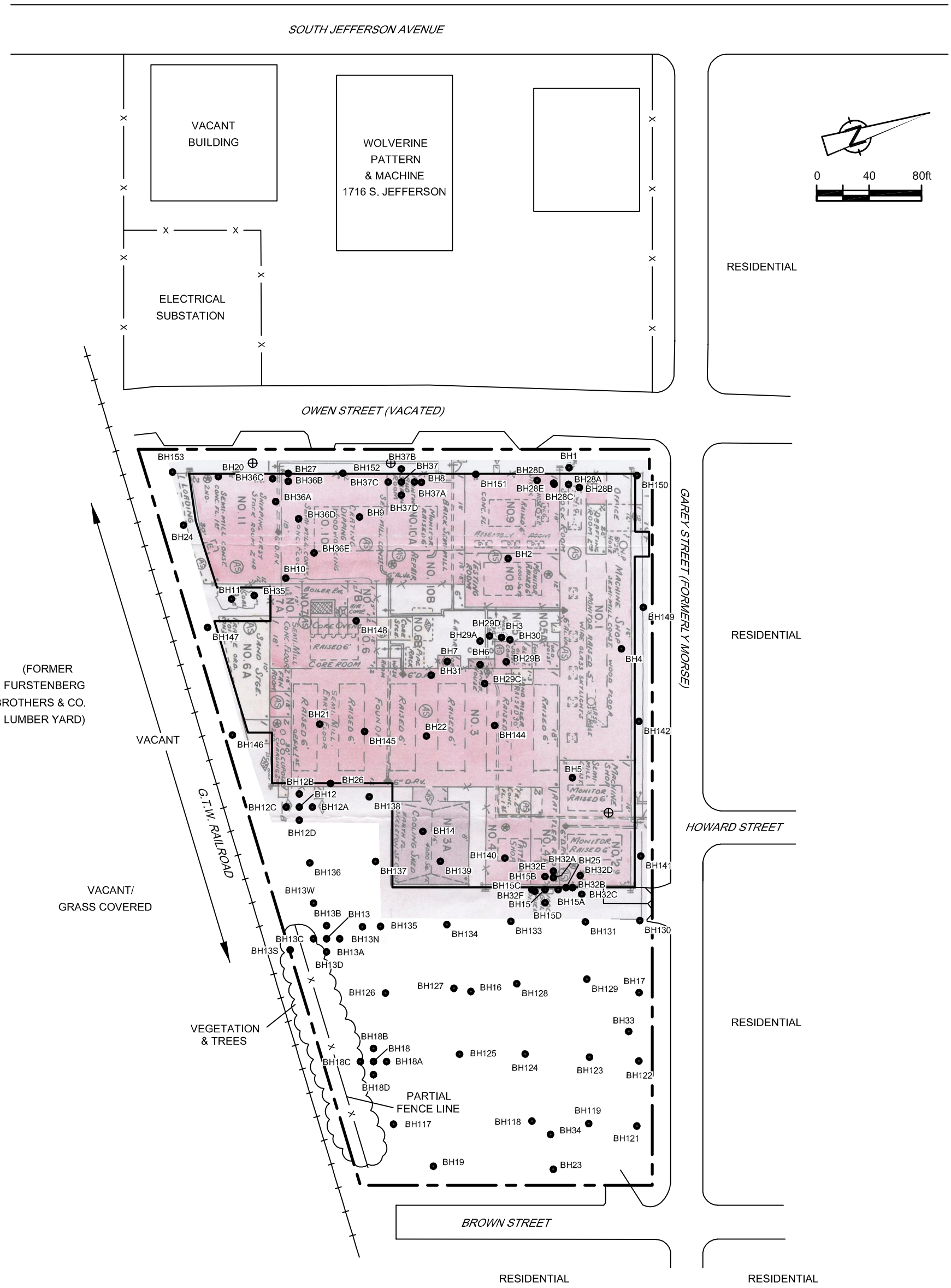

figure 2

GEOPROBE INVESTIGATIVE LOCATIONS
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

45285-T01(RFB001)GN-WA002 SEP 27/2011

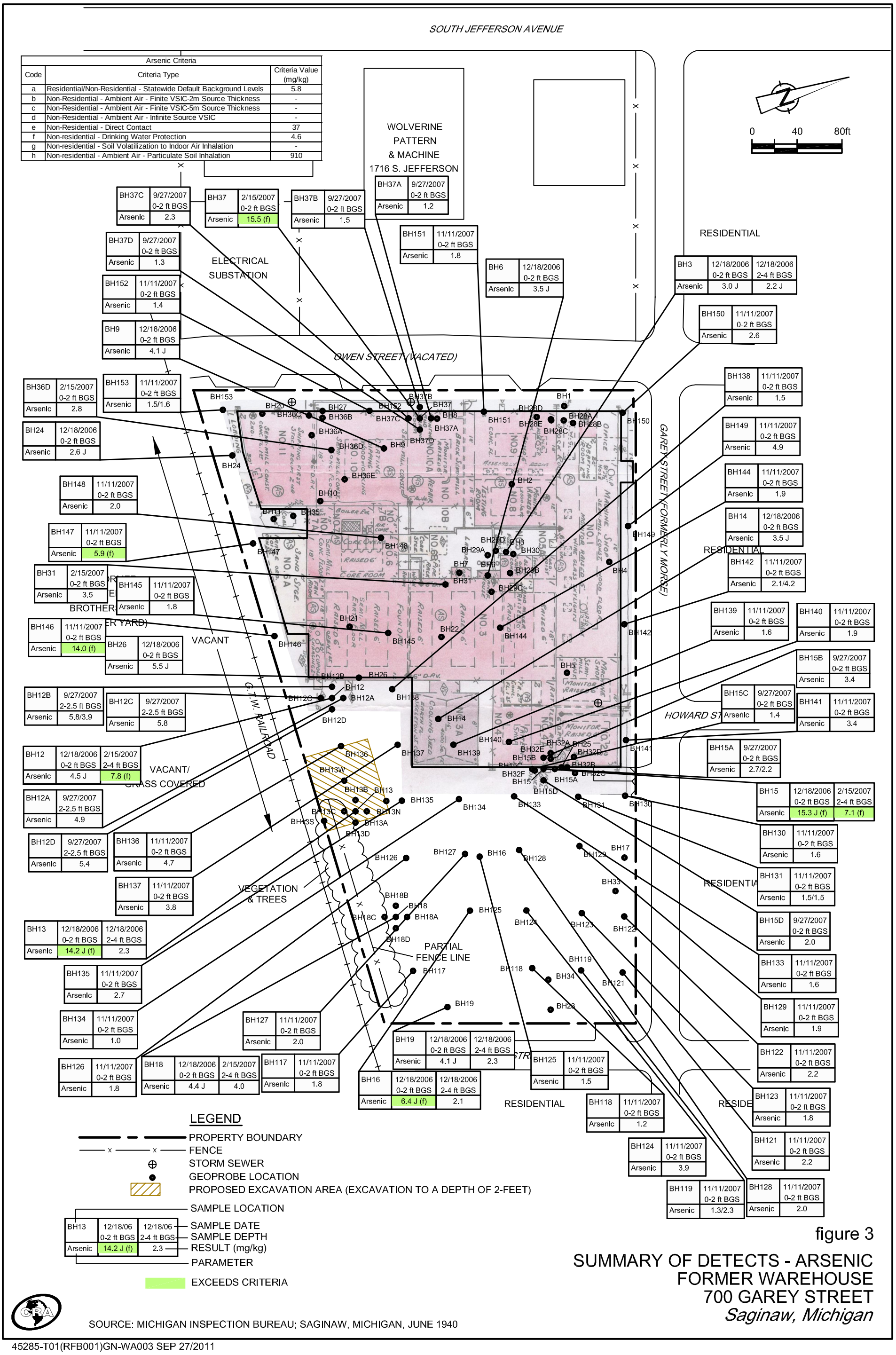

figure 3

SUMMARY OF DETECTS - ARSENIC
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

Chromium Total Criteria		
Code	Criteria Type	Criteria Value (mg/kg)
a	Residential/Non-Residential - Statewide Default Background Levels	18
b	Non-Residential - Ambient Air - Finite VSIC-2m Source Thickness	-
c	Non-Residential - Ambient Air - Finite VSIC-5m Source Thickness	-
d	Non-Residential - Ambient Air - Infinite Source VSIC	-
e	Non-Residential - Direct Contact	9200
f	Non-residential - Drinking Water Protection	30
g	Non-residential - Soil Volatilization to Indoor Air Inhalation	-
h	Non-residential - Ambient Air - Particulate Soil Inhalation	240

SOUTH JEFFERSON AVENUE

WOLVERINE
PATTERN
& MACHINE
1716 S. JEFFERSON

0 40 80ft

BH37	2/15/2007
	0-2 ft BGS
Chromium	13.6

ELECTRICAL
SUBSTATION

BH6	12/18/2006
	0-2 ft BGS
Chromium	8.5

RESIDENTIAL

BH3	12/18/2006	12/18/2006
	0-2 ft BGS	2-4 ft BGS
Chromium	13.2	19.3

BH9	12/18/2006
	0-2 ft BGS
Chromium	13.0

OWEN STREET (VACATED)

BH36D	2/15/2007
	0-2 ft BGS
Chromium	11.2

BH24	12/18/2006
	0-2 ft BGS
Chromium	7.8

BH14	12/18/2006
	0-2 ft BGS
Chromium	7.3

RESIDENTIAL

GAREY STREET (FORMERLY MORSE)

BH31	2/15/2007
	0-2 ft BGS
Chromium	8.6 E

BROTHERS & CO.
LUMBER YARD)

VACANT

BH26	12/18/2006
	0-2 ft BGS
Chromium	14.1

G.T.W. RAILROAD

HOWARD STREET

BH12	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Chromium	39.1 (f)	44.4 (f)

VACANT/
GRASS COVERED

BH15	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Chromium	49.0 (f)	46.7 (f)

VEGETATION
& TREES

BH13	12/18/2006	12/18/2006
	0-2 ft BGS	2-4 ft BGS
Chromium	56.0 (f)	22.3

PARTIAL
FENCE LINE

RESIDENTIAL

BH16	12/18/2006	12/18/2006
	0-2 ft BGS	2-4 ft BGS
Chromium	33.8 (f)	15.9

BH19	12/18/2006	12/18/2006
	0-2 ft BGS	2-4 ft BGS
Chromium	34.3 (f)	21.5

BH18	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Chromium	39.3 (f)	5.4

REET

RESIDENTIAL

RESIDENTIAL

LEGEND

- PROPERTY BOUNDARY
- FENCE
- STORM SEWER
- GEOPROBE LOCATION
- PROPOSED EXCAVATION AREA (EXCAVATION TO A DEPTH OF 2-FEET)

BH18	12/18/06	12/18/06	SAMPLE LOCATION
	0-2 ft BGS	2-4 ft BGS	SAMPLE DATE / SAMPLE DEPTH
Chromium Total	39.3 (f)	5.4	RESULT (mg/kg)
	PARAMETER		

EXCEEDS CRITERIA

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

figure 4

SUMMARY OF DETECTS - CHROMIUM TOTAL
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOUTH JEFFERSON AVENUE

Lead Criteria		
Code	Criteria Type	Criteria Value (mg/kg)
a	Residential/Non-Residential - Statewide Default Background Levels	21
b	Non-Residential - Ambient Air - Finite VSIC-2m Source Thickness	-
c	Non-Residential - Ambient Air - Finite VSIC-5m Source Thickness	-
d	Non-Residential - Ambient Air - Infinite Source VSIC	-
e	Non-Residential - Direct Contact	900
f	Non-residential - Drinking Water Protection	700
g	Non-residential - Soil Volatilization to Indoor Air Inhalation	-
h	Non-residential - Ambient Air - Particulate Soil Inhalation	44000

WOLVERINE
PATTERN
& MACHINE
1716 S. JEFFERSON

RESIDENTIAL

ELECTRICAL
SUBSTATION

OWEN STREET (VACATED)

GAREY STREET (FORMERLY MORSE)

HOWARD STREET

VACANT

VACANT/

VEGETATION
& TREES

PARTIAL
FENCE LINE

G.T.W. RAILROAD

(FORMER
R YARD)

STREET

0 40 80ft

BH9	12/18/2006 0-2 ft BGS
Lead	126

BH36D	2/15/2007 0-2 ft BGS
Lead	49.8

BH152	11/11/2007 0-2 ft BGS
Lead	13.1

BH37	2/15/2007 0-2 ft BGS
Lead	317

BH151	11/11/2007 0-2 ft BGS
Lead	10.6

BH31	2/15/2007 0-2 ft BGS
Lead	47.8

BH6	12/18/2006 0-2 ft BGS
Lead	19.1

BH3	12/18/2006 0-2 ft BGS	12/18/2006 2-4 ft BGS
Lead	98.1	5.9

BH150	11/11/2007 0-2 ft BGS
Lead	39.9

BH148	11/11/2007 0-2 ft BGS
Lead	14.1

BH153	11/11/2007 0-2 ft BGS
Lead	20.3/19.0

BH24	12/18/2006 0-2 ft BGS
Lead	43.8

BH145	11/11/2007 0-2 ft BGS
Lead	11.1

BH147	11/11/2007 0-2 ft BGS
Lead	32.1

BH26	12/18/2006 0-2 ft BGS
Lead	269

BH146	11/11/2007 0-2 ft BGS
Lead	89.4

BH12	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Lead	146	104

BH136	11/11/2007 0-2 ft BGS
Lead	243

BH137	11/11/2007 0-2 ft BGS
Lead	188

BH13W	11/11/2007 0-2 ft BGS	11/11/2007 2-4 ft BGS
Lead	823 (f)	6.8

BH13N	11/11/2007 0-2 ft BGS	11/11/2007 2-4 ft BGS
Lead	106	11.4

BH13B	9/27/2007 0-2 ft BGS
Lead	5450 (ef)

BH13	12/18/2006 0-2 ft BGS	12/18/2006 2-4 ft BGS
Lead	432	7.2 J

BH13C	9/27/2007 0-0.5 ft BGS
Lead	995 (ef)/897 (f)

BH13S	11/11/2007 0-2 ft BGS	11/11/2007 2-4 ft BGS
Lead	42.7	7.3

BH13A	9/27/2007 0-2 ft BGS
Lead	431

BH13D	9/27/2007 0-2 ft BGS
Lead	90.2

BH135	11/11/2007 0-2 ft BGS
Lead	37.0

BH134	11/11/2007 0-2 ft BGS
Lead	8.8

BH126	11/11/2007 0-2 ft BGS
Lead	12.3

BH18	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Lead	172	28.1

BH117	11/11/2007 0-2 ft BGS
Lead	10.4

BH127	11/11/2007 0-2 ft BGS
Lead	10.9

BH19	12/18/2006 0-2 ft BGS	12/18/2006 2-4 ft BGS
Lead	182	9.7 J

BH16	12/18/2006 0-2 ft BGS	12/18/2006 2-4 ft BGS
Lead	386	6.0 J

BH125	11/11/2007 0-2 ft BGS
Lead	22.2

BH118	11/11/2007 0-2 ft BGS
Lead	8.7

BH124	11/11/2007 0-2 ft BGS
Lead	9.6

BH128	11/11/2007 0-2 ft BGS
Lead	10.6

BH119	11/11/2007 0-2 ft BGS
Lead	13.1/17.2

BH121	11/11/2007 0-2 ft BGS
Lead	116

BH123	11/11/2007 0-2 ft BGS
Lead	9.8

BH122	11/11/2007 0-2 ft BGS
Lead	26.6

BH129	11/11/2007 0-2 ft BGS
Lead	7.5

BH133	11/11/2007 0-2 ft BGS
Lead	64.5

BH131	11/11/2007 0-2 ft BGS
Lead	9.3/9.8

BH130	11/11/2007 0-2 ft BGS
Lead	71.7

BH15	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Lead	104	220

BH141	11/11/2007 0-2 ft BGS
Lead	108

BH140	11/11/2007 0-2 ft BGS
Lead	72.7

BH139	11/11/2007 0-2 ft BGS
Lead	10.3

BH142	11/11/2007 0-2 ft BGS
Lead	84.4/118

BH14	12/18/2006 0-2 ft BGS
Lead	17.0

BH149	11/11/2007 0-2 ft BGS
Lead	170

BH138	11/11/2007 0-2 ft BGS
Lead	18.8

LEGEND

- PROPERTY BOUNDARY
- FENCE
- STORM SEWER
- GEOPROBE LOCATION
- PROPOSED EXCAVATION AREA (EXCAVATION TO A DEPTH OF 2-FEET)
- SAMPLE LOCATION
- SAMPLE DATE
- SAMPLE DEPTH
- RESULT (mg/kg)
- PARAMETER
- EXCEEDS CRITERIA

BH13	12/18/06 0-2 ft BGS	12/18/06 2-4 ft BGS
Lead	172	28.1

figure 5

SUMMARY OF DETECTS - LEAD
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

45285-T01(RFB001)GN-WA005 SEP 27/2011

Benzo(a)pyrene Criteria		
Code	Criteria Type	Criteria Value (mg/kg)
a	Residential/Non-Residential - Statewide Default Background Levels	-
b	Non-Residential - Ambient Air - Finite VSIC-2m Source Thickness	-
c	Non-Residential - Ambient Air - Finite VSIC-5m Source Thickness	-
d	Non-Residential - Ambient Air - Infinite Source VSIC	-
e	Non-Residential - Direct Contact	8
f	Non-residential - Drinking Water Protection	-
g	Non-residential - Soil Volatilization to Indoor Air Inhalation	-
h	Non-residential - Ambient Air - Particulate Soil Inhalation	1900

SOUTH JEFFERSON AVENUE

OWEN STREET (VACATED)

GAREY STREET (FORMERLY MORSE)

HOWARD STREET

BROWN STREET

G.T.W. RAILROAD

WOLVERINE PATTERN

BROTHERS & CO. LUMBER YARD)

VACANT

VACANT/

VEGETATION & TREES

PARTIAL FENCE LINE

RESIDENTIAL

0 40 80ft

BH145	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.014 J

BH151	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.084 J

BH31	2/15/2007 0-2 ft BGS
Benzo(a)pyrene	0.52

BH6	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	0.038 J

BH148	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.047 J

BH29D	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.67

BH9	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	0.22 J

BH3	12/18/2006 0-2 ft BGS	12/18/2006 2-4 ft BGS
Benzo(a)pyrene	0.018 J	0.3 U

BH26	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	0.71

BH152	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.12 J

BH28C	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.3 U

BH35	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.31 U/0.3 U

BH36D	2/15/2007 0-2 ft BGS
Benzo(a)pyrene	0.31 U

BH30	2/15/2007 4-5 ft BGS
Benzo(a)pyrene	0.29 U

BH150	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.32

BH153	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.25 J/0.29 J

BH138	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.084 J

BH24	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	1.8

BH144	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.025 J

BH137	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.69 J

BH149	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	3.7

BH147	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.35 J

BH14	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	1.5 U

BH146	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	14 (e)

BH142	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	7/8.4 (e)

BH12	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.54 J	0.46

BH139	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.0096 J

BH136	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.42

BH140	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.38

BH32E	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.31 U

BH15	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	0.37	0.36 U

BH134	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.015 J

BH141	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	6.7

BH135	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.022 J

BH133	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.3 U

BH13	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	0.29 J

BH130	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.18 J

BH127	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.058 J

BH131	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.3 U/0.017 J

BH126	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.067 J

BH129	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.01 J

BH18B	9/27/2007 1-1.5 ft BGS
Benzo(a)pyrene	0.9

BH18C	9/27/2007 0.5-1 ft BGS
Benzo(a)pyrene	0.65

BH33	2/15/2007 0-2 ft BGS
Benzo(a)pyrene	1.6 U

BH18	12/18/2006 0-2 ft BGS	2/15/2007 2-4 ft BGS
Benzo(a)pyrene	4.8	0.36 U

BH122	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.15 J

BH18D	9/27/2007 1-1.5 ft BGS
Benzo(a)pyrene	0.28 J/0.36

BH128	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.055 J

BH19	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	1.9

BH123	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.021 J

BH18A	9/27/2007 1-1.5 ft BGS
Benzo(a)pyrene	0.037 J

BH117	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.02 J

BH121	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.51

BH125	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.015 J

BH16	12/18/2006 0-2 ft BGS
Benzo(a)pyrene	0.12 J

BH119	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.05 J/0.18 J

BH118	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.019 J

BH34	2/15/2007 0-2 ft BGS
Benzo(a)pyrene	0.6 U

BH124	11/11/2007 0-2 ft BGS
Benzo(a)pyrene	0.01 J

LEGEND

- PROPERTY BOUNDARY
- FENCE
- STORM SEWER
- GEOPROBE LOCATION
- PROPOSED EXCAVATION AREA (EXCAVATION TO A DEPTH OF 2-FEET)
- SAMPLE LOCATION
- SAMPLE DATE
- SAMPLE DEPTH
- RESULT (mg/kg)
- PARAMETER
- EXCEEDS CRITERIA

BH13	9/27/07
	1-1.5 ft BGS
Benzo(a)pyrene	0.037 J

figure 6

SUMMARY OF DETECTS - BENZO(a)PYRENE
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

Trichloroethene Criteria		
Code	Criteria Type	Criteria Value (mg/kg)
a	Residential/Non-Residential - Statewide Default Background Levels	-
b	Non-Residential - Ambient Air - Finite VSIC-2m Source Thickness	1100
c	Non-Residential - Ambient Air - Finite VSIC-5m Source Thickness	440
d	Non-Residential - Ambient Air - Infinite Source VSIC	260
e	Non-Residential - Direct Contact	500
f	Non-residential - Drinking Water Protection	0.1
g	Non-residential - Soil Volatilization to Indoor Air Inhalation	37
h	Non-residential - Ambient Air - Particulate Soil Inhalation	2300000

SOUTH JEFFERSON AVENUE

0 40 80ft

WOLV PATT & MACHINE 1716 S. JEFFERSON

BH37	2/15/2007
	0-2 ft BGS
Trichloroethene	0.053 U

BH9	12/18/2006
	0-2 ft BGS
Trichloroethene	0.058 U

BH31	2/15/2007
	0-2 ft BGS
Trichloroethene	0.079

BH29D	2/15/2007
	2-4 ft BGS
Trichloroethene	0.048 U

BH3	12/18/2006	12/18/2006
	0-2 ft BGS	2-4 ft BGS
Trichloroethene	0.045 U	0.045 U

BH28C	2/15/2007
	2-4 ft BGS
Trichloroethene	0.045 U

BH30	2/15/2007
	4-5 ft BGS
Trichloroethene	0.045 U

BH26	12/18/2006
	0-2 ft BGS
Trichloroethene	0.059 U

ELECTRICAL SUBSTATION

BH36D	2/15/2007
	0-2 ft BGS
Trichloroethene	0.045 U

OWEN STREET (VACATED)

BH24	12/18/2006
	0-2 ft BGS
Trichloroethene	0.043 U

BH12	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Trichloroethene	0.52 (f)	0.28 (f)

(FORMER FURSTENBERG BROTHERS & CO. LUMBER YARD)

VACANT

G.T.W. RAILROAD

BH6	12/18/2006
	0-2 ft BGS
Trichloroethene	0.051 U

BH14	12/18/2006
	0-2 ft BGS
Trichloroethene	0.041 U/0.04 U

BH32E	2/15/2007
	2-4 ft BGS
Trichloroethene	0.16 (f)

HOWARD STREET

BH15	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Trichloroethene	0.12 (f)	0.29 (f)

VACANT/

BH13	12/18/2006
	0-2 ft BGS
Trichloroethene	0.046 U

VEGETATION & TREES

PARTIAL FENCE LINE

BH18	12/18/2006	2/15/2007
	0-2 ft BGS	2-4 ft BGS
Trichloroethene	0.047 U	0.081 U

BH33	2/15/2007
	0-2 ft BGS
Trichloroethene	0.047 U

BH19	12/18/2006
	0-2 ft BGS
Trichloroethene	0.051 U

BROWN STREET

BH34	2/15/2007
	0-2 ft BGS
Trichloroethene	0.046 U

BH16	12/18/2006
	0-2 ft BGS
Trichloroethene	0.1

RESIDENTIAL

GAREY STREET (FO

LEGEND

- PROPERTY BOUNDARY
- FENCE
- STORM SEWER
- GEOPROBE LOCATION
- PROPOSED EXCAVATION AREA (EXCAVATION TO A DEPTH OF 2-FEET)
- SAMPLE LOCATION
- SAMPLE DATE
- SAMPLE DEPTH
- RESULT (mg/kg)
- PARAMETER
- EXCEEDS CRITERIA

BH13	12/18/08
	0-2 ft BGS
Trichloroethene	0.051 J

figure 7

SUMMARY OF DETECTS - TRICHLOROETHENE
FORMER WAREHOUSE
700 GAREY STREET
Saginaw, Michigan

SOURCE: MICHIGAN INSPECTION BUREAU; SAGINAW, MICHIGAN, JUNE 1940

ATTACHMENT A

SOIL BORING LOGS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH1
DATE/TIME STARTED 12/12/06
DATE/TIME COMPLETED 12/12/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" 6" 6" 6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist		geoprobe						
1		2	brown to black soft clay, trace sand + gravel, little silt, moist to dry	-064					0-2	–	
2		4	brown soft clay, trace sand + gravel, little silt moist to dry	-065/066					2-4	–	
4		10	hard mottled brown/grey clay, trace sand, silt, gravel, dry	-067					4-5	–	

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS 1
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH2
DATE/TIME STARTED 12/12
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1/2	topsoil, black moist to wet
1/2		3/4	concrete
3/4		1 1/2	brown to black soft clay, some silt + sand, little gravel, moist
1 1/2		4 1/2	brown soft clay, little silt, some sand + gravel, moist
4 1/2		5	brown w/grey mottling clay, little gravel, trace sand + silt, dry to moist

SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH3
DATE/TIME STARTED 12/19/06
DATE/TIME COMPLETED 12/18/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist		geoprobe								
1		2	black sand + gravel, moist, trace silt, med grained sand	-068						0-2	-		
2		5 1/2	soft brown clay, little gray mottling, little sand trace gravel, little silt, moist to dry	-069	MS/MSD					2-4	-		
5 1/2		10	hard clay, mottled brown/gray, trace sand, silt and gravel, dry	070						4-5	-		
		Note:	petroleum odor in BH										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH4
DATE/TIME STARTED 12/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		3	brown soft clay, little silt, moist, trace sand + gravel												
3		5	brown w/grey mottling clay dense, little gravel, trace sand + silt, moist to dry												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH5
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, moist to wet
1		3 1/2	brown soft clay, little silt, trace sand & gravel, moist
3 1/2		5	brown w/grey mottling clay, moist to dry, little gravel, trace sand & silt, dense

SAMPLE DETAILS											
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH6
DATE/TIME STARTED 12/12
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, moist to wet										
1/2		5	concrete pieces, bricks										
			low recovery due to brick pieces										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH7
DATE/TIME STARTED 12/16
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, wet to moist												
1/2		1	black sand little gravel, trace silt wet to moist												
1		4	brown soft clay, little silt, trace sand + gravel, moist												
4		5	brown w/grey mottling clay, dense, moist to dry, little gravel												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH8
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" 6" 6" 6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, wet to moist							
1/2		1'1/2	black sand + gravel, wet to moist, trace silt							
1'1/2		5	brown soft clay, little silt, trace sand + gravel, moist							

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH9
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1/2	topsoil, black, moist to wet
1/2		1	black sand + gravel, moist to wet, pieces of slag
1		2	brown/black soft clay, little silt, trace sand + gravel, moist
2		5	brown soft clay, little silt, trace sand + gravel, moist

SAMPLE DETAILS											
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH 10
DATE/TIME STARTED 12/18/06
DATE/TIME COMPLETED 12/18/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, moist to wet		geoprobe						-		
1/2		1 1/2	Concrete pieces (low recovery)	[redacted]-052						0-2			
1 1/2		5	brown soft clay, little silt, trace sand + gravel, moist to dry										
5		10	hard clay, brown/grey mottled, trace sand, silt + gravel, dry	053						5-6			

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH11
DATE/TIME STARTED 12/8
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		3/4	topsoil, black, wet to moist													
3/4		1 1/2	brown/black clay, little silt, moist, trace sand & gravel, soft													
1 1/2		4	brown soft clay, little silt trace sand & gravel, moist													
4		5	brown w/grey mottling clay, little gravel, trace sand & silt, dense, dry to moist													

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH12
DATE/TIME STARTED 12/18/06
DATE/TIME COMPLETED 12/18/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, moist to wet		grab								
1		2	black sand, little gravel, trace silt, wet to moist, red	033	~~grab~~ SS					0-2			
2		4	soft brown clay, little silt, trace sand + gravel, moist to dry	034 035	~~grab~~ SS					2-4			
4		10	hard clay, brown/grey mottled, trace silt, sand + gravel, dry										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH13
DATE/TIME STARTED 12/13
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, moist to wet												
1/2		1	black to grey sand + gravel, coarse sand, wet, trace silt												
1		2	blackish brown clay, dense, trace silt + gravel, dry												
2		4	brown soft clay, little silt, trace sand + gravel, moist												
4		5	brown clay w/ grey mottling, dense, dry trace sand + silt, little gravel												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH14
DATE/TIME STARTED 12/13
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1/2	topsoil, black, moist to wet
1/2		1	concrete, sand + gravel, dry, grey
1		2	black sand, trace silt + gravel, moist, pieces of slag
2		3	brown soft clay, little silt, trace sand + gravel, moist
3		5	brown w/grey mottling clay, dense dry to moist, trace silt and sand, little gravel

SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH 15
DATE/TIME STARTED 12/12/06
DATE/TIME COMPLETED 12/12/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, moist to wet										
1/2		2	black sand with gravel, spots of red wet to moist, trace silt, med										
2		4 1/2	soft brown clay, little silt, trace sand + gravel, moist to dry										
4 1/2		10	hard clay, brown/grey mottled, trace sand, silt + gravel, dry										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH/6
DATE/TIME STARTED 12/12
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		3/4	topsoil, black, moist to wet
3/4		1	blackish tan sand, med, trace silt + gravel, moist
1		2	black to brown soft clay, little silt trace sand + gravel, moist
2		4'/2	brown clay, soft little silt + gravel, trace sand, moist
4'/2		5	brown w/ grey mottling clay, trace silt, sand + gravel, dry to moist

SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH17
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, moist to wet										
1		4.5	brown clay, med soft, little sand + gravel trace silt, moist										
4.5		5	brown w/ grey mottling, clay, dense, trace sand + silt, little gravel, dry										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH18
DATE/TIME STARTED 12/13
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, moist to wet
1		2.5	black sand + gravel moist, pieces of slag + concrete, moist, trace silt
2.5		3	black to grey silt, little clay + gravel, trace sand moist, soft
3		5	brown soft clay, little silt, trace sand + gravel, moist

SAMPLE DETAILS										
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH 19
DATE/TIME STARTED 12/13/06
DATE/TIME COMPLETED 12/15/06
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, wet to moist										
1/2		1	black sand with gravel, wet, trace silt red										
1		2	soft brown clay, little silt, trace sand + gravel, moist to wet										
2		4 1/2	hard brown clay, mottled gray, trace silt, sand, gravel, moist to wet										
4 1/2		6	brown soft clay, wet, channels thru clay, trace sand + gravel, little silt										
6		10	brown/grey mottled clay, dry to moist, trace sand, silt + gravel										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH20
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		1 1/2	black sand + gravel, wet trace silt, pieces of slag												
1 1/2		2	brown/black clay, little silt, soft, moist, trace sand + gravel												
2		5	brown soft clay, little silt, trace sand + gravel, moist												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH21
DATE/TIME STARTED 12/10
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, moist to wet												
1		5	brown soft clay, little silt, trace sand & gravel, moist												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH22
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSA

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, moist to wet										
1		4	brown soft clay, little silt, trace sand & gravel, moist										
4		5	brown w/grey mottling clay, trace sand & silt, little gravel, moist to dry										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH23
DATE/TIME STARTED 12/1/8
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, moist to wet
1		1.5	dark brown to black silt, little clay trace sand + gravel, moist
1.5			soft clay, little silt, trace sand + gravel moist, brown
	3.5		silt has red tint
		4	
4		5	clay, dense, brown w/ grey mottling, trace large gravel, trace silt

SAMPLE DETAILS											
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH24
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1/2	topsoil, black, moist to wet
1/2		2½	grey to brown sand & gravel, dry to moist (mtl)
			low recovery
2½		5	brown soft clay, little silt, trace sand & gravel, moist

SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH25
DATE/TIME STARTED 12/16
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, moist, black										
1/2		1	concrete										
1		2	tan sand, wet, med, trace silt, (fill)										
2		3	brown soft clay, little silt moist, black/grey tint in places, trace sand + gravel										
3		5	brown w/ grey mottling clay, moist to dry, trace sand + silt, little gravel										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH15/25 (between)
DATE/TIME STARTED 12/12
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	topsoil, black, moist to wet												
1/2		3	black sand + gravel, trace silt, pieces of slag												
3		5	brown soft clay, little silt, trace sand + gravel, moist												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH26
DATE/TIME STARTED 12/18
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, moist to wet
1		2	black sand + gravel, moist, trace silt
2		4	brown soft clay, little silt, trace sand + gravel, moist
4		5	brown w/grey mottling clay, dry to moist, trace sand + ~~gravel~~ silt, little gravel, loose

SAMPLE DETAILS SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH27
DATE/TIME STARTED 12/13
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, wet to moist
1		2	brown/black silty clay, soft, trace sand & gravel, moist
2		5	brown soft clay, little silt, trace sand & gravel, moist

SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH28A
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, wet to moist
1		3	brown/black sand, little silt & clay, moist, pieces of bricks
3		3½	tan sand, med, moist to dry, (fill)
3½		4	brown soft clay
4		5	brown/grey hard clay

SAMPLE DETAILS											
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH28B
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		2	black/brown silty sandy clay trace gravel, wet to moist, brick pieces												
2		3	soft brown clay												
3		5	brown/grey hard clay												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH28C
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist										
1		3	brown/black silty sandy clay, trace gravel moist										
3		5	tan sand, med, moist to dry, (fill)										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH28D
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist										
1		2	sandy clay, little silt & gravel, moist brown										
2		3	black to brown sand, little silt, trace clay & gravel, moist										
3		3 1/2	tan sand, med, moist to dry, (silt)										
3 1/2		4 1/2	brown soft clay										
4 1/2		5	brown/grey hard clay										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH 28 E (10')
DATE/TIME STARTED 7/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
			ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).										
5		5'4	tan sand, moist to dry, med, (fill)										
5'4		10	hard brown/grey clay										

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: 6" from 28C

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH29C
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		1	topsoil, black, wet to moist
1		2 1/2	concrete
2 1/2		3	black sand with slag, concrete, moist
3		4 1/2	brown soft clay
4 1/2		5	brown/grey hard clay slight petroleum odor

SAMPLE DETAILS										
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH29D
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, moist to wet													
1		4'/2	mottled brown/black clay, soft													
			little sand + silt, trace gravel, moist													
4'/2		5	brown/grey hard clay													

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER ____ HOURS ____

COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH30
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		3/4	topsoil, black, wet to moist										
3/4		3	sandy clay, little silt, trace gravel brown to black, moist										
3		5	brown hard and soft clay seams, little silt, trace gravel, moist to dry (4" seams) (petroleum odor)										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH31
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
			ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).										
0		1	topsoil, black, wet to moist										
1		3	black/brown sand, med moist to wet, pieces of concrete, trace silt										
3		5	brown/grey hard clay										

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH32A
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil black, wet to moist										
1		2	brown/black silty sandy clay, pieces of slag + concrete, moist										
2		4 1/2	brown soft clay										
4 1/2		5	brown/grey hard clay										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH32D
DATE/TIME STARTED
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil black, wet to moist												
1		3	brown/black silty sandy clay, moist trace gravel												
3		4	soft brown clay												
4		5	brown/grey hard clay												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS:

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH32E
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		4	brown/black/red silty sandy clay, trace gravel, moist												
4		5	brown/grey hard clay												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH32F
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)
0		1	topsoil, black, wet to moist, concrete pieces
1		3	black sand, pieces of slag + concrete, moist
3		4'/2	brown soft clay
4'/2		5	brown/grey hard clay

SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

CRA

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH33
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		2	black sand, med, wet to moist, pieces of slag												
2		2 1/2	brown silty sand, trace gravel, moist												
2 1/2		4 1/2	brown soft clay, little silt, trace sand & gravel, moist												
4 1/2		5	brown w/grey mottling clay, dense moist to dry, little gravel, trace silt & sand												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH34
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil black, moist to wet													
1		2'/2	brown/black sand, concrete pieces, trace silt moist													
2'/2		4	brown soft clay, little silt, trace sand & gravel, moist													
4		5	brown w/grey mottling clay dense, little gravel, trace sand & silt, moist to dry													

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH35
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
			ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).										
0		1	topsoil, black, wet to moist										
1		1 1/2	brown/black silty sand, wet to moist										
			some gravel										
1 1/2		3	black sand, slag pieces, little gravel, moist										
3		4	brown soft clay										
4		5	brown/grey hard clay										

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH36A
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
			ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) - MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).										
0		1	topsoil, black, wet to moist										
1			soft silty sandy clay, brown, trace gravel, moist										
	3'		pieces of slag + concrete										
		5											

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH36B
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)
0		1	topsoil, black, wet to moist
1		2	black sand, med, piece of slag, moist
2		5	brown soft clay

SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH36C
DATE/TIME STARTED
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist												
1		2	black sand, pieces of concrete + slag												
2		3 1/2	brown soft clay												
~~3 1/2~~	3 1/2	~~4~~	seam of sand + gravel												
3 1/2		5	brown soft clay												

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH36D
DATE/TIME STARTED 2/25
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black moist to wet										
1		2	black sand, med, pieces of slag with blue/green material										
2		4	brown soft clay										
4		5	brown/grey hard clay										

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS

NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH36E
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).)	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	topsoil, black, wet to moist													
1		2	dark brown silty sandy clay, soft moist													
2		4	brown soft clay													
4		5	brown/grey hard clay													

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Former Warehouse
PROJECT NUMBER 45285
CLIENT GM Remediation
LOCATION 700 Garey St. Saginaw, MI

DRILLING CONTRACTOR Altech
DRILLER
SURFACE ELEVATION vacant lot - grass
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH37
DATE/TIME STARTED 2/15
DATE/TIME COMPLETED
DRILLING METHOD geoprobe
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION
			ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – MAIN COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).
0		3/4	topsoil, black, wet to moist
3/4		1'1/2	black sand, med pieces of slag + concrete moist to wet
1'1/2		3	brown/black silty sandy clay, trace gravel, moist
3		4	brown soft clay
4		5	brown/grey hard clay

SAMPLE DETAILS												
SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6"	6"	6"	6"	SAMPLE INTERVAL	PID / FID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE

NOTES AND COMMENTS

CRA

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

ATTACHMENT B

STATISTICAL CALCULATIONS

CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

MEMORANDUM

TO:	John-Eric Pardys	REF. NO.:	045285
FROM:	Wesley Dyck; Daniela Araujo/ev/5	DATE:	October 13, 2011
RE:	Determination of Upper Confidence Limits for Lead and Benzo(a)pyrene in Soil Former Warehouse, 700 Garey Street, Saginaw, Michigan		

1.0 INTRODUCTION

This memorandum describes the calculation 95 percent upper confidence limits (UCLs) of the mean concentrations of lead and benzo[a]pyrene (BaP) in soils at the former warehouse property located at 700 Garey Street in Saginaw, Michigan (Site). The calculation of 95 percent UCLs is recommended under Michigan's Part 201 Regulation for demonstrating the compliance of chemical concentrations in soils with applicable direct contact criteria and volatile soil inhalation criteria. The soil data considered were generated through the chemical analysis of soil samples collected from boreholes advanced at the Site in 2006 and 2007.

Recommended procedures for statistically analyzing data sets and generating 95 percent UCLs are found in Tab 7 (Statistical Methods) of Michigan's *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria* (Michigan, 2002). Historically, Michigan also provided a web-based software tool ("P201 StatSoft") for performing the calculations, but the tool was discontinued at the end of 2009 with an indication that alternative software such as USEPA's "ProUCL" software be used. Therefore, the current evaluation has utilized the strategies and procedures present in ProUCL (current version 4.1) for the calculation of 95 percent UCL values for lead and BaP in soil.

As noted in Michigan (2002), and fully discussed in USEPA (2010), the calculation of an appropriate 95 percent UCL for a data set depends on observed characteristics of the data, such as the number of samples, the presence of censored (non-detect) data, and the observed data distribution (e.g., normal, gamma-distributed, lognormal). The Part 201 guidance (Michigan 2002) provides methods for calculating 95 percent UCL values for data sets that are normally or lognormally distributed and which contain up to 50 percent non-detects. Additional methods for other cases (i.e., different distributions and non-detect frequencies) are available in USEPA's ProUCL software and described in the accompanying Technical Guide (USEPA, 2010).

2.0 LEAD

The available data for lead were compiled and used for statistical analyses. These data are shown in Table 1. The lead data set contained no non-detects, and therefore no special accommodation of such censored data were required. ProUCLs output for the generation of a 95 percent UCL for lead in soil is provided in Attachment A.

The following table provides a summary of the results obtained from ProUCL during 95 percent UCL calculations for lead in Site soils:

Lead Statistical Summary	
Number of samples	59
Percentage of non-detects	0%
Sample mean	71.4 mg/kg
Interpreted data distribution	lognormal
UCL calculation method*	95% Chebyshev (Mean, Sd)
UCL of the mean	119.7 mg/kg

3.0 BENZO(A)PYRENE

The available data for benzo(a)pyrene were compiled and used for statistical analyses. These data are shown in Table 1. The appropriate accommodation of any non-detects present in the data set was handled internally using ProUCL's calculation algorithms (described in full in USEPA, 2010). ProUCLs output for the generation of a 95 percent UCL for BaP in soil is provided in Attachment A.

The following table provides a summary of the results obtained from ProUCL during 95 percent UCL calculations for BaP in Site soils:

Benzo(a)pyrene Statistical Summary	
Number of samples	62
Percentage of non-detects	19.4%
Sample mean	0.864 mg/Kg
Interpreted data distribution	not normal
UCL calculation method*	97.5% KM (Chebyshev)
UCL of the mean	2.61 mg/Kg

* See USEPA, 2010, for descriptions of specific UCL methods

4.0 REFERENCES

Michigan, 2002. Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria. Michigan Department of Environmental Quality, Environmental Response Division.

USEPA, May 2010. ProUCL Version 4.1.00 Technical Guide (Draft). United States Environmental Protection Agency, Office of Research and Development, Washington DC. EPA/600/R-07/041.

TABLE 1

SOIL CHEMISTRY USE FOR 95 PERCENT UPPER CONFIDENCE LIMIT (UCL) CALCULATIONS
FORMER WAREHOUSE, 700 GAREY STREET
SAGINAW, MICHIGAN

Location	*Sample ID*	*Date*	*Depth (ft)*	*Lead (mg/kg)*	*BaP (mg/kg)*
BH03	S-121806-SSH-068	18-Dec-2006	0-2	98.1	0.018
BH03	S-121806-SSH-069	18-Dec-2006	2-4	5.9	0.3 U
BH06	S-121806-SSH-044	18-Dec-2006	0-2	19.1	0.038
BH09	S-121806-SSH-050	18-Dec-2006	0-2	126	0.22
BH12	S-121806-SSH-033	18-Dec-2006	0-2	146	0.54
BH12	S-021507-SSH-076	15-Feb-2007	2-4	104	0.46
BH13D	S-092707-SSH-105	27-Sep-2007	0-2	90.2	--
BH13N	S-45285-111107-SSH-111	11-Nov-2007	0-2	106	--
BH13N	S-45285-111107-SSH-112	11-Nov-2007	2-4	11.4	--
BH13S	S-45285-111107-SSH-115	11-Nov-2007	0-2	42.7	--
BH13S	S-45285-111107-SSH-116	11-Nov-2007	2-4	7.3	--
BH14	S-121806-SSH-029	18-Dec-2006	0-2	17	1.5 U
BH15	S-121806-SSH-019	18-Dec-2006	0-2	104	0.37
BH15	S-021507-SSH-085	15-Feb-2007	2-4	220	0.36 U
BH16	S-121806-SSH-016	18-Dec-2006	0-2	386	0.12
BH16	S-121806-SSH-017	18-Dec-2006	2-4	6	--
BH18	S-121806-SSH-010	18-Dec-2006	0-2	172	4.8
BH18	S-021507-SSH-075	15-Feb-2007	2-4	28.1	0.36 U
BH18A	S-092707-SSH-106	27-Sep-2007	1-1.5	--	0.037
BH18B	S-092707-SSH-107	27-Sep-2007	1-1.5	--	0.9
BH18C	S-092707-SSH-108	27-Sep-2007	0.5-1	--	0.65
BH18D	S-092707-SSH-109 / 110	27-Sep-2007	1-1.5	--	0.32
BH19	S-121806-SSH-007	18-Dec-2006	0-2	182	1.9
BH19	S-121806-SSH-008	18-Dec-2006	2-4	9.7	--
BH24	S-121806-SSH-057	18-Dec-2006	0-2	43.8	1.8
BH26	S-121806-SSH-036	18-Dec-2006	0-2	269	0.71
BH28C	S-021507-SSH-081	15-Feb-2007	2-4	--	0.3 U
BH29D	S-021507-SSH-084	15-Feb-2007	2-4	--	0.67
BH30	S-021507-SSH-082	15-Feb-2007	4-5	--	0.29 U
BH31	S-021507-SSH-083	15-Feb-2007	0-2	47.8	0.52
BH32E	S-021507-SSH-086	15-Feb-2007	2-4	--	0.31 U
BH33	S-021507-SSH-073	15-Feb-2007	0-2	--	1.6 U
BH34	S-021507-SSH-074	15-Feb-2007	0-2	--	0.6 U
BH35	S-021507-SSH-077 / 078	15-Feb-2007	2-4	--	0.305 U
BH36D	S-021507-SSH-079	15-Feb-2007	0-2	49.8	0.31 U
BH37	S-021507-SSH-080	15-Feb-2007	0-2	317	--
BH117	S-45285-111107-SSH-117	11-Nov-2007	0-2	10.4	0.02
BH118	S-45285-111107-SSH-118	11-Nov-2007	0-2	8.7	0.019

TABLE 1

SOIL CHEMISTRY USE FOR 95 PERCENT UPPER CONFIDENCE LIMIT (UCL) CALCULATIONS
FORMER WAREHOUSE, 700 GAREY STREET
SAGINAW, MICHIGAN

Location	*Sample ID*	*Date*	*Depth (ft)*	*Lead (mg/kg)*	*BaP (mg/kg)*
BH119	S-45285-111107-SSH-119 / 120	11-Nov-2007	0-2	15.15	0.115
BH121	S-45285-111107-SSH-121	11-Nov-2007	0-2	116	0.51
BH122	S-45285-111107-SSH-122	11-Nov-2007	0-2	26.6	0.15
BH123	S-45285-111107-SSH-123	11-Nov-2007	0-2	9.8	0.021
BH124	S-45285-111107-SSH-124	11-Nov-2007	0-2	9.6	0.01
BH125	S-45285-111107-SSH-125	11-Nov-2007	0-2	22.2	0.015
BH126	S-45285-111107-SSH-126	11-Nov-2007	0-2	12.3	0.067
BH127	S-45285-111107-SSH-127	11-Nov-2007	0-2	10.9	0.058
BH128	S-45285-111107-SSH-128	11-Nov-2007	0-2	10.6	0.055
BH129	S-45285-111107-SSH-129	11-Nov-2007	0-2	7.5	0.01
BH130	S-45285-111107-SSH-130	11-Nov-2007	0-2	71.7	0.18
BH131	S-45285-111107-SSH-131 / 132	11-Nov-2007	0-2	9.55	0.017
BH133	S-45285-111107-SSH-133	11-Nov-2007	0-2	64.5	0.3 U
BH134	S-45285-111107-SSH-134	11-Nov-2007	0-2	8.8	0.015
BH135	S-45285-111107-SSH-135	11-Nov-2007	0-2	37	0.022
BH136	S-45285-111107-SSH-136	11-Nov-2007	0-2	243	0.42
BH137	S-45285-111107-SSH-137	11-Nov-2007	0-2	188	0.69
BH138	S-45285-111107-SSH-138	11-Nov-2007	0-2	18.8	0.084
BH139	S-45285-111107-SSH-139	11-Nov-2007	0-2	10.3	0.0096
BH140	S-45285-111107-SSH-140	11-Nov-2007	0-2	72.7	0.38
BH141	S-45285-111107-SSH-141	11-Nov-2007	0-2	108	6.7
BH142	S-45285-111107-SSH-142 / 143	11-Nov-2007	0-2	101.2	7.7
BH144	S-45285-111107-SSH-144	11-Nov-2007	0-2	13	0.025
BH145	S-45285-111107-SSH-145	11-Nov-2007	0-2	11.1	0.014
BH146	S-45285-111107-SSH-146	11-Nov-2007	0-2	89.4	14
BH147	S-45285-111107-SSH-147	11-Nov-2007	0-2	32.1	0.35
BH148	S-45285-111107-SSH-148	11-Nov-2007	0-2	14.1	0.047
BH149	S-45285-111107-SSH-149	11-Nov-2007	0-2	170	3.7
BH150	S-45285-111107-SSH-150	11-Nov-2007	0-2	39.9	0.32
BH151	S-45285-111107-SSH-151	11-Nov-2007	0-2	10.6	0.084
BH152	S-45285-111107-SSH-152	11-Nov-2007	0-2	13.1	0.12
BH153	S-45285-111107-SSH-153 / 154	11-Nov-2007	0-2	19.65	0.27

Notes:

Field duplicates (indicated by " / " in sample id) have been averaged prior to statistical calculations.
"U" denotes that analyte concentration was below the indicated detection limit.

ATTACHMENT A

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	D:\EAMgroup\45285 (Garey St. Saginaw)\45285 ProUCL Data.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Lead

General Statistics

Number of Valid Observations	59	Number of Distinct Observations	57
Number of Missing Values	11		

Raw Statistics

Minimum	5.9
Maximum	386
Mean	71.44
Median	32.1
SD	85.01
Std. Error of Mean	11.07
Coefficient of Variation	1.19
Skewness	1.79

Log-transformed Statistics

Minimum of Log Data	1.775
Maximum of Log Data	5.956
Mean of log Data	3.579
SD of log Data	1.218

Relevant UCL Statistics

Normal Distribution Test

Lilliefors Test Statistic	0.22
Lilliefors Critical Value	0.115

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Lilliefors Test Statistic	0.135
Lilliefors Critical Value	0.115

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	89.94

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	92.4
95% Modified-t UCL (Johnson-1978)	90.37

Assuming Lognormal Distribution

95% H-UCL	116.7
95% Chebyshev (MVUE) UCL	137.4
97.5% Chebyshev (MVUE) UCL	165
99% Chebyshev (MVUE) UCL	219.1

Gamma Distribution Test

k star (bias corrected)	0.821
Theta Star	87.03
MLE of Mean	71.44
MLE of Standard Deviation	78.85
nu star	96.87
Approximate Chi Square Value (.05)	75.17
Adjusted Level of Significance	0.0459
Adjusted Chi Square Value	74.69
Anderson-Darling Test Statistic	2.009
Anderson-Darling 5% Critical Value	0.787
Kolmogorov-Smirnov Test Statistic	0.165
Kolmogorov-Smirnov 5% Critical Value	0.12

Data not Gamma Distributed at 5% Significance Level

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	89.65
95% Jackknife UCL	89.94
95% Standard Bootstrap UCL	89.7
95% Bootstrap-t UCL	93.59
95% Hall's Bootstrap UCL	92.96
95% Percentile Bootstrap UCL	90.18
95% BCA Bootstrap UCL	93.19
95% Chebyshev(Mean, Sd) UCL	119.7

97.5% Chebyshev(Mean, Sd) UCL 140.6

99% Chebyshev(Mean, Sd) UCL 181.6

Assuming Gamma Distribution

95% Approximate Gamma UCL 92.07

95% Adjusted Gamma UCL 92.66

Potential UCL to Use | Use 95% Chebyshev (Mean, Sd) UCL 119.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

BaP

General Statistics

Number of Valid Data	62	Number of Detected Data	50
Number of Distinct Detected Data	45	Number of Non-Detect Data	12
Number of Missing Values	8	Percent Non-Detects	19.35%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0096	Minimum Detected	-4.646
Maximum Detected	14	Maximum Detected	2.639
Mean of Detected	1.005	Mean of Detected	-1.791
SD of Detected	2.466	SD of Detected	1.936
Minimum Non-Detect	0.29	Minimum Non-Detect	-1.238
Maximum Non-Detect	1.6	Maximum Non-Detect	0.47

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect	55
Number treated as Detected	7
Single DL Non-Detect Percentage	88.71%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.456	Shapiro Wilk Test Statistic	0.944
5% Shapiro Wilk Critical Value	0.947	5% Shapiro Wilk Critical Value	0.947
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.864	Mean	-1.741
SD	2.232	SD	1.759
95% DL/2 (t) UCL	1.337	95% H-Stat (DL/2) UCL	1.55
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.992
		SD in Log Scale	1.802
		Mean in Original Scale	0.824
		SD in Original Scale	2.241
		95% t UCL	1.299
		95% Percentile Bootstrap UCL	1.319
		95% BCA Bootstrap UCL	1.524

95% H-UCL	1.339

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.362
Theta Star	2.779
nu star	36.18
A-D Test Statistic	2.695
5% A-D Critical Value	0.845
K-S Test Statistic	0.845
5% K-S Critical Value	0.135

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	14
Mean	0.811
Median	0.0755
SD	2.246
k star	0.195
Theta star	4.156
Nu star	24.19
AppChi2	14
95% Gamma Approximate UCL	1.402
95% Adjusted Gamma UCL	1.42

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	0.83
SD	2.222
SE of Mean	0.285
95% KM (t) UCL	1.306
95% KM (z) UCL	1.299
95% KM (jackknife) UCL	1.305
95% KM (bootstrap t) UCL	1.777
95% KM (BCA) UCL	1.37
95% KM (Percentile Bootstrap) UCL	1.343
95% KM (Chebyshev) UCL	2.073
97.5% KM (Chebyshev) UCL	2.611
99% KM (Chebyshev) UCL	3.667

Potential UCLs to Use

97.5% KM (Chebyshev) UCL	2.611

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.