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June 28, 2013

US EPA RECORDS CENTER REGION 5
478369

Reference No. 039611

Mr. Rosauro del Rosario
EPA Project Manager/Coordinator
United States Environmental Protection Agency (USEPA), Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Dear Mr. del Rosario:

Re: Final Copy of the 2012 Annual Groundwater Monitoring Report Rev. 1 (June 2013)
Approved by USEPA on June 14, 2013
Himco Site, Elkhart, Indiana

On behalf of the Himco Site Trust (the Trust), Conestoga-Rovers & Associates (CRA) has prepared a finalized hardcopy of the 2012 Annual Groundwater Monitoring Report for the U.S. Environmental Protection Agency (USEPA). USEPA approved this Report on June 14, 2013. CRA has also included a compact disk with an electronic copy of the Report for your use.

Appendix A: e:DAT (Electronic Data Access Tool) and Appendix C: Laboratory Reports and Data Validation Memoranda of the Report were submitted to USEPA on a flash drive in November 2012. Since there were no changes made to these appendices, we trust that the flash drive previously submitted is adequate.

Please contact me at (519) 884-0510 if you have questions or require additional information.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

A. Van Norman

Alan Van Norman

HS/lp/49rev1
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Tom Lenz, Bayer HealthCare
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November 29, 2012

Reference No. 039611

Mr. Rosauro del Rosario
EPA Project Manager/Coordinator
United States Environmental Protection Agency (USEPA)
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Dear Mr. del Rosario:

Re: 2012 Annual Groundwater Monitoring Report
Himco Site, Elkhart, Indiana (Site)

Please find attached the 2012 Annual Groundwater Monitoring Report for the Himco Site. Conestoga-Rovers & Associates (CRA) has prepared this submittal on behalf of the Himco Site Trust for your review and approval.

Should you have any questions, please contact me at (519) 884-0510.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Denise Gay Quigley

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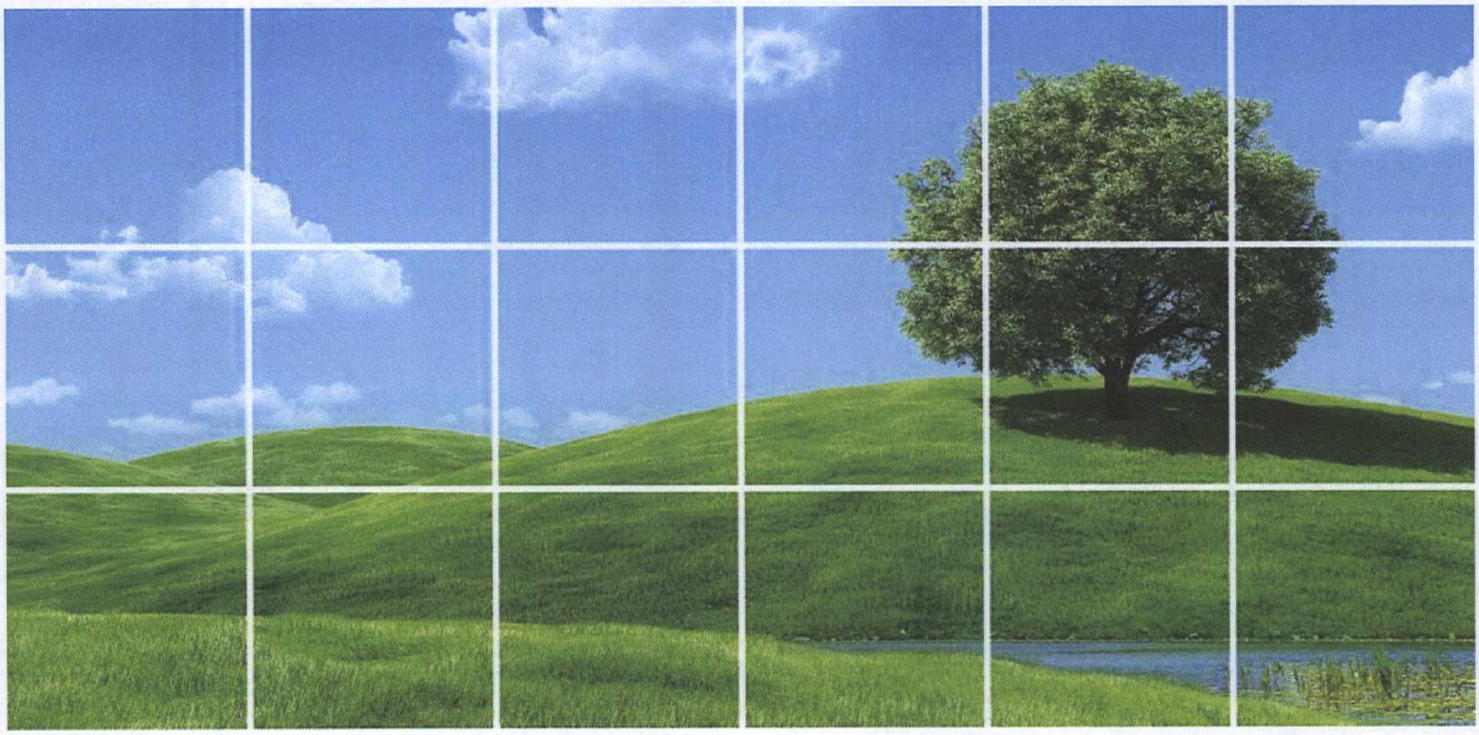

REPORT

2012 Annual Groundwater Monitoring Report

Himco Site
Elkhart, Indiana

Prepared for: Himco Site Trust

Conestoga-Rovers & Associates
651 Colby Drive
Waterloo, Ontario N2V 1C2

June 2013 • #039611
Report Number:34 (Rev. 1)

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1.0 INTRODUCTION

1.1 PURPOSE

This Annual Groundwater Monitoring Report presents the results of routine groundwater monitoring completed in 2011 and 2012 at the Himco Site (Site), located in Elkhart, Indiana. Conestoga-Rovers & Associates (CRA) has prepared this report on behalf of the Performing Settling Defendants (PSDs), collectively known as the Himco Site Trust.

The Himco Site is a National Priorities List (NPL) site that is being remediated pursuant to a Consent Decree (Civil Action No. 2:07cv304 (TS)) (CD). The Statement of Work (SOW), included as Appendix B of the CD, specified the Remedial Action (RA) requirements for the Site. The SOW required groundwater investigations to the east and southeast of the Himco Site and the implementation of a Groundwater Monitoring Program (GMP). CRA prepared a Remedial Design Work Plan on behalf of the PSDs that combined the East and Southeast Groundwater Investigations and the GMP into a three-phase groundwater investigation that built incrementally to address the groundwater investigation and monitoring requirements of the SOW.

CRA completed quarterly groundwater monitoring between 2008 and 2011. The results of previous monitoring rounds were documented by CRA in a series of reports previously submitted to the United States Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM). In accordance with the Interim Groundwater Monitoring Program Report (CRA, 2011) approved by USEPA on August 31, 2011, the GMP currently includes semi-annual groundwater monitoring, with annual reporting each fall.

1.2 BACKGROUND

The Site is a closed, unlicensed landfill located at the intersection of County Road 10 and the John Weaver Parkway (formerly Nappanee Street Extension) in Cleveland Township, Elkhart County, Indiana. The Site is approximately 60 acres in size, and accepted waste such as household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. The landfill was closed in 1976.

Figure 1.1 shows the Site location. Figure 1.2 shows the layout of the Site, including property boundaries.

The Site consists of two major areas: the landfill, and the 4-acre construction debris area (CDA), located on the northern portion of seven residential properties and one commercial property that front onto County Road 10. In 2011, the PSDs relocated CDA waste to the landfill, and completed the construction of a soil cover over the landfill in 2012. USEPA approved the Construction Completion Report/Completion of Remedial Action Report (CRA, 2012) on October 31, 2012.

The Site was proposed for the NPL in 1988 and was placed on the NPL in 1990. The Remedial Design/Remedial Action (RD/RA) is being conducted pursuant to the CD, which became effective on November 27, 2007. The lead Agency for the Site is the USEPA Region 5. IDEM is the support Agency.

1.3 PREVIOUS INVESTIGATIVE ACTIVITIES

Section II, Paragraph 4.3 of the SOW describes the requirements for the groundwater investigation east and southeast of the Site. The purpose of the investigation is to delineate the contaminant plume emanating from the Site that may potentially be impacting the adjacent aquifer and water supply wells.

CRA completed the Phase I Groundwater Investigation in 2008 and 2009. The Phase I Groundwater Investigation consisted of:

- Historic data compilation
- Existing monitoring well reconnaissance and survey
- Baseline groundwater monitoring
- Phase I vertical aquifer sampling (VAS)
- The Interim Groundwater Monitoring Program

CRA submitted the Phase I Groundwater Investigation Report to the USEPA in May 2009. USEPA provided comments on the Phase I Groundwater Investigation Report in a letter dated August 12, 2009. CRA responded to these comments in a letter dated October 20, 2009 and USEPA approved the recommendations for the Phase II Groundwater Investigation in a letter dated December 23, 2009.

The Phase II Groundwater Investigation consisted of the following tasks:

- Additional VAS
- New monitoring well installation

The results of the Phase II Groundwater Investigation refined the horizontal and vertical delineation of impacted groundwater in the vicinity of the Site and improved the definition of background groundwater quality. The Himco Site Trust completed the Phase II Groundwater Investigation in May and June 2010. CRA submitted the Phase II Groundwater Investigation Report to the USEPA in October 2010. USEPA provided comments on the Phase II Groundwater Investigation Report in a letter dated January 25, 2011. CRA responded to these comments in a letter dated February 23, 2011.

CRA submitted the Interim Groundwater Monitoring Program Report to USEPA in May 2011. The Interim Groundwater Monitoring Program Report summarized the results of the Interim Groundwater Monitoring Program after 2 years of sampling (eight quarterly events), and provided recommendations for the scope and frequency of future groundwater monitoring to be included in the GMP. USEPA provided comments on the Interim Groundwater Monitoring Program Report in a letter dated June 23, 2011 and CRA responded to these comments in a letter dated August 12, 2011. USEPA approved the revised Interim Groundwater Monitoring Program Report in a letter dated August 31, 2011.

The Phase III Groundwater Investigation consisted of installing new monitoring wells that completed the monitoring well network. The Himco Site Trust completed the Phase III Groundwater Investigation in February and March 2011. CRA submitted the Phase III Groundwater Investigation Report to the USEPA in July 2011. USEPA provided comments on the Phase III Groundwater Investigation in a letter dated May 10, 2012 and CRA responded to these comments in a letter dated June 8, 2012. USEPA approved the Phase III Groundwater Investigation Report in a letter dated June 20, 2012.

CRA completed a Baseline Groundwater Sampling round from October 28, 2008 through November 6, 2008 and on November 18 and 19, 2008. The purpose of this sampling was to determine if the monitoring wells were capable of providing representative groundwater samples and to establish baseline groundwater quality conditions. The Baseline Groundwater Sampling round represents the first routine quarterly groundwater quality monitoring round (Q1).

CRA completed the initial round of the Interim Groundwater Monitoring Program in February 2009. The following are the dates of the Interim Groundwater Monitoring Program sampling events CRA has completed at the Site to date:

- Interim Groundwater Monitoring Program (Q2) – February 9 to February 19, 2009

- Interim Groundwater Monitoring Program (Q3) - April 29 to May 6, 2009
- Interim Groundwater Monitoring Program (Q4) - August 4 to August 18, 2009
- Interim Groundwater Monitoring Program (Q5) - November 3 to November 11, 2009
- Interim Groundwater Monitoring Program (Q6) - February 23 to March 4, 2010
- Interim Groundwater Monitoring Program (Q7) - June 15 to June 24, 2010
- Interim Groundwater Monitoring Program (Q8) - September 8 to September 15, 2010
- Interim Groundwater Monitoring Program (Q9) - December 7 to December 14, 2010
- Interim Groundwater Monitoring Program (Q10) - March 8 to March 17, 2011
- Interim Groundwater Monitoring Program (Q11) - June 14 to June 24, 2011
- Interim Groundwater Monitoring Program (Q12) - September 12 to September 20, 2011
- Interim Groundwater Monitoring Program (Q13) - December 12 to December 20, 2011

The primary goal of the Interim Groundwater Monitoring Program was to characterize the nature and extent of groundwater contamination beneath the Site. The Interim Groundwater Monitoring Program was completed on a quarterly basis between November 2008 and June 2011. CRA provided the results of the Interim Groundwater Monitoring Program to the USEPA in the following submissions:

- Q1 and Q2 - The Phase I Groundwater Investigation Report (CRA, May 2009)
- Q3 through Q6 - Himco Annual Groundwater Monitoring Report (CRA, July 2010)
- Q7 - The Phase II Groundwater Investigation Report (CRA, October 2010)
- Q8 - Interim Groundwater Monitoring Program Report (CRA, April 2011)
- Q9 through Q11 - 2011 Annual Groundwater Monitoring Report (CRA, November 2011)

CRA completed the initial round of the semi-annual GMP (S1) from April 23 to April 26, 2012. The results of the Q12, Q13, and S1 monitoring are provided in this report. Subsequent sampling events will be discussed in future reports.

CRA also evaluated trends in the groundwater quality data and calculated background concentrations for metals and general chemistry parameters. The Himco Annual Groundwater Monitoring Report (CRA, 2010) includes statistical evaluations of the trends in groundwater quality data based on Q1 through Q6 results.

The Himco Site Trust did not have access to the background monitoring wells (WT102A, WT102B, and WT102C) and four of the monitoring wells along the northern Site boundary (WT112A, WT112B, WT113A, and WT113B) in December 2010 and June 2011 of the Interim Groundwater Monitoring Program. As USEPA is aware, the property owner (D&J Realty) denied the PSDs access to these wells from June 2010 until September 2011. The Himco Site Trust and D&J Realty entered into a new access agreement on September 7, 2011 which provides the PSDs access to the D&J Realty wells for 10 years or until USEPA permits the cessation of groundwater monitoring at the Site.

CRA has uploaded the Himco environmental monitoring database into an in-house software tool called e:DAT (electronic data access tool). The e:DAT for this Site can also be used to access aerial imagery, stratigraphic logs and any relevant well construction diagrams. Appendix A includes a copy of the e:DAT.

1.4 REPORT ORGANIZATION

This report is organized as follows:

- Section 2.0 describes the scope of the routine groundwater monitoring activities completed at the Site
- Section 3.0 describes Site conceptual hydrogeologic model and the groundwater flow regime, and presents hydraulic monitoring data
- Section 4.0 discusses groundwater quality monitoring results
- Section 5.0 presents conclusions and future routine groundwater monitoring activities

2.0 GROUNDWATER MONITORING PROGRAM SCOPE

2.1 GROUNDWATER ELEVATION MONITORING

During this reporting period, CRA completed quarterly groundwater elevation monitoring on September 12, 2011 (Q12), December 12, 2011 (Q13), and April 23, 2012 (S1). Data collected prior to December 2010 are discussed in previous reports. Section 3.0 provides the results of the groundwater elevation monitoring.

2.2 GROUNDWATER QUALITY MONITORING

Table 2.1 summarizes the status and construction details of the monitoring wells installed in the vicinity of the Site since 1990. Tables 2.2 and 2.3 list the monitoring wells included in the Interim Groundwater Monitoring Program and the Groundwater Monitoring Program, respectively. Figure 2.1 shows their locations.

During this reporting period, CRA sampled the wells listed in Table 2.3 in September 12, 2011 (Q12), December 12, 2011 (Q13), and April 23, 2012 (S1). Tables 2.4 and 2.5 provide the groundwater monitoring parameter list for the Interim Groundwater Monitoring Program and the Groundwater Monitoring Program, respectively. TestAmerica Laboratories Inc. of North Canton, Ohio analyzed the groundwater samples. Analytical results are compiled in Appendix B. Laboratory reports and data validation memoranda are provided in Appendix C. CRA validated the groundwater analytical data in accordance with the Quality Assurance Project Plan (QAPP) included in the Remedial Design Work Plan (CRA, November 2008). Stabilization parameters measured during groundwater sampling are summarized in Appendix D.

3.0 HYDROGEOLOGY

3.1 SITE HYDROGEOLOGY

Figure 3.1 provides a schematic of the Site conceptual hydrogeological model. There are five principal hydrostratigraphic units beneath the Site. They are, in descending order:

- The Upper Aquifer
- The Intermediate Aquifer
- The Unnamed Silt/Clay Layer
- The Lower Aquifer
- The Bedrock

CRA conceptualizes the Upper and Intermediate Aquifers beneath the Site as one sand aquifer with silt/clay aquitard materials occasionally interspersed. The Intermediate Aquifer is generally more fine-grained than the overlying Upper Aquifer and it contains discontinuous zones of silt and clay.

The Unnamed Silt/Clay Layer underlies the Intermediate Aquifer. It does not behave as a confining layer.

The sand and gravel Lower Aquifer is beneath the Unnamed Silt Clay layer. The elevation of the Bedrock surface beneath the Site is variable, and therefore, so is the thickness of the Lower Aquifer, but it ranges up to 300 feet thick in the bedrock valley beneath the western portion of the Site. The depth to bedrock is 220 feet beneath the southeast portion of the Site.

3.2 GROUNDWATER ELEVATION MONITORING

CRA has completed three groundwater elevation monitoring rounds during this reporting period. These three monitoring rounds were completed on:

- Q12 - September 12, 2011
- Q13 - December 12, 2011
- S1 - April 23, 2012

CRA has selected the April 23, 2012 monitoring round for discussion purposes due to the similarity in the groundwater flow pattern during different monitoring rounds.

Figure 3.2, Figure 3.3, and Figure 3.4 present groundwater elevation contours derived from groundwater elevation data collected on April 23, 2012 for the Upper Aquifer, Intermediate Aquifer and Lower Aquifer, respectively. The depth to groundwater in the vicinity of the Site is relatively shallow, ranging from less than 10 feet to 25 feet with typical depths ranging from 10 to 15 feet. The elevation of groundwater in the vicinity of the Site ranges from 760 to 745 feet above mean sea level (AMSL).

Figure 3.2 shows that groundwater in the Upper Aquifer typically flows in a southerly direction. Overall groundwater flow is to the south, consistent with the regional groundwater flow pattern. Superimposed on the regional flow are local features. South of the Site, groundwater in the Upper Aquifer flows south. The horizontal hydraulic gradient across the Site ranged from 0.001 to 0.013 feet/feet in the Upper Aquifer in April 2012.

As shown on Figure 3.3, groundwater in the Intermediate Aquifer typically flowed in a southerly direction in April 2012, consistent with the regional groundwater flow pattern. East and southeast of the southeast corner of the Site, groundwater in the Intermediate Aquifer flows south. The horizontal hydraulic gradient in the Intermediate Aquifer ranged from 0.001 to 0.002 feet/feet in April 2012.

Figure 3.4 presents the results from the April 23, 2012 groundwater elevation monitoring for the Lower Aquifer. These data indicate a south-southeasterly groundwater flow direction in the Lower Aquifer, consistent with the regional groundwater flow pattern. The horizontal hydraulic gradient in the Lower Aquifer ranged from 0.001 feet/feet to 0.008 feet/feet in June 2011. There is a sharp increase in the horizontal hydraulic gradient in the Lower Aquifer between the wells in the southeast corner of the Site and WT106C, located south of the southeast corner of the Site. WT101C and WTE3 were installed near the top of the Lower Aquifer (approximately 590 feet AMSL) in a sequence of silt and sand interbeds. This sequence of interbedded sands and silts is absent at WT106C and instead there is a 40-foot thick layer of silt. The top of the Lower Aquifer is much lower at WT106C (approximately 570 feet AMSL) and WT106C was also installed deeper, at approximately 550 feet AMSL.

Figure 3.5 presents the vertical gradients between the hydrostratigraphic units as measured on April 23, 2012. Upward and downward gradients are present across all units on the Site, ranging from approximately -0.06 feet/feet to 0.02 feet/feet. Downward gradients were observed predominantly in monitoring well nests located in the southeast corner of the Site and at monitoring well nest WT106, located south of the Site.

4.0 GROUNDWATER QUALITY MONITORING

4.1 INTRODUCTION

This section of the Annual Groundwater Monitoring Report describes the groundwater quality in the vicinity of the Site and discusses the nature and extent of groundwater contamination emanating from the Site.

This report presents groundwater quality monitoring data for two 2011 quarterly monitoring events and the first semi-annual sampling event of 2012, as follows:

- Interim Groundwater Monitoring Program (Q12) - September 13 to September 20, 2011
- Interim Groundwater Monitoring Program (Q13) - December 13 to December 14, 2011
- Groundwater Monitoring Program (S1) - April 24 to April 26 and May 22, 2012

In a letter dated August 31, 2011, USEPA approved the following analytes for routine groundwater quality monitoring at the Site:

VOCs

- Benzene
- Vinyl chloride
- 1,1-Dichloroethane (1,1-DCA)
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- Carbon disulfide

SVOCs

- Bis(2-ethylhexyl)phthalate

Metals

- Aluminum
- Arsenic
- Barium

- Beryllium
- Calcium
- Iron
- Lead
- Manganese
- Mercury
- Sodium

General Chemistry

- Sulfate
- Chloride

CRA has selected these analytes for discussion purposes as they will form the basis of the ongoing groundwater quality monitoring program in the vicinity of the Site.

4.2 VOLATILE ORGANIC COMPOUNDS

CRA collected 65 groundwater samples from 27 monitoring wells between September 2011 and May 2012, and analyzed them for VOCs. Table 4.1 summarizes the VOCs detected in groundwater samples collected between September 2011 and May 2012.

Benzene was the only VOC detected in routine groundwater monitoring samples at concentrations that were greater than its Primary Maximum Contaminant Level (MCL) (5 micrograms per liter [µg/L]). The other four VOCs in the GMP parameter list were detected at the following frequencies:

- 1,1-DCA = 47.7 percent
- cis-1,2-DCE = 30.8 percent
- Vinyl chloride = 20.0 percent
- Carbon disulfide = 55.4 percent

CRA has provided iso-concentration contour maps (contour maps) for groundwater quality data. CRA created the contours using SURFER version 8 software. SURFER interpolates the groundwater quality data into a uniform grid and then draws contours.

Where a compound was not detected, CRA used 10 percent of the detection limit as the value for drawing the contours. Where estimated concentrations (qualified with "J") were reported at concentrations less than the reporting detection limit, CRA used the estimated value for constructing the contours.

The following is a summary of the frequency of detection of the VOCs in each aquifer for the September 2011 through April 2012 groundwater quality monitoring results:

	Number Of Detection/Number Of Samples		
	Upper Aquifer	*Intermediate Aquifer*	*Lower Aquifer*
Benzene	16/29	0/26	0/8
1,1-DCA	20/29	11/26	0/8
cis-1,2-DCE	17/29	3/26	0/8
Vinyl chloride	6/29	5/26	2/8
Carbon disulfide	10/29	21/26	5/8

When a VOC was not detected in a given aquifer, CRA did not prepare a contour map. For example, benzene was not detected in groundwater samples from the Lower Aquifer monitoring wells, so CRA did not prepare a Lower Aquifer benzene contour map. When a VOC or SVOC was detected in a given aquifer, CRA set the lowest contour value equal to the laboratory reporting detection limit (RDL). Some VOCs and SVOCs were not detected in any samples at concentrations greater than their RDLs. In these cases, such as vinyl chloride in the Upper Aquifer, CRA posted the results on the drawing but did not generate contour lines.

4.2.1 BENZENE

As shown in Table 4.1, benzene was detected in 16 of 65 groundwater samples collected from the monitoring well network, or 24.6 percent of the groundwater samples. The detected concentrations of benzene ranged from 0.23 J µg/L to 34 µg/L. Figure 4.1 shows routine groundwater quality monitoring results for benzene for Q12, Q13, and S1 in the Upper Aquifer.

The concentration of benzene was greater than the Primary MCL of 5 µg/L in all three of the groundwater samples collected from Upper Aquifer monitoring well WT115B during the monitoring period. As shown on Figure 4.1, monitoring wells WT115A and WT115B are Upper Aquifer monitoring wells located in the southeast corner of the landfill, near the limit of waste. The historic benzene results for routine groundwater monitoring samples collected from WT115A, WT115B, and WT115C are as follows:

Benzene Concentration - WT115A/B/C (µg/L)

Date	*WT115A*	*WT115B*	*WT115C*
11/6/2008	5.7/9.3	Not Installed	Not Installed
2/12/2009	12	Not Installed	Not Installed
5/6/2009	1.0 U/0.43 J	Not Installed	Not Installed
8/5/2009	9.9	Not Installed	Not Installed
11/6/2009	12/12	Not Installed	Not Installed
3/2/2010	9.8	Not Installed	Not Installed
6/17/2011	0.69 J	Not Installed	Not Installed
9/15/2010	10	Not Installed	Not Installed
12/13/2010	16	Not Installed	Not Installed
3/11/2011	3.6	30	1.0 U
6/22/2011	1.0 U	29	1.0 U
9/20/2011	2.9	11	1.0 U
12/14/2011	Not Sampled	34	Not Sampled
4/26/2012	1.0 U	30	1.0 U

Notes:

5.7/9.3	Duplicate sample result
J	Estimated concentration
U	Non-detect at the associated value

Phase III monitoring wells WT115B and WT115C were in installed in the Upper and Intermediate Aquifers, respectively, to delineate the benzene detected in samples from WT115A in the Upper Aquifer. The detections of benzene in samples from WT115B represent the maximum concentrations of benzene in the Upper Aquifer while the data from Intermediate Aquifer monitoring well WT115C provide vertical delineation of the Upper Aquifer benzene plume.

Benzene was also detected in routine groundwater monitoring samples collected from five other monitoring wells during September 2011 through May 2012 groundwater quality monitoring rounds, as follows:

Well	*Number of Detections/Number of Samples*	*Range of Benzene Concentrations (µg/L)*
WT101A	2/2	0.23 J - 2.8
WT106A	1/2	1.0 U - 0.23 J
WT111A	2/2	0.52 J - 0.53 J
WT116A	3/3	2.3 - 4.5
WT122A	4/4	0.53 J - 0.7 J

Notes:

J Estimated concentration

U Non-detect at the associated value

As shown on Figure 4.1, these monitoring wells are located along the southern limit of waste or, in the case of WT106A, south of the southeast corner of the Site. All of the five wells are in the Upper Aquifer. Benzene was not detected (RDL=1.0 µg/L) in any groundwater samples collected from Intermediate and Lower Aquifer monitoring wells during Q12, Q13, and S1.

The pattern of low concentrations of benzene along part of the southern edge of the landfill is consistent with a relatively weak, local source of benzene somewhere in the vicinity of WT115A and WT115B. The Q12, Q13, and S1 benzene results are typical of previous monitoring results for the Site.

4.2.2 1,1-DICHLOROETHANE (1,1-DCA)

As summarized in Table 4.1, 1,1-DCA was detected in 31 of 65 routine groundwater samples collected from the monitoring well network, or 47.7 percent of the samples. The positive detections of 1,1-DCA ranged from 0.6 J µg/L to 7.3 µg/L. There is no MCL for 1,1-DCA. USEPA has requested that the Himco Site Trust compare 1,1-DCA results to the calculated Tapwater Regional Screening Level (RSL) of 240 µg/L, which is based on an excess cancer risk of 1 x 10-5.

Figures 4.2 and 4.3 show the distribution of 1,1-DCA in the Upper and Intermediate Aquifers, respectively. 1,1-DCA was detected in groundwater quality monitoring samples collected from the following monitoring wells during Q12, Q13, and S1:

Well	*Number of Detections/Number of Samples*	*Range of 1,1-DCA Concentrations (µg/L)*
WT101A	2/2	0.60 J - 6.7
WT101D	2/2	2.4 - 4.2
WT101E	2/2	1.9 - 2.2
WT106A	2/2	0.61 J - 1.6
WT111A	2/2	4.7- 5.2
WT114B	2/2	1.3 - 1.6
WT114C	3/3	2.7 - 4.1
WT115A	1/2	1.0 U - 1.9
WT115B	3/3	3.1 J - 7.3
WT115C	2/2	2.0 - 2.6
WT116A	3/3	2.6 - 5.2
WT121A	3/3	1.8 - 2.2
WT122A	4/4	4.9 - 6.9

Notes:

J Estimated concentration

U Non-detect at the associated value

1,1-DCA was detected in groundwater samples collected during the reporting period from Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. 1,1-DCA was also detected in groundwater samples collected from Upper Aquifer monitoring wells WT106A and WT121A, located south of the Site. The detected concentrations were significantly less than the calculated Tapwater RSL of 240 µg/L. 1,1-DCA was also detected in groundwater samples from Intermediate Aquifer monitoring wells WT114C and WT114D, located east of the Site. 1,1-DCA was not detected in groundwater samples collected from Intermediate Aquifer Monitoring wells WT120A and WT120B, which are located further east and delineate the eastern limit of 1,1-DCA in the Intermediate Aquifer.

1,1-DCA was not detected (RDL=1.0 µg/L) in groundwater samples collected from any of the Lower Aquifer monitoring wells during this reporting period.

Consistent with previous 1,1-DCA monitoring data and reports, the pattern of widespread, low-concentration 1,1-DCA detections is not consistent with a distinct, high-concentration VOC source. The distribution of 1,1-DCA in groundwater at the Site is more consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

4.2.3 CIS-1,2-DICHLOROETHENE (CIS-1,2-DCE)

cis-1,2-DCE was detected in 20 of 65 routine groundwater samples collected from during the reporting period, or 30.8 percent of the samples. The range of detected concentrations was from 0.23 J µg/L to 2.8 µg/L. None of these concentrations were greater than the Primary MCL of 70 µg/L for cis-1,2-DCE.

The distribution of cis-1,2-DCE is similar to the distribution of 1,1-DCA. cis-1,2-DCE was detected in groundwater samples from the following wells:

Well	*Number of Detections/Number of Samples*	*Range of cis-1,2-DCE Concentrations (µg/L)*
WT101A	1/2	1.0 U - 0.46 J
WT101D	1/2	1.0 U - 0.48 J
WT106A	2/2	0.23 J - 0.55 J
WT111A	2/2	0.37 J - 0.52 J
WT114B	2/2	0.46 J - 0.46 J
WT115B	2/3	4.0 U - 2.8
WT116A	3/3	1.0 - 1.5
WT121A	3/3	1.0 - 1.1
WT122A	4/4	0.66 J - 1.0

Notes:

J Estimated concentration

U Non-detect at the associated value

As shown on Figure 4.4 and Figure 4.5, cis-1,2-DCE was detected in groundwater samples collected from the Upper and Intermediate Aquifer monitoring wells located along the southern Site boundary. cis-1,2-DCE was detected in the groundwater samples collected from WT106A and WT121A, located southeast of the Site, at a maximum concentrations of 1.1 µg/L. cis-1,2-DCE was also detected east of the Site in groundwater samples collected from Intermediate Aquifer monitoring well WT114B, but not in samples from Intermediate Aquifer monitoring wells WT120A and WT120B, located further east of the Site. When detected, the concentrations of cis-1,2-DCE were much less than the Primary MCL of 70 µg/L for cis-1,2-DCE.

cis-1,2-DCE was not detected (RDL=1.0 µg/L) in groundwater samples collected from Lower Aquifer monitoring wells.

In general, the distribution of cis-1,2-DCE in groundwater in the vicinity of the Site during the Q12, Q13, and S1 monitoring events was consistent with previous monitoring results. The pattern of widespread, low-concentration cis-1,2-DCE detections is consistent with residual contamination undergoing degradation in the absence of ongoing contaminant loading.

4.2.4 VINYL CHLORIDE

Between September 2011 and May 2012, vinyl chloride was detected in 13 of 65 groundwater samples collected from the monitoring well network, or 20.0 percent of the samples. When vinyl chloride was detected, its concentration ranged from 0.28 J µg/L to 1 µg/L, as follows:

Well	*Number of Detections/Number of Samples*	*Range of Vinyl Chloride Concentrations (µg/L)*
WT106B	2/2	0.91 J - 1.0
WT111A	1/2	1.0 U - 0.28 J
WT116A	2/3	1.0 U - 0.80 J
WT121B	1/3	1.0 U - 0.95 J
WT122A	3/4	1.0 U - 0.85 J
WT122B	2/2	0.41 J - 0.44 J
WTE3	2/2	0.37 J - 0.67 J

Notes:

J Estimated concentration

U Non-detect at the associated value

None of these concentrations was greater than the Primary MCL of 2 µg/L for vinyl chloride. As shown on Figure 4.6, vinyl chloride was detected in groundwater samples collected from Upper Aquifer monitoring wells located along the southern limit of waste and the southern Site boundary. The concentrations of vinyl chloride detected in Upper Aquifer groundwater samples were less than the RDL of 1 µg/L. With the exception of monitoring well WT122A, vinyl chloride was not detected in any groundwater samples collected from Upper Aquifer monitoring wells located south and east of the Site.

Figure 4.7 shows vinyl chloride results for the Intermediate Aquifer for Q12, Q13, and S1. The concentrations of vinyl chloride detected in Intermediate Aquifer groundwater samples were all equal to or less than the RDL of 1 µg/L.

Figure 4.8 shows vinyl chloride results for the Lower Aquifer for Q12, Q13, and S1. The concentrations of vinyl chloride detected in Lower Aquifer groundwater samples were less than the RDL of 1 µg/L.

Vinyl chloride is produced in reducing environments by the degradation of chlorinated organic compounds such as trichloroethylene (TCE). The distribution of vinyl chloride in groundwater in the vicinity of the Site during the Q12, Q13, and S1 monitoring rounds is consistent with previous routine monitoring results and with residual contamination undergoing degradation in the absence of ongoing source of VOC contaminants.

4.2.5 CARBON DISULFIDE

Carbon disulfide was detected in 36 of 65 routine groundwater monitoring samples collected during the reporting period, or 55.4 percent of the samples. The detected concentrations of carbon disulfide ranged from 0.13 J µg/L to 4.8 µg/L. There is no Primary MCL for carbon disulfide. USEPA has requested that the Himco Site Trust compare carbon disulfide results to the calculated Tapwater RSL of 10,000 µg/L, which is based on an excess cancer risk of 1 x 10-5.

Carbon disulfide was detected in groundwater samples from the following wells:

Well	*Number of Detections/Number of Samples*	*Range of Carbon Disulfide Concentrations (µg/L)*
WT101D	1/2	1.0 U - 1.3
WT101E	2/2	1.9 - 2.7
WT102B	1/2	1.0 U - 0.14 J
WT106B	2/2	0.81 J - 1.9
WT111A	1/2	1.0 U - 0.18 J
WT114C	3/3	0.14 J - 0.92 J
WT115B	3/3	2.2 J - 4.8
WT115C	2/2	1.0 - 1.9
WT116A	2/3	1.0 U - 0.21 J
WT120A	2/2	0.13 J - 0.25 J
WT120B	2/2	0.18 J - 0.24 J
WT121A	1/3	1.0 U - 0.13 J

Well	*Number of Detections/Number of Samples*	*Range of Carbon Disulfide Concentrations (µg/L)*
WT121B	3/3	0.54 J - 1.9
WT122A	3/4	1.0 U - 0.44 J
WT122B	2/2	0.13 J - 0.20 J
WT122C	1/2	1.0 U - 0.30 J

Notes:

J Estimated concentration

U Non-detect at the associated value

The detections of carbon disulfide in groundwater samples during the reporting period are all significantly less than the Tapwater RSL. Similar to vinyl chloride, the degradation of chlorinated organic compounds may produce carbon disulfide. As shown on Figure 4.9, Figure 4.10, and Figure 4.11, the distribution of carbon disulfide is similar to the distribution of vinyl chloride and is consistent with residual contamination undergoing degradation.

4.3 SEMI-VOLATILE ORGANIC COMPOUNDS

CRA collected and analyzed the Q12, Q13, and S1 samples for SVOCs. Bis(2-ethylhexyl)phthalate is the only SVOC parameter that USEPA requires the PSDs to continue monitoring. Phase III Groundwater Investigation wells were analyzed for the full suite of SVOCs on the Interim Groundwater Monitoring Program parameter list on a quarterly basis until December 2011.

Bis(2-ethylhexyl)phthalate was detected in 2 of 65 groundwater samples collected from the monitoring well network during the reporting period, or 3.1 percent of the samples. Figure 4.12 shows bis(2-ethylhexyl)phthalate concentrations in the Q12, Q13, and S1 groundwater samples from the Intermediate Aquifer. The detected concentrations of bis(2-ethylhexyl)phthalate were 0.92 J µg/L and 1.1 J µg/L, both which are less than the Primary MCL of 6 µg/L.

Bis(2-ethylhexyl)phthalate has typically been detected in groundwater samples that are widely dispersed across the Site, both laterally and vertically, and typically at low concentrations. This is not the pattern that a distinct, high concentration source of SVOCs would create, indicating that there is not a plume of bis(2-ethylhexyl)phthalate emanating from the landfill. In fact, the presence of bis(2-Ethylhexyl)phthalate in historic groundwater samples collected from monitoring wells at relatively large

distances both upgradient and downgradient of the Site suggests that the detected concentrations in groundwater samples from the Site may not be completely, if at all, attributable to Site activities.

4.4 METALS AND GENERAL CHEMISTRY ANALYTES

4.4.1 INTRODUCTION

CRA collected 65 groundwater samples from 27 monitoring wells during Q12, Q13, and S1 for select metals and general chemistry analyses. Tables 4.3, 4.4, and 4.5 summarize the metals and general chemistry results for the groundwater samples collected from the Upper, Intermediate, and Lower Aquifers, respectively, during the reporting period.

CRA's approach to screening organic chemicals is different than the approach to screening metals and general chemistry parameters because organic chemicals are typically the result of waste disposal activities while metals and general chemistry parameters also occur naturally in groundwater. Also, two of the contaminants of concern (CoCs), iron and calcium, are mineral nutrients and drinking water can provide a viable fraction of the total recommended daily intake from these nutrients.

CRA analyzed groundwater samples collected from monitoring wells WT102A, WT102B, and WT102C for metals and general chemistry parameters. These wells are located approximately 1,260 feet north of and upgradient of the Site. The 2010 Himco Annual Groundwater Monitoring Report (CRA, 2010) included a statistical analysis of data from these wells to determine background concentrations to compare with concentrations measured at other locations at the Site. CRA collected additional samples from monitoring wells WT102A, WT102B, and WT102C since 2010 and has used these data to update the background concentrations. A statistical analysis was performed on these values to determine background concentrations to compare with values measured at other locations at the Site. The details of the statistical analysis and the background concentrations are included in Appendix E. Tables 4.3 through 4.5 provide the background concentrations for the metals parameters for the Upper, Intermediate, Lower and combined Aquifers. Several of the background threshold values (BTVs) exceeded their respective Primary MCL, Secondary MCL or RDA.

The CD states that the Remedial Action Objectives for groundwater (GW RAOs) are to prevent the use of groundwater that contains Site-related carcinogens and non-carcinogens in excess of MCLs. The CD also states that the GW RAOs are:

> *To prevent the use of groundwater which contains site-related sodium, calcium, and iron in excess of their upper intake limit or recommended dietary allowances for sensitive populations.*

Initially, CRA screened the metals data against the Primary MCLs. There are no Primary MCLs for sodium, calcium and iron. There are Secondary MCLs for sodium (250 micrograms per liter [mg/L]) and iron (0.3 mg/L), but these are aesthetic criteria and are not health based. There is a health-based RSL Tapwater for iron of 26 mg/L. The RDA for calcium is 250 mg/L. In order to establish appropriate GW RAOs, CRA ranked these criteria as follows:

1. Primary MCLs
2. RSL Tapwater
3. Recommended Dietary Allowance (RDA)
4. Secondary MCLs

For example, there is no Primary MCL for iron, so the next level of criteria is the health based RSL Tapwater of 26 mg/L. There is no Primary MCL, RSL Tapwater or RDA for chloride. Therefore, the best available criterion is the Secondary MCL of 250 mg/L.

The concentrations of the following GMP parameters exceeded the metals and general chemistry GW RAOs:

	Number of Exceedances of GW RAOs/Number of Samples		
	Upper Aquifer	*Intermediate Aquifer*	*Lower Aquifer*
Aluminum	0/31	0/26	0/8
Arsenic	3/31	8/26	0/8
Barium	0/31	0/26	0/8
Beryllium	0/31	0/26	0/8
Calcium	8/31	0/26	0/8
Iron	4/31	0/26	0/8
Lead	3/31	0/26	0/8
Manganese	5/31	0/26	0/8

	Number of Exceedances of GW RAOs/Number of Samples		
	Upper Aquifer	*Intermediate Aquifer*	*Lower Aquifer*
Mercury	0/31	0/26	0/8
Sodium	3/31	0/26	0/8
Sulfate	1/31	0/26	0/8
Chloride	3/31	0/26	0/8

CRA selected arsenic, calcium, iron, lead, manganese, sodium, sulfate, and chloride for discussion purposes because they are the only metals and general chemistry parameters included in the GMP detected at concentrations that exceeded their GW RAOs.

4.4.2 ARSENIC

Arsenic was detected in 64 of the 65 routine groundwater quality monitoring samples collected during the reporting period. Arsenic concentrations ranged from less than the RDL (1.0 µg/L) to 21 µg/L. The GW RAO for arsenic is 10 µg/L, which is equal to its Primary MCL. Lead and arsenic are the only metal analytes detected during the Q12, Q13, and S1 monitoring rounds at concentrations that were greater than a GW RAO that is based on a Primary MCL.

Figure 4.13 shows the arsenic concentrations in groundwater samples collected from Upper Aquifer monitoring wells. The concentrations of arsenic exceeded the GW RAO in samples from the following Upper Aquifer monitoring wells:

	Date	*Arsenic Concentration (µg/L)*
WT116A	4/26/2012	21/21
WT121A	4/24/2012	13

Notes:
21/21 Duplicate sample

During the S1 2012 sampling event arsenic concentrations exceeded the GW RAO in groundwater samples collected from monitoring well WT116A, located along the southern limit of the waste. The turbidity of the S1 2012 sample was elevated at 23.7 NTU, which may explain the elevated arsenic concentration. CRA will redevelop WT116A to reduce the turbidity of the sample prior to the S2 2012 sampling event.

The arsenic concentration exceeded the GW RAO in the S1 2012 groundwater sample collected from monitoring well WT121A, south of the Site.

Figure 4.14 shows the arsenic concentrations in groundwater samples collected from Intermediate Aquifer monitoring wells. The concentrations of arsenic exceeded the GW RAO in samples from the following Intermediate Aquifer monitoring wells:

Well	*Date*	*Arsenic Concentration (µg/L)*
WT106B	9/14/2011	13
WT106B	4/25/2012	13
WT114C	9/13/2011	19
WT114C	4/24/2012	20/21
WT121B	9/19/2011	14
WT121B	12/13/2011	13
WT121B	4/24/2012	14

Notes:
21/21 Duplicate sample

Intermediate Aquifer monitoring well WT114C is located immediately east of the Site. WT106B is located south of the Site, and WT121A is located east of WT106B. The Q12, Q13, and S1 arsenic results for these wells are generally consistent with previous results.

Figure 4.15 shows the arsenic concentrations in groundwater samples collected from Lower Aquifer monitoring wells. The maximum arsenic concentrations in groundwater samples collected during this reporting period from the Lower Aquifer monitoring wells was 10 µg/L, which is equal to the GW RAO of 10 µg/L, in a duplicate sample collected from monitoring well WT106C in April 2012.

4.4.2.1 ARSENIC GEOCHEMISTRY

Oxidation reduction potential (ORP) readings are the best indication of reduction-oxidation (redox) conditions in the groundwater at the time of sample collection. ORP values should only be used as a general indicator of redox conditions; since the absolute values can vary significantly, a range of ORP values is typically given when describing the relationship between ORP and geochemical reactions. In general,

ORP values less than 50 millivolts (mV) indicate an anoxic (mildly reducing) environment. ORP values less than 0 mV indicate that iron reduction may be possible.

North of the Site, background redox conditions (based on samples collected from well nest WT102) are anoxic to possibly iron- reducing in the Upper Aquifer, and iron reducing to even more reducing (i.e., possibly nitrate or sulfate reducing) in the Intermediate and Lower Aquifers. This indicates that iron oxide dissolution (and therefore increased concentrations of dissolved iron and arsenic in groundwater) occurs naturally upgradient of the landfill, not as a result of the landfill.

Arsenic mobility in groundwater is generally controlled by: redox conditions, pH, and the amount and types of oxide coating on soil grains available for sorption (He et al., 2010). Under oxidizing or anoxic conditions, arsenic exists as As(V), which has a high affinity for sorption to naturally occurring iron-oxide coatings on soil grains in the aquifer. This means that under oxidizing or anoxic conditions, arsenic concentrations in the groundwater will be low because most of the arsenic will be sorbed to naturally-occurring oxide coatings on the aquifer soil grains, especially iron oxides.

The addition of a source of organic carbon will stimulate biological activity within the aquifer, which will consume the oxygen and other electron acceptors present and cause conditions to become reducing. The source of this organic carbon can be natural or anthropogenic. The creation of reducing conditions in the groundwater will result in the dissolution of the iron oxide coatings on the soil grains, which will decrease the amount of sorption sites available for arsenic, thereby causing arsenic to be released to the groundwater (SERDP, 2008). If this is a major source of arsenic in an aquifer, then the concentrations of arsenic in the groundwater will be positively correlated with the concentrations of iron in the groundwater. This also suggests that when the organic carbon in the groundwater decreases to background levels, the iron and arsenic concentrations in the groundwater will also decrease to background levels.

A major component of the waste in the landfill on Site is calcium sulfate. Calcium is not redox-sensitive, and if it is dissolved in groundwater, it exists as Ca2+. Changes in redox conditions will not affect the solubility or mobility of calcium in solution. Therefore, calcium concentrations in groundwater samples on Site and downgradient of the Site that are greater than background values (BVs) are likely evidence of landfill impact. Under significantly reducing conditions (ORP ~ -100 mV or less), sulfate can be reduced to sulfide, decreasing the concentration of sulfate in groundwater. Sulfate is affected by redox conditions so it is not a good indicator of landfill impact to groundwater near the Site.

Since elevated calcium concentrations in groundwater are potential evidence of landfill impact to groundwater, arsenic concentrations in the groundwater should be correlated with calcium concentrations if the source of arsenic in the groundwater at the Site was a direct release from the landfill as a component of the landfill waste.

CRA completed statistical tests in order to access whether there is a correlation in groundwater concentrations between arsenic and calcium; and between sulfate and calcium. Test descriptions, scope of data, test assumptions and results are described in details in Appendix F. Results in Table F.1 show that arsenic concentrations are poorly correlated to calcium concentrations, indicating that arsenic was not released directly from the landfill. However, sulfate concentrations are somewhat strongly correlated with calcium. Both correlations were statistically significant at 95 percent confidence.

Calcium mobility is not affected by redox conditions, and calcium is generally more mobile than arsenic. Therefore, the calcium plume from the landfill should have traveled further and deeper than any potential arsenic plume, if arsenic is landfill-derived. Calcium concentrations in samples from monitoring wells at the Site were compared to the BV for each Aquifer (Upper, Intermediate and Lower Aquifers), and the results are presented in Table F.3. The results indicate that calcium concentrations in groundwater samples from the Lower Aquifer wells are not greater than BVs, while calcium concentrations exceed BVs in samples from several wells in the Upper and Intermediate Aquifer. This indicates that the groundwater plume from the landfill has not impacted the groundwater in the Lower Aquifer. If the landfill has not impacted the groundwater in the Lower Aquifer, then the arsenic concentrations within those wells must be naturally-occurring. Groundwater vertical gradients are not consistently downward, supporting the conclusion that no significant downward migration of landfill-impacted water has occurred into the Lower Aquifer.

Calcium concentrations in groundwater samples are elevated with respect to background in the Upper and Intermediate Aquifers, supporting the assumption that the landfill has impacted groundwater in those depth zones.

As discussed above, if the arsenic concentrations in the groundwater are elevated due to the release of organic carbon from the landfill, then the concentrations of iron and arsenic should be related, because both are affected in the same way by redox conditions. CRA completed statistical tests to determine if there is a correlation between arsenic and iron concentrations in the groundwater samples from the Site. Test descriptions, scope of data, test assumptions and results are described in details in Appendix F and are summarized in Table F.4. The results indicate that the concentrations of arsenic and iron within the Upper Aquifer are strongly correlated,

while arsenic and iron concentrations in the Intermediate and Lower Aquifers are poorly correlated. CRA further evaluated data for Intermediate Aquifer wells where landfill impact has been conclusively identified. Three wells were identified where persistent concentrations of vinyl chloride and/or carbon disulfide were detected in groundwater samples, indicating possible landfill impact (WT114C, WT106B, and WT121B). CRA evaluated the correlations of iron concentrations to arsenic concentrations within samples from a well cross-gradient of the Site (WT114C) and within samples from two downgradient wells (WT106B, and WT121B). The results for both groups of wells (cross-gradient and downgradient) in the Intermediate Aquifer indicated that arsenic and iron were correlated. However, the calcium and arsenic concentrations in samples from these wells were not correlated, indicating that the arsenic was not released directly from the landfill, but naturally-occurring arsenic was likely released either due to interaction with organic carbon released from the landfill or due to a naturally occurring source.

The strong correlation of arsenic and iron concentrations in groundwater samples from the Upper Aquifer where landfill impact is otherwise known indicates that the source of arsenic is linked to the source of iron in the groundwater. The source or iron in the groundwater is most likely the dissolution of naturally-occurring oxides from soil, and therefore the source of the arsenic is also likely the dissolution of naturally-occurring oxides from the soil. This conclusion is supported by the lack of correlation between arsenic and calcium concentrations in groundwater, indicating that arsenic is not being released directly from the landfill along with the calcium sulfate.

4.4.3 LEAD

Lead was not detected in any of the Intermediate or Lower Aquifer groundwater samples collected during the Q12, Q13, and S1 routine groundwater quality monitoring rounds. However, lead was detected in 4 of the 31 routine groundwater quality monitoring samples collected from Upper Aquifer monitoring wells during the reporting period. Lead concentrations ranged from less than the RDL (1.0 μg/L) to 110 μg/L. The GW RAO for lead is 15 μg/L, which is equal to its Primary MCL. Lead and arsenic are the only metal analytes detected during the Q12, Q13, and S1 monitoring rounds at concentrations that were greater than a GW RAO that is based on a Primary MCL.

Figure 4.16 shows the lead concentrations in groundwater samples collected from Upper Aquifer monitoring wells. The concentrations of lead exceeded the GW RAO in samples from the following Upper Aquifer monitoring wells:

Monitoring Well	*Date*	*Lead Concentration (µg/L)*
WT115A	9/15/2011	21
WT116A	4/26/2012	110/110

Notes:

110/110 Duplicate sample

The lead concentration exceeded the GW RAO in the September 2011 groundwater sample collected from monitoring well WT115A, but not in a subsequent sample collected in April 2012. The lead concentration exceeded the GW RAO in a groundwater sample collected from monitoring well WT116A during the S1 2012 sampling event. The turbidity of the S1 2012 sample was elevated at 23.7 NTU, which may explain the elevated lead concentration. CRA will redevelop WT116A to reduce the turbidity of the sample prior to the S2 2012 sampling event.

4.4.4 CALCIUM

Calcium was detected in all of the 65 routine groundwater quality monitoring samples collected during this reporting period. Calcium concentrations in groundwater samples ranged from 45,000 µg/L to 740,000 µg/L. The GW RAO for calcium is 250,000 µg/L, and is equal to the RDA.

Figure 4.17 shows average calcium concentration contours for the Upper Aquifer for the reporting period. There is a plume of calcium in the Upper Aquifer defined by the GW RAO of 250,000 µg/L. Calcium concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from the following monitoring wells:

Well	*Date*	*Calcium Concentration (µg/L)*
WT101A	9/15/2011	270,000
WT115B	9/20/2011	440,000
WT115B	12/14/2011	380,000
WT115B	4/26/2012	390,000
WT116A	9/15/2011	740,000
WT116A	4/26/2012	630,000/620,000
WT122A	4/25/2012	290,000

Notes:
630,000/620,000 Duplicate sample

The maximum calcium concentrations in the Upper Aquifer were detected in groundwater samples collected from monitoring well WT116A, located within the limit of the waste in the south-central portion of the Site. Calcium concentrations have typically exceeded the GW RAO in groundwater samples collected from monitoring well WT115B, located in the southeast portion of the Site. Calcium concentrations occasionally exceeded the GW RAO in groundwater samples collected from monitoring well WT122A, located south of the southern limit of waste.

Calcium concentrations in the Intermediate and Lower Aquifers were less than the GW RAO.

The calcium data for the Q12, Q13, and S1 routine groundwater quality monitoring rounds are generally consistent with previous routine groundwater monitoring results from November 2008 through June 2011.

4.4.5 IRON

Iron was detected in 59 of the 65 routine groundwater quality monitoring samples collected during the reporting period. Iron concentrations ranged from less than 100 µg/L to 36,000 µg/L. The GW RAO for iron is 26,000 µg/L, which is the RSL Tapwater.

Figure 4.18 shows iron concentration contours for the Upper Aquifer. There is a plume of iron in the Upper Aquifer defined by the GW RAO of 26,000 µg/L. Iron concentrations in the Upper Aquifer that were greater than the GW RAO were detected

in groundwater samples collected from monitoring wells WT101A and WT116A, as follows:

Well	*Date*	*Iron Concentration (µg/L)*
WT101A	9/15/2011	36,000
WT116A	9/15/2011	31,000
WT116A	4/26/2012	35,000/35,000

Notes:
35,000/35,000 Duplicate sample

WT101A and WT116A are located on Site along the southern limit of waste. The turbidity of the S1 2012 sample was elevated at 23.7 NTU, which may explain the elevated iron concentration. CRA redeveloped WT116A to reduce the turbidity of the sample prior to the S2 2012 sampling event. The rest of the iron concentrations in samples collected during the reporting period from Upper Aquifer wells were less than the GW RAO of 26,000 µg/L.

The maximum iron concentrations in the Intermediate and Lower Aquifers were 6,600 µg/L and 1,800 µg/L, respectively, which are less than the GW RAO.

The iron concentrations detected during for Q12, Q13, and S1 routine groundwater quality monitoring are consistent with previous routine groundwater monitoring results.

CRA completed a statistical evaluation of the arsenic concentrations in groundwater samples (see Appendix F). The evaluation indicates that iron and arsenic concentrations in groundwater samples are correlated in all three aquifers; however, the correlation is strongest in the Upper Aquifer. Figure F.1 shows the relationship between iron and arsenic in all three aquifers, for all data collected between 2008 and 2012, inclusive. Figure F.1 shows that the arsenic concentrations are similar in all three aquifers, although the maximum arsenic concentrations in samples from the Upper Aquifer samples are slightly higher than in the other two aquifers. The maximum iron concentrations in samples from the Upper Aquifer are also higher than the iron concentrations in samples from the other aquifers. The highest iron concentrations were detected in samples from monitoring wells within the waste area (WT115A, WT116A, and WT101A). The samples from these three monitoring wells account for 28 of the 30 results where iron was greater than 6 mg/L. With these three locations excluded, the iron and arsenic concentrations for all three aquifers overlap.

4.4.6 MANGANESE

Manganese was detected in 62 of the 65 routine groundwater quality monitoring samples collected during the reporting period. The concentrations of manganese in groundwater samples ranged from 3.9 J µg/L to 2,400 µg/L. The GW RAOs for manganese in the Upper and Lower Aquifers are 1,070 µg/L and 1,140 µg/L, which are the respective BVs for those aquifers. The GW RAO for manganese in the Intermediate Aquifer is 880 µg/L, which is its Secondary MCL.

Figure 4.19 shows the concentration of manganese in routine groundwater quality monitoring samples collected from the Upper Aquifer during the reporting period. There is a plume of manganese in the Upper Aquifer defined by the 1,070 µg/L contour. The samples that contained manganese at concentrations that were greater than the GW RAO were as follows:

Well	*Date*	*Manganese Concentration (µg/L)*
WT101A	4/26/2012	1,800
WT101A	9/15/2011	2,400
WT116A	4/26/2012	1,400/1,400

Notes:
1,400/1,400 Duplicate sample

WT101A and WT116A are located along the southern limit of waste. All other manganese concentrations in Upper Aquifer well samples were less than the GW RAO of 1,070 µg/L.

The maximum manganese concentrations in the Intermediate and Lower Aquifer well samples were 240 µg/L and 160 µg/L, respectively, which are less than the GW RAO.

The manganese data for the Q12, Q13, and S1 routine groundwater quality monitoring rounds are consistent with previous routine groundwater monitoring rounds.

4.4.7 SODIUM

Sodium was detected in all 65 of the routine groundwater quality monitoring samples collected during the reporting period. Sodium concentrations in groundwater samples ranged from 8,100 µg/L to 380,000 µg/L. The GW RAO for sodium is 150,000 µg/L, which is its RDA.

Figure 4.20 shows average sodium concentration contours for the Upper Aquifer. Only the samples from monitoring well WT114A contained sodium concentrations that were greater than the GW RAO, as follows:

Well	*Date*	*Sodium Concentration (µg/L)*
WT114A	9/13/2011	370,000/380,000
WT114A	4/24/2012	250,000

Notes:
370,000/380,000 Duplicate sample

Monitoring well WT114A is cross gradient of the Site. WT114A is located adjacent to the John Weaver Parkway. The source of the sodium (and chloride) in the groundwater samples collected from WT114A is likely road salt applied to the adjacent roadway.

Sodium concentrations in the Q12, Q13, and S1 groundwater samples from the Intermediate and Lower Aquifers were less than the GW RAO.

The sodium results for the routine groundwater quality monitoring samples for this monitoring period are consistent with previous routine groundwater monitoring results.

4.4.8 SULFATE

Sulfate was detected in 63 of 65 groundwater samples collected during this reporting period. Sulfate concentrations in groundwater samples ranged from 0.27 J mg/L to 1,000 mg/L. The GW RAOs for sulfate are as follows:

- Upper Aquifer - 637 mg/L (Background Value)
- Intermediate Aquifer - 370 mg/L (Background Value)
- Lower Aquifer - 250 mg/L (Secondary MCL)

Figure 4.21 shows sulfate concentration contours for the Upper Aquifer. The concentration of sulfate was greater than the GW RAO of 637 mg/L in 1 of 33 groundwater samples collected from the Upper Aquifer monitoring well network in Q12, Q13, and S1. Sulfate was detected at a concentration of 1,000 mg/L in the groundwater sample collected from WT116A in September 2011. The highest sulfate concentrations measured during the Q9, Q10, and Q11 routine groundwater sampling events were also detected in groundwater samples collected from WT116A.

Sulfate concentrations in the Intermediate and Lower Aquifer samples were less than their respective GW RAOs.

The sulfate concentrations detected in samples collected during this reporting period are consistent with previous routine groundwater monitoring results from November 2008 through June 2011.

4.4.9 CHLORIDE

Chloride was detected in all 65 groundwater samples collected from the monitoring well network during this reporting period. The detected concentrations of chloride ranged from 1.9 mg/L to 640 mg/L. The GW RAO for chloride is 250 mg/L, which is equal to its Secondary MCL.

Figure 4.22 shows chloride concentrations in Upper Aquifer groundwater samples. Both samples collected from WT114A contained chloride at concentrations that were greater than the GW RAO (640/640 mg/L (duplicate sample) and 360 mg/L). WT114A is cross gradient of the Site and located adjacent the John Weaver Parkway. The source of the chloride (and sodium) in the groundwater samples collected from WT114A is likely road salt applied to the adjacent roadway.

The maximum chloride concentrations detected in groundwater samples from the Intermediate and Lower Aquifers were 120 mg/L and 39 mg/L, respectively, which are less than the GW RAO of 250 mg/L.

The chloride concentration in routine groundwater quality monitoring samples collected during this reporting period are consistent with previous routine groundwater monitoring results.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GROUNDWATER ELEVATION MONITORING

Data collected during Q12, Q13, and S1 indicate that groundwater in the Upper, Intermediate, and Lower Aquifers typically flows south, consistent with the regional groundwater flow direction and previous on-Site monitoring. Upward and downward vertical hydraulic gradients are present across all units on the Site, ranging from approximately -0.06 feet/feet to 0.02 feet/feet.

5.2 GROUNDWATER QUALITY MONITORING

5.2.1 VOCS

Benzene was the only VOC detected at concentrations greater than its Primary MCL during the reporting period. Benzene concentrations that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT115A and WT115B located in the southeast corner of the landfill. The maximum benzene concentration of 34 μg/L was detected in a groundwater sample collected from Upper Aquifer monitoring well WT115B. Benzene was not detected in the two groundwater samples collected from Intermediate Aquifer monitoring well WT115C, which provides vertical delineation of the WT115 benzene plume.

1,1-DCA, cis-1,2-DCE, vinyl chloride, and carbon disulfide were detected in 20.0 percent to 55.4 percent of routine groundwater quality monitoring samples collected during the reporting period. Unlike the distinct benzene plume in the vicinity of WT115B, these other VOCs were detected at concentrations that were significantly less than their respective GW RAOs. 1,1-DCA, cis-1,2-DCE, and vinyl chloride detections were clustered along the southern Site boundary. The broad distribution of low-level VOC concentrations of degradation products is consistent with residual VOC groundwater contamination undergoing degradation.

Routine groundwater quality monitoring results for this reporting period (Q12, Q13, and S1) are consistent with previous monitoring data for VOCs.

5.2.2 SVOCS

Bis(2-ethylhexyl)phthalate was detected in 2 of 65 groundwater samples collected from the monitoring well network, or 3.1 percent of the routine groundwater monitoring samples collected during this reporting period. The concentrations of bis(2-ethylhexyl)phthalate in the groundwater samples ranged from 0.92 J µg/L to 1.1 µg/L, all of which is less than the Primary MCL of 6 µg/L.

The sporadic presence of bis(2-ethylhexyl)phthalate at relatively low concentrations at large distances apart, both upgradient and down-gradient of the Site, and sporadically with depth, indicate that it is not attributable to Site activities. The Q12, Q13, and S1 groundwater quality monitoring results are consistent with previous Site monitoring data for SVOCs.

5.2.3 METALS AND GENERAL CHEMISTRY PARAMETERS

Arsenic, lead, calcium, iron, manganese, sodium, sulfate and chloride are the only metals and general chemistry parameters detected at concentrations in groundwater samples that exceeded their GW RAOs during this reporting period.

The GW RAO for arsenic is 10 µg/L, which is equal to its Primary MCL. Arsenic and lead are the only metal analytes detected during the Q12, Q13, and S1 monitoring rounds at concentrations that were greater than a Primary MCL. The concentrations of arsenic exceeded the GW RAO in samples from Upper Aquifer monitoring wells WT116A and WT121A. The concentrations of arsenic exceeded the GW RAO in samples from Intermediate Aquifer monitoring wells WT106B, WT114C, and WT121B. The Q12, Q13, and S1 arsenic results for these wells are generally consistent with previous results. The maximum arsenic concentrations in groundwater samples collected during this reporting period from the Lower Aquifer monitoring wells was 10 µg/L, which is equal to the GW RAO of 10 µg/L, in a duplicate collected from monitoring well WT106C in April 2012.

In the Upper Aquifer, the calcium concentrations in groundwater near the landfill are significantly greater than background values, indicating that the landfill has impacted groundwater in the Upper Aquifer. Arsenic concentrations in the samples near to and downgradient of the landfill are also greater than background concentrations; however, calcium concentrations are poorly correlated with arsenic concentrations, indicating that the arsenic and calcium are not likely from the same origin. The arsenic and iron concentrations are well correlated in the Upper Aquifer, meaning that iron and arsenic

likely have a similar origin. This origin is most likely the dissolution of naturally-occurring oxides from the aquifer matrix.

In the Intermediate Aquifer, calcium concentrations near and downgradient of the landfill are greater than BVs indicating impact from the landfill. Elevated arsenic concentrations are landfill-related when groundwater samples also contain elevated calcium concentrations, because redox conditions are further reduced and naturally occurring arsenic is being dissolved from oxide coatings on the aquifer soils.

In the Lower Aquifer, the calcium concentrations in groundwater samples collected near and downgradient of the landfill are not greater than BVs, therefore there is no evidence of impact from the landfill on Lower Aquifer groundwater quality. The arsenic detected in groundwater samples from the Lower Aquifer are likely due to a natural source, and are unrelated to landfill activities.

Lead concentrations of 110/110 μg/L were greater than the GW RAO of 15 μg/L in duplicate groundwater samples collected from monitoring well WT116A during the S1 2012 sampling event. The turbidity of the S1 2013 sample was elevated at 23.7 NTU, which may explain the atypically elevated lead concentration. CRA will redevelop WT116A to reduce the turbidity of the sample prior to the S2 2012 sampling event. Lead was detected at a concentration of 21 μg/L in the September 2011 groundwater sample collected from monitoring well WT115A. Lead was not detected in subsequent samples collected in April 2012. Lead was not detected in any of the Intermediate or Lower Aquifer groundwater samples collected during the Q12, Q13, and S1 routine groundwater quality monitoring rounds.

There is a plume of calcium in the Upper Aquifer defined by the GW RAO of 250,000 μg/L. Calcium concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from Upper Aquifer monitoring wells WT101A, WT115B, WT116A, and WT122A and WT123A, located along the southern limit of waste. Calcium concentrations in groundwater samples from the Intermediate and Lower Aquifers were less than their GW RAOs.

There is a plume of iron in the Upper Aquifer defined by the GW RAO of 26,000 μg/L. Iron concentrations in the Upper Aquifer that were greater than the GW RAO were detected in groundwater samples collected from monitoring wells WT101A and WT116A, located on Site along the south limit of waste. The maximum iron concentrations in the Intermediate and Lower Aquifers were 6,600 μg/L and 1,800 μg/L, respectively, which are less than the GW RAO.

There is a plume of manganese in the Upper Aquifer defined by the 1,070 µg/L contour. The manganese concentrations in groundwater samples collected from WT101A and WT116A, which are located along the southern limit of waste, were greater than the GW RAO. The maximum manganese concentrations in the Intermediate and Lower Aquifer well samples were 240 µg/L and 160 µg/L, respectively, which are less than the GW RAO.

The GW RAO for sodium is 150,000 µg/L, which is its RDA. Sodium concentrations that were greater than the GW RAO were detected in groundwater samples from Upper Aquifer monitoring well WT114A. The sodium detected in groundwater samples from the Upper Aquifer in the vicinity of monitoring well WT114A is cross gradient of the Site and located adjacent the John Weaver Parkway. The source of the sodium in the groundwater samples collected from WT114A is likely road salt applied to the adjacent roadway.

Chloride concentrations were greater than the GW RAO in all three groundwater samples collected from Upper aquifer monitoring well WT114A. WT114A is cross gradient of the Site and located adjacent the John Weaver Parkway. The source of the chloride (and sodium, as stated above) in the groundwater samples collected from WT114A is likely road salt applied to the adjacent roadway. The maximum chloride concentrations in the Intermediate and Lower Aquifers were 120 mg/L and 39 mg/L, respectively, which are less than the GW RAO of 250 mg/L.

The concentration of sulfate was greater than the GW RAO of 960 mg/L in a groundwater sample collected from Upper Aquifer monitoring well WT116A in September 2011. Sulfate concentrations in the Intermediate and Lower Aquifers were less than the GW RAO.

The metals and general chemistry data for Q12, Q13, and S1 routine groundwater quality monitoring are consistent with previous routine groundwater monitoring results from November 2008 through June 2011.

5.3 FUTURE MONITORING AND REPORTING

The following monitoring wells were installed during the Phase III Hydrogeologic Investigation:

- WT106C
- WT115B
- WT115C
- WT120C
- WT121A
- WT121B
- WT122A
- WT122B
- WT122C

CRA collected the first groundwater samples from the Phase III monitoring wells in March 2011. Quarterly samples were collected from the Phase III monitoring wells until December 2011 and samples from these wells were analyzed for the analytes listed in Table 2.3. This provided four rounds of quarterly groundwater quality monitoring of the Phase III monitoring wells. The frequency of monitoring was then reduced to semi-annually in accordance with the GMP. As recommended in the 2011 Himco Annual Monitoring Report (CRA, November 2011) CRA included five Phase III wells in the GMP:

- WT115B
- WT120C
- WT121A
- WT121B
- WT122A

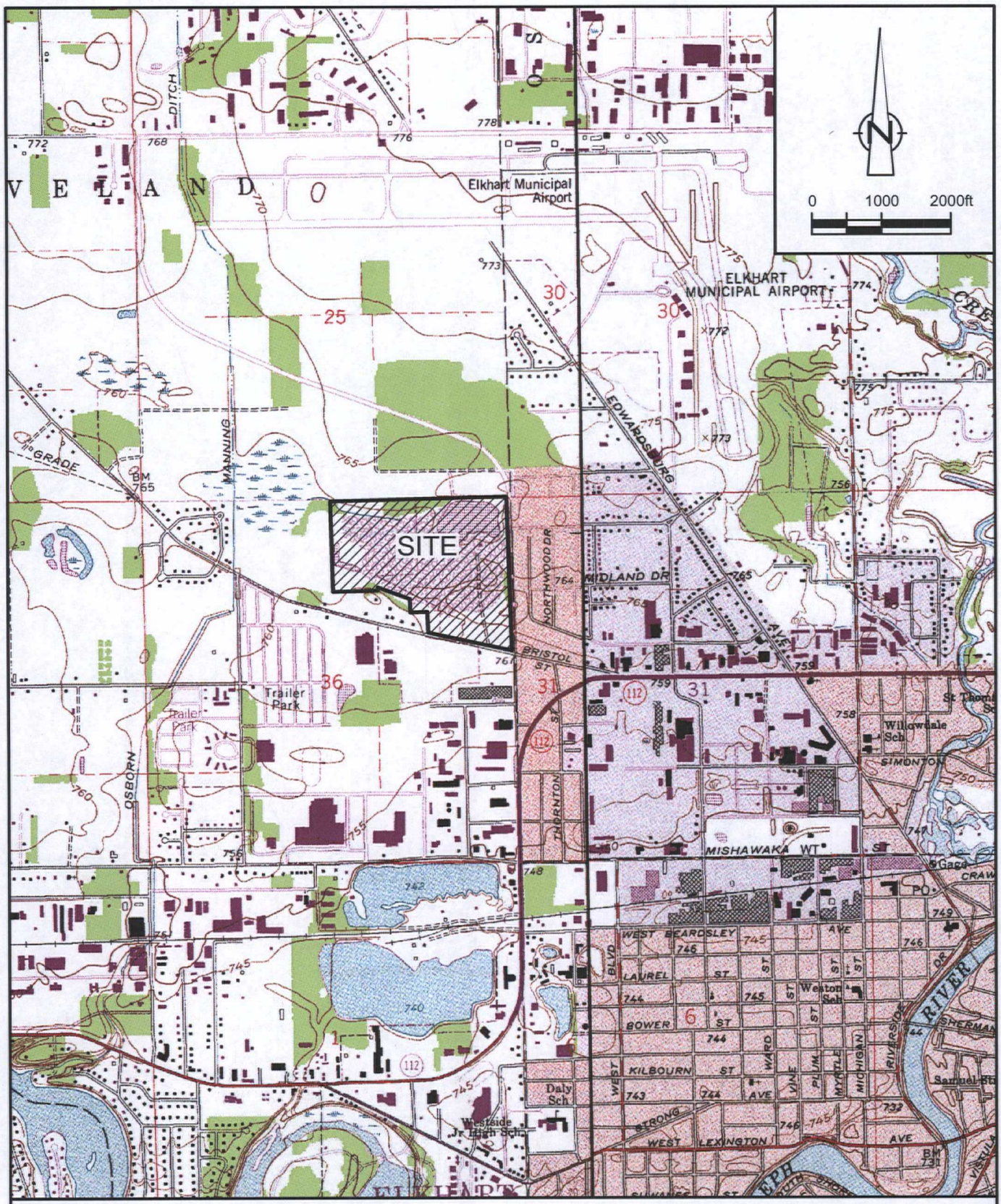
Based on the results of the monitoring completed at the Site to date. CRA recommends that the following Phase III monitoring wells be included in future GMP monitoring wells based on the rationale provided below.

Phase III Monitoring Wells	*Future Monitoring*	*Rationale*
WT106C	Add to GMP	Vertical delineation of arsenic at WT106B
WT115B	Currently included in GMP	Detection monitoring well (benzene)
WT115C	Add to GMP	Vertical delineation of benzene at WT115B
WT120C	Currently included in GMP	Cross gradient of iron and calcium at WT101A
WT121A	Currently included in GMP	down gradient of iron and calcium at WT101A
WT121B	Currently included in GMP	Downgradient of arsenic at WT120B
WT122A	Currently included in GMP	Down gradient of benzene at WT115B
WT122B	Add to GMP	Down gradient of benzene at WT115B
WT122C	Add to GMP	Down gradient of benzene at WT115B

The monitoring wells included in the GMP are listed in Table 5.1 and shown on Figure 5.1. Groundwater samples will be collected on a semi-annual basis and will be analyzed for the analytes listed in Table 2.5.

The PSDs will submit routine annual reports of groundwater quality monitoring at the Himco Site. The next groundwater monitoring report will be submitted to USEPA in November 2013 and will include monitoring data collected from September 2012 through June 2013.

FIGURES



SOURCE: USGS QUADRANGLE MAPS;
ELKHART AND OSCEOLA, INDIANA

figure 1.1

SITE LOCATION MAP
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA027 NOV 28/2012

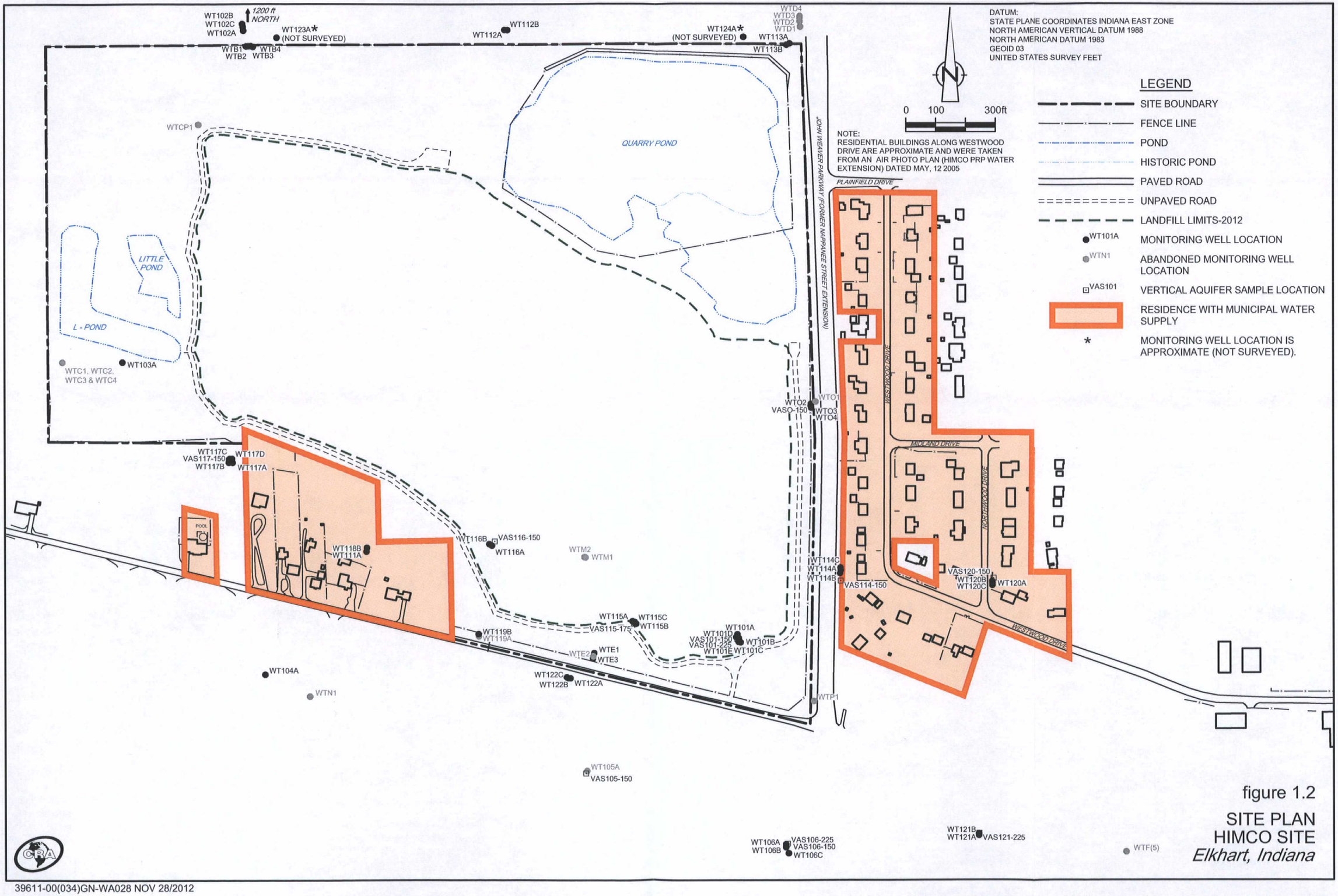


figure 1.2

SITE PLAN
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA028 NOV 28/2012

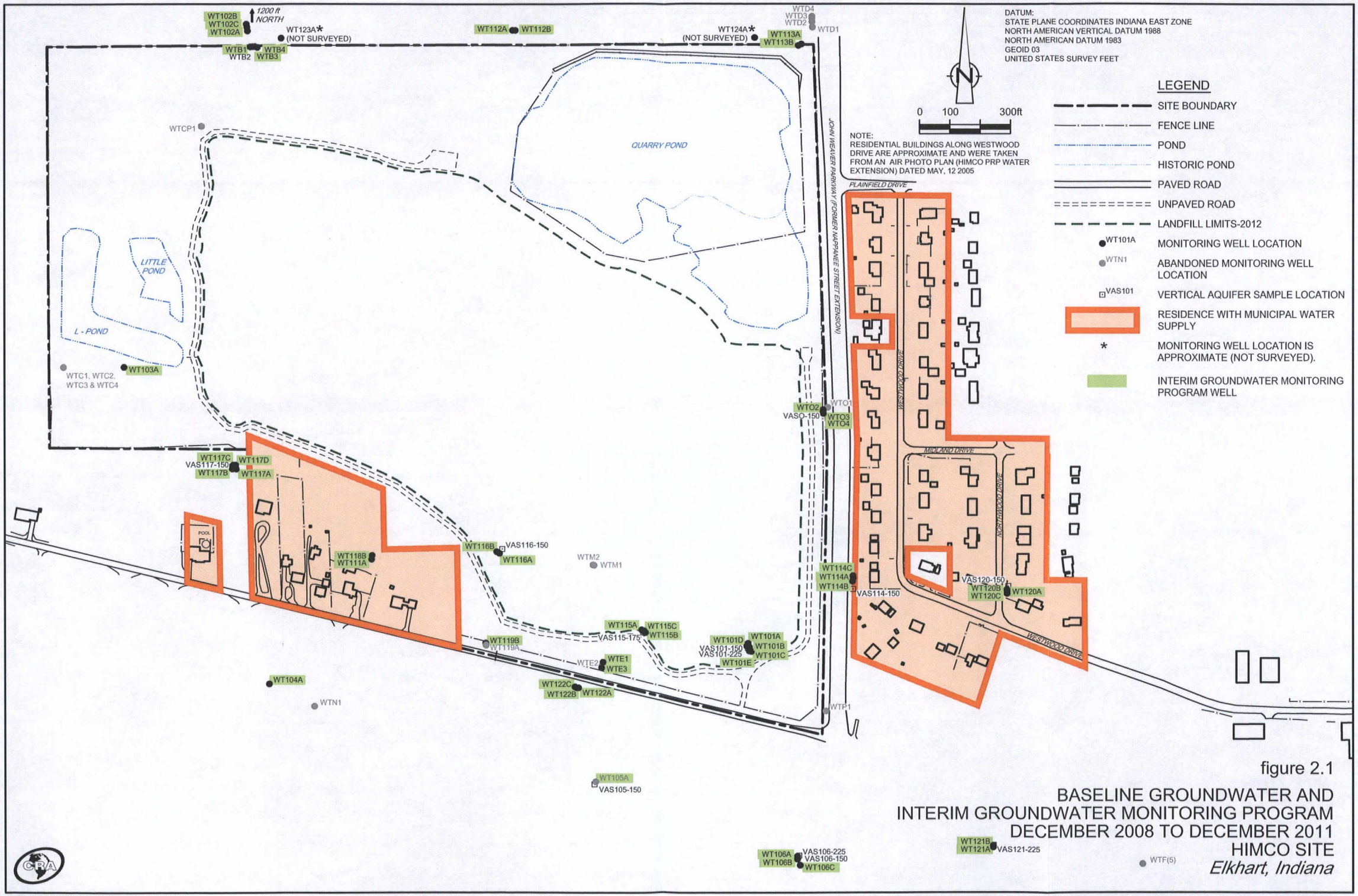


figure 2.1

BASELINE GROUNDWATER AND INTERIM GROUNDWATER MONITORING PROGRAM DECEMBER 2008 TO DECEMBER 2011

HIMCO SITE

Elkhart, Indiana

39611-00(034)GN-WA031 NOV 28/2012

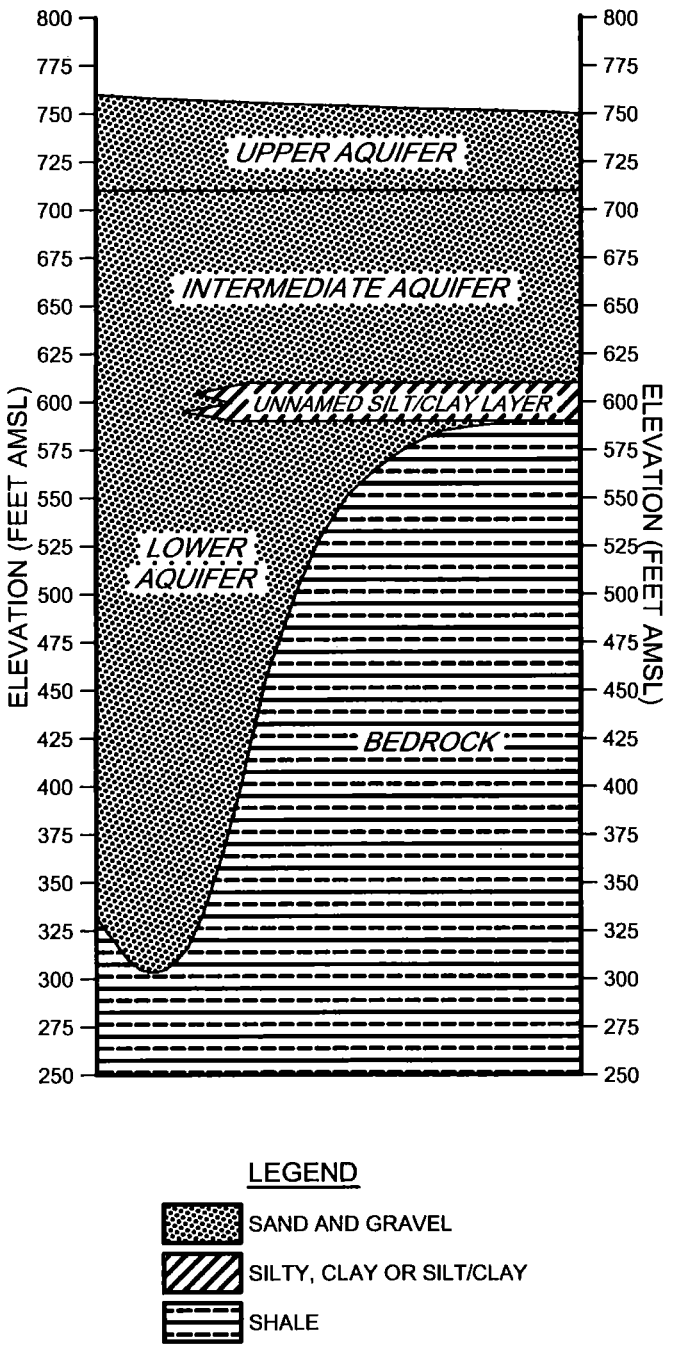


figure 3.1

SCHEMATIC CROSS-SECTION
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA026 NOV 28/2012

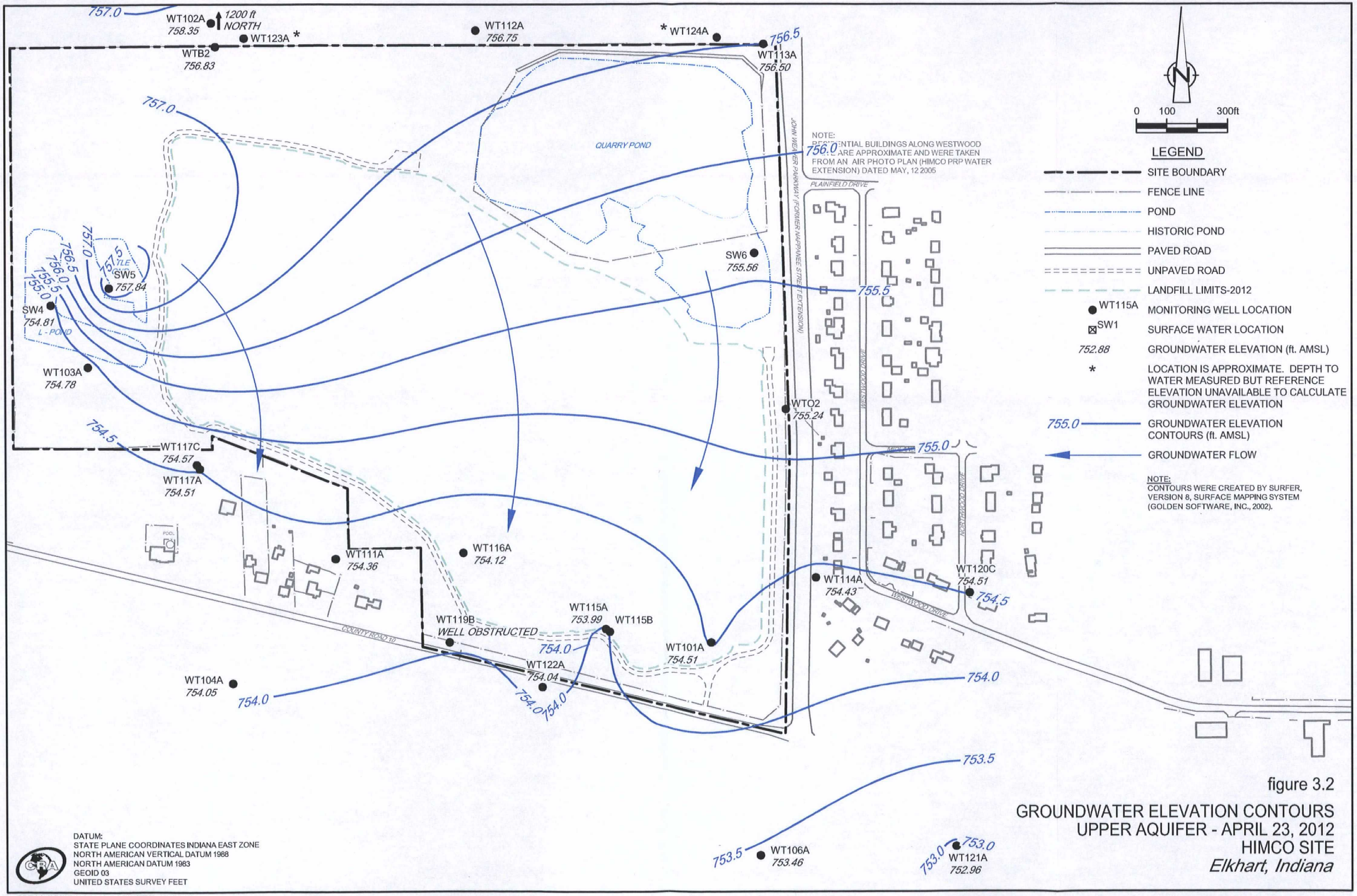


figure 3.2

GROUNDWATER ELEVATION CONTOURS
UPPER AQUIFER - APRIL 23, 2012
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA022 FEB 15/2013

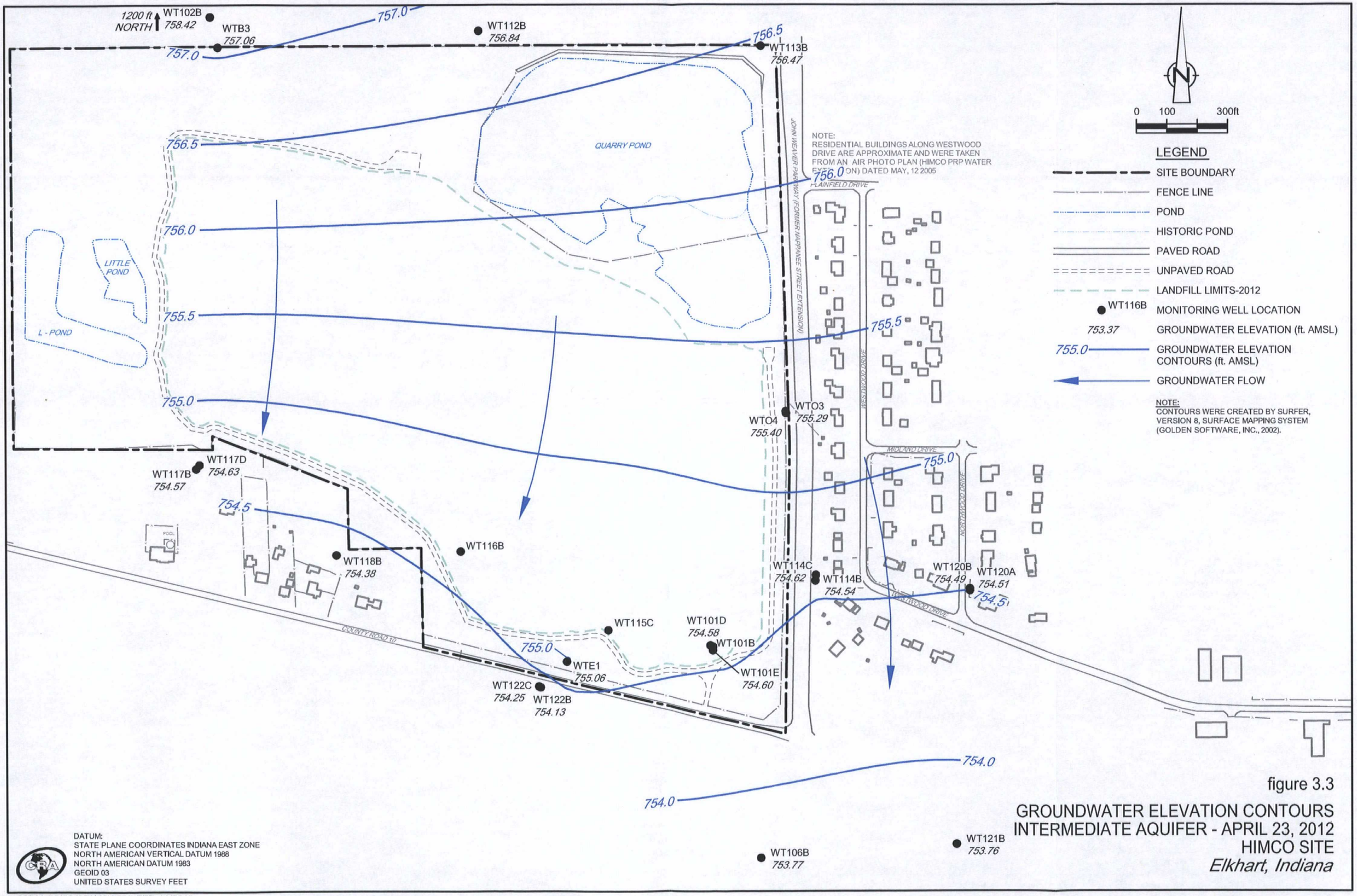


figure 3.3

GROUNDWATER ELEVATION CONTOURS
INTERMEDIATE AQUIFER - APRIL 23, 2012
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA023 FEB 11/2013

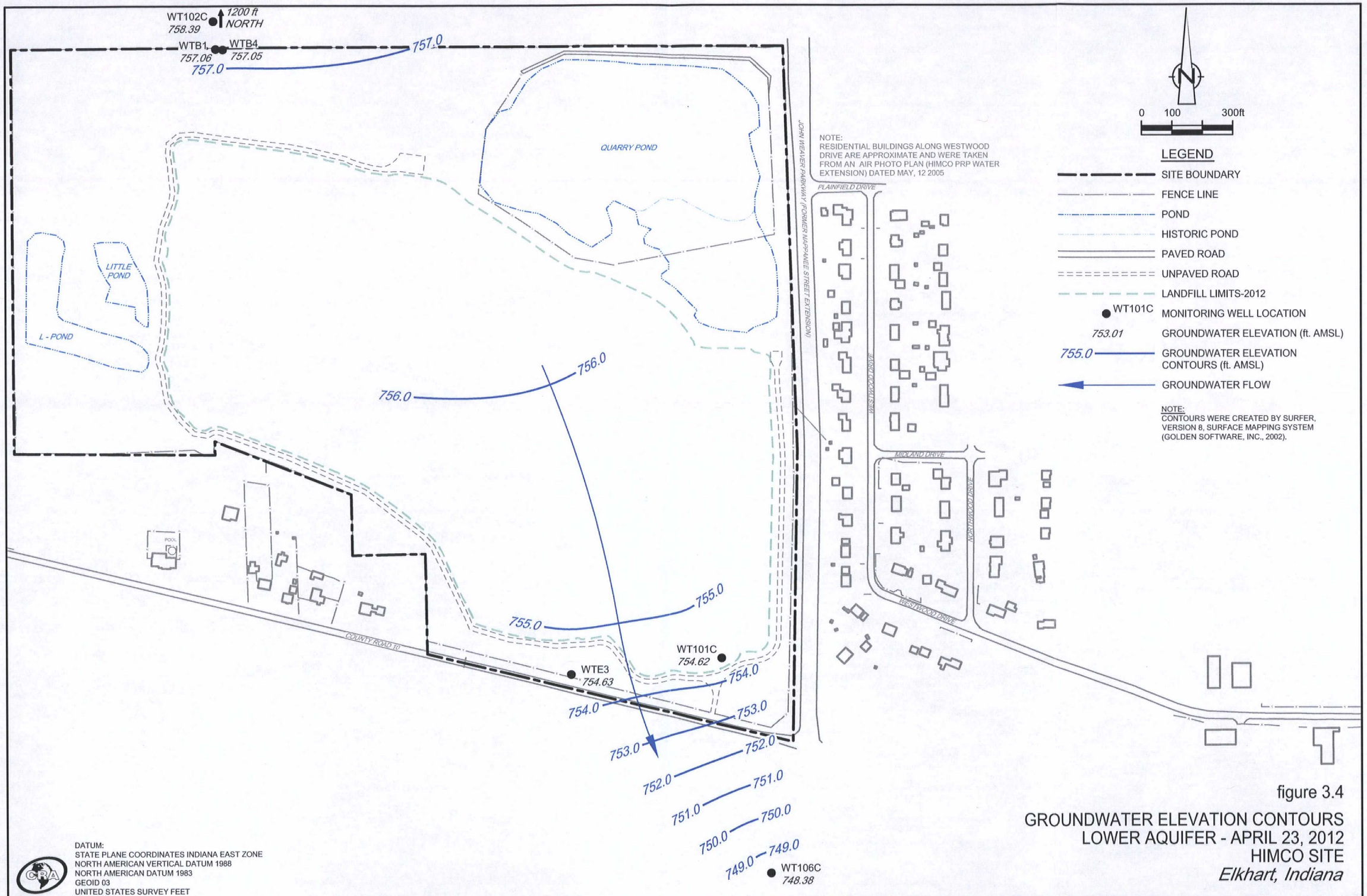
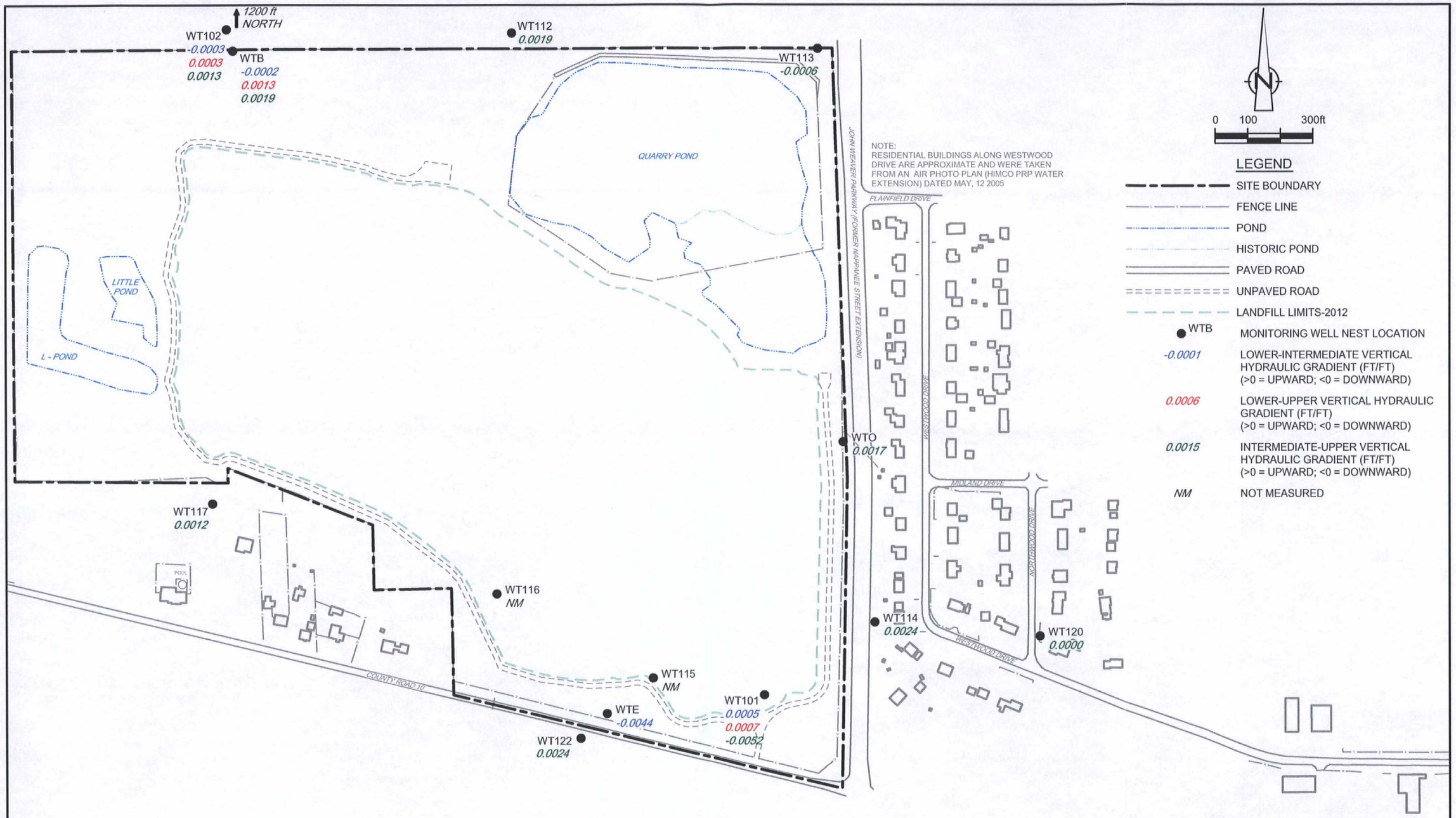


figure 3.4

GROUNDWATER ELEVATION CONTOURS
LOWER AQUIFER - APRIL 23, 2012
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA024 NOV 28/2012



DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

figure 3.5

VERTICAL HYDRAULIC GRADIENTS
APRIL 23, 2012
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA025 NOV 28/2012

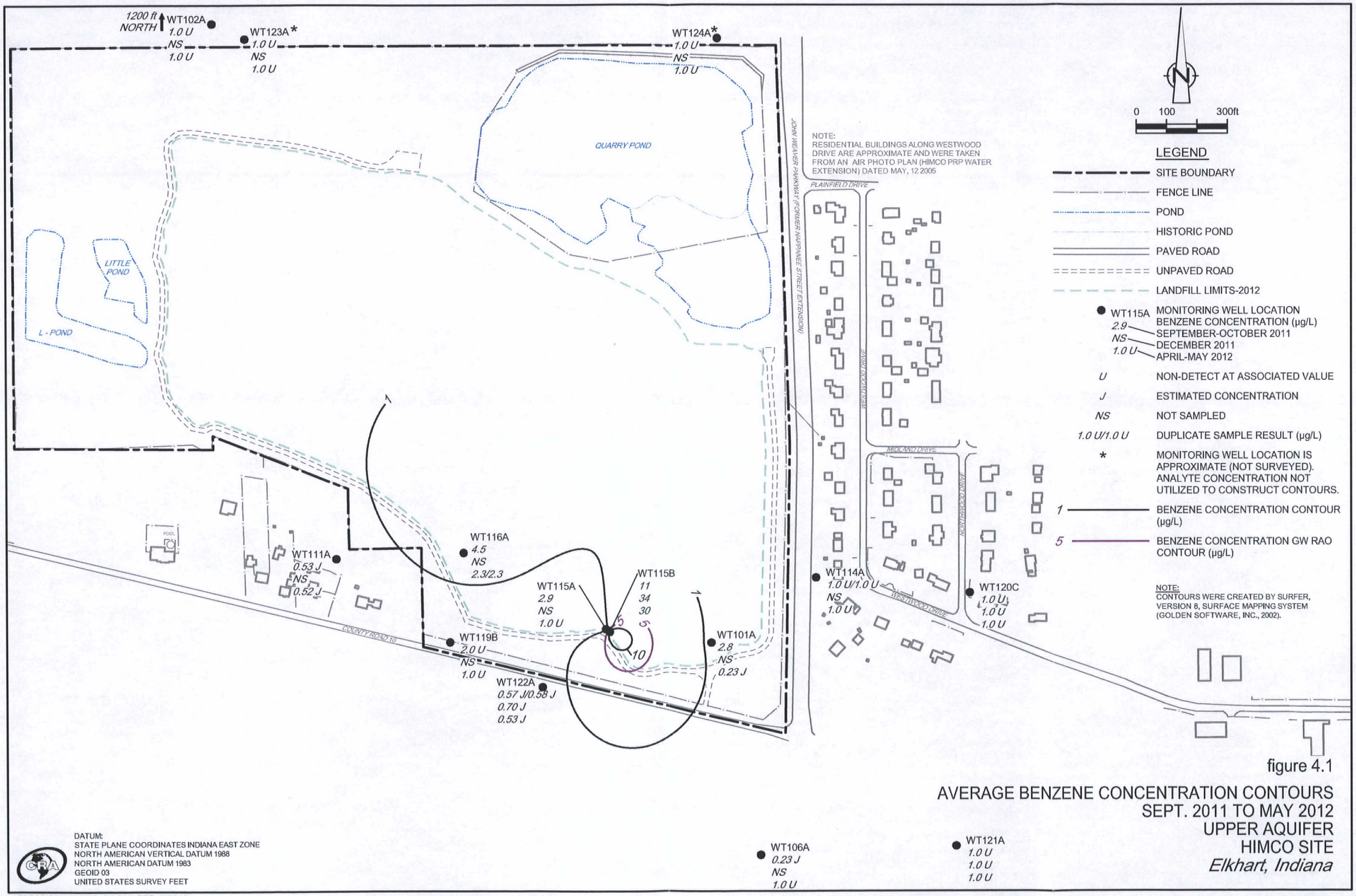


figure 4.1

AVERAGE BENZENE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

39611-00(034)GN-WA009 FEB 7/2013

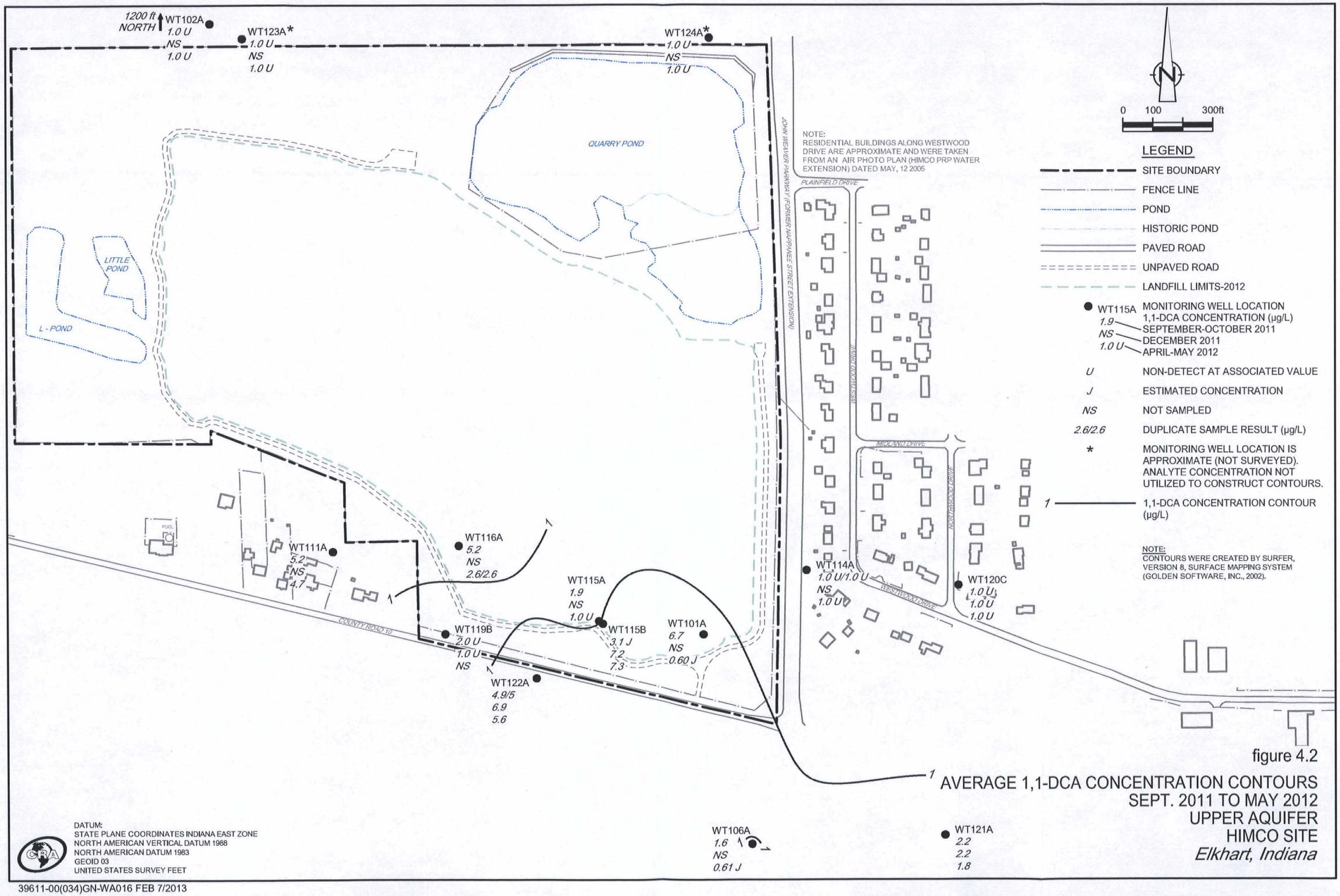


figure 4.2

AVERAGE 1,1-DCA CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA016 FEB 7/2013

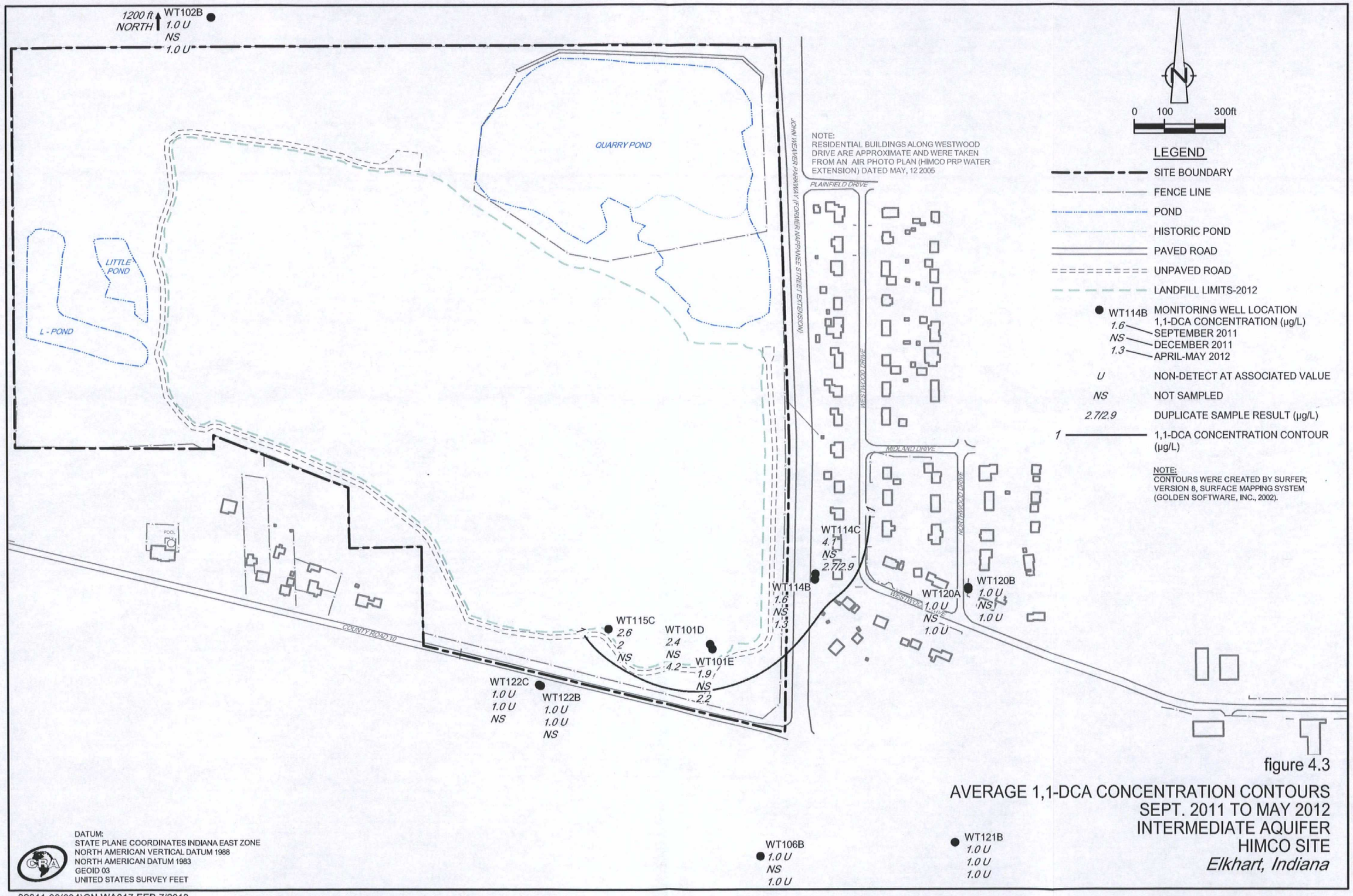


figure 4.3

AVERAGE 1,1-DCA CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA017 FEB 7/2013

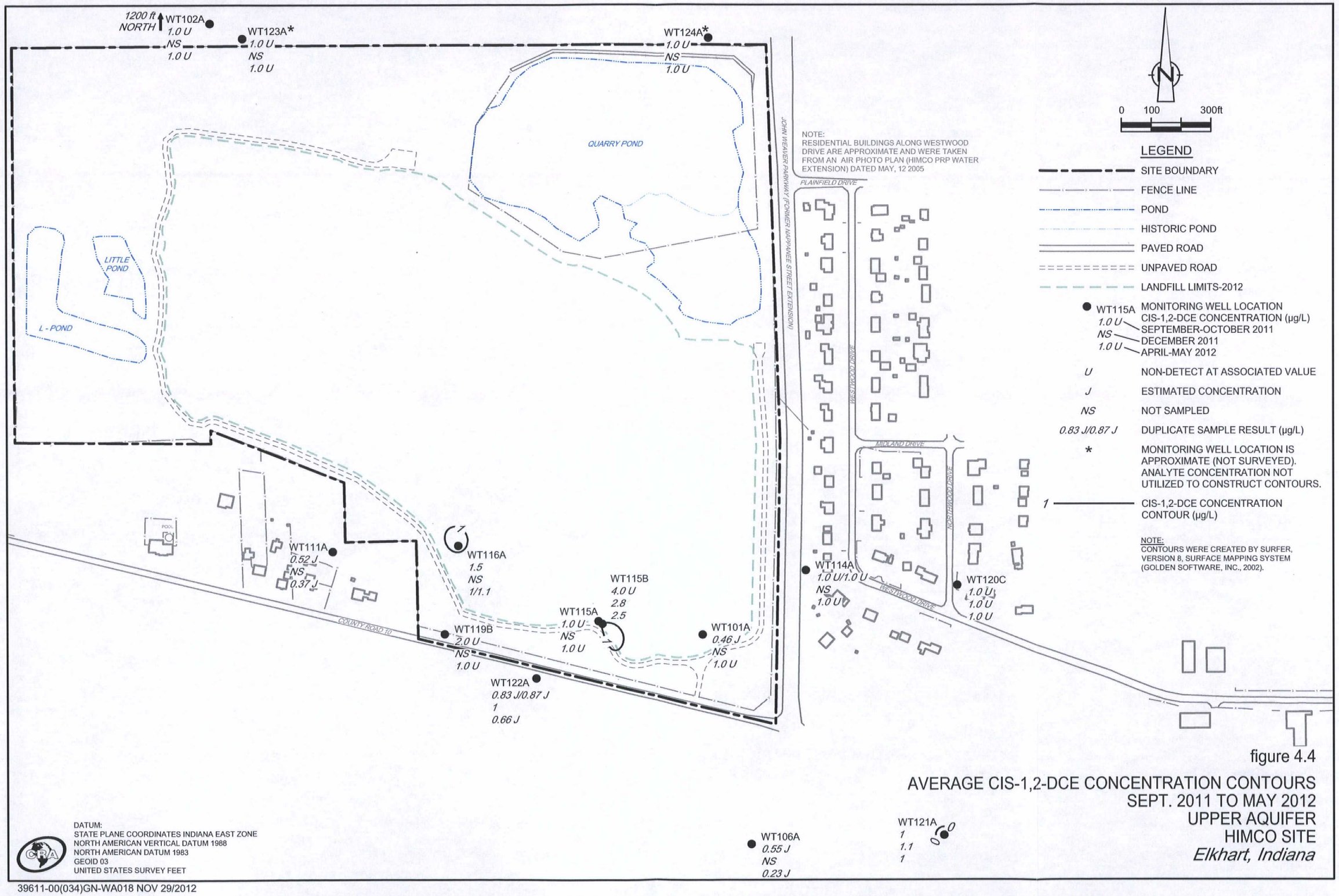


figure 4.4

AVERAGE CIS-1,2-DCE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA018 NOV 29/2012

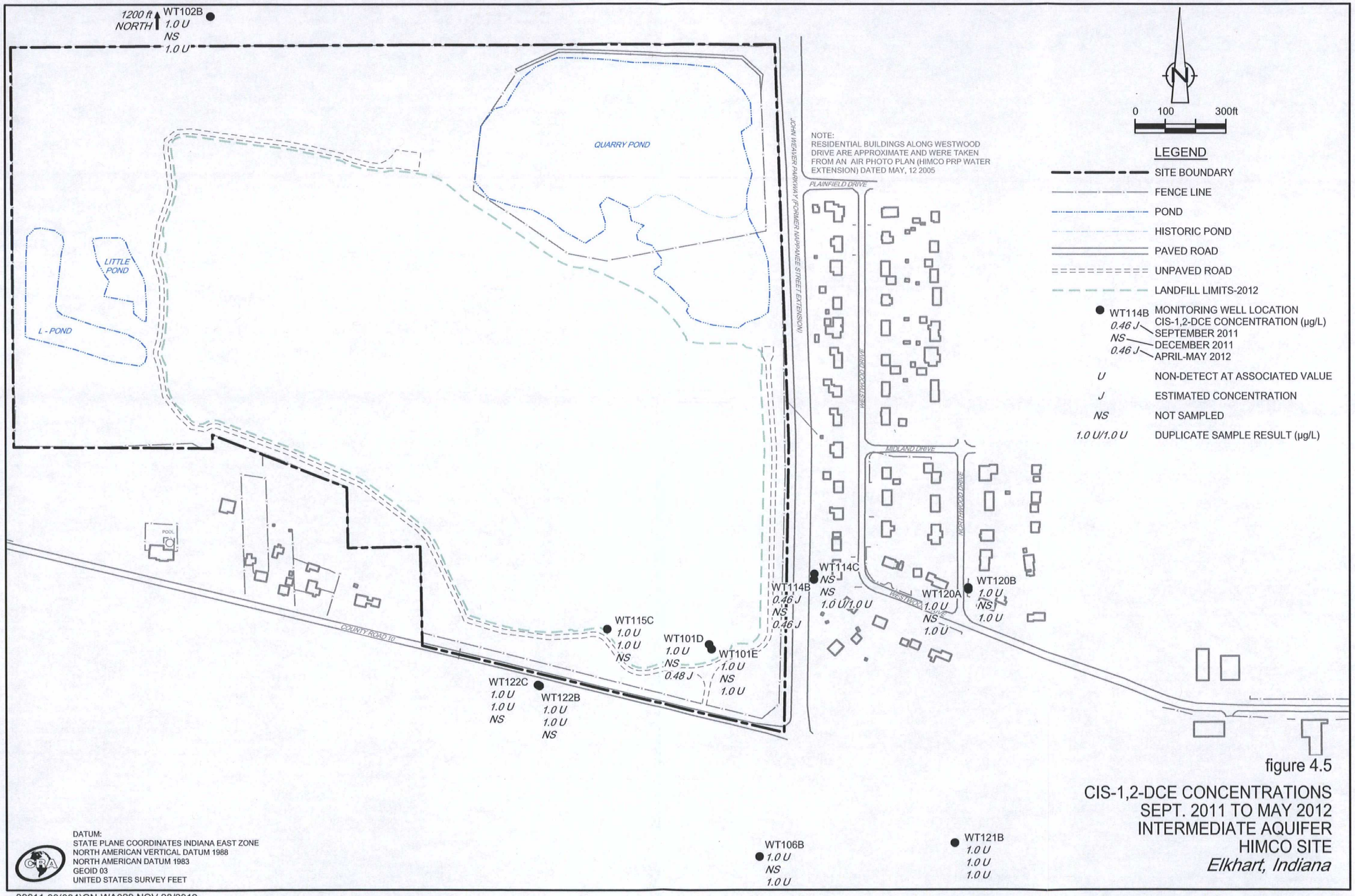


figure 4.5

CIS-1,2-DCE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA029 NOV 28/2012

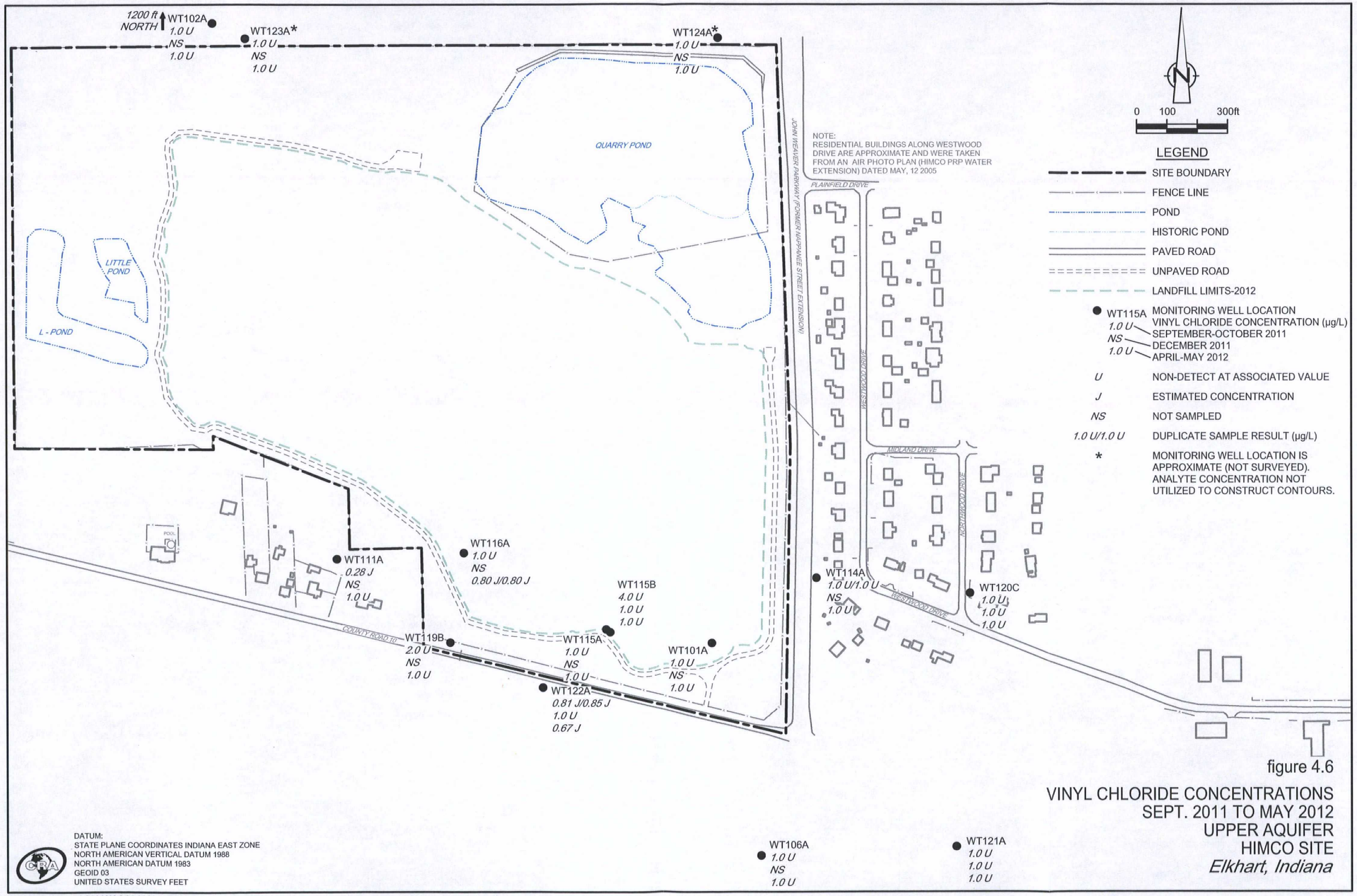


figure 4.6

VINYL CHLORIDE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA011 NOV 29/2012

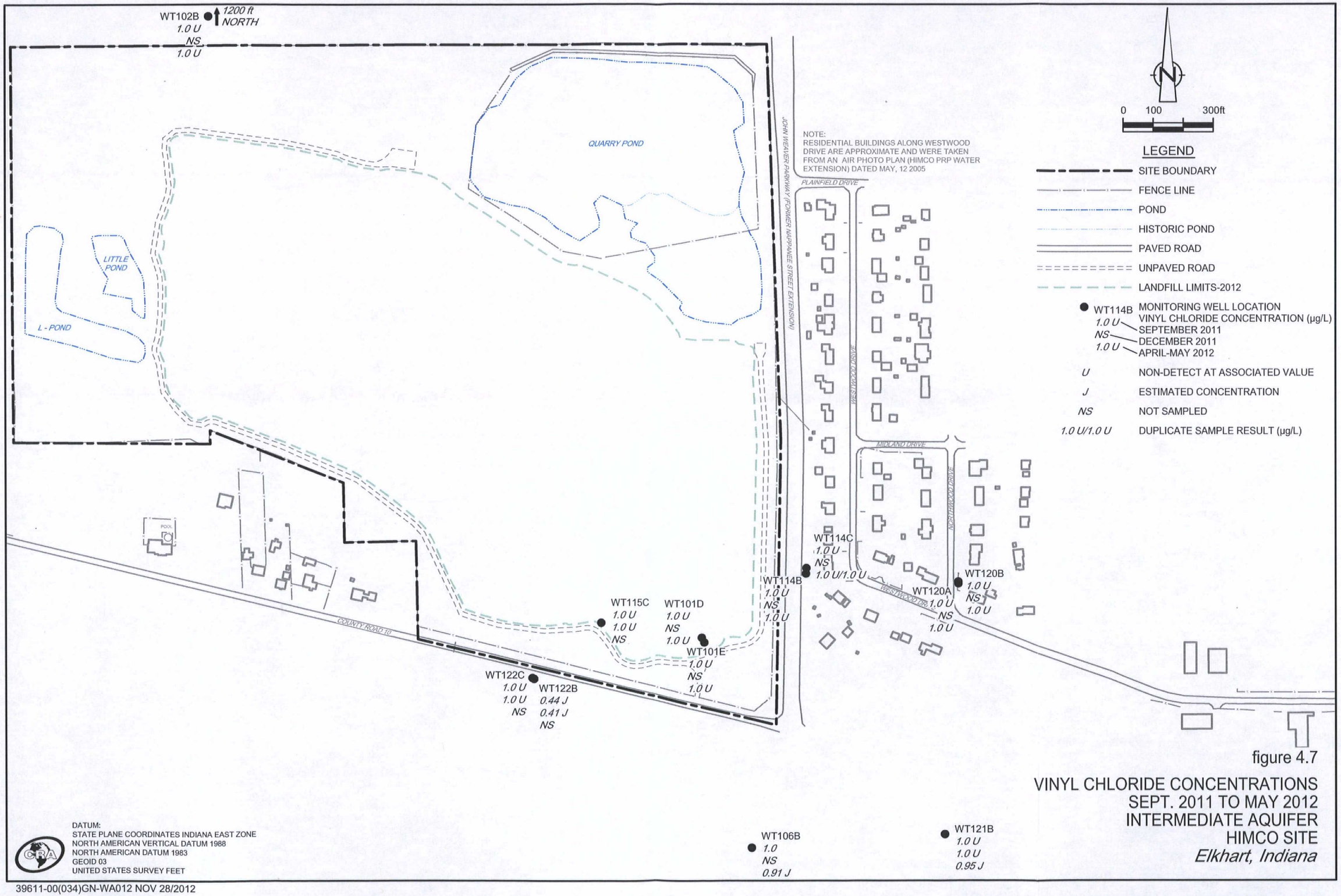


figure 4.7

VINYL CHLORIDE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA012 NOV 28/2012

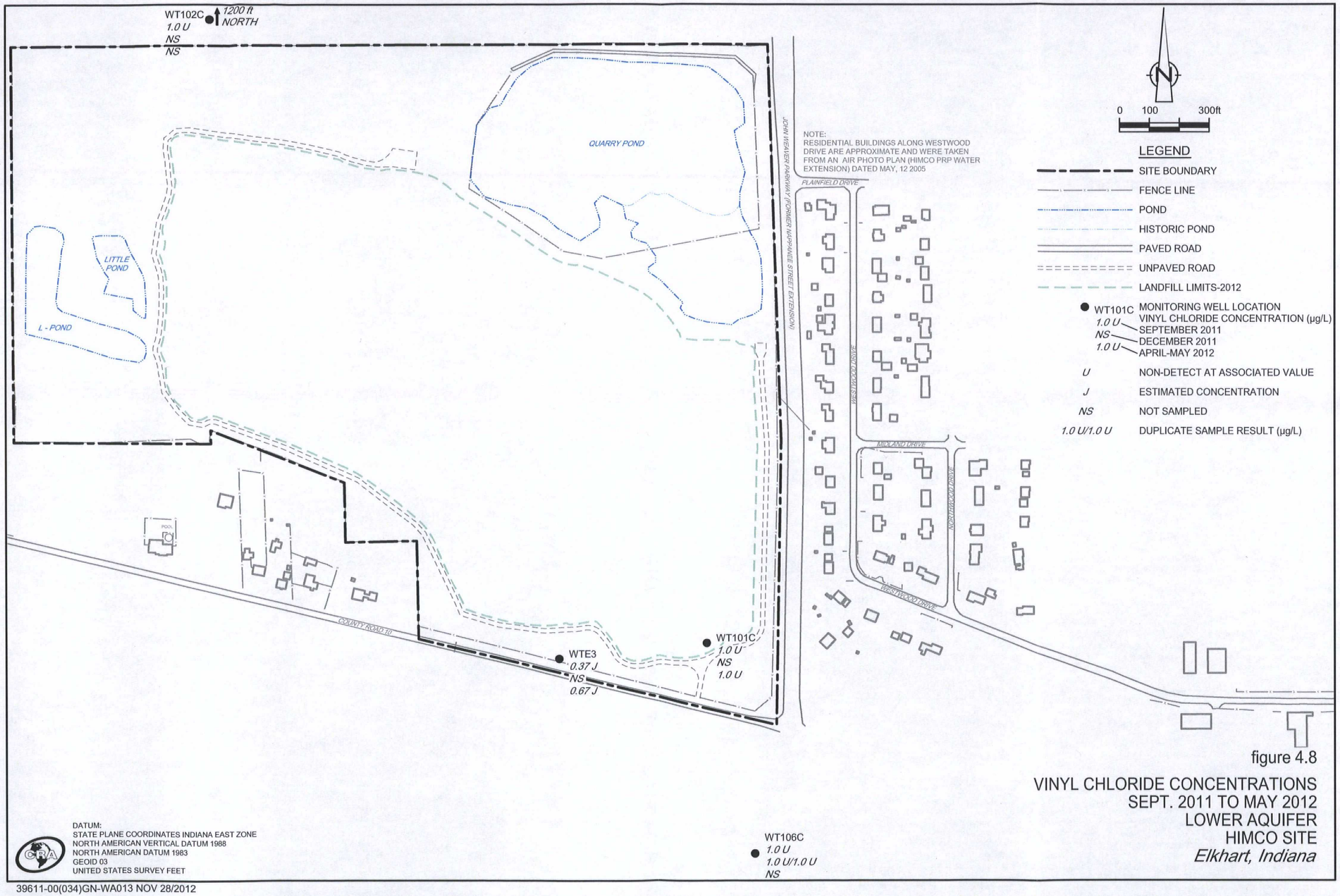


figure 4.8

VINYL CHLORIDE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
LOWER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA013 NOV 28/2012

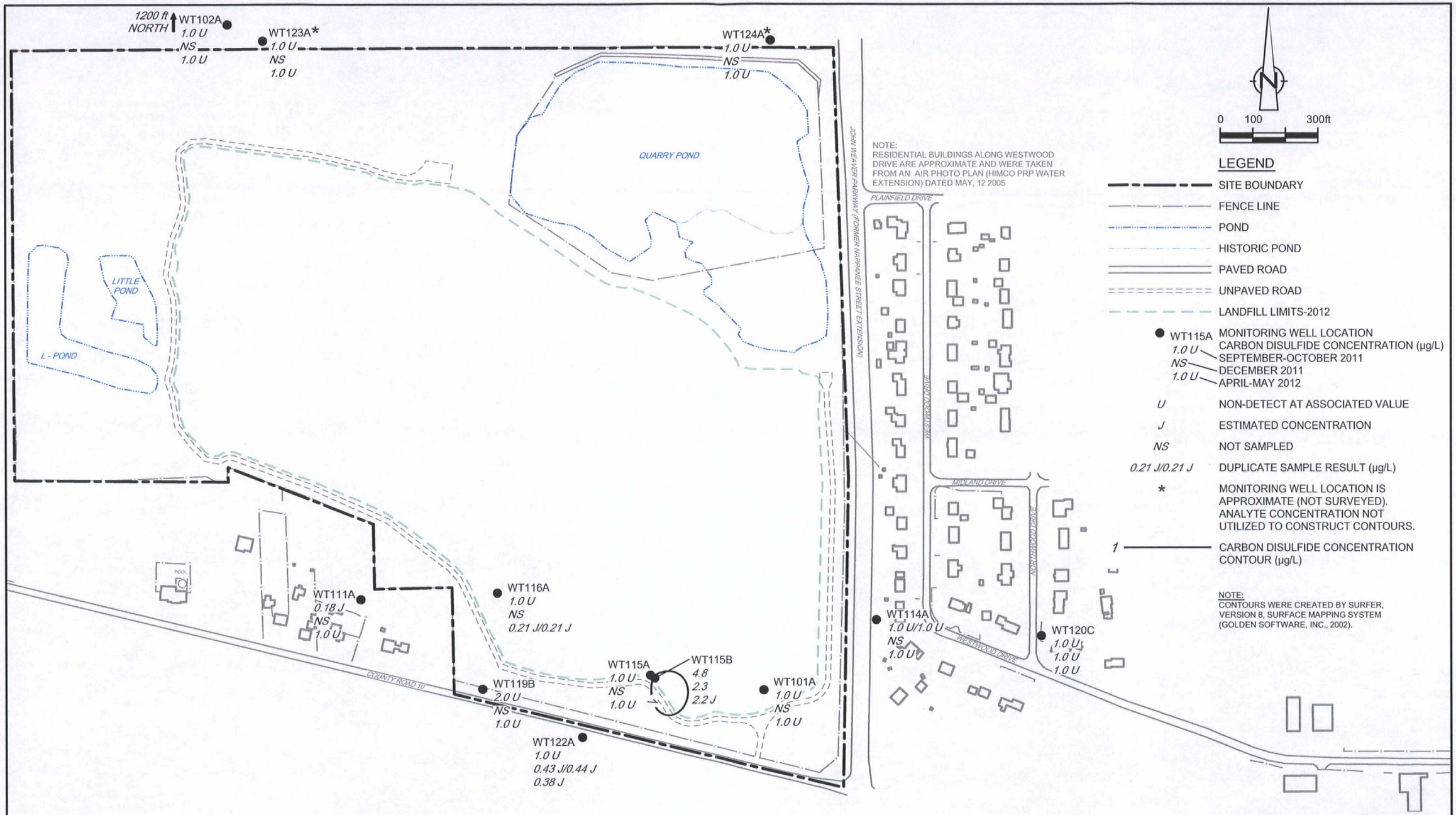


figure 4.9

AVERAGE CARBON DISULFIDE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

39611-00(034)GN-WA019 NOV 29/2012

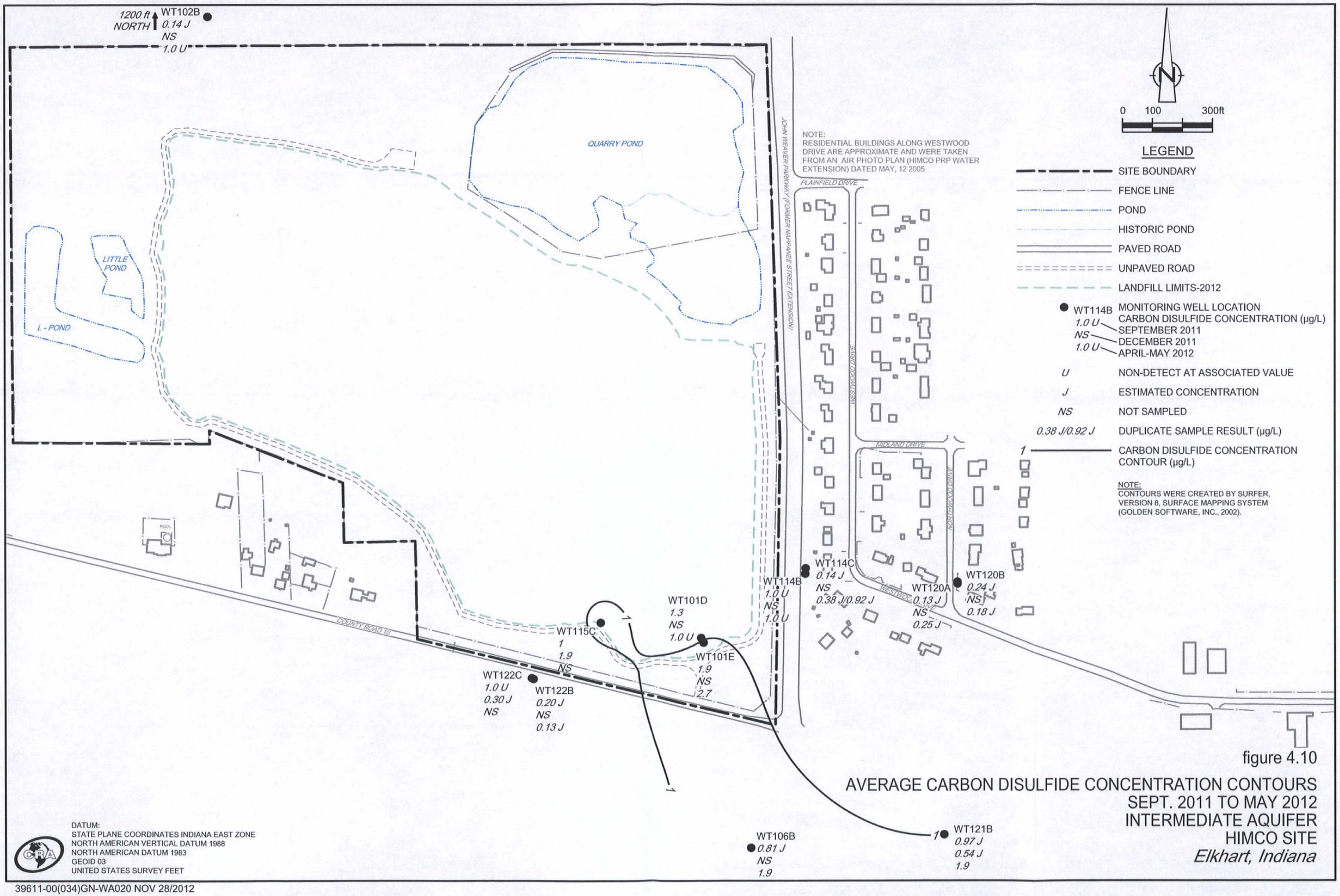


figure 4.10

AVERAGE CARBON DISULFIDE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

39611-00(034)GN-WA020 NOV 28/2012

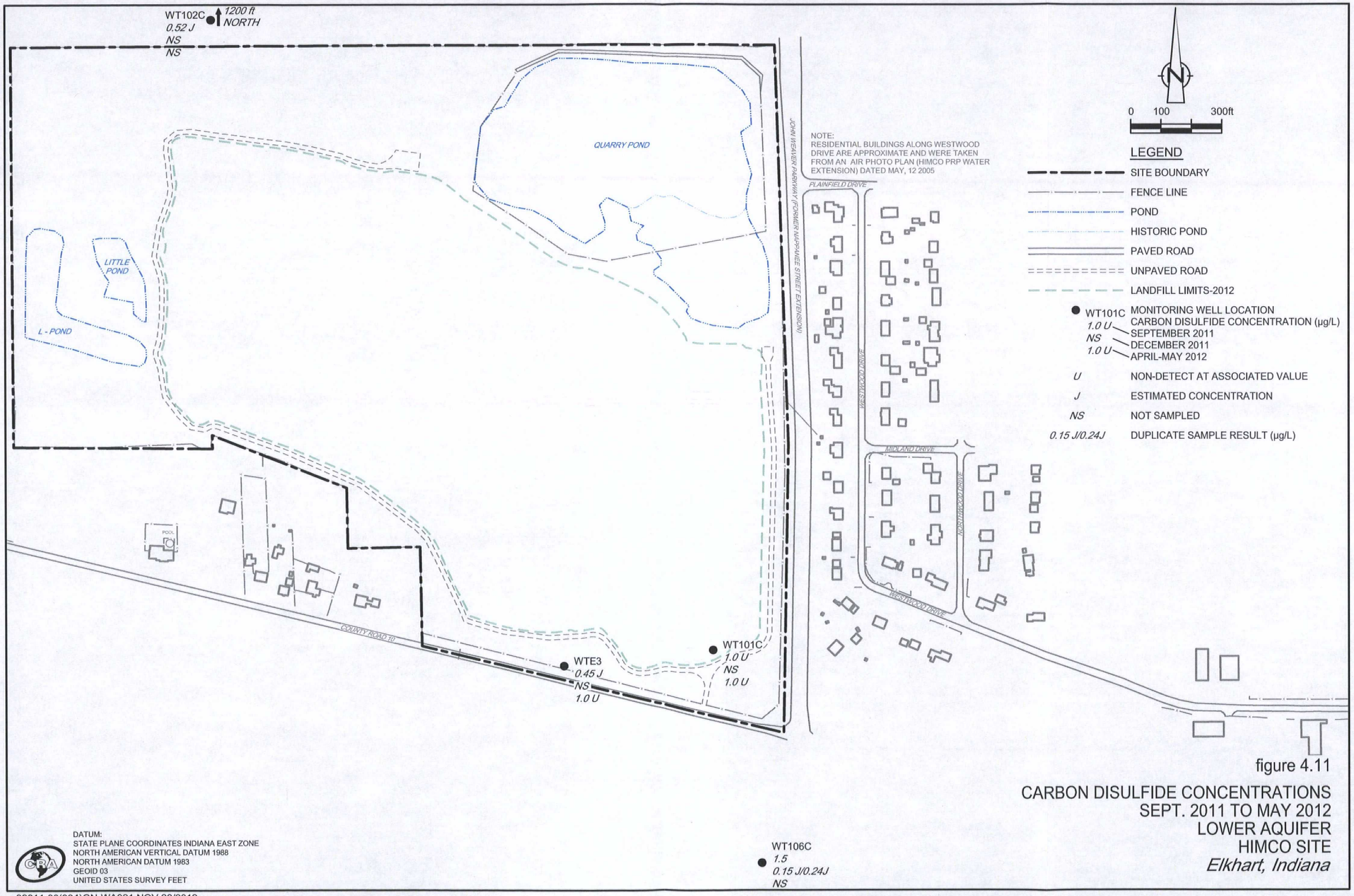


figure 4.11

CARBON DISULFIDE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
LOWER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA021 NOV 28/2012

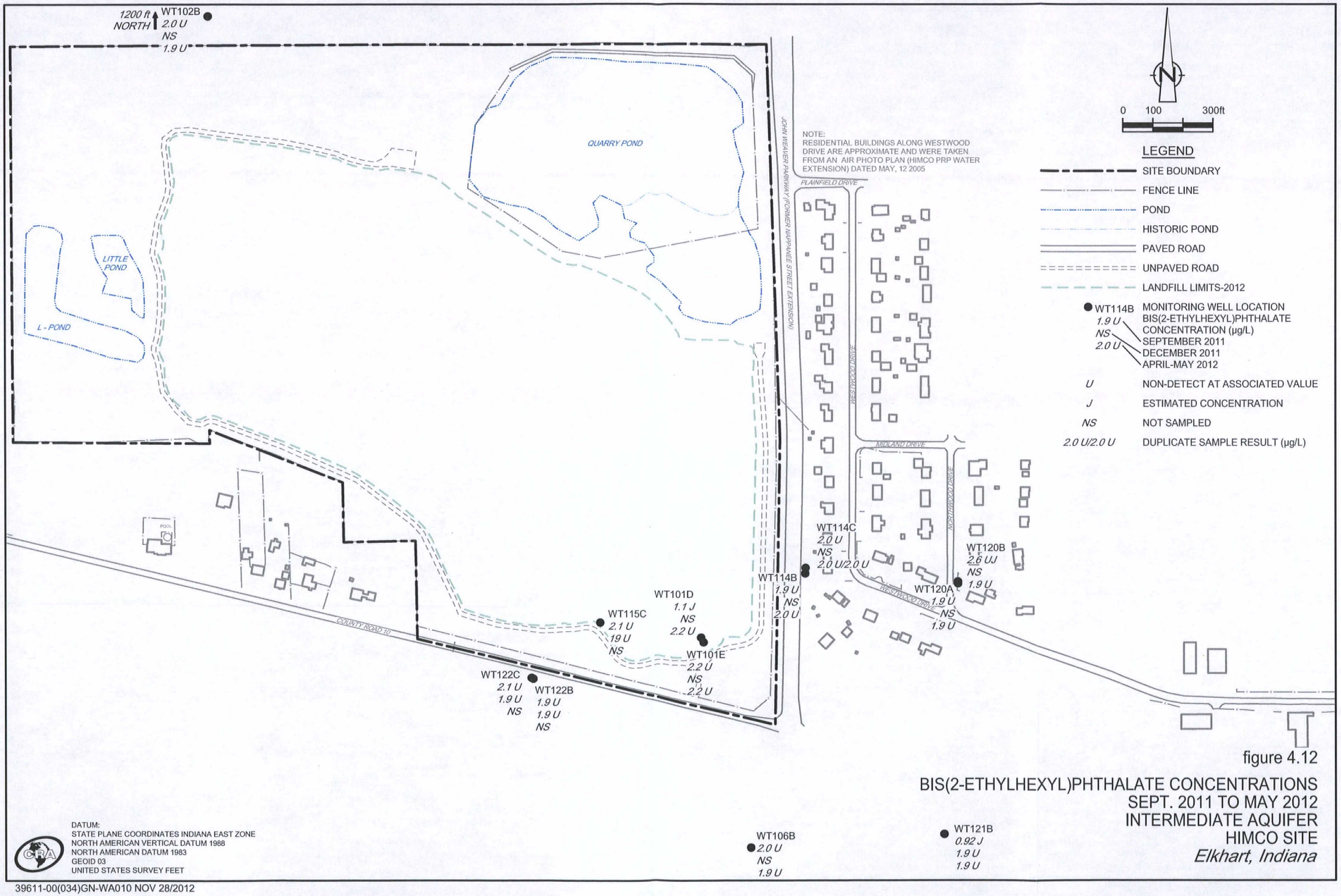


figure 4.12

BIS(2-ETHYLHEXYL)PHTHALATE CONCENTRATIONS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA010 NOV 28/2012

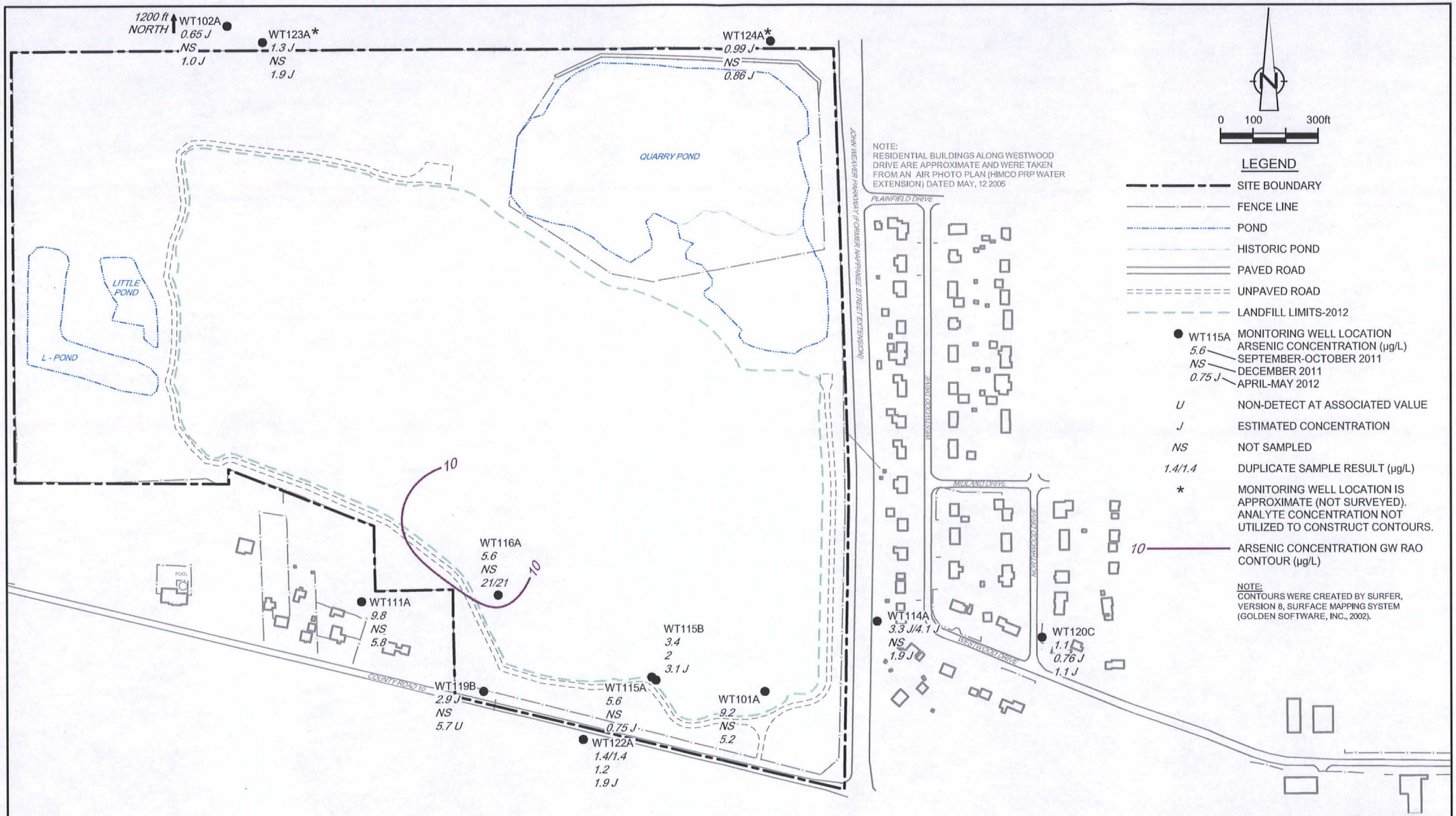


figure 4.13

AVERAGE ARSENIC CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

39611-00(034)GN-WA001 FEB 7/2013

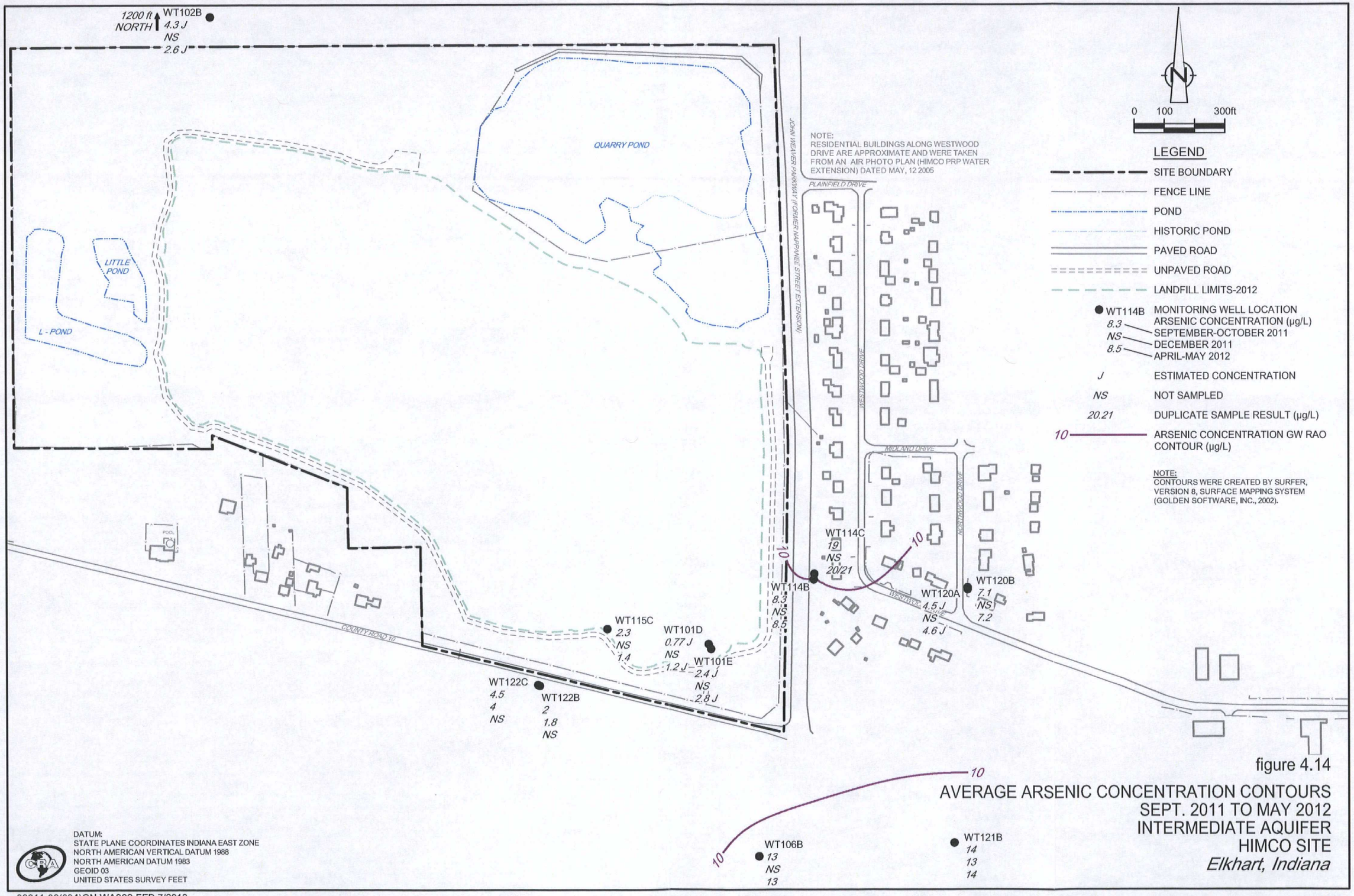


figure 4.14

AVERAGE ARSENIC CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
INTERMEDIATE AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA002 FEB 7/2013

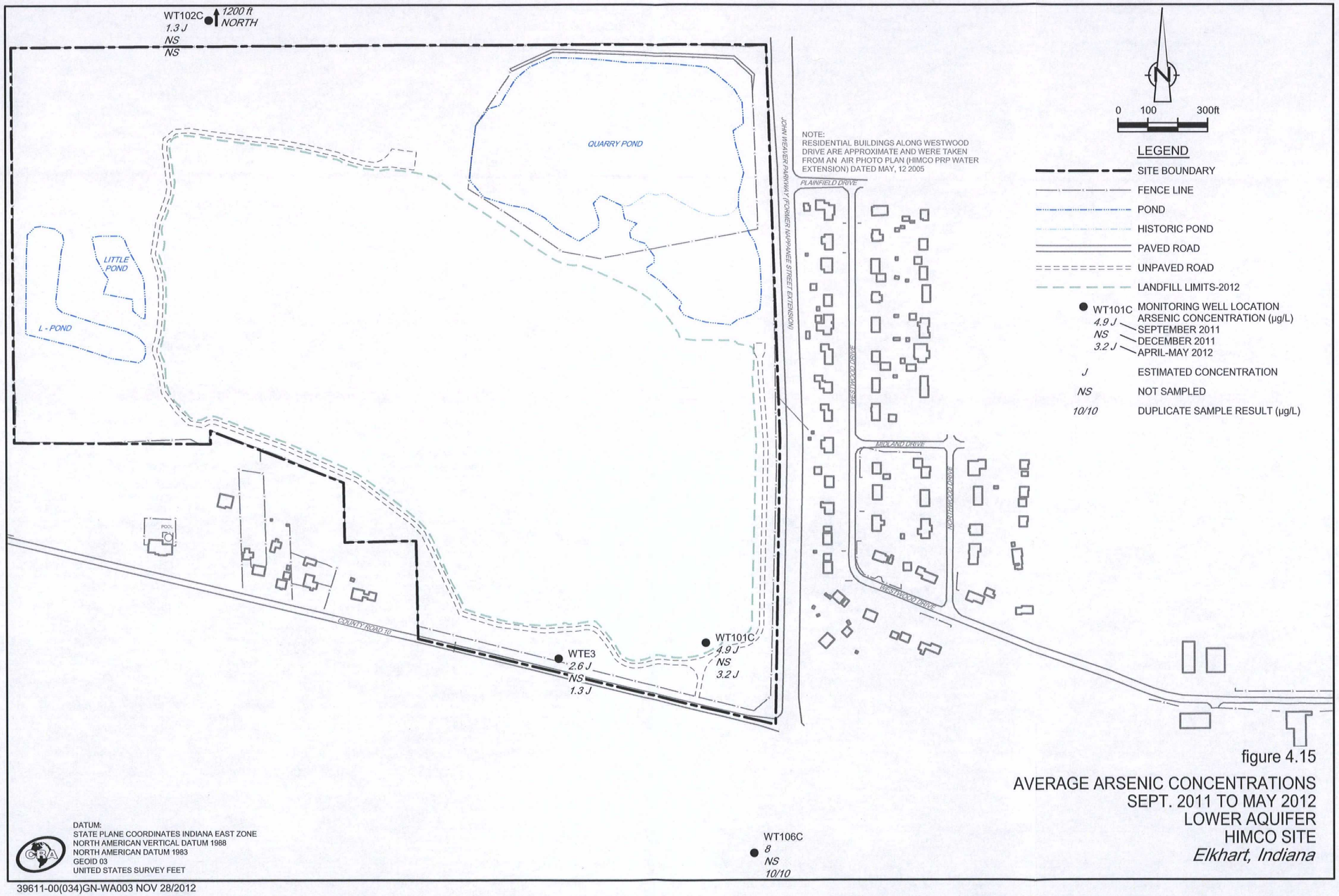


figure 4.15

AVERAGE ARSENIC CONCENTRATIONS
SEPT. 2011 TO MAY 2012
LOWER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA003 NOV 28/2012

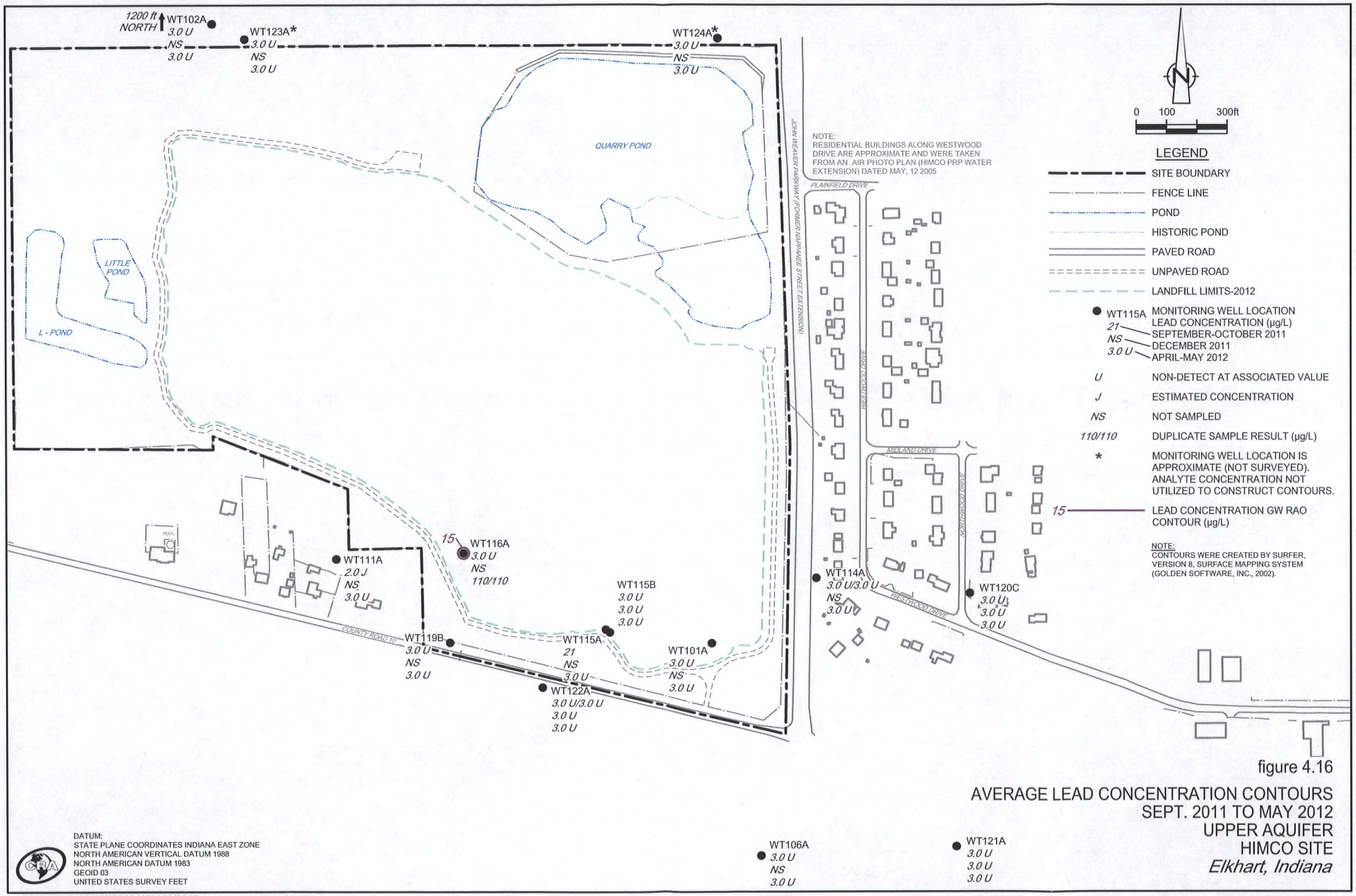
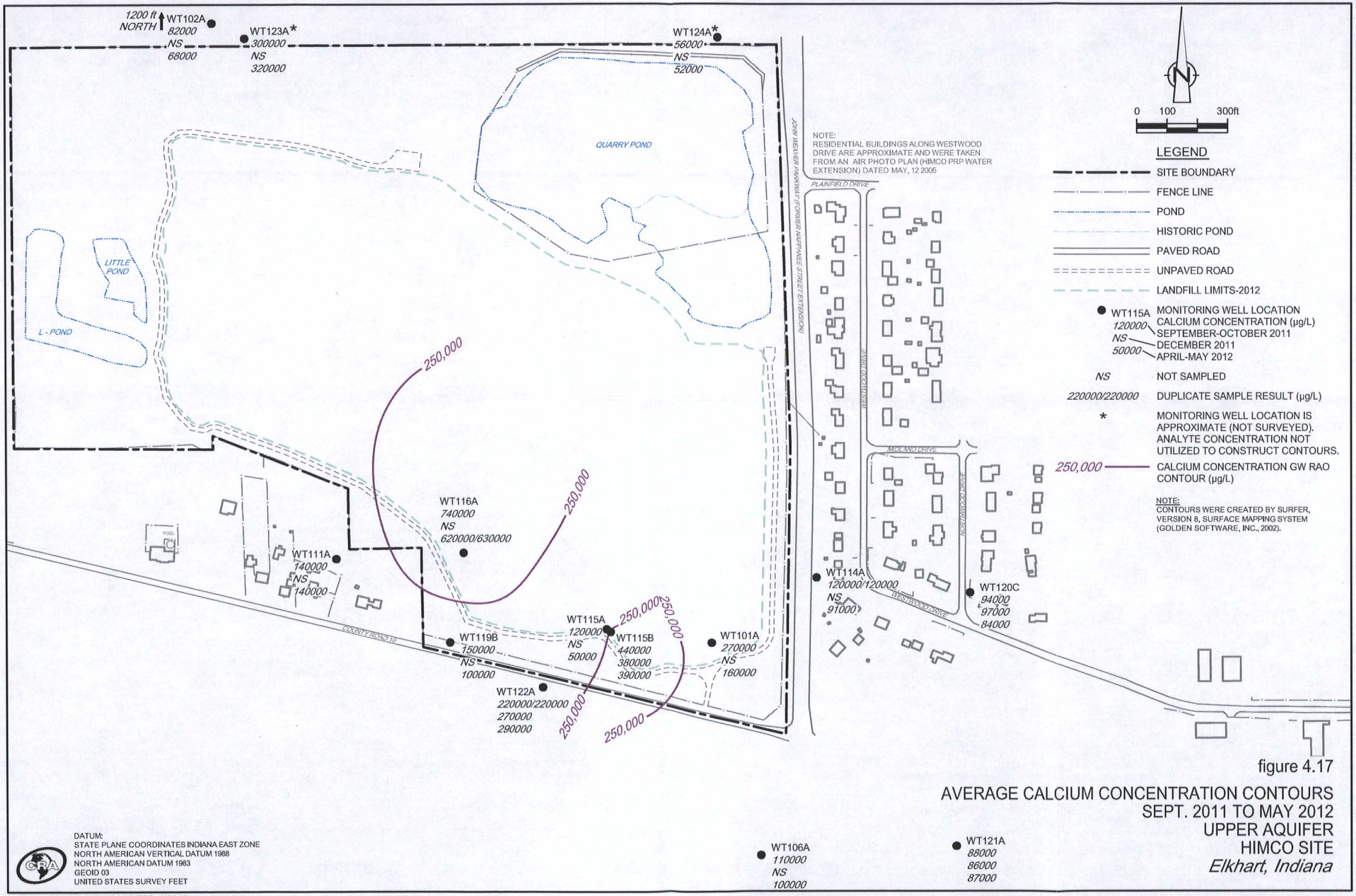


figure 4.16

AVERAGE LEAD CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA006 NOV 29/2012

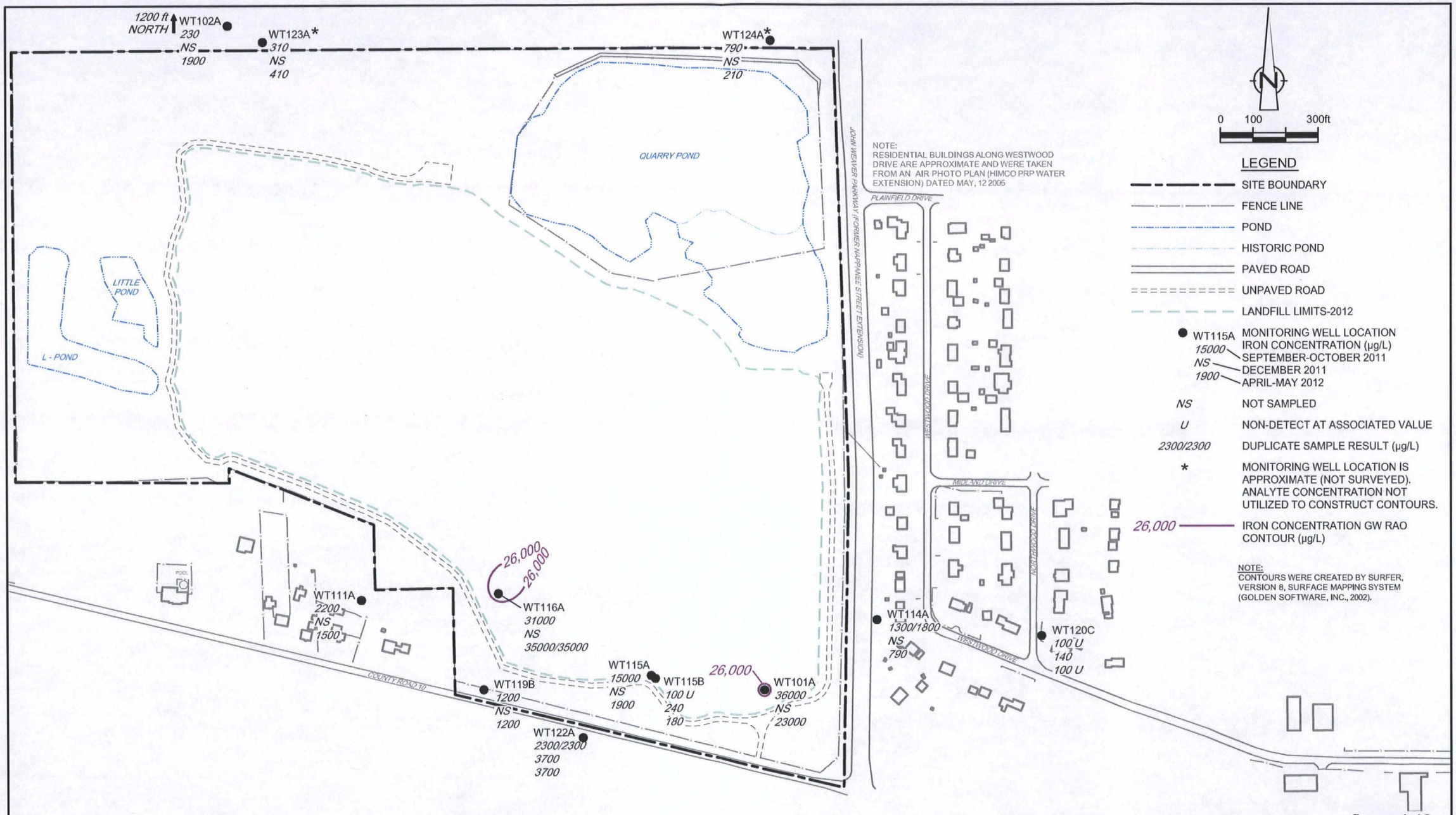


DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

figure 4.17

AVERAGE CALCIUM CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA004 FEB 7/2013



DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

figure 4.18

AVERAGE IRON CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA005 FEB 7/2013

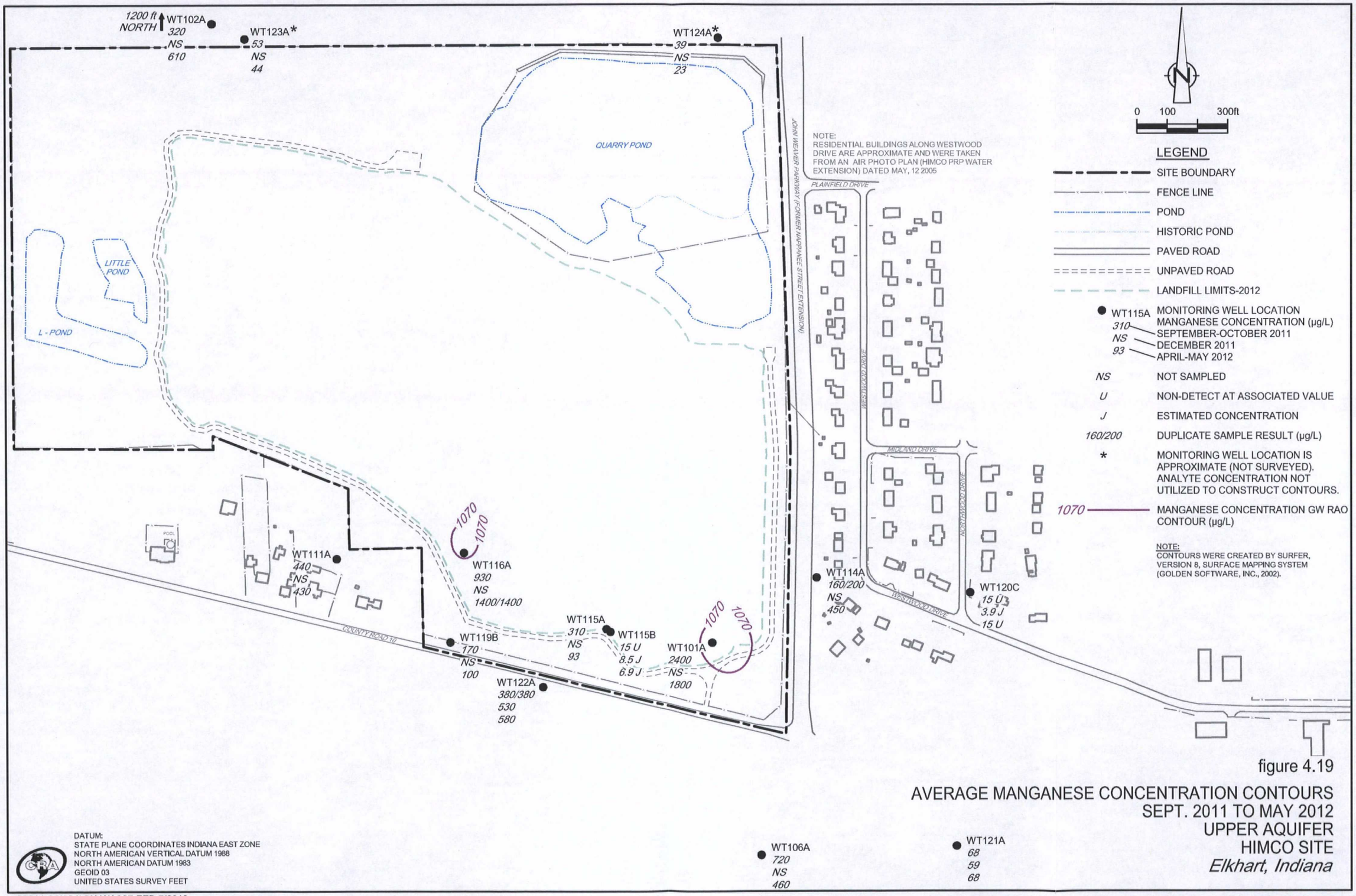
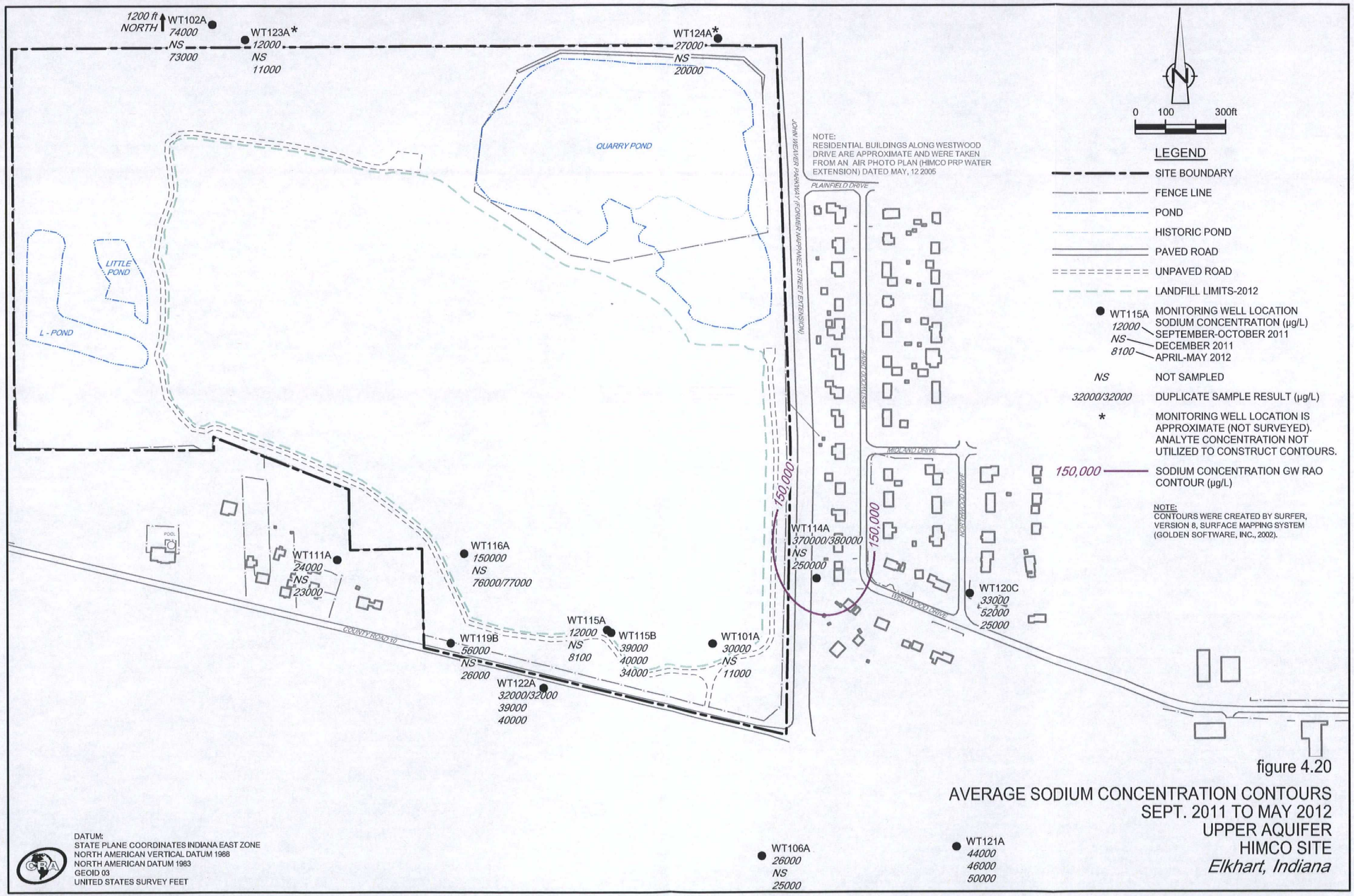


figure 4.19

AVERAGE MANGANESE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA007 FEB 7/2013



DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

figure 4.20

AVERAGE SODIUM CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA008 FEB 7/2013

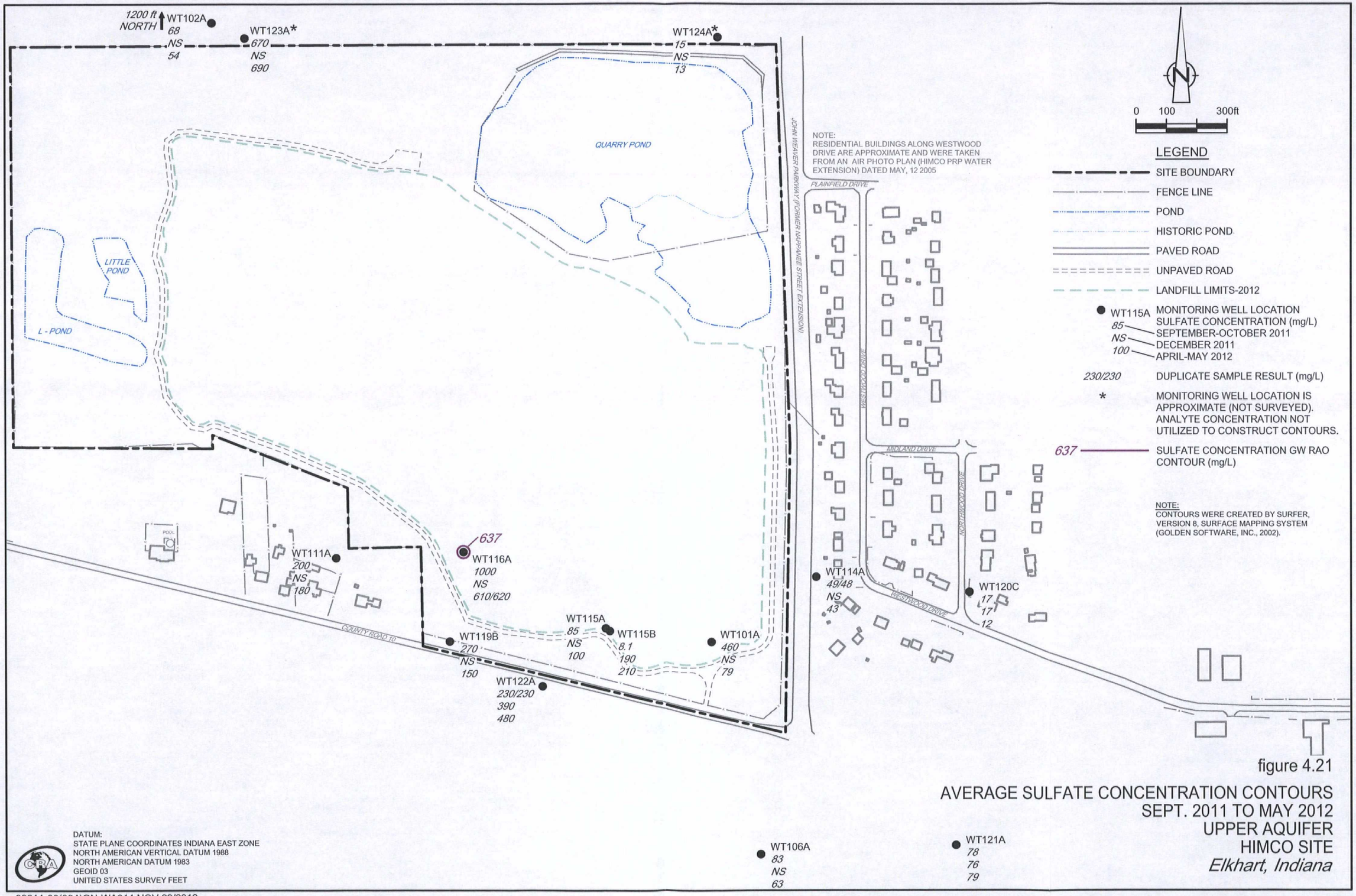


figure 4.21

AVERAGE SULFATE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA014 NOV 29/2012

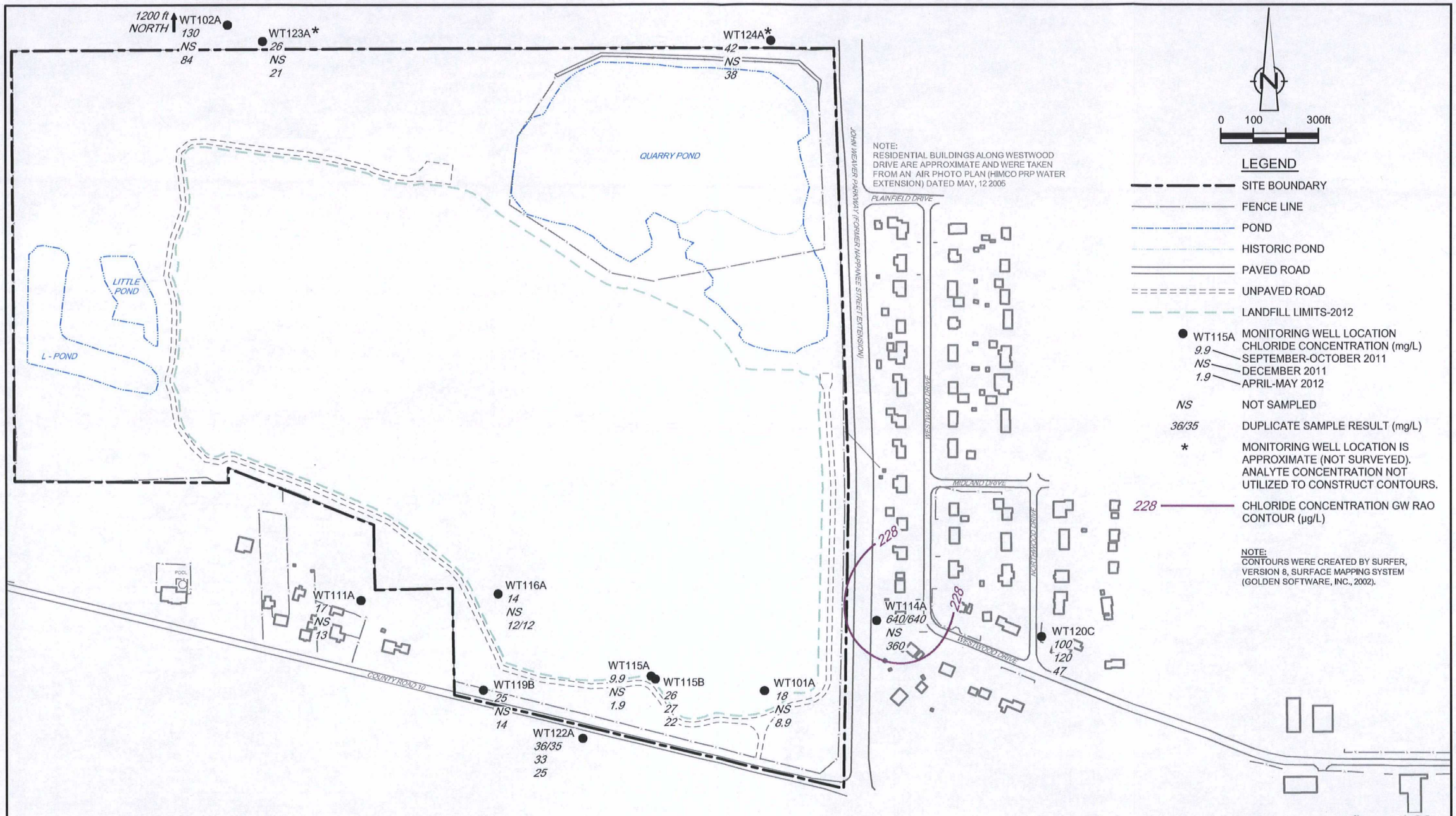


figure 4.22

AVERAGE CHLORIDE CONCENTRATION CONTOURS
SEPT. 2011 TO MAY 2012
UPPER AQUIFER
HIMCO SITE
Elkhart, Indiana

DATUM:
STATE PLANE COORDINATES INDIANA EAST ZONE
NORTH AMERICAN VERTICAL DATUM 1988
NORTH AMERICAN DATUM 1983
GEOID 03
UNITED STATES SURVEY FEET

39611-00(034)GN-WA015 FEB 7/2013

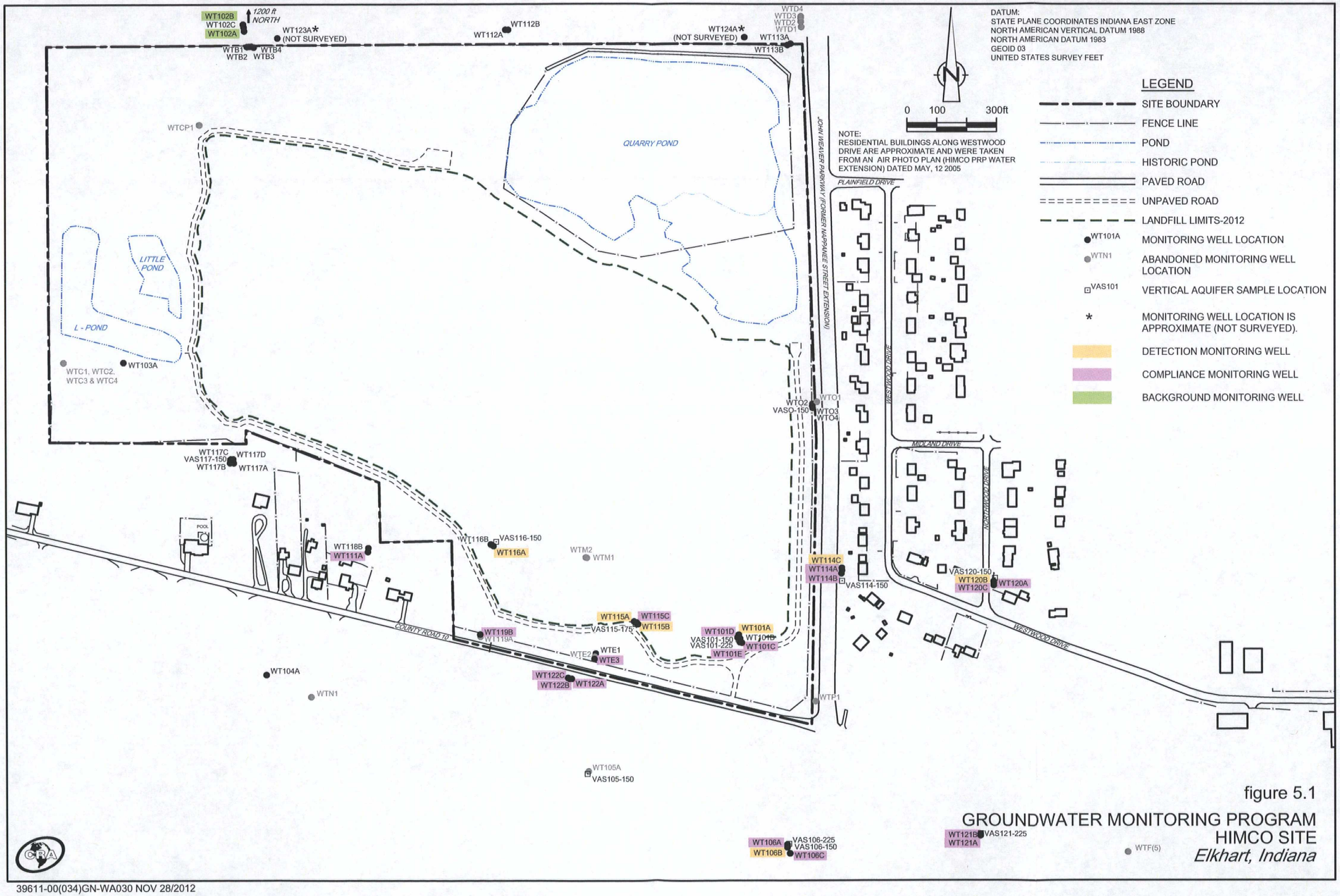


figure 5.1

GROUNDWATER MONITORING PROGRAM
HIMCO SITE
Elkhart, Indiana

39611-00(034)GN-WA030 NOV 28/2012

TABLES

TABLE 2.1

MONITORING WELL STATUS
HIMCO SITE
ELKHART, INDIANA

Well ID	Status	Installation Date	Screen Length (ft)	Material	Casing Diameter (inches)	Installed Depth (ft bgs)	Reference Elevation (ft AMSL)	Ground Surface (ft AMSL)	Top of Well Screen (ft AMSL)	Bottom of Well Screen (ft AMSL)	Aquifer Designation	Northing	Easting
UPPER AQUIFER WELLS (760 - 710 ft AMSL)													
WT101A	Functional	11/12/1990	10.00	Stainless Steel	2	16.3	768.69	765.67	759.37	749.37	Upper	2351887.31	235722.28
WT102A	Functional	11/10/1990	10.00	Stainless Steel	2	16.0	768.50	766.19	760.19	750.19	Upper	2355111.73	234055.37
WT103A	Functional	11/11/1990	10.00	Stainless Steel	2	16.0	760.11	757.60	751.60	741.60	Upper	2352799.65	233645.99
WT104A	Functional	11/12/1990	10.00	Stainless Steel	2	16.3	765.50	761.75	755.45	745.45	Upper	2351753.96	234123.98
WT105A	Functional	11/10/1990	10.00	Stainless Steel	2	16.0	762.37	760.07	754.07	744.07	Upper	2351430.59	235211.48
WT106A	Functional	11/9/1990	10.00	Stainless Steel	2	16.3	760.98	758.46	752.16	742.16	Upper	2351184.52	235885.61
WT111A	Functional	9/10/1991	10.00	Stainless Steel	2	20.0	766.00	764.30	754.30	744.30	Upper	2352165.35	234465.00
WT112A	Functional	8/23/1995	10.00	PVC	2	15.4	765.28	763.71	758.31	748.31	Upper	2353912.48	234933.96
WT113A	Functional	8/10/1995	10.00	PVC	2	21.7	771.27	769.32	757.62	747.62	Upper	2353866.00	235898.24
WT114A	Functional	8/21/1995	10.00	PVC	2	22.0	768.62	766.82	754.82	744.82	Upper	2352102.29	236069.62
WT115A	Functional	8/22/1995	10.00	PVC	2	17.4	766.65	762.52	755.12	745.12	Upper	2351932.55	235367.21
WT115B	Functional	2/22/2011	5.00	PVC	2	28.0	766.27	762.38	739.38	734.38	Upper	2351923.36	235380.68
WT116A	Damaged	8/17/1995	10.00	PVC	2	12.6	767.21	763.43	760.83	750.83	Upper	2352185.01	234891.12
WT117A	Functional	8/15/1995	10.00	PVC	2	15.5	766.70	764.66	759.16	749.16	Upper	2352463.27	234015.45
WT117C	Functional	5/6/2010	5.00	PVC	2	28.0	766.53	763.74	740.74	735.71	Upper	2352476.42	234005.49
WT119A	Damaged	10/14/1998	10.00	PVC	2	17.5	763.26				Upper	2351868.88	234816.74
WT119B	Functional	5/10/2010	10.00	PVC	2	18.0	764.87	760.61	752.32	742.32	Upper	2351889.06	234845.27
WT120C	Functional	2/24/2011	5.00	PVC	2	17.0	762.11	762.57	750.57	745.57	Upper	2352052.29	236578.54
WT121A	Functional	2/28/2011	5.00	PVC	2	24.0	758.48	758.87	739.87	734.87	Upper	2351213.71	236533.21
WT122A	Functional	2/23/2011	5.00	PVC	2	25.0	762.58	763.03	743.03	738.03	Upper	2351740.44	235154.91
WT123A	Functional	9/27/2011	10.00	PVC	2	17.0		NOT SURVEYED			Upper	NOT SURVEYED	
WT124A	Functional	9/27/2011	10.00	PVC	2	22.0		NOT SURVEYED			Upper	NOT SURVEYED	
WTB2	Damaged	11/3/1977	10.00	Black Steel	2	11.9	762.70	760.82	758.92	748.92	Upper	2353858.07	234068.99
WTO1	Destroyed	5/1/1979	5.00	PVC	2	30.0		NOT SURVEYED			Upper	2352650.39	235975.90
WTO2	Functional	5/5/2010	5.00	PVC	2	37.0	765.95	763.15	731.15	726.15	Upper	2352659.27	235970.66

TABLE 2.1

MONITORING WELL STATUS
HIMCO SITE
ELKHART, INDIANA

Well ID	*Status*	*Installation Date*	*Screen Length (ft)*	*Material*	*Casing Diameter (inches)*	*Installed Depth (ft bgs)*	*Reference Elevation (ft AMSL)*	*Ground Surface (ft AMSL)*	*Top of Well Screen (ft AMSL)*	*Bottom of Well Screen (ft AMSL)*	*Aquifer Designation*	*Northing*	*Easting*
INTERMEDIATE AQUIFER WELLS (710 - 610 ft AMSL)													
WT101B	Functional	12/14/1990	5.00	Stainless Steel	2	98.0	768.95	764.89	671.89	666.89	Intermediate	2351874.25	235726.99
WT101D	Functional	5/3/2010	5.00	PVC	2	63.0	768.81	765.27	703.63	698.30	Intermediate	2351877.98	235718.51
WT101E	Functional	5/4/2010	5.00	PVC	2	123.0	768.68	764.30	643.52	638.52	Intermediate	2351862.22	235726.63
WT102B	Functional	12/2/1990	5.00	Stainless Steel	2	65.4	768.22	765.87	705.47	700.47	Intermediate	2355133.90	234051.70
WT106B	Functional	5/10/2010	5.00	PVC	2	115.0	761.50	758.71	648.71	643.71	Intermediate	2351175.05	235885.57
WT112B	Functional	8/23/1995	5.00	PVC	2	59.4	765.54	763.55	709.15	704.15	Intermediate	2353912.39	234943.21
WT113B	Functional	8/10/1995	5.00	PVC	2	67.2	771.47	769.52	707.32	702.32	Intermediate	2353861.31	235888.26
WT114B	Functional	8/22/1995	5.00	PVC	2	65.3	768.77	766.95	706.65	701.65	Intermediate	2352092.21	236067.36
WT114C	Functional	5/11/2010	5.00	PVC	2	127.0	768.87	766.14	644.14	639.14	Intermediate	2352110.84	236068.83
WT115C	Functional	2/22/2011	5.00	PVC	2	68.0	766.03	762.37	699.37	694.37	Intermediate	2351928.83	235375.65
WT116B	Functional	8/17/1995	5.00	PVC	2	58.4	766.85	762.83	709.43	704.43	Intermediate	2352189.86	234881.45
WT117B	Functional	8/14/1995	5.00	PVC	2	61.3	766.13	764.20	707.90	702.90	Intermediate	2352463.66	234002.76
WT117D	Functional	5/6/2010	5.00	PVC	2	112.0	766.58	763.90	656.90	651.90	Intermediate	2352476.61	234013.25
WT118B	Functional	8/18/1995	5.00	PVC	2	62.5	765.99	763.56	706.06	701.06	Intermediate	2352178.19	234466.70
WT120A	Functional	5/12/2010	5.00	PVC	2	73.0	762.19	762.43	694.43	689.43	Intermediate	2352059.17	236578.58
WT120B	Functional	5/12/2010	5.00	PVC	2	117.0	762.18	762.58	650.58	645.58	Intermediate	2352065.60	236578.16
WT121B	Functional	2/28/2011	5.00	PVC	2	63.0	758.46	758.74	700.74	695.74	Intermediate	2351219.53	236532.99
WT122B	Functional	2/23/2011	5.00	PVC	2	63.0	762.75	762.98	704.98	699.98	Intermediate	2351740.49	235148.61
WT122C	Functional	2/24/2011	5.00	PVC	2	103.0	762.63	762.97	664.97	659.97	Intermediate	2351743.38	235142.97
WTB3	Functional	10/17/1977	10.00	PVC	5	135.0	762.74	760.62	635.62	625.62	Intermediate	2353858.37	234077.13
WTE1	Functional	10/11/1977	10.00	PVC	5	81.0	766.11	762.50	691.50	681.50	Intermediate	2351825.22	235236.59
WTO3	Functional	5/5/2010	5.00	PVC	2	92.0	765.65	763.00	676.00	671.00	Intermediate	2352652.85	235969.84
WTO4	Functional	5/4/2010	5.00	PVC	2	132.0	765.29	762.77	635.77	630.77	Intermediate	2352646.28	235971.31

TABLE 2.1

MONITORING WELL STATUS
HIMCO SITE
ELKHART, INDIANA

Well ID	*Status*	*Installation Date*	*Screen Length (ft)*	*Material*	*Casing Diameter (inches)*	*Installed Depth (ft bgs)*	*Reference Elevation (ft AMSL)*	*Ground Surface (ft AMSL)*	*Top of Well Screen (ft AMSL)*	*Bottom of Well Screen (ft AMSL)*	*Aquifer Designation*	*Northing*	*Easting*
LOWER AQUIFER WELLS (610 - 275 ft AMSL)													
WT101C	Functional	12/12/1990	5.00	Stainless Steel	2	165.0	768.53	764.25	604.25	599.25	Lower	2351860.52	235732.51
WT102C	Functional	12/1/1990	5.00	Stainless Steel	2	159.5	768.65	765.94	611.44	606.44	Lower	2355123.61	234053.78
WT106C	Functional	3/30/2011	5.00	PVC	2	208.0	757.80	758.06	555.06	550.06	Lower	2351154.95	235894.48
WTB1	Functional	10/6/1977	6.00	PVC	5	473.0	763.06	761.58	294.58	288.58	Lower	2353857.39	234061.79
WTB4	Functional	10/7/1977	5.00	PVC	5	173.0	761.77	760.67	592.67	587.67	Lower	2353855.62	234084.92
WTE3	Functional	10/11/1977	5.00	PVC	5	176.0	765.29	762.22	591.22	586.22	Lower	2351807.07	235231.75

TABLE 2.2

INTERIM GROUNDWATER MONITORING PROGRAM
HIMCO SITE
ELKHART, INDIANA

WT101A	WT116A
WT101B	WT116B[3]
WT101C	WT117A
WT101D	WT117B
WT101E	WT117C
WT102A[1]	WT117D
WT102B[1]	WT118B
WT102C[1]	WT119B
WT103A	WT120A
WT104A	WT120B
WT105A	WT120C[3]
WT106A	WT121A[3]
WT106B	WT121B[3]
WT106C[3]	WT122A[3]
WT111A	WT122B[3]
WT112A[1][2]	WT122C[3]
WT112B[1]	WTB1
WT113A[1]	WTB3
WT113B[1]	WTB4
WT114A	WTE1
WT114B	WTE3
WT114C	WTO2
WT115A	WTO3
WT115B[3]	WTO4
WT115C[3]	

Notes:

1. Property owner withdrew permission to access the well from June 2010 to September 2011. Samples were not collected in December 2010 and June 2011.
2. Monitoring well was obstructed in March 2011 which prevented sampling.
3. Phase III monitoring well. Routine groundwater sampling commenced in March and April 2011. Quarterly sampling conducted for one year, ending December 2011.

TABLE 2.3

2011-2012 GROUNDWATER MONITORING PROGRAM
HIMCO SITE
ELKHART, INDIANA

UPPER AQUIFER WELLS

Detection Monitoring Wells

Well
WT101A
WT115A
WT116A

Compliance Monitoring Wells

Well
WT106A
WT111A
WT114A
WT115B
WT119B
WT120C
WT121A
WT122A

Background Monitoring Well

WT102A

INTERMEDIATE AQUIFER WELLS

Detection Monitoring Wells

Well
WT106B
WT114C
WT120B

Compliance Monitoring Wells

Well
WT101D
WT101E
WT114B
WT120A
WT121B

Background Monitoring Well

WT102B

LOWER AQUIFER WELLS

Compliance Monitoring Wells

WT101C
WTE3

TABLE 2.4

INTERIM GROUNDWATER MONITORING PROGRAM PARAMETER LIST
HIMCO SITE
ELKHART, INDIANA

Volatile Organic Compounds

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloro-1,2,2-trifluoroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2,4-Trichlorobenzene
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Butanone
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Dibromochloromethane
Dichlorodifluoromethane
Ethylbenzene
Isopropylbenzene (Cumene)
Methyl Acetate
Methyl tert Butyl Ether
Methylcyclohexane
Methylene chloride
Styrene
Tetrachloroethene
Toluene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride
Xylenes (total)

TABLE 2.4

INTERIM GROUNDWATER MONITORING PROGRAM PARAMETER LIST
HIMCO SITE
ELKHART, INDIANA

Semi-volatile Organic Compounds

1,1'-Biphenyl
2,2'-oxybis(1-Chloropropane)
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Bromophenylphenyl ether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
Acenaphthene
Acenaphthylene
Acetophenone
Anthracene
Atrazine
Benzaldehyde
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether
bis(2-Ethylhexyl)phthalate
Butylbenzylphthalate
Caprolactam
Carbazole
Chrysene
Dibenz(a,h)anthracene
Dibenzofuran
Diethylphthalate
Dimethylphthalate
Di-n-butyphthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

TABLE 2.4

INTERIM GROUNDWATER MONITORING PROGRAM PARAMETER LIST
HIMCO SITE
ELKHART, INDIANA

TAL Metals

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Nickel
- Potassium
- Selenium
- Silver
- Sodium
- Thallium
- Vanadium
- Zinc

Water Quality Parameters

- Bromide
- Chloride
- Sulfate
- Cyanide

TABLE 2.5

GROUNDWATER MONITORING PROGRAM PARAMETER LIST
HIMCO SITE
ELKHART, INDIANA

Volatile Organic Compounds

Benzene
Vinyl chloride
1,1-Dichloroethane
cis-1,2-Dichloroethene
Carbon disulfide

Semi-Volatile Organic Compounds

Bis- (2ethylhexyl)phthalate

Metals

Aluminium
Arsenic
Barium
Beryllium
Calcium
Iron
Lead
Manganese
Mercury
Sodium

General Chemistry

Sulfate
Chloride

TABLE 4.1

GROUNDWATER ANALTYICAL RESULTS SUMMARY - VOCs
HIMCO SITE
ELKHART, INDIANA

Parameters	*Units*	*GWRAO*	*Number of Samples*	*Number of Detections*	*Percentage of Detections*	*Number of Exceedences*	*Percentage of Exceedences*	*Minimum Detection*	*Maximum Detection*
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	200	20	0	0.0%	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
1,1-Dichloroethane	µg/L	240	65	31	47.7%	0	0.00%	0.60 J	7.3
1,1-Dichloroethene	µg/L	7	20	0	0.0%	N/A	N/A	N/A	N/A
1,2,4-Trichlorobenzene	µg/L	70	20	0	0.0%	N/A	N/A	N/A	N/A
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	20	0	0.0%	N/A	N/A	N/A	N/A
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	20	0	0.0%	N/A	N/A	N/A	N/A
1,2-Dichlorobenzene	µg/L	600	20	0	0.0%	N/A	N/A	N/A	N/A
1,2-Dichloroethane	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
1,2-Dichloropropane	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
1,3-Dichlorobenzene	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	µg/L	75	20	0	0.0%	N/A	N/A	N/A	N/A
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	20	3	15.0%	N/A	N/A	2.4 J	6.5 J
2-Hexanone	µg/L	-	20	1	5.0%	N/A	N/A	0.66 J	0.66 J
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	20	3	15.0%	N/A	N/A	0.62 J	1.6 J
Acetone	µg/L	-	20	2	10.0%	N/A	N/A	3.1 J	11 J
Benzene	µg/L	5	65	16	24.6%	3	4.62%	0.23 J	34
Bromodichloromethane	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Bromoform	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Bromomethane (Methyl bromide)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Carbon disulfide	µg/L	10000	65	36	55.4%	0	0.00%	0.13 J	4.8
Carbon tetrachloride	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
Chlorobenzene	µg/L	100	20	1	5.0%	0	0.00%	0.24 J	0.24 J
Chloroethane	µg/L	-	20	3	15.0%	N/A	N/A	0.88 J	1.2
Chloroform (Trichloromethane)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Chloromethane (Methyl chloride)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
cis-1,2-Dichloroethene	µg/L	70	65	20	30.8%	0	0.00%	0.23 J	2.8
cis-1,3-Dichloropropene	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Cyclohexane	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Dibromochloromethane	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	-	20	1	5.0%	N/A	N/A	0.32 J	0.32 J
Ethylbenzene	µg/L	700	20	1	5.0%	0	0.00%	1.8	1.8
Isopropyl benzene	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Methyl acetate	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Methyl cyclohexane	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Methyl tert butyl ether (MTBE)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Methylene chloride	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
Styrene	µg/L	100	20	0	0.0%	N/A	N/A	N/A	N/A
Tetrachloroethene	µg/L	5	20	0	0.0%	N/A	N/A	N/A	N/A
Toluene	µg/L	1000	20	3	15.0%	0	0.00%	0.31 J	3.0
trans-1,2-Dichloroethene	µg/L	100	20	0	0.0%	N/A	N/A	N/A	N/A
trans-1,3-Dichloropropene	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Trichloroethene	µg/L	5	20	4	20.0%	0	0.00%	0.35 J	0.47 J
Trichlorofluoromethane (CFC-11)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Trifluorotrichloroethane (Freon 113)	µg/L	-	20	0	0.0%	N/A	N/A	N/A	N/A
Vinyl chloride	µg/L	2	65	13	20.0%	0	0.00%	0.28 J	1.0
Xylenes (total)	µg/L	10000	20	1	5.0%	0	0.00%	5.8	5.8

Notes:

GW RAO Groundwater Remedial Action Objective.
- Not applicable.
N/A Not available.
J Estimated.

TABLE 4.2

GROUNDWATER ANALTYICAL RESULTS SUMMARY - SVOCS
HIMCO SITE
ELKHART, INDIANA

Parameters	*Units*	*GWRAO*	*Number of Samples*	*Number of Detections*	*Percentage of Detections*	*Number of Exceedences*	*Percentage of Exceedences*	*Minimum Detection*	*Maximum Detection*
Semivolatile Organic Compounds									
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,4,5-Trichlorophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,4,6-Trichlorophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,4-Dimethylphenol	µg/L	-	20	2	10%	N/A	N/A	3.6	4.1
2,4-Dinitrophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Chloronaphthalene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Chlorophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Methylnaphthalene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Methylphenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Nitroaniline	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
2-Nitrophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
3&4-Methylphenol	µg/L	-	20	2	10%	N/A	N/A	1.6 J	3.4
3,3'-Dichlorobenzidine	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
3-Nitroaniline	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4,6-Dinitro-2-methylphenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Bromophenyl phenyl ether	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Chloro-3-methylphenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Chloroaniline	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Chlorophenyl phenyl ether	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Nitroaniline	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
4-Nitrophenol	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Acenaphthene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Acenaphthylene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Acetophenone	µg/L	-	20	13	65%	N/A	N/A	0.36 J	22
Anthracene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Atrazine	µg/L	3	20	0	0%	N/A	N/A	N/A	N/A
Benzaldehyde	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Benzo(a)anthracene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Benzo(a)pyrene	µg/L	0.2	20	0	0%	N/A	N/A	N/A	N/A
Benzo(b)fluoranthene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Biphenyl (1,1-Biphenyl)	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
bis(2-Chloroethoxy)methane	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
bis(2-Chloroethyl)ether	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	6	65	2	3%	0	0.00%	0.92 J	1.1 J
Butyl benzylphthalate (BBP)	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Caprolactam	µg/L	-	20	3	15%	N/A	N/A	0.80 J	2.7 J
Carbazole	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Chrysene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Dibenz(a,h)anthracene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Dibenzofuran	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Diethyl phthalate	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Dimethyl phthalate	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Di-n-butylphthalate (DBP)	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Di-n-octyl phthalate (DnOP)	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Fluoranthene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Fluorene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Hexachlorobenzene	µg/L	1	20	0	0%	N/A	N/A	N/A	N/A
Hexachlorobutadiene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Hexachlorocyclopentadiene	µg/L	50	20	0	0%	N/A	N/A	N/A	N/A
Hexachloroethane	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Isophorone	µg/L	-	20	1	5%	N/A	N/A	0.96 J	0.96 J
Naphthalene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Nitrobenzene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
N-Nitrosodi-n-propylamine	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
N-Nitrosodiphenylamine	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Pentachlorophenol	µg/L	1	20	0	0%	N/A	N/A	N/A	N/A
Phenanthrene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A
Phenol	µg/L	-	20	1	5%	N/A	N/A	3.6	3.6
Pyrene	µg/L	-	20	0	0%	N/A	N/A	N/A	N/A

Notes:

GW RAO Groundwater Remedial Action Objective.
- Not applicable.
N/A Not available.
J Estimated.

TABLE 4.3

UPPER AQUIFER GROUNDWATER ANALYTICAL RESULTS SUMMARY - METALS
HIMCO SITE
ELKHART, INDIANA

Parameters	*Units*	*Primary MCL*	*Secondary MCL*	*RDA*	*RSL Tapwater*	*BV*	*GWRAO*	*Number of Samples*	*Number of Detections*	*Percentage of Detections*	*Number of Exceedances*	*Percentage of Exceedances*	*Minimum Detection*	*Maximum Detection*
Metals														
Aluminum	µg/L	-	50	-	37000	651	37000	31	23	74.2%	0	0.0%	20 J	36000
Antimony	µg/L	6	-	-	15	42.2 UJ	42.2 UJ	9	0	0.0%	N/A	N/A	N/A	N/A
Arsenic	µg/L	10	-	-	0.045	2 U	10	31	30	96.8%	3	9.7%	0.65 J	21
Barium	µg/L	2000	-	-	7300	200 U	2000	31	31	100.0%	0	0.0%	18 J	260
Beryllium	µg/L	4		-	73	5.0 U	5.0 U	31	2	6.5%	0	0.0%	0.52 J	1.0 J
Cadmium	µg/L	5		-	18	4.6 UJ	5	9	0	0.0%	N/A	N/A	N/A	N/A
Calcium	µg/L	-	-	250000	-	242000	250000	31	31	100.0%	9	29.0%	50000	740000
Chromium	µg/L	100	-	-		882	882	9	3	33.3%	0	0.0%	2.6 J	4.7 J
Cobalt	µg/L	-		-	11	50 U	50 U	9	0	0.0%	N/A	N/A	N/A	N/A
Copper	µg/L	1300	1000	-	1500	64.8	1300	9	0	0.0%	N/A	N/A	N/A	N/A
Iron	µg/L	-	300	1000	26000	7100	26000	31	28	90.3%	4	12.9%	140	36000
Lead	µg/L	15		-	-	3.0 U	15	31	4	12.9%	3	9.7%	2.0 J	110
Magnesium	µg/L	-	-	-	-	26300	-	9	9	100.0%	N/A	N/A	17000	28000
Manganese	µg/L	-	50	-	880	1070	1070	31	28	90.3%	4	12.9%	3.9 J	2400
Mercury	µg/L	2		-	0.57	0.2 U	2	31	5	16.1%	0	0.0%	0.13 J	0.23
Nickel	µg/L	-	-	-	-	142	-	9	0	0.0%	N/A	N/A	N/A	N/A
Potassium	µg/L	-	-	-	-	2750	-	9	9	100.0%	N/A	N/A	1600 J	8300
Selenium	µg/L	50		-	180	6.0 UJ	50	9	0	0.0%	N/A	N/A	N/A	N/A
Silver	µg/L	-		-	180	19.5	180	9	0	0.0%	N/A	N/A	N/A	N/A
Sodium	µg/L	-	-	150000	-	102000	150000	31	31	100.0%	3	9.7%	8100	380000
Thallium	µg/L	2	-	-	-	12.35	12.35	9	0	0.0%	N/A	N/A	N/A	N/A
Vanadium	µg/L	-		-	2.6	50 U	50 U	9	3	33.3%	0	0.0%	3.1 J	15 J
Zinc	µg/L	-	5000	-	11000	24.1 J	11000	9	0	0.0%	N/A	N/A	N/A	N/A
General Chemistry														
Bromide	mg/L	-	-	-	-	0.5 U	-	9	6	66.7%	N/A	N/A	0.17 J	0.81
Chloride	mg/L	-	250	-	-	228	250	31	31	100.0%	3	9.7%	1.9	640
Cyanide (total)	mg/L	0.2		-	-	0.01U	0.2	9	2	22.2%	1	11.1%	0.0057 J	0.47
Sulfate	mg/L	-	250	-	-	637	637	31	31	100.0%	1	3.2%	8.1	1000

Notes:

U	Not detected. The associated numerical value is the reporting detection limit.
J	Estimated.
N/A	Not available.
-	Not applicable.
MCL	Maximum Contaminant Level.
RDA	Recommended Daily Allowance.
BV	Background Value.
GW RAO	Groundwater Remedial Action Objective.

TABLE 4.4

INTERMEDIATE AQUIFER GROUNDWATER ANALYTICAL RESULTS SUMMARY -METALS
HIMCO SITE
ELKHART, INDIANA

Parameters	*Units*	*Primary MCL*	*Secondary MCL*	*RDA*	*RSL Tapwater*	*BV*	*GWRAO*	*Number of Samples*	*Number of Detections*	*Percentage of Detections*	*Number of Exceedances*	*Percentage of Exceedances*	*Minimum Detection*	*Maximum Detection*
Metals														
Aluminum	µg/L	-	50	-	37000	161	37000	26	4	15.4%	0	0%	20 J	38 J
Antimony	µg/L	6	-	-	15	5.37	6	8	0	0%	N/A	N/A	N/A	N/A
Arsenic	µg/L	10	-	-	0.045	7.05	10	26	26	100%	8	30.8%	0.77 J	21
Barium	µg/L	2000	-	-	7300	200 U	2000	26	26	100%	0	0%	39 J	410
Beryllium	µg/L	4		-	73	5.0 U	5.0 U	26	0	0%	N/A	N/A	N/A	N/A
Cadmium	µg/L	5		-	18	3.05 U	5	8	0	0%	N/A	N/A	N/A	N/A
Calcium	µg/L	-	-	250000	-	85800	250000	26	26	100%	0	0%	67000	150000
Chromium	µg/L	100	-	-		32.5	100	8	0	0%	N/A	N/A	N/A	N/A
Cobalt	µg/L	-		-	11	50.0 U	50 U	8	0	0%	N/A	N/A	N/A	N/A
Copper	µg/L	1300	1000	-	1500	25.0 U	1300	8	0	0%	N/A	N/A	N/A	N/A
Iron	µg/L	-	300	1000	26000	2170	26000	26	23	88.5%	0	0%	100	6600
Lead	µg/L	15		-	-	3.0 U	15	26	0	0%	N/A	N/A	N/A	N/A
Magnesium	µg/L	-	-	-	-	25400	-	8	8	100%	N/A	N/A	19000	50000
Manganese	µg/L	-	50	-	880	170	880	26	26	100%	0	0%	31	240
Mercury	µg/L	2		-	0.57	0.2 U	2	26	1	3.8%	0	0%	0.26	0.26
Nickel	µg/L	-	-	-	-	20 U	-	8	1	12.5%	N/A	N/A	3.5 J	3.5 J
Potassium	µg/L	-	-	-	-	7400	-	8	8	100%	N/A	N/A	2500 J	6200
Selenium	µg/L	50		-	180	5.0 U	50	8	0	0%	N/A	N/A	N/A	N/A
Silver	µg/L	-		-	180	10.0 U	180	8	1	12.5%	0	0%	3.2 J	3.2 J
Sodium	µg/L	-	-	150000	-	31600	150000	26	26	100%	0	0%	13000	60000
Thallium	µg/L	2	-	-	-	9.85	9.85	8	0	0%	N/A	N/A	N/A	N/A
Vanadium	µg/L	-		-	2.6	50.0 U	50.0 U	8	0	0%	N/A	N/A	N/A	N/A
Zinc	µg/L	-	5000	-	11000	20.0 U	11000	8	0	0%	N/A	N/A	N/A	N/A
General Chemistry														
Bromide	mg/L	-	-	-	-	0.5 U	-	8	6	75%	N/A	N/A	0.085 J	1.6
Chloride	mg/L	-	250	-	-	54.5	250	26	26	100%	0	0%	21	120
Cyanide (total)	mg/L	0.2		-	-	0.01U	0.2	8	0	0%	N/A	N/A	N/A	N/A
Sulfate	mg/L	-	250	-	-	370	370	26	26	100%	0	0%	1.3	210

Notes:

U	Not detected. The associated numerical value is the reporting detection limit.
J	Estimated.
N/A	Not available.
-	Not applicable.
MCL	Maximum Contaminant Level.
RDA	Recommended Daily Allowance.
BV	Background Value.
GW RAO	Groundwater Remedial Action Objective.

TABLE 4.5

LOWER AQUIFER GROUNDWATER ANALYTICAL RESULTS SUMMARY - METALS
HIMCO SITE
ELKHART, INDIANA

Parameters	*Units*	*Primary MCL*	*Secondary MCL*	*RDA*	*RSL Tapwater*	*BV*	*GWRAO*	*Number of Samples*	*Number of Detections*	*Percentage of Detections*	*Number of Exceedances*	*Percentage of Exceedances*	*Minimum Detection*	*Maximum Detection*
Metals														
Aluminum	µg/L	-	50	-	37000	4910	37000	8	3	37.5%	0	0%	28 J	110
Antimony	µg/L	6	-	-	15	1.85	6	3	0	0%	N/A	N/A	N/A	N/A
Arsenic	µg/L	10	-	-	0.045	5.58	10	8	8	100%	0	0%	1.3 J	10
Barium	µg/L	2000	-	-	7300	419	2000	8	8	100%	0	0%	56 J	280
Beryllium	µg/L	4		-	73	5.0 U	73	8	0	0%	N/A	N/A	N/A	N/A
Cadmium	µg/L	5		-	18	1.0 U	5	3	0	0%	N/A	N/A	N/A	N/A
Calcium	µg/L	-	-	250000	-	239000	250000	8	8	100%	0	0%	45000	84000
Chromium	µg/L	100	-	-		31.9	100	3	0	0%	N/A	N/A	N/A	N/A
Cobalt	µg/L	-		-	11	50.0 U	50 U	3	0	0%	N/A	N/A	N/A	N/A
Copper	µg/L	1300	1000	-	1500	25.0 U	1300	3	0	0%	N/A	N/A	N/A	N/A
Iron	µg/L	-	300	1000	26000	15300	26000	8	8	100%	0	0%	240	1800
Lead	µg/L	15		-	-	3.9	15	8	0	0%	N/A	N/A	N/A	N/A
Magnesium	µg/L	-	-	-	-	129000	-	3	3	100%	N/A	N/A	21000	22000
Manganese	µg/L	-	50	-	880	1140	1140	8	8	100%	0	0%	14 J	160 J
Mercury	µg/L	2		-	0.57	0.20 U	2	8	0	0%	N/A	N/A	N/A	N/A
Nickel	µg/L	-	-	-	-	40 U	-	3	0	0%	N/A	N/A	N/A	N/A
Potassium	µg/L	-	-	-	-	4590	-	3	3	100%	N/A	N/A	1100 J	1700 J
Selenium	µg/L	50		-	180	5.0 U	50	3	0	0%	N/A	N/A	N/A	N/A
Silver	µg/L	-		-	180	10.0 U	180	3	0	0%	N/A	N/A	N/A	N/A
Sodium	µg/L	-	-	150000	-	80600	150000	8	8	100%	0	0%	13000	56000
Thallium	µg/L	2	-	-	-	1.0 U	2	3	0	0%	N/A	N/A	N/A	N/A
Vanadium	µg/L	-		-	2.6	50 U	50 U	3	0	0%	N/A	N/A	N/A	N/A
Zinc	µg/L	-	5000	-	11000	40.1	11000	3	0	0%	N/A	N/A	N/A	N/A
General Chemistry														
Bromide	mg/L	-	-	-	-	0.5 U	-	3	3	100%	N/A	N/A	0.29 J	0.30 J
Chloride	mg/L	-	250	-	-	77.7	250	8	8	100%	0	0%	2.6	39
Cyanide (total)	mg/L	0.2		-	-	0.01 U	0.2	3	0	0%	N/A	N/A	N/A	N/A
Sulfate	mg/L	-	250	-	-	73.2	250	8	6	75%	0	0%	0.27 J	78

Notes:

U	Not detected. The associated numerical value is the reporting detection limit.
J	Estimated.
N/A	Not available.
-	Not applicable.
MCL	Maximum Contaminant Level.
RDA	Recommended Daily Allowance.
BV	Background Value.
GW RAO	Groundwater Remedial Action Objective.

TABLE 5.1

GROUNDWATER MONITORING PROGRAM
HIMCO SITE
ELKHART, INDIANA

UPPER AQUIFER WELLS

Detection Monitoring Wells

Well
WT101A
WT115A
WT115B
WT116A

Compliance Monitoring Wells

Well
WT106A
WT111A
WT114A
WT115C
WT119B
WT120C
WT121A
WT122A

Background Monitoring Well
WT102A

INTERMEDIATE AQUIFER WELLS

Detection Monitoring Wells

Well
WT106B
WT114C
WT120B

Compliance Monitoring Wells

Well
WT101D
WT101E
WT114B
WT120A
WT121B
WT122B
WT122C

Background Monitoring Well
WT102B

LOWER AQUIFER WELLS

Compliance Monitoring Wells

WT101C
WT106C
WTE3

TABLE 5.2

GROUNDWATER MONITORING PROGRAM
MONITORING RATIONALE
HIMCO SITE
ELKHART, INDIANA

UPPER AQUIFER WELLS

Detection Monitoring Wells

Well	*Rationale*
WT101A	iron and manganese routinely exceed GW RAOs and calcium often exceeds GWRAO
WT115A	benzene, arsenic, lead, iron and calcium occasionally exceeds GWRAO
WT115B	benzene routinely exceeds GW RAO
WT116A	calcium routinely exceeds GW RAO and sodium and sulfate routinely exceed GWRAO

Compliance Monitoring Wells

Well	*Rationale*
WT106A	down gradient of iron and calcium at WT101A
WT111A	cross gradient of iron and calcium at WT101A
WT114A	cross gradient of iron and calcium at WT101A
WT115C	vertical delineation of benzene at WT115B
WT119B	down gradient of calcium at WT116A
WT120C	cross gradient of iron and calcium at WT101A
WT121A	down gradient of iron and calcium at WT101A
WT122A	down gradient of benzene at WT115A

Background Monitoring Well
WT102A

INTERMEDIATE AQUIFER WELLS

Detection Monitoring Wells

Well	*Rationale*
WT106B	arsenic routinely exceeds the GW RAO
WT114C	arsenic occasionally exceeds the GW RAO
WT120B	arsenic occasionally exceeds the GW RAO

Compliance Monitoring Wells

Well	*Rationale*
WT101D	vertical delineation of iron and calcium at WT101A
WT101E	vertical delineation of iron and calcium at WT101A
WT114B	vertical delineation of arsenic at WT114C
WT120A	vertical delineation of arsenic at WT120B
WT121B	downgradient of arsenic at WT120B
WT122B	down gradient of benzene at WT115B
WT122C	down gradient of benzene at WT115B

Background Monitoring Well
WT102B

LOWER AQUIFER WELLS

Compliance Monitoring Wells

WT101C	USEPA mandated
WT106C	vertical delineation of arsenic at WT106B
WTE3	USEPA mandated

APPENDIX A

E:DAT (ELECTRONIC DATA ACCESS TOOL)

APPENDIX B

TABLE OF ANALYTICAL RESULTS

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT101A*	*WT101A*	*WT101C*	*WT101C*	*WT101D*	*WT101D*	*WT101E*	*WT101E*	*WT102A*
Sample Date:			*9/15/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/13/2011*
Parameters	*Units*	*USEPA MCL Primary a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	µg/L	5	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	µg/L	-	6.7	0.60 J	1.0 U	1.0 U	2.4	4.2	1.9	2.2	1.0 U
1,1-Dichloroethene	µg/L	7	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/L	70	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	µg/L	600	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	µg/L	5	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	µg/L	5	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	µg/L	75	-	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	-	-	-	-	-	-	-	-	-
2-Hexanone	µg/L	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	-	-	-	-	-	-	-	-	-
Acetone	µg/L	-	-	-	-	-	-	-	-	-	-
Benzene	µg/L	5	2.8	0.23 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	-
Bromomethane (Methyl bromide)	µg/L	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	1.0 U	1.0 U	1.0 U	1.0 U	1.3	1.0 U	1.9	2.7	1.0 U
Carbon tetrachloride	µg/L	5	-	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	100	-	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	-
Chloroform (Trichloromethane)	µg/L	-	-	-	-	-	-	-	-	-	-
Chloromethane (Methyl chloride)	µg/L	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	µg/L	70	0.46 J	1.0 U	1.0 U	1.0 U	1.0 U	0.48 J	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	-	-	-	-
Cyclohexane	µg/L	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane (CFC-12)	µg/L	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	700	-	-	-	-	-	-	-	-	-
Isopropyl benzene	µg/L	-	-	-	-	-	-	-	-	-	-
Methyl acetate	µg/L	-	-	-	-	-	-	-	-	-	-
Methyl cyclohexane	µg/L	-	-	-	-	-	-	-	-	-	-
Methyl tert butyl ether (MTBE)	µg/L	-	-	-	-	-	-	-	-	-	-
Methylene chloride	µg/L	5	-	-	-	-	-	-	-	-	-
Styrene	µg/L	100	-	-	-	-	-	-	-	-	-
Tetrachloroethene	µg/L	5	-	-	-	-	-	-	-	-	-
Toluene	µg/L	1000	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	µg/L	100	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	-	-	-	-
Trichloroethene	µg/L	5	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane (CFC-11)	µg/L	-	-	-	-	-	-	-	-	-	-
Trifluorotrichloroethane (Freon 113)	µg/L	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	-	-	-	-	-	-	-	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichloromethane, Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11* Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT102A*	*WT102B*	*WT102B*	*WT102C*	*WT106A*	*WT106A*	*WT106B*	*WT106B*	*WT106C*
Sample Date:			*4/25/2012*	*9/13/2011*	*4/25/2012*	*9/13/2011*	*9/14/2011*	*4/25/2012*	*9/14/2011*	*4/25/2012*	*9/20/2011*
Parameters	*Units*	*USEPA MCL Primary a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	-	-	-	-	-	-	-	-	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
1,1,2-Trichloroethane	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	1.0 U	1.0 U	1.6	0.61 J	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	-	-	-	-	-	-	-	-	1.0 U
1,2,4-Trichlorobenzene	µg/L	70	-	-	-	-	-	-	-	-	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	-	-	-	-	-	-	-	-	2.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	-	-	-	-	-	-	-	-	1.0 U
1,2-Dichlorobenzene	µg/L	600	-	-	-	-	-	-	-	-	1.0 U
1,2-Dichloroethane	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
1,2-Dichloropropane	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
1,3-Dichlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
1,4-Dichlorobenzene	µg/L	75	-	-	-	-	-	-	-	-	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	-	-	-	-	-	-	-	-	10 U
2-Hexanone	µg/L	-	-	-	-	-	-	-	-	-	10 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	-	-	-	-	-	-	-	-	10 U
Acetone	µg/L	-	-	-	-	-	-	-	-	-	10 U
Benzene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	0.23 J	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Bromoform	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Bromomethane (Methyl bromide)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Carbon disulfide	µg/L	-	1.0 U	0.14 J	1.0 U	0.52 J	1.0 U	1.0 U	0.81 J	1.9	1.5
Carbon tetrachloride	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
Chlorobenzene	µg/L	100	-	-	-	-	-	-	-	-	1.0 U
Chloroethane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Chloroform (Trichloromethane)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Chloromethane (Methyl chloride)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	1.0 U	1.0 U	0.55 J	0.23 J	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Cyclohexane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Dibromochloromethane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Ethylbenzene	µg/L	700	-	-	-	-	-	-	-	-	1.0 U
Isopropyl benzene	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Methyl acetate	µg/L	-	-	-	-	-	-	-	-	-	10 U
Methyl cyclohexane	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	-	-	-	-	-	-	-	-	-	5.0 U
Methylene chloride	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
Styrene	µg/L	100	-	-	-	-	-	-	-	-	1.0 U
Tetrachloroethene	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
Toluene	µg/L	1000	-	-	-	-	-	-	-	-	0.31 J
trans-1,2-Dichloroethene	µg/L	100	-	-	-	-	-	-	-	-	1.0 U
trans-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Trichloroethene	µg/L	5	-	-	-	-	-	-	-	-	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	-	-	-	-	-	-	-	-	-	1.0 U
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0	0.91 J	1.0 U
Xylenes (total)	µg/L	10000	-	-	-	-	-	-	-	-	2.0 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11[a] Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT106C*	*WT106C*	*WT111A*	*WT111A*	*WT114A*	*WT114A*	*WT114A*	*WT114B*	*WT114B*
Sample Date:			*12/13/2011*	*12/13/2011*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*
		USEPA MCL		*Duplicate*				*Duplicate*			
Parameters	*Units*	*Primary*									
		a									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	1.0 U	1.0 U	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
1,1,2-Trichloroethane	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	5.2	4.7	1.0 U	1.0 U	1.0 U	1.6	1.3
1,1-Dichloroethene	µg/L	7	1.0 U	1.0 U	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/L	70	1.0 U	1.0 U	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	2.0 U	2.0 U	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	1.0 U	1.0 U	-	-	-	-	-	-	-
1,2-Dichlorobenzene	µg/L	600	1.0 U	1.0 U	-	-	-	-	-	-	-
1,2-Dichloroethane	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
1,2-Dichloropropane	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
1,3-Dichlorobenzene	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
1,4-Dichlorobenzene	µg/L	75	1.0 U	1.0 U	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	10 U	10 U	-	-	-	-	-	-	-
2-Hexanone	µg/L	-	10 U	10 U	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	10 U	-	-	-	-	-	-	-
Acetone	µg/L	-	10 U	10 U	-	-	-	-	-	-	-
Benzene	µg/L	5	1.0 U	1.0 U	0.53 J	0.52 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Bromoform	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Bromomethane (Methyl bromide)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	0.15 J	0.24 J	0.18 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
Chlorobenzene	µg/L	100	1.0 U	1.0 U	-	-	-	-	-	-	-
Chloroethane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Chloroform (Trichloromethane)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Chloromethane (Methyl chloride)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	0.52 J	0.37 J	1.0 U	1.0 U	1.0 U	0.46 J	0.46 J
cis-1,3-Dichloropropene	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Cyclohexane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Dichlorodifluoromethane (CFC-12)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Ethylbenzene	µg/L	700	1.0 U	1.0 U	-	-	-	-	-	-	-
Isopropyl benzene	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Methyl acetate	µg/L	-	10 U	10 U	-	-	-	-	-	-	-
Methyl cyclohexane	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Methyl tert butyl ether (MTBE)	µg/L	-	5.0 U	5.0 U	-	-	-	-	-	-	-
Methylene chloride	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
Styrene	µg/L	100	1.0 U	1.0 U	-	-	-	-	-	-	-
Tetrachloroethene	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
Toluene	µg/L	1000	1.0 U	1.0 U	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	µg/L	100	1.0 U	1.0 U	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Trichloroethene	µg/L	5	1.0 U	1.0 U	-	-	-	-	-	-	-
Trichlorofluoromethane (CFC-11)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Trifluorotrichloroethane (Freon 113)	µg/L	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Vinyl chloride	µg/L	2	1.0 U	1.0 U	0.28 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	2.0 U	2.0 U	-	-	-	-	-	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11* Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT114C*	*WT114C*	*WT114C*	*WT115A*	*WT115A*	*WT115B*	*WT115B*	*WT115B*	*WT115C*
Sample Date:			*9/13/2011*	*4/24/2012*	*4/24/2012*	*9/15/2011*	*4/26/2012*	*9/20/2011*	*12/14/2011*	*4/26/2012*	*9/20/2011*
					Duplicate						
Parameters	*Units*	*USEPA MCL Primary* *a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,1,2-Trichloroethane	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,1-Dichloroethane	µg/L	-	4.1	2.9	2.7	1.9	1.0 U	3.1 J	7.2	7.3	2.6
1,1-Dichloroethene	µg/L	7	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,2,4-Trichlorobenzene	µg/L	70	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	-	-	-	-	-	8.0 U	2.0 U	-	2.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,2-Dichlorobenzene	µg/L	600	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,2-Dichloroethane	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,2-Dichloropropane	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,3-Dichlorobenzene	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
1,4-Dichlorobenzene	µg/L	75	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	-	-	-	-	-	6.5 J	10 U	-	2.6 J
2-Hexanone	µg/L	-	-	-	-	-	-	40 U	10 U	-	0.66 J
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	-	-	-	-	-	1.6 J	0.62 J	-	0.64 J
Acetone	µg/L	-	-	-	-	-	-	11 J	10 U	-	3.1 J
Benzene	µg/L	5	1.0 U	1.0 U	1.0 U	2.9	1.0 U	11[a]	34[a]	30[a]	1.0 U
Bromodichloromethane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Bromoform	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Bromomethane (Methyl bromide)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Carbon disulfide	µg/L	-	0.14 J	0.38 J	0.92 J	1.0 U	1.0 U	4.8	2.3	2.2 J	1.0
Carbon tetrachloride	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Chlorobenzene	µg/L	100	-	-	-	-	-	4.0 U	0.24 J	-	1.0 U
Chloroethane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Chloroform (Trichloromethane)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Chloromethane (Methyl chloride)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	2.8	2.5	1.0 U
cis-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Cyclohexane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Dibromochloromethane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	0.32 J
Ethylbenzene	µg/L	700	-	-	-	-	-	4.0 U	1.8	-	1.0 U
Isopropyl benzene	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Methyl acetate	µg/L	-	-	-	-	-	-	40 U	10 U	-	10 U
Methyl cyclohexane	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	-	-	-	-	-	-	20 U	5.0 U	-	5.0 U
Methylene chloride	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Styrene	µg/L	100	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Tetrachloroethene	µg/L	5	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Toluene	µg/L	1000	-	-	-	-	-	0.92 J	3.0	-	1.0 U
trans-1,2-Dichloroethene	µg/L	100	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
trans-1,3-Dichloropropene	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Trichloroethene	µg/L	5	-	-	-	-	-	4.0 U	0.47 J	-	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	-	-	-	-	-	-	4.0 U	1.0 U	-	1.0 U
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	-	-	-	-	-	8.0 U	5.8	-	2.0 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
[a] The total concentration of Trihalomethanes (Bromoform, Bromodichlor Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
- Not applicable.
11[a] Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT115C*	*WT116A*	*WT116A*	*WT116A*	*WT119B*	*WT119B*	*WT120A*	*WT120A*	*WT120B*
Sample Date:			*12/14/2011*	*9/15/2011*	*4/26/2012*	*4/26/2012*	*9/14/2011*	*5/22/2012*	*9/14/2011*	*4/24/2012*	*9/14/2011*
						Duplicate					
Parameters	*Units*	*USEPA MCL Primary a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	1.0 U	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
1,1-Dichloroethane	µg/L	-	2.0	5.2	2.6	2.6	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	1.0 U	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/L	70	1.0 U	-	-	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	2.0 U	-	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	1.0 U	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	µg/L	600	1.0 U	-	-	-	-	-	-	-	-
1,2-Dichloroethane	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
1,2-Dichloropropane	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	µg/L	75	1.0 U	-	-	-	-	-	-	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	2.4 J	-	-	-	-	-	-	-	-
2-Hexanone	µg/L	-	10 U	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	-	-	-	-	-	-	-	-
Acetone	µg/L	-	10 U	-	-	-	-	-	-	-	-
Benzene	µg/L	5	1.0 U	4.5	2.3	2.3	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Bromoform	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Bromomethane (Methyl bromide)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Carbon disulfide	µg/L	-	1.9	1.0 U	0.21 J	0.21 J	2.0 U	1.0 U	0.13 J	0.25 J	0.24 J
Carbon tetrachloride	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
Chlorobenzene	µg/L	100	1.0 U	-	-	-	-	-	-	-	-
Chloroethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Chloroform (Trichloromethane)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Chloromethane (Methyl chloride)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.5	1.1	1.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Dibromochloromethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Dichlorodifluoromethane (CFC-12)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	700	1.0 U	-	-	-	-	-	-	-	-
Isopropyl benzene	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Methyl acetate	µg/L	-	10 U	-	-	-	-	-	-	-	-
Methyl cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Methyl tert butyl ether (MTBE)	µg/L	-	5.0 U	-	-	-	-	-	-	-	-
Methylene chloride	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
Styrene	µg/L	100	1.0 U	-	-	-	-	-	-	-	-
Tetrachloroethene	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
Toluene	µg/L	1000	1.0 U	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	µg/L	100	1.0 U	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Trichloroethene	µg/L	5	1.0 U	-	-	-	-	-	-	-	-
Trichlorofluoromethane (CFC-11)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Trifluorotrichloroethane (Freon 113)	µg/L	-	1.0 U	-	-	-	-	-	-	-	-
Vinyl chloride	µg/L	2	1.0 U	1.0 U	0.80 J	0.80 J	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	2.0 U	-	-	-	-	-	-	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11[a] Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT120B*	*WT120C*	*WT120C*	*WT120C*	*WT120C*	*WT121A*	*WT121A*	*WT121A*	*WT121B*
Sample Date:			*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*	*9/19/2011*	*12/13/2011*	*4/24/2012*	*9/19/2011*
Parameters	*Units*	*USEPA MCL Primary a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,1,2-Trichloroethane	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	1.0 U	-	1.0 U	2.2	2.2	1.8	1.0 U
1,1-Dichloroethene	µg/L	7	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,2,4-Trichlorobenzene	µg/L	70	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	-	2.0 U	2.0 U	-	-	2.0 U	2.0 U	-	2.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,2-Dichlorobenzene	µg/L	600	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,2-Dichloroethane	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,2-Dichloropropane	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,3-Dichlorobenzene	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
1,4-Dichlorobenzene	µg/L	75	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U
2-Hexanone	µg/L	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U
Acetone	µg/L	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U
Benzene	µg/L	5	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Bromoform	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Bromomethane (Methyl bromide)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Carbon disulfide	µg/L	-	0.18 J	1.0 U	1.0 U	-	1.0 U	1.0 U	0.13 J	1.0 U	0.97 J
Carbon tetrachloride	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Chlorobenzene	µg/L	100	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Chloroethane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Chloroform (Trichloromethane)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Chloromethane (Methyl chloride)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0	1.1	1.0	1.0 U
cis-1,3-Dichloropropene	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Cyclohexane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Dibromochloromethane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Ethylbenzene	µg/L	700	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Isopropyl benzene	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Methyl acetate	µg/L	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U
Methyl cyclohexane	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	-	-	5.0 U	5.0 U	-	-	5.0 U	5.0 U	-	5.0 U
Methylene chloride	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Styrene	µg/L	100	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Tetrachloroethene	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Toluene	µg/L	1000	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
trans-1,2-Dichloroethene	µg/L	100	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
trans-1,3-Dichloropropene	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Trichloroethene	µg/L	5	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	-	2.0 U	2.0 U	-	-	2.0 U	2.0 U	-	2.0 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11* Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT121B*	*WT121B*	*WT122A*	*WT122A*	*WT122A*	*WT122A*	*WT122B*	*WT122B*	*WT122C*
Sample Date:			*12/13/2011*	*4/24/2012*	*9/20/2011*	*9/20/2011*	*12/13/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*9/20/2011*
		USEPA MCL				*Duplicate*					
Parameters	*Units*	*Primary*									
		a									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	5.0	4.9	6.9	5.6	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	70	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	2.0 U	-	2.0 U	2.0 U	2.0 U	-	2.0 U	2.0 U	2.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	µg/L	600	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	µg/L	75	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	10 U	-	10 U	10 U	10 U	-	10 U	10 U	10 U
2-Hexanone	µg/L	-	10 U	-	10 U	10 U	10 U	-	10 U	10 U	10 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	-	10 U	10 U	10 U	-	10 U	10 U	10 U
Acetone	µg/L	-	10 U	-	10 U	10 U	10 U	-	10 U	10 U	10 U
Benzene	µg/L	5	1.0 U	1.0 U	0.58 J	0.57 J	0.70 J	0.53 J	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	-	0.54 J	1.9	0.43 J	0.44 J	1.0 U	0.38 J	0.20 J	0.13 J	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	100	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	-	1.0 U	-	0.91 J	0.88 J	1.2	-	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	0.87 J	0.83 J	1.0	0.66 J	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Cyclohexane	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	700	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Isopropyl benzene	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Methyl acetate	µg/L	-	10 U	-	10 U	10 U	10 U	-	10 U	10 U	10 U
Methyl cyclohexane	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	-	5.0 U	-	5.0 U	5.0 U	5.0 U	-	5.0 U	5.0 U	5.0 U
Methylene chloride	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Styrene	µg/L	100	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	5	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1000	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	100	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	5	1.0 U	-	0.35 J	0.38 J	0.39 J	-	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	2	1.0 U	0.95 J	0.85 J	0.81 J	1.0 U	0.67 J	0.44 J	0.41 J	1.0 U
Xylenes (total)	µg/L	10000	2.0 U	-	2.0 U	2.0 U	2.0 U	-	2.0 U	2.0 U	2.0 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
- Not applicable.
11* Concentration greater than criteria indicated.

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT122C*	*WT123A*	*WT123A*	*WT124A*	*WT124A*	*WTE3*	*WTE3*	*Equipment Blank*	*Equipment Blank*
Sample Date:			*12/13/2011*	*10/13/2011*	*4/26/2012*	*10/13/2011*	*4/26/2012*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*9/20/2011*
Parameters	*Units*	*USEPA MCL Primary a*									
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	200	1.0 U	-	-	-	-	-	-	-	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
1,1,2-Trichloroethane	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	1.0 U	-	-	-	-	-	-	-	1.0 U
1,2,4-Trichlorobenzene	µg/L	70	1.0 U	-	-	-	-	-	-	-	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	2.0 U	-	-	-	-	-	-	-	2.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	1.0 U	-	-	-	-	-	-	-	1.0 U
1,2-Dichlorobenzene	µg/L	600	1.0 U	-	-	-	-	-	-	-	1.0 U
1,2-Dichloroethane	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
1,2-Dichloropropane	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
1,3-Dichlorobenzene	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
1,4-Dichlorobenzene	µg/L	75	1.0 U	-	-	-	-	-	-	-	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	10 U	-	-	-	-	-	-	-	10 U
2-Hexanone	µg/L	-	10 U	-	-	-	-	-	-	-	10 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	-	-	-	-	-	-	-	10 U
Acetone	µg/L	-	10 U	-	-	-	-	-	-	-	10 U
Benzene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Bromoform	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Bromomethane (Methyl bromide)	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Carbon disulfide	µg/L	-	0.30 J	1.0 U	1.0 U	1.0 U	1.0 U	0.45 J	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
Chlorobenzene	µg/L	100	1.0 U	-	-	-	-	-	-	-	1.0 U
Chloroethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Chloroform (Trichloromethane)	µg/L	-	1.0 U	-	-	-	-	-	-	-	0.61 J
Chloromethane (Methyl chloride)	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Dibromochloromethane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Ethylbenzene	µg/L	700	1.0 U	-	-	-	-	-	-	-	1.0 U
Isopropyl benzene	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Methyl acetate	µg/L	-	10 U	-	-	-	-	-	-	-	10 U
Methyl cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	-	5.0 U	-	-	-	-	-	-	-	5.0 U
Methylene chloride	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
Styrene	µg/L	100	1.0 U	-	-	-	-	-	-	-	1.0 U
Tetrachloroethene	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
Toluene	µg/L	1000	1.0 U	-	-	-	-	-	-	-	1.0 U
trans-1,2-Dichloroethene	µg/L	100	1.0 U	-	-	-	-	-	-	-	1.0 U
trans-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Trichloroethene	µg/L	5	1.0 U	-	-	-	-	-	-	-	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	-	1.0 U	-	-	-	-	-	-	-	1.0 U
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.37 J	0.67 J	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	2.0 U	-	-	-	-	-	-	-	2.0 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
- Not applicable.
11* Concentration greater than criteria indicated.

CRA 039611 (34)

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Trip Blank*	*Trip Blank*	*Trip Blank*	*Trip Blank*	*Trip Blank*	*Trip Blank*	*Trip Blank*
Sample Date:			*12/13/2011*	*4/24/2012*	*4/24/2012*	*9/13/2011*	*9/15/2011*	*9/16/2011*	*9/19/2011*	*12/13/2011*	*4/24/2012*	*4/25/2012*
Parameters	*Units*	*USEPA MCL Primary a*										
Volatile Organic Compounds												
1,1,1-Trichloroethane	µg/L	200	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,1,2,2-Tetrachloroethane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,1,2-Trichloroethane	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,2,4-Trichlorobenzene	µg/L	70	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	2.0 U	-	-	-	-	-	2.0 U	2.0 U	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,2-Dichlorobenzene	µg/L	600	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,2-Dichloroethane	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,2-Dichloropropane	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,3-Dichlorobenzene	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
1,4-Dichlorobenzene	µg/L	75	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	10 U	-	-	-	-	-	10 U	10 U	-	-
2-Hexanone	µg/L	-	10 U	-	-	-	-	-	10 U	10 U	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	-	-	-	-	-	10 U	10 U	-	-
Acetone	µg/L	-	10 U	-	-	-	-	-	10 U	2.2 J	-	-
Benzene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Bromoform	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Bromomethane (Methyl bromide)	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Carbon disulfide	µg/L	-	1.0 U	1.0 U	0.47 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Chlorobenzene	µg/L	100	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Chloroethane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Chloroform (Trichloromethane)	µg/L	-	0.70 J	-	-	-	-	-	1.0 U	1.0 U	-	-
Chloromethane (Methyl chloride)	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Dibromochloromethane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Dichlorodifluoromethane (CFC-12)	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Ethylbenzene	µg/L	700	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Isopropyl benzene	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Methyl acetate	µg/L	-	10 U	-	-	-	-	-	10 U	10 U	-	-
Methyl cyclohexane	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Methyl tert butyl ether (MTBE)	µg/L	-	5.0 U	-	-	-	-	-	5.0 U	5.0 U	-	-
Methylene chloride	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Styrene	µg/L	100	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Tetrachloroethene	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Toluene	µg/L	1000	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
trans-1,2-Dichloroethene	µg/L	100	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
trans-1,3-Dichloropropene	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Trichloroethene	µg/L	5	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Trichlorofluoromethane (CFC-11)	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Trifluorotrichloroethane (Freon 113)	µg/L	-	1.0 U	-	-	-	-	-	1.0 U	1.0 U	-	-
Vinyl chloride	µg/L	2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	2.0 U	-	-	-	-	-	2.0 U	2.0 U	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor
Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
- Not applicable.
11* Concentration greater than criteria indicated.

CRA 039611 (04)

TABLE B.1

GROUNDWATER SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*Trip Blank*	*Trip Blank*
Sample Date:			*4/26/2012*	*4/26/2012*
Parameters	*Units*	*USEPA MCL Primary a*		
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	200	-	-
1,1,2,2-Tetrachloroethane	µg/L	-	-	-
1,1,2-Trichloroethane	µg/L	5	-	-
1,1-Dichloroethane	µg/L	-	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7	-	-
1,2,4-Trichlorobenzene	µg/L	70	-	-
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	0.2	-	-
1,2-Dibromoethane (Ethylene dibromide)	µg/L	0.05	-	-
1,2-Dichlorobenzene	µg/L	600	-	-
1,2-Dichloroethane	µg/L	5	-	-
1,2-Dichloropropane	µg/L	5	-	-
1,3-Dichlorobenzene	µg/L	-	-	-
1,4-Dichlorobenzene	µg/L	75	-	-
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	-	-
2-Hexanone	µg/L	-	-	-
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	-	-
Acetone	µg/L	-	-	-
Benzene	µg/L	5	1.0 U	1.0 U
Bromodichloromethane	µg/L	-	-	-
Bromoform	µg/L	-	-	-
Bromomethane (Methyl bromide)	µg/L	-	-	-
Carbon disulfide	µg/L	-	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	-	-
Chlorobenzene	µg/L	100	-	-
Chloroethane	µg/L	-	-	-
Chloroform (Trichloromethane)	µg/L	-	-	-
Chloromethane (Methyl chloride)	µg/L	-	-	-
cis-1,2-Dichloroethene	µg/L	70	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	-	-	-
Cyclohexane	µg/L	-	-	-
Dibromochloromethane	µg/L	-	-	-
Dichlorodifluoromethane (CFC-12)	µg/L	-	-	-
Ethylbenzene	µg/L	700	-	-
Isopropyl benzene	µg/L	-	-	-
Methyl acetate	µg/L	-	-	-
Methyl cyclohexane	µg/L	-	-	-
Methyl tert butyl ether (MTBE)	µg/L	-	-	-
Methylene chloride	µg/L	5	-	-
Styrene	µg/L	100	-	-
Tetrachloroethene	µg/L	5	-	-
Toluene	µg/L	1000	-	-
trans-1,2-Dichloroethene	µg/L	100	-	-
trans-1,3-Dichloropropene	µg/L	-	-	-
Trichloroethene	µg/L	5	-	-
Trichlorofluoromethane (CFC-11)	µg/L	-	-	-
Trifluorotrichloroethane (Freon 113)	µg/L	-	-	-
Vinyl chloride	µg/L	2	1.0 U	1.0 U
Xylenes (total)	µg/L	10000	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
* The total concentration of Trihalomethanes (Bromoform, Bromodichlor Dibromochloromethane and Chloroform) cannot exceed 80 µg/L.
\- Not applicable.
11* Concentration greater than criteria indicated.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT101A*	*WT101A*	*WT101C*	*WT101C*	*WT101D*	*WT101D*	*WT101E*	*WT101E*	*WT102A*	*WT102A*	*WT102B*
Sample Date:			*9/15/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/13/2011*	*4/25/2012*	*9/13/2011*
Parameters	*Units*	*MCL Primary a*											
Semivolatile Organic Compounds													
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrotoluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dinitrotoluene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Chloronaphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
3&4-Methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
3,3'-Dichlorobenzidine	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
3-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromophenyl phenyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Acetophenone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Atrazine	µg/L	3	-	-	-	-	-	-	-	-	-	-	-
Benzaldehyde	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.2	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Biphenyl (1,1-Biphenyl)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Chloroethyl)ether	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	6	2.2 U	2.2 U	2.1 U	2.2 U	1.1 J	2.2 U	2.2 U	2.2 U	1.9 U	1.9 U	2.0 U
Butyl benzylphthalate (BBP)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Caprolactam	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octyl phthalate (DnOP)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	1	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:			*WT101A*	*WT101A*	*WT101C*	*WT101C*	*WT101D*	*WT101D*	*WT101E*	*WT101E*	*WT102A*	*WT102A*	*WT102B*
Sample Date:			*9/15/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/13/2011*	*4/25/2012*	*9/13/2011*
Parameters	*Units*	*MCL Primary a*											
Hexachlorocyclopentadiene	µg/L	50	-	-	-	-	-	-	-	-	-	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Isophorone	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
N-Nitrosodiphenylamine	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	µg/L	1	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	µg/L	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample reporting limit. The sample reporting limit is estimated.
- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT102B*	*WT102C*	*WT106A*	*WT106A*	*WT106B*	*WT106B*	*WT106C*	*WT106C*	*WT106C*	*WT111A*	*WT111A*
Sample Date:		*4/25/2012*	*9/13/2011*	*9/14/2011*	*4/25/2012*	*9/14/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*12/13/2011 Duplicate*	*9/14/2011*	*4/25/2012*
Parameters	*Units*											
Semivolatile Organic Compounds												
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
2,4,5-Trichlorophenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
2,4,6-Trichlorophenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
2,4-Dichlorophenol	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
2,4-Dimethylphenol	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
2,4-Dinitrophenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
2,4-Dinitrotoluene	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
2,6-Dinitrotoluene	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
2-Chloronaphthalene	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
2-Chlorophenol	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
2-Methylnaphthalene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
2-Methylphenol	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
2-Nitroaniline	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
2-Nitrophenol	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
3&4-Methylphenol	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
3,3'-Dichlorobenzidine	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
3-Nitroaniline	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4,6-Dinitro-2-methylphenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
4-Bromophenyl phenyl ether	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4-Chloro-3-methylphenol	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4-Chloroaniline	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4-Chlorophenyl phenyl ether	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4-Nitroaniline	µg/L	-	-	-	-	-	-	2.0 U	1.9 U	1.9 U	-	-
4-Nitrophenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
Acenaphthene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Acenaphthylene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Acetophenone	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Anthracene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Atrazine	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Benzaldehyde	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Benzo(a)anthracene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Benzo(a)pyrene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Benzo(b)fluoranthene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Biphenyl (1,1-Biphenyl)	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
bis(2-Chloroethoxy)methane	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
bis(2-Chloroethyl)ether	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	1.9 U	1.9 U	2.0 U	1.9 U	2.0 U	1.9 U	2.0 U	1.9 U	1.9 U	1.9 U	1.9 U
Butyl benzylphthalate (BBP)	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Caprolactam	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
Carbazole	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Chrysene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Dibenz(a,h)anthracene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Dibenzofuran	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Diethyl phthalate	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Dimethyl phthalate	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Di-n-butylphthalate (DBP)	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Di-n-octyl phthalate (DnOP)	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Fluoranthene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Fluorene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT102B*	*WT102C*	*WT106A*	*WT106A*	*WT106B*	*WT106B*	*WT106C*	*WT106C*	*WT106C*	*WT111A*	*WT111A*
Sample Date:		*4/25/2012*	*9/13/2011*	*9/14/2011*	*4/25/2012*	*9/14/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*12/13/2011*	*9/14/2011*	*4/25/2012*
										Duplicate		
Parameters	*Units*											
Hexachlorocyclopentadiene	µg/L	-	-	-	-	-	-	9.9 U	9.6 U	9.5 U	-	-
Hexachloroethane	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Indeno(1,2,3-cd)pyrene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Isophorone	µg/L	-	-	-	-	-	-	0.96 J	0.96 U	0.95 U	-	-
Naphthalene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Nitrobenzene	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
N-Nitrosodi-n-propylamine	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
N-Nitrosodiphenylamine	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Pentachlorophenol	µg/L	-	-	-	-	-	-	5.0 U	4.8 U	4.8 U	-	-
Phenanthrene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-
Phenol	µg/L	-	-	-	-	-	-	0.99 U	0.96 U	0.95 U	-	-
Pyrene	µg/L	-	-	-	-	-	-	0.20 U	0.19 U	0.19 U	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT114A*	*WT114A*	*WT114A*	*WT114B*	*WT114B*	*WT114C*	*WT114C*	*WT114C*	*WT115A*	*WT115A*	*WT115B*
Sample Date:		*9/13/2011*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*4/24/2012*	*9/15/2011*	*4/26/2012*	*9/20/2011*
			Duplicate						*Duplicate*			
Parameters	*Units*											
Semivolatile Organic Compounds												
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
2,4,5-Trichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
2,4,6-Trichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
2,4-Dichlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
2,4-Dimethylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	4.1
2,4-Dinitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
2,4-Dinitrotoluene	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
2,6-Dinitrotoluene	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
2-Chloronaphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
2-Chlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
2-Methylnaphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
2-Methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
2-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
2-Nitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
3&4-Methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	3.4
3,3'-Dichlorobenzidine	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
3-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4,6-Dinitro-2-methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
4-Bromophenyl phenyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4-Chloro-3-methylphenol	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4-Chloroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4-Chlorophenyl phenyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4-Nitroaniline	µg/L	-	-	-	-	-	-	-	-	-	-	2.0 U
4-Nitrophenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
Acenaphthene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Acenaphthylene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Acetophenone	µg/L	-	-	-	-	-	-	-	-	-	-	2.2
Anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Atrazine	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Benzaldehyde	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Benzo(a)anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Benzo(a)pyrene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Benzo(b)fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Benzo(g,h,i)perylene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Benzo(k)fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Biphenyl (1,1-Biphenyl)	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
bis(2-Chloroethoxy)methane	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
bis(2-Chloroethyl)ether	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.1 U	2.1 U	1.9 U	1.9 U	2.0 U	2.0 U	2.0 U	2.0 U	2.1 U	2.2 U	2.0 U
Butyl benzylphthalate (BBP)	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Caprolactam	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
Carbazole	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Chrysene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Dibenz(a,h)anthracene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Dibenzofuran	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Diethyl phthalate	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Dimethyl phthalate	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Di-n-butylphthalate (DBP)	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Di-n-octyl phthalate (DnOP)	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Fluoranthene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Fluorene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Hexachlorobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Hexachlorobutadiene	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT114A*	*WT114A*	*WT114A*	*WT114B*	*WT114B*	*WT114C*	*WT114C*	*WT114C*	*WT115A*	*WT115A*	*WT115B*
Sample Date:		*9/13/2011*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*4/24/2012*	*9/15/2011*	*4/26/2012*	*9/20/2011*
			Duplicate						*Duplicate*			
Parameters	*Units*											
Hexachlorocyclopentadiene	µg/L	-	-	-	-	-	-	-	-	-	-	9.9 U
Hexachloroethane	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Indeno(1,2,3-cd)pyrene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Isophorone	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Naphthalene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Nitrobenzene	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
N-Nitrosodi-n-propylamine	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
N-Nitrosodiphenylamine	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Pentachlorophenol	µg/L	-	-	-	-	-	-	-	-	-	-	5.0 U
Phenanthrene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U
Phenol	µg/L	-	-	-	-	-	-	-	-	-	-	0.99 U
Pyrene	µg/L	-	-	-	-	-	-	-	-	-	-	0.20 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
\- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT115B*	*WT115B*	*WT115C*	*WT115C*	*WT116A*	*WT116A*	*WT116A*	*WT119B*	*WT119B*	*WT120A*	*WT120A*
Sample Date:		*12/14/2011*	*4/26/2012*	*9/20/2011*	*12/14/2011*	*9/15/2011*	*4/26/2012*	*4/26/2012*	*9/14/2011*	*5/22/2012*	*9/14/2011*	*4/24/2012*
								Duplicate				
Parameters	*Units*											
Semivolatile Organic Compounds												
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
2,4-Dichlorophenol	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
2,4-Dimethylphenol	µg/L	3.6	-	2.1 U	19 U	-	-	-	-	-	-	-
2,4-Dinitrophenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
2,4-Dinitrotoluene	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
2,6-Dinitrotoluene	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
2-Chloronaphthalene	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
2-Chlorophenol	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
2-Methylnaphthalene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
2-Methylphenol	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
2-Nitroaniline	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
2-Nitrophenol	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
3&4-Methylphenol	µg/L	1.6 J	-	2.1 U	19 U	-	-	-	-	-	-	-
3,3'-Dichlorobenzidine	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
3-Nitroaniline	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
4-Bromophenyl phenyl ether	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
4-Chloroaniline	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether	µg/L	2.0 U	-	2.1 U	19 U	-	-	-	-	-	-	-
4-Nitroaniline	µg/L	2.0 U	-	2.1 UJ	19 U	-	-	-	-	-	-	-
4-Nitrophenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
Acenaphthene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Acenaphthylene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Acetophenone	µg/L	1.0 U	-	22	9.5 U	-	-	-	-	-	-	-
Anthracene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Atrazine	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Benzaldehyde	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Benzo(a)anthracene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Benzo(b)fluoranthene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Biphenyl (1,1-Biphenyl)	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
bis(2-Chloroethoxy)methane	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
bis(2-Chloroethyl)ether	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.0 U	2.0 UJ	2.1 U	19 U	2.0 U	1.9 U	2.1 U	2.0 U	1.9 U	1.9 U	1.9 U
Butyl benzylphthalate (BBP)	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Caprolactam	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
Carbazole	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Chrysene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Dibenzofuran	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Diethyl phthalate	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Dimethyl phthalate	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Di-n-butylphthalate (DBP)	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Di-n-octyl phthalate (DnOP)	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Fluoranthene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Fluorene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Hexachlorobenzene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Hexachlorobutadiene	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT115B*	*WT115B*	*WT115C*	*WT115C*	*WT116A*	*WT116A*	*WT116A*	*WT119B*	*WT119B*	*WT120A*	*WT120A*
Sample Date:		*12/14/2011*	*4/26/2012*	*9/20/2011*	*12/14/2011*	*9/15/2011*	*4/26/2012*	*4/26/2012*	*9/14/2011*	*5/22/2012*	*9/14/2011*	*4/24/2012*
								Duplicate				
Parameters	*Units*											
Hexachlorocyclopentadiene	µg/L	10 U	-	11 U	95 U	-	-	-	-	-	-	-
Hexachloroethane	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Isophorone	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Naphthalene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Nitrobenzene	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
N-Nitrosodiphenylamine	µg/L	1.0 U	-	1.1 U	9.5 U	-	-	-	-	-	-	-
Pentachlorophenol	µg/L	5.0 U	-	5.3 U	48 U	-	-	-	-	-	-	-
Phenanthrene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-
Phenol	µg/L	1.0 U	-	3.6	9.5 U	-	-	-	-	-	-	-
Pyrene	µg/L	0.20 U	-	0.21 U	1.9 U	-	-	-	-	-	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT120B*	*WT120B*	*WT120C*	*WT120C*	*WT120C*	*WT120C*	*WT121A*	*WT121A*	*WT121A*	*WT121B*	*WT121B*
Sample Date:		*9/14/2011*	*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*	*9/19/2011*	*12/13/2011*	*4/24/2012*	*9/19/2011*	*12/13/2011*
Parameters	*Units*											
Semivolatile Organic Compounds												
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
2,4,5-Trichlorophenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
2,4,6-Trichlorophenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
2,4-Dichlorophenol	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
2,4-Dimethylphenol	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
2,4-Dinitrophenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
2,4-Dinitrotoluene	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
2,6-Dinitrotoluene	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
2-Chloronaphthalene	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
2-Chlorophenol	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
2-Methylnaphthalene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
2-Methylphenol	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
2-Nitroaniline	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
2-Nitrophenol	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
3&4-Methylphenol	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
3,3'-Dichlorobenzidine	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
3-Nitroaniline	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4,6-Dinitro-2-methylphenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
4-Bromophenyl phenyl ether	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4-Chloro-3-methylphenol	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4-Chloroaniline	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4-Chlorophenyl phenyl ether	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4-Nitroaniline	µg/L	-	-	1.9 U	1.9 U	-	-	1.9 U	1.9 U	-	1.9 U	1.9 U
4-Nitrophenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
Acenaphthene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Acenaphthylene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Acetophenone	µg/L	-	-	0.73 J	0.95 U	-	-	0.38 J	0.51 J	-	0.92 J	1.1
Anthracene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Atrazine	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Benzaldehyde	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Benzo(a)anthracene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Benzo(a)pyrene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Benzo(b)fluoranthene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Benzo(g,h,i)perylene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Benzo(k)fluoranthene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Biphenyl (1,1-Biphenyl)	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
bis(2-Chloroethoxy)methane	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
bis(2-Chloroethyl)ether	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	2.6 UJ	1.9 U	1.9 U	1.9 U	-	1.9 U	1.9 U	1.9 U	1.9 U	0.92 J	1.9 U
Butyl benzylphthalate (BBP)	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Caprolactam	µg/L	-	-	2.7 J	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
Carbazole	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Chrysene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Dibenz(a,h)anthracene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Dibenzofuran	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Diethyl phthalate	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Dimethyl phthalate	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Di-n-butylphthalate (DBP)	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Di-n-octyl phthalate (DnOP)	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Fluoranthene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Fluorene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Hexachlorobenzene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Hexachlorobutadiene	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT120B*	*WT120B*	*WT120C*	*WT120C*	*WT120C*	*WT120C*	*WT121A*	*WT121A*	*WT121A*	*WT121B*	*WT121B*
Sample Date:		*9/14/2011*	*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*	*9/19/2011*	*12/13/2011*	*4/24/2012*	*9/19/2011*	*12/13/2011*
Parameters	***Units***											
Hexachlorocyclopentadiene	µg/L	-	-	9.5 U	9.5 U	-	-	9.6 U	9.5 U	-	9.6 U	9.5 U
Hexachloroethane	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Indeno(1,2,3-cd)pyrene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Isophorone	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Naphthalene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Nitrobenzene	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
N-Nitrosodi-n-propylamine	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
N-Nitrosodiphenylamine	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Pentachlorophenol	µg/L	-	-	4.8 U	4.8 U	-	-	4.8 U	4.8 U	-	4.8 U	4.8 U
Phenanthrene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U
Phenol	µg/L	-	-	0.95 U	0.95 U	-	-	0.96 U	0.95 U	-	0.96 U	0.95 U
Pyrene	µg/L	-	-	0.19 U	0.19 U	-	-	0.19 U	0.19 U	-	0.19 U	0.19 U

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT121B*	*WT122A*	*WT122A*	*WT122A*	*WT122A*	*WT122B*	*WT122B*	*WT122C*	*WT122C*	*WT123A*	*WT123A*
Sample Date:		*4/24/2012*	*9/20/2011*	*9/20/2011*	*12/13/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*9/20/2011*	*12/13/2011*	*10/13/2011*	*4/26/2012*
				Duplicate								
Parameters	*Units*											
Semivolatile Organic Compounds												
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
2,4,5-Trichlorophenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
2,4,6-Trichlorophenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
2,4-Dichlorophenol	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
2,4-Dimethylphenol	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
2,4-Dinitrophenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
2,4-Dinitrotoluene	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
2,6-Dinitrotoluene	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
2-Chloronaphthalene	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
2-Chlorophenol	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
2-Methylnaphthalene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
2-Methylphenol	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
2-Nitroaniline	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
2-Nitrophenol	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
3&4-Methylphenol	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
3,3'-Dichlorobenzidine	µg/L	-	5.3 U	4.9 U	4.8 UJ	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
3-Nitroaniline	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4,6-Dinitro-2-methylphenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
4-Bromophenyl phenyl ether	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4-Chloro-3-methylphenol	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4-Chloroaniline	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4-Chlorophenyl phenyl ether	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4-Nitroaniline	µg/L	-	2.1 U	1.9 U	1.9 U	-	1.9 U	1.9 U	2.1 U	1.9 U	-	-
4-Nitrophenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
Acenaphthene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Acenaphthylene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Acetophenone	µg/L	-	1.1 U	0.43 J	0.36 J	-	1.9	1.8	1.8	2.1	-	-
Anthracene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Atrazine	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Benzaldehyde	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Benzo(a)anthracene	µg/L	-	0.21 U	0.19 U	0.19 UJ	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Benzo(a)pyrene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Benzo(b)fluoranthene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Benzo(g,h,i)perylene	µg/L	-	0.21 U	0.19 U	0.19 UJ	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Benzo(k)fluoranthene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Biphenyl (1,1-Biphenyl)	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
bis(2-Chloroethoxy)methane	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
bis(2-Chloroethyl)ether	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	1.9 U	2.1 U	1.9 U	1.9 U	1.9 UJ	1.9 U	1.9 U	2.1 U	1.9 U	0.93 J	2.2 U
Butyl benzylphthalate (BBP)	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Caprolactam	µg/L	-	5.3 U	4.9 U	0.94 J	-	0.80 J	4.8 U	5.2 U	4.8 U	-	-
Carbazole	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Chrysene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Dibenz(a,h)anthracene	µg/L	-	0.21 U	0.19 U	0.19 UJ	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Dibenzofuran	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Diethyl phthalate	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Dimethyl phthalate	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Di-n-butylphthalate (DBP)	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Di-n-octyl phthalate (DnOP)	µg/L	-	1.1 U	0.97 U	0.95 UJ	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Fluoranthene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Fluorene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Hexachlorobenzene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Hexachlorobutadiene	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT121B*	*WT122A*	*WT122A*	*WT122A*	*WT122A*	*WT122B*	*WT122B*	*WT122C*	*WT122C*	*WT123A*	*WT123A*
Sample Date:		*4/24/2012*	*9/20/2011*	*9/20/2011*	*12/13/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*9/20/2011*	*12/13/2011*	*10/13/2011*	*4/26/2012*
				Duplicate								
Parameters	*Units*											
Hexachlorocyclopentadiene	µg/L	-	11 U	9.7 U	9.5 U	-	9.6 U	9.5 U	10 U	9.5 U	-	-
Hexachloroethane	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Indeno(1,2,3-cd)pyrene	µg/L	-	0.21 U	0.19 U	0.19 UJ	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Isophorone	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Naphthalene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Nitrobenzene	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
N-Nitrosodi-n-propylamine	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
N-Nitrosodiphenylamine	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Pentachlorophenol	µg/L	-	5.3 U	4.9 U	4.8 U	-	4.8 U	4.8 U	5.2 U	4.8 U	-	-
Phenanthrene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-
Phenol	µg/L	-	1.1 U	0.97 U	0.95 U	-	0.96 U	0.95 U	1.0 U	0.95 U	-	-
Pyrene	µg/L	-	0.21 U	0.19 U	0.19 U	-	0.19 U	0.19 U	0.21 U	0.19 U	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
- Not applicable.

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT124A*	*WT124A*	*WTE3*	*WTE3*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*
Sample Date:		*10/13/2011*	*4/26/2012*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*
Parameters	*Units*									
Semivolatile Organic Compounds										
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ethe	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
2,4,5-Trichlorophenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
2,4,6-Trichlorophenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
2,4-Dichlorophenol	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
2,4-Dimethylphenol	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
2,4-Dinitrophenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
2,4-Dinitrotoluene	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
2,6-Dinitrotoluene	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
2-Chloronaphthalene	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
2-Chlorophenol	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
2-Methylnaphthalene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
2-Methylphenol	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
2-Nitroaniline	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
2-Nitrophenol	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
3&4-Methylphenol	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
3,3'-Dichlorobenzidine	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
3-Nitroaniline	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4,6-Dinitro-2-methylphenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
4-Bromophenyl phenyl ether	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4-Chloro-3-methylphenol	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4-Chloroaniline	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4-Chlorophenyl phenyl ether	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4-Nitroaniline	µg/L	-	-	-	-	-	2.0 U	1.9 U	-	-
4-Nitrophenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
Acenaphthene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Acenaphthylene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Acetophenone	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Anthracene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Atrazine	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Benzaldehyde	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Benzo(a)anthracene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Benzo(a)pyrene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Benzo(b)fluoranthene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Biphenyl (1,1-Biphenyl)	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
bis(2-Chloroethoxy)methane	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
bis(2-Chloroethyl)ether	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	1.4 J	1.9 U	1.9 U	1.9 U	1.9 U	1.1 J	0.80 J	0.93 J	2.2 U
Butyl benzylphthalate (BBP)	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Caprolactam	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
Carbazole	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Chrysene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Dibenz(a,h)anthracene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Dibenzofuran	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Diethyl phthalate	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Dimethyl phthalate	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Di-n-butylphthalate (DBP)	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Di-n-octyl phthalate (DnOP)	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Fluoranthene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Fluorene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Hexachlorobenzene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Hexachlorobutadiene	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-

TABLE B.2

GROUNDWATER SAMPLING RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT124A*	*WT124A*	*WTE3*	*WTE3*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*
Sample Date:		*10/13/2011*	*4/26/2012*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*
Parameters	*Units*									
Hexachlorocyclopentadiene	µg/L	-	-	-	-	-	10 U	9.6 U	-	-
Hexachloroethane	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Indeno(1,2,3-cd)pyrene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Isophorone	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Naphthalene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Nitrobenzene	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
N-Nitrosodi-n-propylamine	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
N-Nitrosodiphenylamine	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Pentachlorophenol	µg/L	-	-	-	-	-	5.0 U	4.8 U	-	-
Phenanthrene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-
Phenol	µg/L	-	-	-	-	-	1.0 U	0.96 U	-	-
Pyrene	µg/L	-	-	-	-	-	0.20 U	0.19 U	-	-

Notes:

a USEPA Primary Maximum Contaminant Level
J Value is estimated.
U Not present at or above the associated value.
UJ The parameter was not detected above the sample repor reporting limit is estimated.
- Not applicable.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT101A*	*WT101A*	*WT101C*	*WT101C*	*WT101D*	*WT101D*	*WT101E*	*WT101E*	*WT102A*	*WT102A*	*WT102B*
Sample Date:					*9/15/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/13/2011*	*4/25/2012*	*9/13/2011*
		MCL		*RDA*											
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	50 U	50 U	50 U	50 U	20 J	50 U	50 U	50 U	37 J	150[b]	50 U
Antimony	µg/L	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	µg/L	10	-	-	9.2	5.2	4.9 J	3.2 J	0.77 J	1.2 J	2.4 J	2.8 J	0.65 J	1.0 J	4.3 J
Barium	µg/L	2000	-	-	76 J	110 J	81 J	86 J	43 J	54 J	66 J	58 J	37 J	31 J	110 J
Beryllium	µg/L	4	-	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	µg/L	-	-	250000	270000[c]	160000	45000	50000	80000	95000	83000	91000	82000	68000	67000
Chromium	µg/L	100	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	µg/L	1.3	1000	-	-	-	-	-	-	-	-	-	-	-	-
Iron	µg/L	-	300	1000	36000[bc]	23000[bc]	810[b]	570[b]	100	1500[bc]	100 U	100 U	230	1900[bc]	960[b]
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	µg/L	-	50	-	2400[b]	1800[b]	14 J	15	57[b]	51[b]	51[b]	50	320[b]	610[b]	58[b]
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	µg/L	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	µg/L	-	100	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	µg/L	-	-	150000	30000	11000	21000	21000	20000	21000	15000	15000	74000	73000	26000
Thallium	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	µg/L	-	5000	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry															
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	250000	-	18	8.9	2.7	2.6	39	40	33	33	130	84	51
Cyanide (total)	mg/L	200	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	-	250000	-	460	79	1.0 U	1.0 U	24	66	11	1.3	68	54	38

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
J Value is estimated.
U Not present at or above the associated value.
* Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water.
If more than 10% of tap water samples exceed the action level, water systems must take additional steps.
For copper, the action level is 1.3 mg/L and for lead, the action level is 0.015 mg/L.
The action level is discussed herein because there is no primary MCL for lead.
The action level applies to public water treatment facilities, and is included herein for discussion purposes only
\- Not applicable.
326000[c] Concentration greater than criteria indicated.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT102B*	*WT102C*	*WT106A*	*WT106A*	*WT106B*	*WT106B*	*WT106C*	*WT106C*	*WT106C*	*WT111A*	*WT111A*
Sample Date:					*4/25/2012*	*9/13/2011*	*9/14/2011*	*4/25/2012*	*9/14/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*12/13/2011*	*9/14/2011*	*4/25/2012*
		MCL		*RDA*									*Duplicate*		
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	50 U	110[b]	40 J	64[b]	50 U	50 U	50 U	28 J	34 J	1100[b]	540[b]
Antimony	µg/L	6	-	-	-	-	-	-	-	-	2.0 U	2.0 U	2.0 U	-	-
Arsenic	µg/L	10	-	-	2.6 J	1.3 J	2.4 J	1.5 J	13[a]	13[a]	8.0	10	10	9.8	5.8
Barium	µg/L	2000	-	-	160 J	280	40 J	28 J	110 J	110 J	72 J	70 J	69 J	63 J	74 J
Beryllium	µg/L	4	-	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	5.0 U	5.0 U
Cadmium	µg/L	5	-	-	-	-	-	-	-	-	1.0 U	1.0 U	1.0 U	-	-
Calcium	µg/L	-	-	250000	72000	62000	110000	100000	140000	150000	45000	48000	49000	140000	140000
Chromium	µg/L	100	-	-	-	-	-	-	-	-	10 U	10 U	10 U	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	50 U	50 U	50 U	-	-
Copper	µg/L	1.3	1000	-	-	-	-	-	-	-	25 U	25 U	25 U	-	-
Iron	µg/L	-	300	1000	500[b]	240	850[b]	820[b]	5400[bc]	6300[bc]	520[b]	1100[bc]	990[b]	2200[bc]	1500[bc]
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	2.0 J	3.0 U
Magnesium	µg/L	-	-	-	-	-	-	-	-	-	21000	21000	22000	-	-
Manganese	µg/L	-	50	-	38	160[b]	720[b]	460[b]	46	46	37	24	23	440[b]	430[b]
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 UJ	0.20 U	0.26	0.20 U	0.20 U	0.20 U	0.20 U	0.23	0.20 U
Nickel	µg/L	-	-	-	-	-	-	-	-	-	40 U	40 U	40 U	-	-
Potassium	µg/L	-	-	-	-	-	-	-	-	-	1700 J	1100 J	1400 J	-	-
Selenium	µg/L	50	-	-	-	-	-	-	-	-	5.0 U	5.0 U	5.0 U	-	-
Silver	µg/L	-	100	-	-	-	-	-	-	-	10 U	10 U	10 U	-	-
Sodium	µg/L	-	-	150000	30000	56000	26000	25000	33000	35000	20000	18000	17000	24000	23000
Thallium	µg/L	2	-	-	-	-	-	-	-	-	1.0 U	1.0 U	1.0 U	-	-
Vanadium	µg/L	-	-	-	-	-	-	-	-	-	50 U	50 U	50 U	-	-
Zinc	µg/L	-	5000	-	-	-	-	-	-	-	20 U	20 U	20 U	-	-
General Chemistry															
Bromide	mg/L	-	-	-	-	-	-	-	-	-	0.30 J	0.29 J	0.30 J	-	-
Chloride	mg/L	-	250000	-	45	39	35	36	22	21	11	9.3	9.2	17	13
Cyanide (total)	mg/L	200	-	-	-	-	-	-	-	-	0.010 U	0.010 U	0.010 U	-	-
Sulfate	mg/L	-	250000	-	13	6.8	83	63	210	200	0.42 J	0.27 J	0.30 J	200	180

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
J Value is estimated.
U Not present at or above the associated value.
* Lead and copper are regulated by a Treatment Technique that requir
to control the corrosiveness of their water.
If more than 10% of tap water samples exceed the action level, water
must take additional steps.
For copper, the action level is 1.3 mg/L and for lead, the action level
The action level is discussed herein because there is no primary MCI
The action level applies to public water treatment facilities, and is in
herein for discussion purposes only
\- Not applicable.
326000[c] Concentration greater than criteria indicated.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT114A*	*WT114A*	*WT114A*	*WT114B*	*WT114B*	*WT114C*	*WT114C*	*WT114C*	*WT115A*	*WT115A*	*WT115B*
Sample Date:					*9/13/2011*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*9/13/2011*	*4/24/2012*	*4/24/2012*	*9/15/2011*	*4/26/2012*	*9/20/2011*
		MCL		*RDA*		*Duplicate*						*Duplicate*			
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	29 J	26 J	50 U	50 U	50 U	50 U	38 J	33 J	36000[b]	640[b]	32 J
Antimony	µg/L	6	-	-	-	-	-	-	-	-	-	-	-	-	2.0 U
Arsenic	µg/L	10	-	-	4.1 J	3.3 J	1.9 J	8.3	8.5	19[a]	21[a]	20[a]	5.6	0.75 J	3.4
Barium	µg/L	2000	-	-	110 J	120 J	81 J	44 J	50 J	64 J	65 J	65 J	260	77 J	150 J
Beryllium	µg/L	4	-	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.0 J	5.0 U	0.52 J
Cadmium	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	1.0 U
Calcium	µg/L	-	-	250000	120000	120000	91000	80000	89000	74000	80000	79000	120000	50000	440000[c]
Chromium	µg/L	100	-	-	-	-	-	-	-	-	-	-	-	-	2.8 J
Cobalt	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	50 U
Copper	µg/L	1.3	1000	-	-	-	-	-	-	-	-	-	-	-	25 U
Iron	µg/L	-	300	1000	1800[bc]	1300[bc]	790[b]	2100[bc]	2500[bc]	3300[bc]	4800[bc]	4600[bc]	15000[bc]	1900[bc]	100 U
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	21[a]	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	17000
Manganese	µg/L	-	50	-	200[b]	160[b]	450[b]	37	42	31	34	33	310[b]	93[b]	15 U
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.14 J	0.20 U	0.20 U
Nickel	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	40 U
Potassium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	7300
Selenium	µg/L	50	-	-	-	-	-	-	-	-	-	-	-	-	5.0 U
Silver	µg/L	-	100	-	-	-	-	-	-	-	-	-	-	-	10 U
Sodium	µg/L	-	-	150000	370000[c]	380000[c]	250000[c]	20000	22000	14000	15000	15000	12000	8100	39000
Thallium	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	1.0 U
Vanadium	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	15 J
Zinc	µg/L	-	5000	-	-	-	-	-	-	-	-	-	-	-	20 U
General Chemistry															
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.77
Chloride	mg/L	-	250000	-	640	640	360	37	44	31	33	33	9.9	1.9	26
Cyanide (total)	mg/L	200	-	-	-	-	-	-	-	-	-	-	-	-	0.47
Sulfate	mg/L	-	250000	-	49	48	43	75	100	110	110	110	85	100	8.1

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
J Value is estimated.
U Not present at or above the associated value.
* Lead and copper are regulated by a Treatment Technique that requir
to control the corrosiveness of their water.
If more than 10% of tap water samples exceed the action level, water
must take additional steps.
For copper, the action level is 1.3 mg/L and for lead, the action level
The action level is discussed herein because there is no primary MCI
The action level applies to public water treatment facilities, and is in
herein for discussion purposes only
\- Not applicable.
326000[c] Concentration greater than criteria indicated.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT115B*	*WT115B*	*WT115C*	*WT115C*	*WT116A*	*WT116A*	*WT116A*	*WT119B*	*WT119B*	*WT120A*	*WT120A*
Sample Date:					*12/14/2011*	*4/26/2012*	*9/20/2011*	*12/14/2011*	*9/15/2011*	*4/26/2012*	*4/26/2012*	*9/14/2011*	*5/22/2012*	*9/14/2011*	*4/24/2012*
		MCL		*RDA*							*Duplicate*				
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	110[b]	100[b]	50 U	50 U	20 J	1500[b]	1500[b]	270[b]	150[b]	50 U	50 U
Antimony	µg/L	6	-	-	2.0 U	-	2.0 U	2.0 U	-	-	-	-	-	-	-
Arsenic	µg/L	10	-	-	2.0	3.1 J	2.3	1.4	5.6	21[a]	21[a]	2.9 J	5.7 U	4.5 J	4.6 J
Barium	µg/L	2000	-	-	140 J	140 J	62 J	49 J	110 J	130 J	130 J	80 J	41 J	90 J	94 J
Beryllium	µg/L	4	-	-	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	µg/L	5	-	-	1.0 U	-	1.0 U	1.0 U	-	-	-	-	-	-	-
Calcium	µg/L	-	-	250000	380000[c]	390000[c]	140000	120000	740000[c]	630000[c]	620000[c]	150000	100000	87000	80000
Chromium	µg/L	100	-	-	4.7 J	-	10 U	10 U	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	50 U	-	50 U	50 U	-	-	-	-	-	-	-
Copper	µg/L	1.3	1000	-	25 U	-	25 U	25 U	-	-	-	-	-	-	-
Iron	µg/L	-	300	1000	240	180	120	100 U	31000[bc]	35000[bc]	35000[bc]	1200[bc]	1200[bc]	1200[bc]	1100[bc]
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	110[a]	110[a]	3.0 U	3.0 U	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	17000	-	24000	19000	-	-	-	-	-	-	-
Manganese	µg/L	-	50	-	8.5 J	6.9 J	72[b]	67[b]	930[b]	1400[b]	1400[b]	170[b]	100[b]	95[b]	85[b]
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.16 J	0.13 J	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	-	-	-	40 U	-	40 U	40 U	-	-	-	-	-	-	-
Potassium	µg/L	-	-	-	8300	-	2500 J	2700 J	-	-	-	-	-	-	-
Selenium	µg/L	50	-	-	5.0 U	-	5.0 U	5.0 U	-	-	-	-	-	-	-
Silver	µg/L	-	100	-	10 U	-	10 U	10 U	-	-	-	-	-	-	-
Sodium	µg/L	-	-	150000	40000	34000	19000	16000	150000	77000	76000	56000	26000	38000	60000
Thallium	µg/L	2	-	-	1.0 U	-	1.1 U	1.0 U	-	-	-	-	-	-	-
Vanadium	µg/L	-	-	-	14 J	-	50 U	50 U	-	-	-	-	-	-	-
Zinc	µg/L	-	5000	-	20 U	-	20 U	20 U	-	-	-	-	-	-	-
General Chemistry															
Bromide	mg/L	-	-	-	0.81	-	0.12 J	0.50 U	-	-	-	-	-	-	-
Chloride	mg/L	-	250000	-	27	22	37	34	14	12	12	25	14	120	110
Cyanide (total)	mg/L	200	-	-	0.010 U	-	0.010 U	0.010 U	-	-	-	-	-	-	-
Sulfate	mg/L	-	250000	-	190	210	50	28	1000	610	620	270	150	41	44

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
J Value is estimated.
U Not present at or above the associated value.
* Lead and copper are regulated by a Treatment Technique that requir
to control the corrosiveness of their water.
If more than 10% of tap water samples exceed the action level, water
must take additional steps.
For copper, the action level is 1.3 mg/L and for lead, the action level
The action level is discussed herein because there is no primary MCI
The action level applies to public water treatment facilities, and is in
herein for discussion purposes only
\- Not applicable.
326000[c] Concentration greater than criteria indicated.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT120B*	*WT120B*	*WT120C*	*WT120C*	*WT120C*	*WT120C*	*WT121A*	*WT121A*	*WT121A*	*WT121B*	*WT121B*
Sample Date:					*9/14/2011*	*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*	*9/19/2011*	*12/13/2011*	*4/24/2012*	*9/19/2011*	*12/13/2011*
		MCL		*RDA*											
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	50 U	50 U	24 J	30 J	-	50 U	50 U	50 U	83[b]	50 U	50 U
Antimony	µg/L	6	-	-	-	-	2.0 U	2.0 U	-	-	2.0 U	2.0 U	-	2.0 U	2.0 U
Arsenic	µg/L	10	-	-	7.1	7.2	1.1	0.76 J	-	1.1 J	9.1	8.3	13[a]	14[a]	13[a]
Barium	µg/L	2000	-	-	90 J	97 J	21 J	23 J	-	18 J	71 J	65 J	71 J	370	380
Beryllium	µg/L	4	-	-	5.0 U	5.0 U	1.0 U	1.0 U	-	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Cadmium	µg/L	5	-	-	-	-	1.0 U	1.0 U	-	-	1.0 U	1.0 U	-	1.0 U	1.0 U
Calcium	µg/L	-	-	250000	70000	76000	94000	97000	-	84000	88000	86000	87000	100000	100000
Chromium	µg/L	100	-	-	-	-	10 U	10 U	-	-	10 U	10 U	-	10 U	10 U
Cobalt	µg/L	-	-	-	-	-	50 U	50 U	-	-	50 U	50 U	-	50 U	50 U
Copper	µg/L	1.3	1000	-	-	-	25 U	25 U	-	-	25 U	25 U	-	25 U	25 U
Iron	µg/L	-	300	1000	1100[bc]	1200[bc]	100 U	140	-	100 U	3200[bc]	3600[bc]	13000[bc]	6000[bc]	6600[bc]
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	-	-	22000	22000	-	-	20000	19000	-	49000	50000
Manganese	µg/L	-	50	-	230[b]	240[b]	15 U	3.9 J	-	15 U	68[b]	59[b]	68[b]	32	39
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	-	0.20 U	0.20 U	0.20 U	0.14 J	0.20 U	0.20 U
Nickel	µg/L	-	-	-	-	-	40 U	40 U	-	-	40 U	40 U	-	3.5 J	40 U
Potassium	µg/L	-	-	-	-	-	2200 J	3000 J	-	-	1700 J	1600 J	-	5800	6200
Selenium	µg/L	50	-	-	-	-	5.0 U	5.0 U	-	-	5.0 U	5.0 U	-	5.0 U	5.0 U
Silver	µg/L	-	100	-	-	-	10 U	10 U	-	-	10 U	10 U	-	3.2 J	10 U
Sodium	µg/L	-	-	150000	13000	15000	33000	52000	-	25000	44000	46000	50000	58000	56000
Thallium	µg/L	2	-	-	-	-	1.0 U	1.0 U	-	-	1.6 U	1.0 U	-	1.0 U	1.0 U
Vanadium	µg/L	-	-	-	-	-	50 U	50 U	-	-	50 U	50 U	-	50 U	50 U
Zinc	µg/L	-	5000	-	-	-	20 U	20 U	-	-	20 U	20 U	-	20 U	20 U
General Chemistry															
Bromide	mg/L	-	-	-	-	-	0.50 U	0.17 J	-	-	0.50 U	0.50 U	-	1.6	1.5
Chloride	mg/L	-	250000	-	29	33	100	120	-	47	96	92	89	30	29
Cyanide (total)	mg/L	200	-	-	-	-	0.010 U	0.010 U	-	-	0.010 U	0.010 U	-	0.010 U	0.010 U
Sulfate	mg/L	-	250000	-	66	56	17	17	-	12	78	76	79	73	86

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
J Value is estimated.
U Not present at or above the associated value.
* Lead and copper are regulated by a Treatment Technique that requir
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\- Not applicable.
326000[c] Concentration greater than criteria indicated.

TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT121B*	*WT122A*	*WT122A*	*WT122A*	*WT122A*	*WT122B*	*WT122B*	*WT122C*	*WT122C*	*WT123A*	*WT123A*
Sample Date:					*4/24/2012*	*9/20/2011*	*9/20/2011*	*12/13/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*	*9/20/2011*	*12/13/2011*	*10/13/2011*	*4/26/2012*
		MCL		*RDA*			*Duplicate*								
Parameters	*Units*	*Primary*	*Secondary*												
		a	*b*	*c*											
Metals															
Aluminum	µg/L	-	50	-	50 U	50 U	50 U	230[b]	27 J	20 J	50 U	50 U	50 U	130[b]	180[b]
Antimony	µg/L	6	-	-	-	2.0 U	2.0 U	2.0 U	-	2.0 U	2.0 U	2.0 U	2.0 U	-	-
Arsenic	µg/L	10	-	-	14[a]	1.4	1.4	1.2	1.9 J	2.0	1.8	4.5	4.0	1.3 J	1.9 J
Barium	µg/L	2000	-	-	410	54 J	54 J	68 J	76 J	61 J	66 J	39 J	45 J	49 J	44 J
Beryllium	µg/L	4	-	-	5.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	5.0 U
Cadmium	µg/L	5	-	-	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U		-
Calcium	µg/L	-	-	250000	110000	220000	220000	270000[c]	290000[c]	130000	150000	110000	120000	300000[c]	320000[c]
Chromium	µg/L	100	-	-	-	10 U	10 U	2.6 J	-	10 U	10 U	10 U	10 U	-	-
Cobalt	µg/L	-	-	-	-	50 U	50 U	50 U	-	50 U	50 U	50 U	50 U	-	-
Copper	µg/L	1.3	1000	-	-	25 U	25 U	25 U	-	25 U	25 U	25 U	25 U	-	-
Iron	µg/L	-	300	1000	6600[bc]	2300[bc]	2300[bc]	3700[bc]	3700[bc]	4200[bc]	4500[bc]	2200[bc]	2500[bc]	310[b]	410[b]
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	-	20000	20000	28000	-	27000	31000	23000	30000	-	-
Manganese	µg/L	-	50	-	34	380[b]	380[b]	530[b]	580[b]	140[b]	150[b]	150[b]	150[b]	53	44
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	-	-	-	-	40 U	40 U	40 U	-	40 U	40 U	40 U	40 U	-	-
Potassium	µg/L	-	-	-	-	4200 J	4200 J	5400	-	2500 J	3100 J	2700 J	3500 J	-	-
Selenium	µg/L	50	-	-	-	5.0 U	5.0 U	5.0 U	-	5.0 U	5.0 U	5.0 U	5.0 U	-	-
Silver	µg/L	-	100	-	-	10 U	10 U	10 U	-	10 U	10 U	10 U	10 U	-	-
Sodium	µg/L	-	-	150000	60000	32000	32000	39000	40000	20000	23000	18000	20000	12000	11000
Thallium	µg/L	2	-	-	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	-	-
Vanadium	µg/L	-	-	-	-	50 U	50 U	3.1 J	-	50 U	50 U	50 U	50 U	-	-
Zinc	µg/L	-	5000	-	-	20 U	20 U	20 U	-	20 U	20 U	20 U	20 U	-	-
General Chemistry															
Bromide	mg/L	-	-	-	-	0.46 J	0.43 J	0.56	-	0.085 J	0.13 J	0.10 J	0.50 U	-	-
Chloride	mg/L	-	250000	-	25	36	35	33	25	35	34	33	32	26	21
Cyanide (total)	mg/L	200	-	-	-	0.010 U	0.010 U	0.0057 J	-	0.010 U	0.010 U	0.010 U	0.010 U	-	-
Sulfate	mg/L	-	250000	-	66	230	230	390	480	150	160	170	150	670	690

Notes:

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b USEPA Secondary Contaminant Level
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\- Not applicable.
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TABLE B.3

GROUNDWATER SAMPLING RESULTS - METALS AND GENERAL CHEMISTRY
HIMCO SITE
ELKHART, INDIANA

Sample Location:					*WT124A*	*WT124A*	*WTE3*	*WTE3*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*	*Equipment Blank*
Sample Date:					*10/13/2011*	*4/26/2012*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*4/24/2012*
		MCL		*RDA*									
Parameters	*Units*	*Primary*	*Secondary*										
		a	*b*	*c*									
Metals													
Aluminum	µg/L	-	50	-	110[b]	74[b]	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Antimony	µg/L	6	-	-		-	-	-	-	2.0 U	0.15 J	-	-
Arsenic	µg/L	10	-	-	0.99 J	0.86 J	2.6 J	1.3 J	5.0 U	1.0 U	1.0 U	5.0 U	5.0 U
Barium	µg/L	2000	-	-	20 J	12 J	56 J	66 J	200 U	200 U	200 U	200 U	200 U
Beryllium	µg/L	4	-	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.0 U	1.0 U	5.0 U	5.0 U
Cadmium	µg/L	5	-	-	-	-	-	-	-	1.0 U	1.0 U	-	-
Calcium	µg/L	-	-	250000	56000	52000	84000	70000	5000 U	5000 U	5000 U	5000 U	5000 U
Chromium	µg/L	100	-	-	-	-	-	-	-	10 U	10 U	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-	50 U	50 U	-	-
Copper	µg/L	1.3	1000	-	-	-	-	-	-	25 U	5.6 J*	-	-
Iron	µg/L	-	300	1000	790[b]	210	1800[b]	930[b]	100 U	100 U	100 U	100 U	100 U
Lead	µg/L	15	-	-	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Magnesium	µg/L	-	-	-	-	-	-	-	-	5000 U	5000 U	-	-
Manganese	µg/L	-	50	-	39	23	30	37	15 U	15 U	15 U	15 U	15 U
Mercury	µg/L	2	-	-	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	µg/L	-	-	-	-	-	-	-	-	40 U	40 U	-	-
Potassium	µg/L	-	-	-	-	-	-	-	-	100 J	5000 U	-	-
Selenium	µg/L	50	-	-	-	-	-	-	-	5.0 U	5.0 U	-	-
Silver	µg/L	-	100	-	-	-	-	-	-	10 U	10 U	-	-
Sodium	µg/L	-	-	150000	27000	20000	14000	13000	5000 U	5000 U	5000 U	5000 U	5000 U
Thallium	µg/L	2	-	-	-	-	-	-	-	0.24 J	1.0 U	-	-
Vanadium	µg/L	-	-	-	-	-	-	-	-	50 U	50 U	-	-
Zinc	µg/L	-	5000	-	-	-	-	-	-	20 U	20 U	-	-
General Chemistry													
Bromide	mg/L	-	-	-	-	-	-	-	-	0.50 U	0.50 U	-	-
Chloride	mg/L	-	250000	-	42	38	16	9.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cyanide (total)	mg/L	200	-	-	-	-	-	-	-	0.010 U	0.010 U	-	-
Sulfate	mg/L	-	250000	-	15	13	78	2.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Notes:

a USEPA Primary Contaminant Level
b USEPA Secondary Contaminant Level
c Recommended Dietary Allowance
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\- Not applicable.
326000[c] Concentration greater than criteria indicated.

APPENDIX C

LABORATORY REPORTS AND DATA VALIDATION MEMORANDA

APPENDIX D

GROUNDWATER SAMPLING STABILIZATION PARAMETERS

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT101A*	*WT101A*	*WT101C*	*WT101C*	*WT101D*	*WT101D*	*WT101E*	*WT101E*
Sample Date:		*9/15/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*	*9/16/2011*	*4/26/2012*
Parameters	***Units***								
Field Parameters									
Conductivity	mS/cm	1.638	0.923	0.469	0.506	0.625	0.647	0.593	0.648
Dissolved oxygen (DO), field	mg/L	0.91	0.91	0.71	0.55	0.83	0.97	0.31	0.85
Oxidation reduction potential (ORP), field	millivolts	-25.4	-40.2	-73.8	-70.4	-241	-260.4	-275.7	-309.2
pH, field	s.u.	6.92	6.08	7.11	6.88	7.23	6.91	6.85	6.71
Temperature, sample	Deg C	16.37	11.51	14.82	13.67	14.5	12.26	15.12	12.41
Turbidity	NTU	2.67	3.27	1.88	-	1.94	-	1.6	0.97

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT102A*	*WT102A*	*WT102B*	*WT102B*	*WT102C*	*WT106A*	*WT106A*	*WT106B*
Sample Date:		*9/13/2011*	*4/25/2012*	*9/13/2011*	*4/25/2012*	*9/13/2011*	*9/14/2011*	*4/25/2012*	*9/14/2011*
Parameters	*Units*								
Field Parameters									
Conductivity	mS/cm	0.893	0.754	0.604	0.608	0.717	0.737	0.616	1.242
Dissolved oxygen (DO), field	mg/L	5.01	2.03	0.78	1.36	0.5	3.06	1.6	0.96
Oxidation reduction potential (ORP), field	millivolts	86.4	-36.8	-107.2	-216.8	-146.6	-25.3	-29.2	-115.4
pH, field	s.u.	6.96	7.25	7.33	7.61	6.96	7.76	7.42	6.84
Temperature, sample	Deg C	13.89	10.23	13.34	11.09	15.64	14.88	9.93	12.6
Turbidity	NTU	1.99	3.33	3.15	4.17	7.33	1.81	14.4	1.84

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT106B*	*WT106C*	*WT106C*	*WT111A*	*WT111A*	*WT114A*	*WT114A*	*WT114B*
Sample Date:		*4/25/2012*	*9/20/2011*	*12/13/2011*	*9/14/2011*	*4/25/2012*	*9/13/2011*	*4/24/2012*	*9/13/2011*
Parameters	*Units*								
Field Parameters									
Conductivity	mS/cm	1.281	0.445	0.429	0.901	0.786	2.61	1.586	0.602
Dissolved oxygen (DO), field	mg/L	2.82	0.7	0.73	0.77	0.62	0.89	0.15	0.39
Oxidation reduction potential (ORP), field	millivolts	-146.1	-63.3	-168	-51.1	-32.3	29.9	-44.5	-89.7
pH, field	s.u.	6.88	6.85	7.65	6.69	6.68	6.93	7.26	7.97
Temperature, sample	Deg C	11.61	17.67	11.37	14.91	11.14	15.33	12.08	14.11
Turbidity	NTU	2.33	2.85	3.24	32.1	8.55	4.94	2.98	0.33

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT114B*	*WT114C*	*WT114C*	*WT115A*	*WT115A*	*WT115B*	*WT115B*	*WT115B*
Sample Date:		*4/24/2012*	*9/13/2011*	*4/24/2012*	*9/15/2011*	*4/26/2012*	*9/20/2011*	*12/14/2011*	*4/26/2012*
Parameters	*Units*								
Field Parameters									
Conductivity	mS/cm	0.665	0.608	0.579	0.603	0.35	1.373	1.15	2.189
Dissolved oxygen (DO), field	mg/L	1	1.23	0.1	3.29	1.24	0.53	0.4	0.91
Oxidation reduction potential (ORP), field	millivolts	-106.6	-129.2	-274.4	16.4	-218	-242.2	-191	-333.8
pH, field	s.u.	7.25	7.76	7.5	6.96	5.45	6.96	7.05	6.92
Temperature, sample	Deg C	13.57	13.29	13.19	15.62	11.3	17.81	15.8	12.33
Turbidity	NTU	1.43	0.79	2.02	242	5.02	1.12	1.94	4.81

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT115C*	*WT115C*	*WT116A*	*WT116A*	*WT119B*	*WT119B*	*WT120A*	*WT120A*
Sample Date:		*9/20/2011*	*12/14/2011*	*9/15/2011*	*4/26/2012*	*9/14/2011*	*5/22/2012*	*9/14/2011*	*4/24/2012*
Parameters	***Units***								
Field Parameters									
Conductivity	mS/cm	0.914	1.01	3.619	3.03	1.319	0.875	0.798	0.812
Dissolved oxygen (DO), field	mg/L	0.55	0.47	3.4	3.77	0.84	0.57	1.52	1.07
Oxidation reduction potential (ORP), field	millivolts	-219.1	-210	-39.3	-108.4	-95.9	-123.3	-95.2	-120.7
pH, field	s.u.	7.1	7.23	6.96	6.35	7.11	6.82	7.33	7.2
Temperature, sample	Deg C	17.68	15.6	19.98	11.6	15.6	11.77	12.85	12.02
Turbidity	NTU	1.85	1.08	3.38	23.7	4.78	4.74	2.66	1.83

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT120B*	*WT120B*	*WT120C*	*WT120C*	*WT120C*	*WT121A*	*WT121A*	*WT121A*
Sample Date:		*9/14/2011*	*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/24/2012*	*9/19/2011*	*12/13/2011*	*4/24/2012*
Parameters	*Units*								
Field Parameters									
Conductivity	mS/cm	0.557	0.585	0.794	0.83	0.61	0.785	0.759	0.735
Dissolved oxygen (DO), field	mg/L	1.07	1.21	3.11	0.7	1.46	0.98	0.54	0.13
Oxidation reduction potential (ORP), field	millivolts	-97.9	-143.3	29.7	-9	-5.5	-39.9	-139	-183.3
pH, field	s.u.	7.3	7.28	7.36	7.38	7.59	7	7.3	7.6
Temperature, sample	Deg C	13.14	12.33	16.35	13.21	11.16	13.84	12.91	12.2
Turbidity	NTU	1.03	2.43	3.22	3.95	1.46	2.04	2.01	1.4

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT121B*	*WT121B*	*WT121B*	*WT122A*	*WT122A*	*WT122A*	*WT122B*	*WT122B*
Sample Date:		*9/19/2011*	*12/13/2011*	*4/24/2012*	*9/20/2011*	*12/13/2011*	*4/25/2012*	*9/20/2011*	*12/13/2011*
Parameters	***Units***								
Field Parameters									
Conductivity	mS/cm	1.146	1.14	1.204	1.2002	1.52	1.545	0.895	0.94
Dissolved oxygen (DO), field	mg/L	0.75	0.42	0.84	0.53	0.42	0.28	0.45	0.76
Oxidation reduction potential (ORP), field	millivolts	-78.3	-142	-107.6	-83.8	-168	-112.5	-54.5	-186
pH, field	s.u.	6.77	7.13	7	6.77	6.92	8.6	7.06	7.09
Temperature, sample	Deg C	13.01	11.67	12.26	14.18	13.11	12.43	14.11	11.87
Turbidity	NTU	1.17	0.56	0.93	2.13	4.82	3.7	1.51	0.78

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

TABLE D.1

GROUNDWATER SAMPLING STABILIZATION PARAMETERS
GROUNDWATER SAMPLING RESULTS - SEPTEMBER 2011 TO APRIL/MAY 2012
HIMCO SITE
ELKHART, INDIANA

Sample Location:		*WT122C*	*WT122C*	*WT123A*	*WT123A*	*WT124A*	*WT124A*	*WTE3*	*WTE3*
Sample Date:		*9/20/2011*	*12/13/2011*	*10/13/2011*	*4/26/2012*	*10/13/2011*	*4/26/2012*	*9/14/2011*	*4/25/2012*
Parameters	*Units*								
Field Parameters									
Conductivity	mS/cm	0.773	0.829	1.41	1.548	0.478	0.469	0.643	0.538
Dissolved oxygen (DO), field	mg/L	0.61	0.28	3.66	2.08	4.32	4.77	1.41	0.6
Oxidation reduction potential (ORP), field	millivolts	-116.3	-299	198	51.6	198	31.1	-203.6	-277.5
pH, field	s.u.	7.39	7.3	7.62	7.33	7.56	7.6	6.99	6.98
Temperature, sample	Deg C	13.87	11.8	13.59	10.24	14.05	10.86	14.07	12.45
Turbidity	NTU	1.59	1.19	3.28	4.38	4.49	3.33	2.05	1.51

Notes:

mS/cm	milliSiemens per cm
mg/L	milligrams per litre
s.u.	standard units
NTU	Nephelometric Turbidity Units

APPENDIX E

BACKGROUND VALUES CALCULATIONS

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) has performed a statistical evaluation of observed concentrations of metals and general chemistry parameters in upgradient wells during groundwater monitoring at the Himco Site in Elkhart, Indiana (Site). The 2010 Himco Annual Groundwater Monitoring Report (CRA, 2010) included a statistical analysis to determine background concentrations to compare with concentrations measured at other locations at the Site. CRA collected additional samples from monitoring wells WT102A, WT102B, and WT102C since 2010 and has used these data to update the background values (BVs) with 2011-2012 data.

2.0 BACKGROUND VALUE CALCULATIONS

2.1 SCOPE OF BACKGROUND DATA

The groundwater monitored at the Site is divided into the Upper, Intermediate and Lower Aquifers. The monitoring network at the Site includes a nest of three wells (WT102A in the Upper Aquifer, WT102B in the Intermediate Aquifer, and WT102C in the Lower Aquifer) located upgradient of the Site, which provide background data representing groundwater conditions prior to on-Site influences. CRA used the monitoring data from these wells to calculate BVs for the Site. Consistent with United States Environmental Protection Agency (USEPA) guidance (USEPA, 2010), BVs have been calculated separately for each aquifer.

All available historical groundwater monitoring data (1990-2012) for inorganics in the background wells were used for BV calculations. The number of samples varied from 16 from the Upper Aquifer well WT102A, to 14 samples from the Intermediate Aquifer well WT102B, to 9 samples in the Lower Aquifer well WT102C. Not all background samples were analyzed for all inorganics, which resulted in smaller background data sets for certain monitoring parameters. Table E.1 presents the available background data. Monitoring frequencies have been irregular at the Site, with sampling events occurring in 1990, 1991 (two events), 1995, 1998, 2000, 2008, 2009, 2010, 2011 and 2012. Not all background wells were sampled in each of these years. It is preferable (USEPA, 2010) to have 8-10 or more observations for BV calculations, and thus those BVs based on fewer samples represent interim values that may not capture the full extent of natural variability in background conditions. Due to the low numbers of background data for the Lower Aquifer (5-9 points, depending on the monitoring parameter), a combined-background data set consisting of results from all three zones (i.e., wells WT102A in the Upper Aquifer, WT102B in the Intermediate Aquifer, and WT102C in the Lower Aquifer) was also considered. BVs for all monitoring parameters were calculated using this combined data set, which may be applied when the individual-aquifer upgradient data sets did not contain a sufficient number of samples for BV calculations.

The inorganic analytes (23) monitored at the Site for which BV calculations were performed include:

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Calcium
- Chromium (total)
- Cobalt
- Copper
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Nickel
- Potassium
- Selenium
- Silver
- Sodium
- Thallium
- Vanadium
- Zinc

The general chemistry parameters (4) monitored at the Site for which BV calculations were performed include:

- Bromide
- Chloride
- Cyanide (total)
- Sulfate

2.2 STATISTICAL METHODS

The methods CRA used to compare results from samples collected from downgradient wells to background conditions are presented in EPA's statistical guidance for evaluating groundwater monitoring data (USEPA, 2009). For the purposes of point-by-point comparisons of downgradient data versus upgradient background conditions, statistical upper tolerance limits (UTLs) are recommended (USEPA, 2010; 2009). Methods for calculating UTLs are available in USEPA (2010; 2006), Hahn and Meeker (1991), and Guenther (1972). An UTL represents an upper limit, with specified confidence, (e.g., 95 percent), on a percentile of the population (e.g., 95th percentile of background). If an on-site observation exceeds the background UTL, it is unlikely to belong to the same population (i.e., the on-site sample concentration is greater than upgradient conditions).

For the purposes of this evaluation, UTLs on the 95th percentile of the upgradient population (with 95 percent confidence) were calculated as BVs for each inorganic analyte in each groundwater zone (Upper, Intermediate and Lower Aquifers), and for the combined-aquifer data set. By selecting this statistic for the BVs, there is 95 percent confidence that no more than one in twenty groundwater samples consistent with upgradient conditions would exceed the BV due to natural variation, and thus any on-site observations greater than the BV are likely due to an on-site effect. However,

since the BVs represent a 1 in 20 upper limit on background conditions, which could occur occasionally due to natural variation, it is customary to confirm any parameter concentrations greater than the BV with a subsequent sample.

In performing the statistical procedures required, any non-detect (less-than) data were substituted with a value of one-half the reported detection limit prior to testing, with the exception of non-parametric UTL calculations (see Section 3.2) where no prior substitution was needed.

2.2.1 ASSESSMENT OF DATA CHARACTERISTICS AND ASSUMPTIONS

Before calculating BVs, statistical characterization of the upgradient data sets was necessary to determine the appropriate methods to use. Specifically, assumptions regarding data distribution and the presence of statistical outliers were evaluated, and the presence of censored data (non-detects) quantified.

Each analyte's data set was evaluated to determine if it was normally distributed, gamma distributed, lognormally distributed, or did not fit any of the distributions tested. Data distribution testing for normality and lognormality was undertaken using the Shapiro-Wilk W-test, and for gamma distribution using the Kolmogorov-Smirnov and Anderson-Darling tests (see USEPA, 2006, 2010 for descriptions of these tests).

The assessment of outliers was performed using Dixon's test or Rosner's test (see USEPA 2006 for details of these tests) applied for the observed data distribution, unless more than half of the data were non-detects (in which case no outlier testing was performed).

The findings of the data distribution and outlier testing were considered in selecting appropriate UTL methods in the BV calculations. Any identified outliers were retained in the BV calculations, since these were found in upgradient conditions, but were considered in assigning an appropriate data distribution (e.g., an apparent outlier in a normal distribution may not be an outlier in a lognormal distribution).

2.2.2 BACKGROUND VALUE (BV) CALCULATION METHODS

Background values were calculated for each analyte on a single-aquifer (Upper Aquifer and Intermediate Aquifer), or on both single-aquifer and combined-aquifer bases (for the Lower Aquifer, having fewer background samples).

Depending on the findings of the initial data characterization (Section 3.1 above) CRA selected, an appropriate UTL method for BV calculation as indicated in the following table:

	Appropriate UTL for Background Value calculation		
Data Distribution	***0-50% Non-detects***	***51-99% Non-detects***	***100% Non-detects***
Normal	Student's *t*-UTL	Non-parametric UTL	Maximum DL
Gamma	Gamma UTL	Non-parametric UTL	Maximum DL
Lognormal	Student's *t*-UTL (log)	Non-parametric UTL	Maximum DL
Not identifiable	Non-parametric UTL	Non-parametric UTL	Maximum DL

Note: DL - detection limit reported for non-detect results

As noted above, descriptions of the methods for calculating these various UTLs are available in USEPA (2010; 2009; 2006), Hahn and Meeker (1991), and Guenther (1972). In cases where a data set fit more than one distribution (e.g., either gamma or lognormal distribution), the priority for assignment was normal > gamma-distributed > lognormal, consistent with USEPA (2010).

It is noted that when the use of non-parametric UTLs was required (i.e., if a data set did not follow an identified distribution or had greater than 50 percent non-detects), the desired percentile (95th) of background is not achieved using the existing data. This is due to the number of background samples available, since the non-parametric UTL method requires 86 or more data points to achieve a 95th percentile estimate with 95 percent confidence. In these cases, the BV calculated will be conservatively low, but is the best estimate available with the current data set.

CRA used single Upper and Intermediate Aquifers background values for the current evaluation since there are enough data samples (8 to 10) from the background wells WT102A and WT102B to calculate the BV. Due to the low numbers of background samples for the Lower Aquifer (5-9 points, depending on the monitoring parameter), a combined-background data set consisting of results from all three zones (i.e., wells WT102A in the Upper Aquifer, WT102B in the Intermediate Aquifer, and WT102C in the Lower Aquifer) was used together with the single aquifer BV for this aquifer.

2.3 BV CALCULATION RESULTS

The upgradient data sets used to calculate BVs are shown in Table E.1. The calculated BVs are provided in Table E.2 (Upper Aquifer), Table E.3 (Intermediate Aquifer), Table E.4 (Lower Aquifer) and Table E.5 (Combined Aquifers). Summary statistics and data distributions are also provided for each analyte on these Tables. The BVs provided are suitable for ongoing point-by-point comparisons of downgradient versus upgradient conditions. They are not appropriate for group-based tests, such as mean or median comparisons, for which other statistical procedures should be applied.

3.0 CONCLUSIONS

As described above in Section 2, CRA has established BVs for the 23 inorganic analytes and four general chemistry parameters in each of the monitored aquifers (Upper, Intermediate and Lower) at the Site. These BVs are presented in Tables 2 through 5, and are appropriate for point-by-point comparisons to on-Site data.

4.0 REFERENCES

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TABLE E.1

BACKGROUND DATA FROM UPGRADIENT WELLS
HIMCO SITE
ELKHART, INDIANA

Well Type:		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Sample Location:		WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A	WT102A
Sample Depth:		8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs	8.4-18.4 ft bgs
Sample Date:		1990/11	1991/01	1991/09	1995/09	1998/10	2000/04	2008/10	2009/02	2009/04	2009/08	2009/11	2010/02	2011/03	2011/09	2012/04	2012/09
Parameter	*Units*																
Metals																	
Aluminum	ug/L	32.7 BJ	81.8 B	165 BJ	268/200 U	27.6 J	118 U	92.2	106/109	262	22.1 J	262	554	50.0 U	37 J	150	84
Antimony	ug/L	30.0 U	37.0 U	13.00 U	21.7 J/60 U	42.2 UJ	2 U	2.0 U	2.0 U/2.0 U	2.0 U	2.0 U	0.15 J	2.0 U	2.0 U	--	--	--
Arsenic	ug/L	--	--	--	*3.8 U/10 U*	*0.90 UJ*	*2 U*	0.46 J	0.54 J/0.50 J	0.71 J	0.78 J	0.55 J	0.79 J	0.40 J	0.65 J	1.0 J	0.43
Barium	ug/L	65.5 B	60.3 B	56.5 B	53.3 J/200 U	47.3 J	46.7	42.5 J	40.0 J/37.6 J	32.6 J	34.0 J	41.0 J	42.3 J	36.8 J	37 J	31 J	28
Beryllium	ug/L	1.20 B	3.1 BJ	1.00 U	1.3 J/5 U	0.60 UJ	2 U	1.0 U	1.0 U/1.0 U	1.0 U	1.0 U	0.48 J	1.0 U	1.0 U	5.0 U	5.0 U	1
Cadmium	ug/L	-	-	-	1.1 U/5 U	4.6 UJ	0.1 U	1.0 U	1.0 U/1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Calcium	ug/L	211000	181000	165000	157000/170000	17100 J	173000	99800/99800	102000/95100	73200	89500	93600	89000	80000	82000	68000	70000
Chromium (Total)	ug/L	5.0 U	6.5 BJ	2.80 B	23.9/10 U	20.3 J	17.8 J	47.1	6.8 J/6.4 J	31.3	7.2 J	128	427	13.2	--	--	--
Cobalt	ug/L	*7.0 U*	*5.0 U*	*3.00 U*	13.1 J/50 U	*7.8 UJ*	4.1 J	*50.0 U*	*50.0 U/50.0 U*	1.9 J	*50.0 U*	2.7 J	*50.0 U*	2.6 J	--	--	--
Copper	ug/L	6.9 BJ	16.7 BJ	*6.00 U*	17.9 J/25 U	*4.1 UJ*	*9.3 U*	*25.0 U*	37.5/63.7	*25.0 U*	*25.0 U*	*25.0 U*	7.5 J	*25.0 U*	--	--	--
Iron	ug/L	56.5 BJ	123	60.80 B	39.0 J/100 U	96.8 J	115 JB	480	155/178	855	107	1040	2760	433	230	1900	670
Lead	ug/L	2.2 BJ	1.0 UJ	1.00 U	1.7 U/3 U	0.50 UJ	2 U	3.0 U	3.0 U/3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3
Magnesium	ug/L	25100	22500	20300	15900/16200	16600 J	18800 J	17800	17800/19100	14000	15900	17000	16800	15000	--	--	--
Manganese	ug/L	38.1	23	9.20 B	30.2/21	61.5 J	86.7	62.2	62.5/59.4	195	110	112	641	490	320	610	240
Mercury	ug/L	--	--	--	0.20 U/0.2 U	0.10 J	0.1 U	0.20 U	0.20 U/0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.2
Nickel	ug/L	6.0 U	20.0 U	7.00 U	40.6/40 U	73.0 J	45.4 J	18.0 J	38.5 J/35.4 J	21.9 J	44.3	129	86.6	62.8	--	--	--
Potassium	ug/L	2110.0 B	2000 B	2120 B	2070 J/5000 U	1610 J	2060	1320 J	1090 J/1160 J	1090 J	943 J	1530 J	1320 J	1480 J	--	--	--
Selenium	ug/L	--	--	--	3.6 U/5 U	6.0 UJ	2 U	5.0 U	5.0 U/5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--	--	--
Silver	ug/L	5.0 U	5.0 UJ	2.00 UJ	19.5/10 U	6.1 J	11.1 U	10.0 U	10.0 U/10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	--	--	--
Sodium	ug/L	48600	41900	50700 J	52300 J/50000	48000 J	100000	58500	62300/58300	61200	55300	70400	71400	83600	74000	73000	70000
Thallium	ug/L	--	--	--	4.7/20	0.40 UJ	1 U	1.0 U	1.0 U/1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Vanadium	ug/L	3.0 U	4.0 U	2.00 U	26.5 J/50 U	12.3 UJ	5.1 U	0.65 J	50.0 U/50.0 U	50.0 U	50.0 U	0.69 J	3.3 J	50.0 U	--	--	--
Zinc	ug/L	9.0 U	24.1 J	6.00 U	4.1 J/20 U	3.2 UJ	*34.1 U*	20.0 U	20.0 U/20.0 U	20.0 U	7.3 J	20.0 U	20.0 U	20.0 U	--	--	--
General Chemistry																	
Bromide	mg/L	0.1 U	0.1	0.1 U	--	--	0.06J	0.5 U	0.5 U/0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--
Chloride	mg/L	--	--	--	--	--	--	114	164/162	108	142	168	182	138	130	84	92
Cyanide (total)	mg/L	R	0.01U	0.01U	0.01U/0.01U	0.0085 J	--	--	0.01U/0.01U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Sulfate	mg/L	430	360 J	338 J	--	--	202 JD	87.1	44.2/44.8	29.7	56.3	73	61.5	83.1	68	54	52

Notes:

-- No data/not analyzed
U - Analyte not detected above specified detection limit.
UJ - Estimated reporting limit.
J - Analyte was estimated.
B - Method blank contamination.
D - Compounds at secondary dilution factor.
R - Rejected data.
268/200 - Field duplicate result.
Values in *italics* were not considered in the UTL calculations (non-detects, non-detects with elevated detection limits or outliers).

TABLE E.1

BACKGROUND DATA FROM UPGRADIENT WELLS
HIMCO SITE
ELKHART, INDIANA

Well Type:		Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer	Intermediate Aquifer
Sample Location:		WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B	WT102B
Sample Depth:		62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs	62.9-67.9 ft bgs
Sample Date:		1991/01	1991/09	1995/09	2000/04	2008/10	2009/02	2009/04	2009/08	2009/11	2010/02	2011/03	2011/09	2012/04	2012/09
Parameter	*Units*														
Metals															
Aluminum	ug/L	25.0 U	139 BJ	200 U/161 J	118 U	20.1 J	50.0 U	50.0 U / 50.0 U	50.0 U	23.2 J	50.0 U	50.0 U / 50.0 U	50 U	50 U	50
Antimony	ug/L	*37.0 U*	*13.0 U*	*60 U/29.7 J*	2 U	2.0 U	2.0 U	0.26 J / 2.0 U	0.44 J	2.0 U	0.17 J	0.16 J / 0.49 J	--	--	--
Arsenic	ug/L	3.0 U	2.0 UJ	10 U/4.8 J	6 J	4.6	4.1	3.9 / 3.9	2.4	3.0	2.8	3.5 / 3.4	4.3 J	2.6 J	4.4
Barium	ug/L	103 B	85.1 B	200 U/91.0 J	103	92.3 J	84.2 J	101 J / 97.7 J	107 J	101 J	124 J	119 J / 128 J	110 J	160 J	110
Beryllium	ug/L	--	--	5 U/0.40 U	2 U	1.0 U	1.0 U	1.0 U / 1.0 U	1.0 U	0.47 J	1.0 U	1.0 U / 1.0 U	5.0 U	5.0 U	1
Cadmium	ug/L	--	--	5 U/1.1 U	0.1 U	1.0 U	1.0 U	1.0 U / 1.0 U	1.0 U	1.0 U	1.0 U	1.0 U / 1.0 U	--	--	--
Calcium	ug/L	68700	62400	67100/61200	75800	49700	51800	57300 / 53100	45900	57000	62800	64700 / 66800	67000	72000	72000
Chromium (Total)	ug/L	4.0 U	2.0 U	*10 U/4.0 U*	24.2 J	4.1 J	3.3 J	10.0 U / 2.5 J	20.2	6.9 J	8.4 J	8.4 J / 20.3	--	--	--
Cobalt	ug/L	5.0 U	3.0 U	50 U/12.4 J	13.2 U	50.0 U	50.0 U	50.0 U / 50.0 U	50.0 U	50.0 U	50.0 U	50.0 U / 50.0 U	--	--	--
Copper	ug/L	4.9 BJ	6.0 U	25 U/1.7 U	9.3 U	25.0 U	25.0 U	25.0 U / 25.0 U	25.0 U	25.0 U	25.0 U	25.0 U / 25.0 U	--	--	--
Iron	ug/L	15.0 U	70.6 B	493/490	1580 JB	529	601	564 / 541	857	676	677	797 / 973	960	500	2100
Lead	ug/L	1.2 BJ	1.0 UJ	3 U/1.7 U	2 U	3.0 U	3.0 U	3.0 U / 3.0 U	3.0 U	3.0 U	3.0 U	3.0 U / 3.0 U	3.0 U	3.0 U	3
Magnesium	ug/L	21300	19400	21900/20400	22300	19800	19400	21400 / 21000	22600	21400	23600	22500 / 23600	--	--	--
Manganese	ug/L	124	118	79/87.3	91.9	47.2	113	57.5 / 52.0	37.7	51.9	50.4	45.6 / 44.4	58	38	66
Mercury	ug/L	--	--	0.2 U/0.20 U	0.1 U	0.20 U	0.20 U	0.20 U / 0.20 U	0.20 U	0.20 U	0.20 U	0.20 U / 0.20 U	0.20 U	0.20 U	0.2
Nickel	ug/L	*20.0 U*	*7.0 U*	*40 U/9.5 U*	8.1 J	*40.0 U*	*40.0 U*	*40.0 U / 40.0 U*	7.5 J	3.2 J	3.5 J	5.1 J / 5.9 J	--	--	--
Potassium	ug/L	1420 B	1690 B	5000 U/1870 J	1840	4530 J	4320 J	3610 J / 4780 J	6240 J	2920 J	2750 J	2920 J / 3250 J	--	--	--
Selenium	ug/L	--	--	5 U/3.6 U	2 U	5.0 U	5.0 U	5.0 U / 4.4 J	5.0 U	5.0 U	5.0 U	5.0 U / 5.0 U	--	--	--
Silver	ug/L	5.0 UJ	2.0 UJ	10 U/2.5 U	3.4 J	10.0 U	10.0 U	10.0 U / 10.0 U	10.0 U	10.0 U	10.0 U	10.0 U / 10.0 U	--	--	--
Sodium	ug/L	26100	26900 J	27700/27800 J	25900	25500	25000	25000 / 26100	30000	24100	25600	25300 / 26100	26000	30000	29000
Thallium	ug/L	3.0 U	3.0 U	14/5.7 J	1 U	0.15 J	1.0 U	1.0 U / 1.0 U	0.21 J	1.0 U	1.0 U	1.0 U / 1.0 U	--	--	--
Vanadium	ug/L	4.0 U	2.0 U	50 U/13.2 J	1.9 J	50.0 U	50.0 U	50.0 U / 50.0 U	50.0 U	50.0 U	50.0 U	50.0 U / 50.0 U	--	--	--
Zinc	ug/L	12.1 BJ	6.0 U	20 U/3.5 J	*34.1 U*	20.0 U	20.0 U	20.0 U / 20.0 U	7.9 J	5.5 J	20.0 U	20.0 U / 20.0 U	--	--	--
General Chemistry															
Bromide	mg/L	0.2	0.1 U	-	0.08 J	0.5 U	0.5 U	0.5 U/0.5 U	0.5 U	0.5 U	0.5 U	0.5 U/0.5 U	--	--	--
Chloride	mg/L	-	-	-	-	43.7	43.5	46.7	49.2	46.7	48.3	48.8 / 48.9	51	45	49
Cyanide (total)	mg/L	-	-	0.01 U/0.01 U	-	-	0.01U	0.01 U/0.01 U	0.007J	0.01U	0.01U	0.01 U/0.01 U	--	--	--
Sulfate	mg/L	64 J	430	-	58 JD	52.7	47.3	44.9 / 1.0 U	45.6	40.8	35.3	38 / 38	38	13	37

Notes

U - Analyte not detected above specified detection limit.
UJ - Estimated reporting limit.
J - Analyte was estimated.
B - Method blank contamination.
D - Compounds at secondary dilution factor.
R - Rejected data.
268/200 U - Field duplicate result.
Values in *italics* were not considered in the UTL calculations (non-detects, non-detects with elevated detection limits or outliers).

TABLE E.1

BACKGROUND DATA FROM UPGRADIENT WELLS
HIMCO SITE
ELKHART, INDIANA

Well Type:		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
Sample Location:		WT102C	WT102C	WT102C	WT102C	WT102C	WT102C	WT102C	WT102C	WT102C
Sample Depth:		157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs	157-162 ft bgs
Sample Date:		1991/01	1991/09	2008/10	2009/04	2009/08	2009/11	2010/02	2011/03	2011/09
Parameter	***Units***									
Metals										
Aluminum	ug/L	1130	171 BJ	1750	185	489	2010	790	3900	110
Antimony	ug/L	--	--	0.15 J	2.0 U	0.18 J	0.48 J	0.48 J	0.90 J	--
Arsenic	ug/L	3.0 U	2.0 UJ	2.6	2.3	2.1	3.1	3.4	4.2	1.3 J
Barium	ug/L	100 B	63 B	141 J	166 J	177 J	203	224	298	280
Beryllium	ug/L	4.5 BJ	1.0 U	1.0 U	1.0 U	1.0 U	0.57 J	1.0 U	1.0 U	5.0 U
Cadmium	ug/L	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
Calcium	ug/L	71400	50700	52100	65700	59500	97400	74600	196000 J	62000
Chromium (Total)	ug/L	23.8 J	2.0 U	10.8	10.0 U	8.0 J	8.3 J	5.1 J	14.3	--
Cobalt	ug/L	7.3 B	3.0 U	50.0 U	50.0 U	50.0 U	50.0 U	50.0 U	2.7 J	--
Copper	ug/L	8.8 BJ	6.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	5.6 J	--
Iron	ug/L	1680	89 B	1170	418	1130	3330	1620	7670	240
Lead	ug/L	1.8 BJ	1.0 UJ	2.3 J	3.0 U	3.0 U	1.9 J	3.0 U	3.9	3.0 U
Magnesium	ug/L	24800	16200	32300	27500	28900	45800	31800	88200 J	--
Manganese	ug/L	231	170	86	168	164	379	331	771 J	160
Mercury	ug/L	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	ug/L	*20.0 U*	*7.0 U*	8.9 J	*40.0 U*	5.7 J	6.4 J	4.3 J	9.9 J	--
Potassium	ug/L	1290 B	902 B	2150 J	1120 J	1700 J	2230 J	1420 J	3630 J	--
Selenium	ug/L	--	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	--
Silver	ug/L	--	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	--
Sodium	ug/L	3180 B	7230 J	42600	8640	35400	23500	11000	34400	56000
Thallium	ug/L	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
Vanadium	ug/L	7.5 B	2.0 U	2.8 J	*50.0 U*	1.4 J	4.5 J	1.6 J	9.7 J	--
Zinc	ug/L	24.7 J	6.0 U	18.8 J	20.0 U	9.7 J	20.9	20.0 U	*37.4 U*	--
General Chemistry										
Bromide	mg/L	0.1	0.11	0.5 U	0.5 U	0.5 U	0.5 U	0.3 J	0.5 U	--
Chloride	mg/L	--	--	52.3	61.5	56.3	53.6	58.2	49.4	39
Cyanide (total)	mg/L	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Sulfate	mg/L	35 J	50 J	47.1	38.3	32.9	22.8	31.2	17.4	6.8

Notes:

U - Analyte not detected above specified detection limit.
UJ - Estimated reporting limit.
J - Analyte was estimated.
B - Method blank contamination.
D - Compounds at secondary dilution factor.
R - Rejected data.
268/200 U - Field duplicate result.
Values in *italics* were not considered in the UTL calculations (non-detects, non-detects with elevated detection limits or outliers).

TABLE E.2

BACKGROUND VALUE CALCULATIONS – UPPER AQUIFER
HIMCO SITE
ELKHART, INDIANA

Upper Aquifer Background (Upgradient) Well: WT102A

Analyte	Units	Number of Samples Total	Number of Samples Used in Calculation	Percent Non-Detect	Minimum	Maximum	95/95 UTL [1] Method	Calculated 95/95 UTL	Background Value
Aluminum	µg/L	16	16	13%	22.1 J	554	Parametric-gamma	651	651
Antimony	µg/L	13	13	85%	0.15 J	42.2 UJ	Non-parametric	42.2 UJ	42.2 UJ
Arsenic	µg/L	13	10 [2]	0%	0.40 J	1.0 J	Parametric	1.19	2 U [4]
Barium	µg/L	16	16	0%	28	65.5 B	Parametric	70.8	200 U [4]
Beryllium	µg/L	16	16	69%	0.48 J	5.0 U	Non-parametric	5.0 U	5.0 U
Cadmium	µg/L	10	10	100%	0.1 U	4.6 UJ	Max DL	4.6 UJ	4.6 UJ
Calcium	µg/L	16	16	0%	17100 J	211000	Parametric	242000	242000
Chromium (Total)	µg/L	13	13	8%	2.80 B	427	Parametric-log	882	882
Cobalt	µg/L	13	5 [2]	0%	1.9 J	13.1	Parametric-gamma	41.8	50 U [4]
Copper	µg/L	13	8 [3]	38%	4.1 UJ	50.6	Parametric-gamma	64.8	64.8
Iron	µg/L	16	16	0%	39	2760	Parametric-log	7100	7100
Lead	µg/L	16	16	88%	0.50 UJ	3.0 U	Non-parametric	3.0 U	3.0 U
Magnesium	µg/L	13	13	0%	14000	25100	Parametric	26300	26300
Manganese	µg/L	16	16	0%	9.20 B	641	Parametric-gamma	1070	1070
Mercury	µg/L	13	13	85%	0.10 J	0.2 U	Non-parametric	0.2 U	0.2 U
Nickel	µg/L	13	13	23%	6.0 U	129	Parametric	142	142
Potassium	µg/L	13	13	0%	943 J	2120 B	Parametric	2750	2750
Selenium	µg/L	10	10	100%	2 U	6.0 UJ	Max DL	6.0 UJ	6.0 UJ
Silver	µg/L	13	13	85%	2.00 UJ	19.5	Non-parametric	19.5	19.5
Sodium	µg/L	16	16	0%	41900	100000	Parametric	102000	102000
Thallium	µg/L	10	10	90%	0.40 UJ	12.35	Non-parametric	12.35	12.35
Vanadium	µg/L	13	13	69%	0.65 J	50 U	Non-parametric	50 U	50 U
Zinc	µg/L	13	12	75%	3.2 UJ	24.1 J	Non-parametric	24.1 J	24.1 J
Bromide	mg/L	11	11	82%	0.06J	0.5 U	Non-parametric	0.5 U	0.5 U
Chloride	mg/L	10	10	0%	84	182	Parametric	228	228
Cyanide (total)	mg/L	10	10	90%	0.0085 J	0.01U	Non-parametric	0.01U	0.01U
Sulfate	mg/L	14	14	0%	29.7	430	Parametric-gamma	637	637

Notes:

UJ - Estimated reporting limit.
U - Analyte not detected above specified detection limit.
B - Method blank contamination.
J - Analyte was estimated.
Max DL - Maximum Detection Limit.
Upper Tolerance Limits (UTLs) are calculated using a method appropriate for the observed data distribution.
(1) UTLs on the 95th percentile of the upgradient data, with 95 percent confidence.
(2) All non-detects were removed from the UTL calculation.
(3) Non-detects with elevated detection limits were removed from the UTL calculation.
(4) The calculated UTL was below the detection limit, therefore the maximum non-detect result was used for the background value.

TABLE E.3

BACKGROUND VALUE CALCULATIONS – INTERMEDIATE AQUIFER
HIMCO SITE
ELKHART, INDIANA

Intermediate Aquifer Background (Upgradient) Well: WT102B

Analyte	Units	Number of Samples Total	Number of Samples Used in Calculation	Percent Non-Detect	Minimum	Maximum	95/95 UTL [1] Method	Calculated 95/95 UTL	Background Value
Aluminum	µg/L	14	14	64%	20.1 J	161	Non-parametric	161	161
Antimony	µg/L	11	8 [3]	50%	0.17 J	2 U	Parametric-log	5.37	5.37
Arsenic	µg/L	14	14	14%	2.0 UJ	6 J	Parametric	7.05	7.05
Barium	µg/L	14	14	0%	84.2 J	160 J	Parametric-gamma	161	200 U [4]
Beryllium	µg/L	12	12	83%	0.47 J	5.0 U	Non-parametric	5.0 U	5.0 U
Cadmium	µg/L	9	9	100%	0.1 U	3.05 U	Max DL	3.05 U	3.05 U
Calcium	µg/L	14	14	0%	45900	75800	Parametric	85800	85800
Chromium (Total)	µg/L	11	10 [3]	20%	2.0 U	24.2 J	Parametric	32.5	32.5
Cobalt	µg/L	11	11	91%	3.0 U	50.0 U	Non-parametric	50.0 U	50.0 U
Copper	µg/L	11	11	91%	4.9 BJ	25.0 U	Non-parametric	25.0 U	25.0 U
Iron	µg/L	14	14	7%	15.0 U	2100	Parametric	2170	2170
Lead	µg/L	14	14	86%	1.0 UJ	3.0 U	Non-parametric	3.0 U	3.0 U
Magnesium	µg/L	11	11	0%	19400	23600	Parametric	25400	25400
Manganese	µg/L	14	14	0%	37.7	124	Parametric-gamma	170	170
Mercury	µg/L	12	12	92%	0.1 U	0.2 U	Non-parametric	0.2 U	0.2 U
Nickel	µg/L	11	5 [2]	0%	3.2 J	8.1 J	Parametric	15	20 U [4]
Potassium	µg/L	11	11	0%	1420 B	6240 J	Parametric	7400	7400
Selenium	µg/L	9	9	89%	2 U	5.0 U	Non-parametric	5.0 U	5.0 U
Silver	µg/L	11	11	91%	2.0 UJ	10.0 U	Non-parametric	10.0 U	10.0 U
Sodium	µg/L	14	14	0%	24100	30000	Parametric-gamma	31600	31600
Thallium	µg/L	11	11	73%	0.15 J	9.85	Non-parametric	9.85	9.85
Vanadium	µg/L	11	11	82%	1.9 J	50.0 U	Non-parametric	50.0 U	50.0 U
Zinc	µg/L	11	10 [3]	60%	3.5	20.0 U	Non-parametric	20.0 U	20.0 U
Bromide	mg/L	10	10	80%	0.08 J	0.5 U	Non-parametric	0.5 U	0.5 U
Chloride	mg/L	10	10	0%	43.5	51	Parametric	54.5	54.5
Cyanide (total)	mg/L	7	7	86%	0.007J	0.01U	Non-parametric	0.01U	0.01U
Sulfate	mg/L	13	13	0%	13	430	Parametric-log	370	370

Notes:

UJ - Estimated reporting limit.
U - Analyte not detected above specified detection limit.
B - Method blank contamination.
J - Analyte was estimated.
Max DL - Maximum Detection Limit.
Upper Tolerance Limits (UTLs) are calculated using a method appropriate for the observed data distribution.
(1) UTLs on the 95th percentile of the upgradient data, with 95 percent confidence.
(2) All non-detects were removed from the UTL calculation.
(3) Non-detects with elevated detection limits were removed from the UTL calculation.
(4) The calculated UTL was below the detection limit, therefore the maximum non-detect result was used for the background value.

TABLE E.4

BACKGROUND VALUE CALCULATIONS – LOWER AQUIFER
HIMCO SITE
ELKHART, INDIANA

Lower Aquifer Background (Upgradient) Well: WT102C

Analyte	Units	Number of Samples Total	Number of Samples Used in Calculation	Percent Non-Detect	Minimum	Maximum	95/95 UTL [1] Method	Calculated 95/95 UTL	Background Value
Aluminum	µg/L	9	9	0%	110	3900	Parametric	4910	4910
Antimony	µg/L	6	6	17%	0.15 J	2.0 U	Parametric	1.85	1.85
Arsenic	µg/L	9	9	22%	1.3 J	4.2	Parametric	5.58	5.58
Barium	µg/L	9	9	0%	63 B	298	Parametric	419	419
Beryllium	µg/L	9	9	78%	0.57 J	5.0 U	Non-parametric	5.0 U	5.0 U
Cadmium	*µg/L*	*6*	*6*	*100%*	*1.0 U*	*1.0 U*	*Max DL*	*1.0 U*	*1.0 U*
Calcium	µg/L	9	9	0%	50700	196000 J	Parametric-gamma	239000	239000
Chromium (Total)	µg/L	8	8	25%	2.0 U	23.8 J	Parametric	31.9	31.9
Cobalt	µg/L	8	8	75%	2.7 J	50.0 U	Non-parametric	50.0 U	50.0 U
Copper	µg/L	8	8	75%	5.6 J	25.0 U	Non-parametric	25.0 U	25.0 U
Iron	µg/L	9	9	0%	89 B	7670	Parametric-gamma	15300	15300
Lead	µg/L	9	9	56%	1.0 UJ	3.9	Non-parametric	3.9	3.9
Magnesium	µg/L	8	8	0%	16200	88200 J	Parametric-gamma	129000	129000
Manganese	µg/L	9	9	0%	86	771 J	Parametric-gamma	1140	1140
Mercury	µg/L	7	7	100%	0.20 U	0.20 U	Max DL	0.20 U	0.20 U
Nickel	µg/L	8	5 [2]	0%	4.3 J	9.9 J	Parametric	16.8	40 U [4]
Potassium	µg/L	8	8	0%	902 B	3630 J	Parametric	4590	4590
Selenium	µg/L	6	6	100%	5.0 U	5.0 U	Max DL	5.0 U	5.0 U
Silver	µg/L	6	6	100%	10.0 U	10.0 U	Max DL	10.0 U	10.0 U
Sodium	µg/L	9	9	0%	3180 B	56000	Parametric	80600	80600
Thallium	µg/L	6	6	100%	1.0 U	1.0 U	Max DL	1.0 U	1.0 U
Vanadium	µg/L	8	7 [3]	14%	1.4 J	9.7 J	Parametric	15.5	50 U [4]
Zinc	µg/L	8	7 [3]	43%	6.0 U	24.7 J	Parametric	40.1	40.1
Bromide	mg/L	8	8	63%	0.1	0.5 U	Non-parametric	0.5 U	0.5 U
Chloride	mg/L	7	7	0%	39	61.5	Parametric	77.7	77.7
Cyanide (total)	mg/L	5	5	100%	0.01 U	0.01 U	Max DL	0.01 U	0.01 U
Sulfate	mg/L	9	9	0%	6.8	50 J	Parametric	73.2	73.2

Notes:

UJ - Estimated reporting limit.
U - Analyte not detected above specified detection limit.
B - Method blank contamination.
J - Analyte was estimated.
Max DL - Maximum Detection Limit.
Upper Tolerance Limits (UTLs) are calculated using a method appropriate for the observed data distribution.
(1) UTLs on the 95th percentile of the upgradient data, with 95 percent confidence.
(2) All non-detects were removed from the UTL calculation.
(3) Non-detects with elevated detection limits were removed from the UTL calculation.
(4) The calculated UTL was below the detection limit, therefore the maximum non-detect result was used for the background value.

TABLE E.5

BACKGROUND VALUE CALCULATIONS – COMBINED AQUIFERS
HIMCO SITE
ELKHART, INDIANA

Background (Upgradient) Wells (All aquifers): WT102A, WT102B, WT102C

Analyte	Units	Number of Samples: Total	Number of Samples: Used in Calculation	Percent Non-Detect	Minimum	Maximum	95/95 UTL [1] Method	Calculated 95/95 UTL	Background Value
Aluminum	µg/L	39	39	28%	20.1 J	3900	Non-Parametric	3900	3900
Antimony	µg/L	30	22 [3]	55%	0.15 J	2 U	Non-parametric	2 U	2 U
Arsenic	µg/L	36	35 [3]	17%	0.40 J	6 J	Parametric-log	10.3	10.3
Barium	µg/L	39	39	0%	28	298	Parametric-log	317	317
Beryllium	µg/L	37	37	76%	0.47 J	5.0 U	Non-parametric	5.0 U	5.0 U
Cadmium	µg/L	25	25	100%	0.1 U	4.6 UJ	Max DL	4.6 UJ	4.6 UJ
Calcium	µg/L	39	39	0%	17100 J	211000	Parametric-log	211000	211000
Chromium (Total)	µg/L	32	32	19%	2.0 U	427	Parametric-log	159	159
Cobalt	µg/L	32	32	75%	1.9 J	50.0 U	Non-parametric	50.0 U	50.0 U
Copper	µg/L	32	32	75%	4.1 UJ	50.6	Non-parametric	50.6	50.6
Iron	µg/L	39	39	3%	15.0 U	7670	Parametric-gamma	4220	4220
Lead	µg/L	39	39	79%	0.50 UJ	3.9	Non-parametric	3.9	3.9
Magnesium	µg/L	32	32	0%	14000	88200 J	Parametric-log	48300	48300
Manganese	µg/L	39	39	0%	9.20 B	771 J	Parametric-log	858	858
Mercury	µg/L	32	32	91%	0.10 J	0.20 U	Non-parametric	0.20 U	0.20 U
Nickel	µg/L	32	32	38%	3.2 J	129	Parametric-log	141	141
Potassium	µg/L	32	32	0%	902 B	6240 J	Parametric-log	5580	5580
Selenium	µg/L	25	25	96%	2 U	6.0 UJ	Non-parametric	6.0 UJ	6.0 UJ
Silver	µg/L	30	30	90%	2.00 UJ	19.5	Non-parametric	19.5	19.5
Sodium	µg/L	39	39	0%	3180 B	100000	Parametric	89900	89900
Thallium	µg/L	27	27	85%	0.15 J	12.35	Non-parametric	12.4	12.4
Vanadium	µg/L	32	20 [3]	40%	0.65 J	26.5	Parametric-log	29.5	50 U [4]
Zinc	µg/L	32	16 [3]	31%	3.2 UJ	24.7 J	Parametric-gamma	40	40
Bromide	mg/L	32	10 [3]	30%	0.06 J	0.3 J	Parametric-gamma	0.423	0.5 U [4]
Chloride	mg/L	24	27	0%	39	182	Parametric-log	219	219
Cyanide (total)	mg/L	25	22	91%	0.007J	0.01 U	Non-parametric	0.01 U	0.01 U
Sulfate	mg/L	33	36	0%	6.8	430	Parametric-log	380	380

Notes:

UJ - Estimated reporting limit.
U - Analyte not detected above specified detection limit.
B - Method blank contamination.
J - Analyte was estimated.
Max DL - Maximum Detection Limit.
Upper Tolerance Limits (UTLs) are calculated using a method appropriate for the observed data distribution.
(1) UTLs on the 95th percentile of the upgradient data, with 95 percent confidence.
(2) All non-detects were removed from the UTL calculation.
(3) Non-detects with elevated detection limits were removed from the UTL calculation.
(4) The calculated UTL was below the detection limit, therefore the maximum non-detect result was used for the background value.

APPENDIX F

ARSENIC INVESTIGATION IN GROUNDWATER MEMORANDUM

CONESTOGA-ROVERS & ASSOCIATES

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MEMORANDUM

TO:	Alan Deal	REF. NO.:	39611
FROM:	Daniela Araujo, Wesley Dyck/lp/11	DATE:	November 28, 2012
RE:	**Arsenic Investigation in Groundwater** **Himco Site** **Elkhart, Indiana**		

1.0 INTRODUCTION

This memorandum presents an evaluation of arsenic concentrations in groundwater samples collected from wells at the Himco Landfill in Elkhart, Indiana (Site). Arsenic was detected in groundwater collected from various wells near the landfill. Elevated arsenic concentrations detected could be from the landfill, or may be naturally-occurring arsenic released due to interaction with organic carbon released from the landfill, or may be naturally-occurring arsenic concentrations due to natural conditions in the aquifer.

In order to determine the likely source(s) of arsenic in the groundwater at the Site, a series of statistical tests was carried out. The first test considered correlations between arsenic and calcium concentrations and between calcium and sulfate concentrations in groundwater, since calcium sulfate is one of the sources of waste in the landfill. The second test compared calcium concentrations in Site wells to calcium background value calculated using pooled results from all three aquifers combined (combined BV). The third test considered correlations between arsenic and iron concentrations in Site wells, as a potential indicator of an ambient origin of the observed arsenic levels (i.e., evaluating a hypothesis that both analytes have been mobilized into groundwater from naturally-occurring soils due to reducing aquifer conditions).

2.0 SCOPE OF DATA

The monitoring network included wells located to the east and southeast of the Site and the groundwater monitored at the Site is divided into three zones: the upper, intermediate and lower aquifers.

Arsenic, calcium, iron and sulfate concentration data were generated from analysis of samples collected from 48 Site wells (21 wells in the upper aquifer, 22 wells in the intermediate aquifer and 5 wells in the lower aquifer) during the period of 2008 to 2012.

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3.0 STATISTICAL TESTS

As introduced above, two types of statistical tests were used in this evaluation, including:

i) Correlation analyses, assessing the potential relationship between:
   a) Arsenic vs. calcium concentrations
   b) Calcium vs. sulfate concentrations
   c) Arsenic v. iron concentrations

ii) Comparison of calcium Site concentrations to a background value calculated using calcium results from all three aquifers

The statistical tests used during this evaluation are described below.

3.1 CORRELATION ANALYSIS

The relationship between two groups of environmental data may be quantified using regression and/or correlation techniques (McBean & Rovers, 1998). Correlation analysis evaluates the degree to which two data sets vary in similar patterns. In order to assess the strength of correlation between the two variables, a correlation coefficient "R^2" is calculated. "R^2" has no unit and its value varies between -1 and +1. A perfect correlation will have a coefficient (R^2) close to +1 (positive correlation) or -1 (inverse correlation). If the correlation coefficient is close to zero, then the two data sets are poorly correlated. Irrespective of the strength of a correlation (described by the correlation coefficient), the statistical significance (P-value, for *probability*) of a correlation is equally important in interpreting the analysis results. A regression may not be strong (i.e., have a relatively low R-value), but may still be significant (i.e., have a P-value that indicates a high degree of statistical confidence in the findings).

Methodology for performing correlation analysis is described in USEPA (2009), as well as most introductory statistical texts. Statistical software and spreadsheet applications commonly include correlation calculation capabilities. As noted in USEPA (2006), extreme values may exert a high influence on the correlation results. For example, environmental data sets commonly have many low concentrations and few high concentrations, resulting in the few high concentrations exerting high influence on correlation analysis results. To avoid this issue in the present evaluation, a logarithmic transformation was applied to the analytes concentration data prior to the correlation analysis, in order to obtain more evenly-distributed (i.e., normal) scatter in the data.

In the present evaluation, correlation analysis comparing arsenic and calcium concentrations was performed separately for each aquifer, as well as for arsenic and iron concentrations correlation analysis. Sulfate and calcium concentrations correlation analysis was performed using the results from the Site wells combined (i.e., monitoring wells located at all three aquifers). A significance level of 0.05 (i.e., 95 percent confidence) was selected for use in evaluating the findings of the correlation analyses.

A correlation analysis between arsenic and iron and between arsenic and calcium concentrations were performed at specific Site wells: intermediate aquifer wells WT106B and WT121B and lower aquifer well WT114C.

3.2 BACKGROUND VALUE (BV) CALCULATIONS METHODS

Background values calculations are described in Appendix E of the 2012 Annual Groundwater Monitoring Report (CRA, 2012).

4.0 RESULTS

Correlation analyses were carried out using SYSTAT 10 (a commercial statistics software package) using log-transformed data as previously described, and the output is provided in Attachment 1. The use of log-transformed data for the correlation was necessitated by the presence of skewed data distributions for arsenic, calcium, iron and sulfate.

Correlation analyses were carried out to look for potential relationships between arsenic and calcium concentrations in groundwater. If the source of arsenic in the groundwater at the Site is related to the landfill, then the arsenic concentrations in the groundwater should be correlated with calcium concentrations. The results of this correlation analysis are presented in Table F.1. A statistically significant ($P < 0.05$) correlation was found between the log-transformed arsenic and calcium concentrations in the upper and intermediate aquifer wells. The correlation coefficient R^2 approached zero at the intermediate and lower aquifers (0.045 and 0.011, respectively), and was found to be 0.3 in the upper aquifer, indicating a weak correlation.

Results for the correlation analysis between log-transformed calcium and sulfate concentrations (Table F.1) show a statistically-significant (P=1.0E-15) correlation, with an R^2 value of 0.52 indicating a somewhat strong relationship between these two parameters, which was expected, since they were part of the landfill waste.

Calcium mobility is not affected by redox conditions, and calcium is generally more mobile than arsenic. Therefore, the calcium plume from the landfill should have traveled further and deeper than any potential arsenic plume, if arsenic is landfill-derived. Calcium concentrations in monitoring wells at the Site were compared to background values (BVs) calculated for each Aquifer (Upper, Intermediate and Lower) and the results are presented in Table F.3. The results indicate that calcium concentrations in the Lower Aquifer wells are not above background values, while several wells in the Upper and Intermediate Aquifers have concentrations exceeding background. This indicates that the groundwater plume from the landfill has not impacted the groundwater the Lower Aquifer. If the landfill has not impacted the groundwater in the Lower Aquifer, then the arsenic concentrations within those wells must be naturally-occurring. Groundwater vertical gradients are not consistently downward, supporting the conclusion that no significant downward migration of landfill-impacted water has occurred into the Intermediate and Lower Aquifers.

A further evaluation of the Intermediate Aquifer wells where landfill impact has been conclusively identified. Three wells were identified where persistent concentrations of vinyl chloride and/or carbon disulfide were present, indicating landfill impact (WT114C, WT106B, and WT121B). The correlations of iron and arsenic within the cross-gradient well (WT114C) and within the downgradient wells (WT106B, and WT121B) were evaluated. The results for both groups of wells (cross-gradient and downgradient) are shown in Table F.2. A statistically-significant ($P < 0.05$) correlation was found between the log-transformed arsenic and iron concentrations in groups of wells (cross-gradient and downgradient). The correlation coefficient R^2 found in the downgradient wells was 0.77 and in the cross-gradient well was 0.9, indicating a

strong correlation between arsenic and iron concentrations. However, the calcium and arsenic in these wells are not correlated, as shown in Table F.2. No statistically significant ($P > 0.05$) was observed and the resulting R^2 of 0.004 (downgradient wells) and 0.3 (cross-gradient well) shows poor to weak correlation between arsenic and iron concentrations. These results indicate that the arsenic was not released directly from the landfill, but naturally-occurring arsenic released due to interaction with organic carbon released from the landfill.

Correlation analyses were carried out to look for potential relationships between arsenic and iron concentrations in groundwater in all three aquifers. The results of the correlation analysis are presented in Table F.4. A statistically-significant (P=1.0E-15, or 99.9999 percent confidence) correlation was found between the log-transformed detected arsenic and iron concentrations in the upper aquifer. The correlation coefficient R^2 was 0.54, indicating a strong correlation. Poor correlations were found in the intermediate and lower aquifers (R^2 was 0.07 and 0.2, respectively).

Naturally occurring arsenic is often associated with (adsorbed to) iron oxides. Under reducing conditions, the iron in the iron oxides can be reduced to a more mobile form, causing the dissolution of the oxide. This in turn can cause the mobilization of arsenic, increasing its concentration in aqueous solution. If the arsenic and iron aqueous concentrations are well correlated, then it is possible that the arsenic is from a natural source.

5.0 CONCLUSIONS

Correlation analysis investigating relationships between arsenic and calcium indicated poor correlations between these two chemicals in all three aquifers. This finding indicates that arsenic and calcium do not come from the same source.

Correlation analysis investigating relationships between arsenic and iron indicated a reasonably strong correlation between concentrations of the two metals. The strong correlation of arsenic and iron concentrations in the Upper Aquifer indicates that the source of arsenic is linked to the source of iron in the groundwater. The source of iron in the groundwater is most likely the dissolution of naturally occurring oxides, and therefore the source of the arsenic is also likely the dissolution of naturally occurring oxides from the soil. This conclusion is supported by the lack of correlation between arsenic and calcium, indicating that arsenic is not being released directly from the landfill along with the calcium sulfate.

In the Intermediate Aquifer wells impacted by the landfill, arsenic concentrations are correlated to iron concentrations, indicating that that there is a natural origin for the arsenic in these Intermediate Aquifer wells.

6.0 REFERENCES

McBean, E.A. & F.A. Rovers, 1998. Statistical Procedures for Analysis of Environmental Monitoring Data & Risk Assessment. Upper Saddle River, NJ: Prentice Hall PTR.

USEPA, February 2006. Data Quality Assessment: Statistical Methods for Practitioners (EPA QA/G-9S). Office of Environmental Information, United States Environmental Protection Agency, Washington D.C. EPA/240/B-06/003.

USEPA, March 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, United States Environmental Protection Agency Washington DC. EPA 530-R-09-007.

TABLE F.1

CORRELATION OF ARSENIC, CALCIUM AND SULFATE CONCENTRATIONS IN GROUNDWATER
HIMCO SITE
ELKHART, INDIANA

	Arsenic x Calcium						*Sulfate x Calcium*	
	Upper Aquifer		*Intermediate Aquifer*		*Lower Aquifer*			
	Arsenic	*Calcium*	*Arsenic*	*Calcium*	*Arsenic*	*Calcium*	*Sulfate*	*Calcium*
Pearson Correlation								
Number of Samples:	191	191	177	177	60	60	427	427
Percent non-detect:	14%	0%	7%	0%	20%	0%	4%	0%
Minimum:	0.40 J	5900	0.42 J	7070	0.47 J	43800	0.24 J	5900
Maximum:	38.6	815000	21	232000	17	133000	1260	815000
Correlation Coefficient (Pearson's R):	0.515		-0.211		-0.104		0.720	
R^2:	**0.265**		**0.045**		**0.011**		**0.518**	
Probability:	**2.4E-14**		**0.005**		**0.429**		**1.0E-15**	
Conclusion:	**Weak correlation**		**Poor correlation**		**Poor correlation**		**Strong correlation**	

Notes:

Pearson's Correlation Coefficient was calculated using log-transformed data.
Stronger correlation is observed when the correlation coefficient (Pearson's R) approaches +1 (positive correlation) or -1 (inverse correlation). A value of 0 indicates no correlation.
A statistically significant correlation is observed when the probability is below 0.05, for a 95 percent confidence level.

TABLE F.2

CORRELATION OF ARSENIC, CALCIUM AND SULFATE CONCENTRATIONS IN GROUNDWATER AT INTERMEDIATE AQUIFER WELLS WT106B, WT114C AND WT121B
HIMCO SITE
ELKHART, INDIANA

	Arsenic x Calcium				*Arsenic x Iron*			
	Downgradient Wells WT106B and WT121B		*Cross-Gradient Well WT114C*		*Downgradient Wells WT106B and WT121B*		*Cross-Gradient Well WT114C*	
	Arsenic	*Calcium*	*Arsenic*	*Calcium*	*Arsenic*	*Iron*	*Arsenic*	*Iron*
Pearson Correlation								
Number of Samples:	12	12	9	9	12	12	9	9
Percent non-detect:	0%	0%	0%	0%	0%	0%	0%	0%
Minimum:	8.2	100000	6.8	70400	8.2	4230	6.8	995
Maximum:	15	153000	21	92000	15	6600	21	4800
Correlation Coefficient (Pearson's R):	-0.064		0.552		0.875		0.949	
R^2:	**0.004**		**0.305**		**0.766**		**0.900**	
Probability:	**0.843**		**0.123**		**1.9E-04**		**9.6E-05**	
Conclusion:	**Poor correlation**		**Weak correlation**		**Strong correlation**		**Strong correlation**	

Notes:

Pearson's Correlation Coefficient was calculated using log-transformed data.
Stronger correlation is observed when the correlation coefficient (Pearson's R) approaches +1 (positive correlation) or -1 (inverse correlation). A value of 0 indicates no correlation.
A statistically significant correlation is observed when the probability is below 0.05, for a 95 percent confidence level.

TABLE F.3

COMPARISON OF RECENT (2010-2012) SITE DATA VS. BACKGROUND VALUES -- COMBINED AQUIFERS
HIMCO SITE
ELKHART, INDIANA

Calcium (mg/L)		*Combined Background*	*Samples Above*	*Downgradient Samples*								
Well	*Aquifer*	*Value*[1]	*Combined UTL*	6/2010	9/2010	12/2010	3/2011	6/2011	9/2011	12/2011	4/2012	9/2012
WT101A	Upper	242000	7	**326000**	**281000**	**278000**	**299000**	**260000**	**270000**	NS	160000	**300000**
WT103A	Upper	242000	0	134000	127000	129000	127000	130000	NS	NS	NS	NS
WT104A	Upper	242000	0	26100	25100	38600	28000	26000	NS	NS	NS	NS
WT105A	Upper	242000	0	53600	63700	69200	NS	NS	NS	NS	NS	NS
WT106A	Upper	242000	0	125000	140000	129000	125000	110000	110000	NS	100000	120000
WT111A	Upper	242000	2	184000	**263000**	**289000**	182000	130000	140000	NS	140000	170000
WT112A	Upper	242000	--	NS	NS	NS	NS	NS	NS	NS	NS	NS
WT113A	Upper	242000	0	NS	NS	NS	55400	NS	NS	NS	NS	NS
WT114A	Upper	242000	0	104000	107000	86800	94800	120000	120000/120000	NS	91000	91000
WT115A	Upper	242000	3	48100	**260000**	**300000**	84300	26000	120000	NS	50000	**340000**
WT115B	Upper	242000	5	NS	NS	NS	**318000**	**430000**	**440000**	**380000**	**390000**	NS
WT116A	Upper	242000	8	**689000**	**617000**	**712000**	**561000**	**420000**	**740000**	NS	**630000/620000**	**680000**
WT117A	Upper	242000	0	19600	69300	98900	157000	17000	NS	NS	NS	NS
WT117C	Upper	242000	5	**263000**	**268000/259000**	**251000**	**258000**	**290000**	NS	NS	NS	NS
WT119B	Upper	242000	0	192000/194000	140000	136000	169000/159000	160000	150000	NS	100000	NS
WT120C	Upper	242000	0	NS	NS	NS	103000	69000	94000	97000	84000	NS
WT121A	Upper	242000	0	NS	NS	NS	86200	91000	88000	86000	87000	NS
WT122A	Upper	242000	2	NS	NS	NS	209000	200000	220000/220000	**270000**	**290000**	NS
WT123	Upper	242000	2	NS	NS	NS	NS	NS	**300000**	NS	**320000**	NS
WT124	Upper	242000	0	NS	NS	NS	NS	NS	56000	NS	52000	NS
WTO2	Upper	242000	0	81100	79700	73600	75000	86000	NS	NS	NS	NS
WT101B	Intermediate	85800	3	64800	80500/75800	**89100**	**86400**	**91000**	NS	NS	NS	NS
WT101D	Intermediate	85800	5	**93500**	**94700**	**94000**	**84300**	**90000**	80000	NS	**95000**	NS
WT101E	Intermediate	85800	6	**101000**	**95000**	**101000**	**87300**	**93000**	83000	NS	**91000**	NS
WT106B	Intermediate	85800	7	**150000**	**144000**	**153000**	**133000**	**140000**	**140000**	NS	**150000**	NS
WT112B	Intermediate	85800	0	NS	NS	NS	79100	NS	NS	NS	NS	NS
WT113B	Intermediate	85800	0	NS	NS	NS	68500	NS	NS	NS	NS	NS
WT114B	Intermediate	85800	1	77500	78000	83600	78800	79000	80000	NS	**89000**	85000
WT114C	Intermediate	85800	1	70400	78300	**92000**	82500/80300	78000	74000	NS	80000/79000	NS
WT115C	Intermediate	85800	4	NS	NS	NS	**152000**	**150000**	**140000**	**120000**	NS	NS
WT116B	Intermediate	85800	5	**168000**	**175000**	**170000**	**154000**	**140000**	NS	NS	NS	NS
WT117B	Intermediate	85800	5	**232000**	**181000**	**133000**	**176000**	**180000**	NS	NS	NS	NS
WT117D	Intermediate	85800	5	**122000**	**121000**	**119000**	**119000**	**120000**	NS	NS	NS	NS
WT118B	Intermediate	85800	5	**158000**	**171000**	**173000**	**168000**	**170000/170000**	NS	NS	NS	NS
WT120A	Intermediate	85800	1	74500	82900	77500/77500	71100	85000	**87000**	NS	80000	NS
WT120B	Intermediate	85800	0	79500	71300	77500	74800	77000	70000	NS	76000	NS
WT121B	Intermediate	85800	5	NS	NS	NS	**106000**	**110000**	**100000**	**100000**	**110000**	NS
WT122B	Intermediate	85800	4	NS	NS	NS	**133000**	**130000**	**130000**	**150000**	NS	NS
WT122C	Intermediate	85800	2	NS	NS	NS	68900	89000/9000	**110000**	**120000**	NS	NS
WTE1	Intermediate	85800	5	**103000**	**108000**	**112000**	**108000**	**100000**	NS	NS	NS	NS

TABLE F.3

COMPARISON OF RECENT (2010-2012) SITE DATA VS. BACKGROUND VALUES -- COMBINED AQUIFERS
HIMCO SITE
ELKHART, INDIANA

Calcium (mg/L)		*Combined Background Value*[1]	*Samples Above Combined UTL*	*Downgradient Samples*								
Well	*Aquifer*			6/2010	9/2010	12/2010	3/2011	6/2011	9/2011	12/2011	4/2012	9/2012
WTB3	Intermediate	85800	0	84800	74800	79300	78100	71000	NS	NS	NS	NS
WTO3	Intermediate	85800	0	51700	53100	56300	51300	57000	NS	NS	NS	NS
WTO4	Intermediate	85800	0	60800	54100	55100/55500	51100	54000	NS	NS	NS	NS
WT101C	Lower	239000	0	50100/48700	50400	57500	45200	52000	45000	NS	50000	49000
WT106C	Lower	239000	0	NS	NS	NS	50600	47000	45000	48000/49000	NS	NS
WTB1	Lower	239000	0	53600	45000	53200	48000	44000	NS	NS	NS	NS
WTB4	Lower	239000	0	62100	67100	66500	60700	61000	NS	NS	NS	NS
WTE3	Lower	239000	0	117000	72900	73100	64800	100000	84000	NS	70000	61000/60000

Notes:

NS - Not sampled during this monitoring event.

(1) Background Values are UTLs on the 95th percentile of the background, with 95 percent confidence.

UTLs are calculated using a method appropriate for the data distribution noted.

326000 Values highlighted in **bold** and boxed exceed the background value.

TABLE F.4

CORRELATION OF ARSENIC AND IRON CONCENTRATIONS IN GROUNDWATER
HIMCO SITE
ELKHART, INDIANA

	Arsenic x Iron					
	Upper Aquifer		*Intermediate Aquifer*		*Lower Aquifer*	
	Arsenic	*Iron*	*Arsenic*	*Iron*	*Arsenic*	*Iron*
Pearson Correlation						
Number of Samples:	191	191	177	177	60	60
Percent non-detect:	14%	13%	7%	3%	20%	3%
Minimum:	0.40 J	100 U	0.42 J	100 U	0.47 J	100 U
Maximum:	38.6	177000	21	8670	17	6530
Correlation Coefficient (Pearson's R):	0.737		0.273		0.431	
R^2:	**0.544**		**0.075**		**0.186**	
Probability:	**1.0E-15**		**2.4E-04**		**5.8E-04**	
Conclusion:	**Strong correlation**		**Poor correlation**		**Poor correlation**	

Notes:

Pearson's Correlation Coefficient was calculated using log-transformed data.
Stronger correlation is observed when the correlation coefficient (Pearson's R) approaches +1 (positive correlation) or -1 (inverse correlation). A value of 0 indicates no correlation.
A statistically significant correlation is observed when the probability is below 0.05, for a 95 percent confidence level.

ATTACHMENT 1

SYSTAT OUTPUT – CORRELATION ANALYSES

>USE "I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 APPA CA x AS.SYD"
SYSTAT Rectangular file I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 APPA CA x AS.SYD,
created Mon Nov 26, 2012 at 15:50:03, contains variables:

CA_UPPER	LN_CA_UPPER	AS_UPPER$	LN_AS_UPPER	CA_INTM	LN_CA_INTM
AS_INTM$	LN_AS_INTM	CA_LOWER	LN_CA_LOWER	AS_LOWER$	LN_AS_LOWER

ARSENIC vs. CALCIUM IN UPPER AQUIFER WELLS

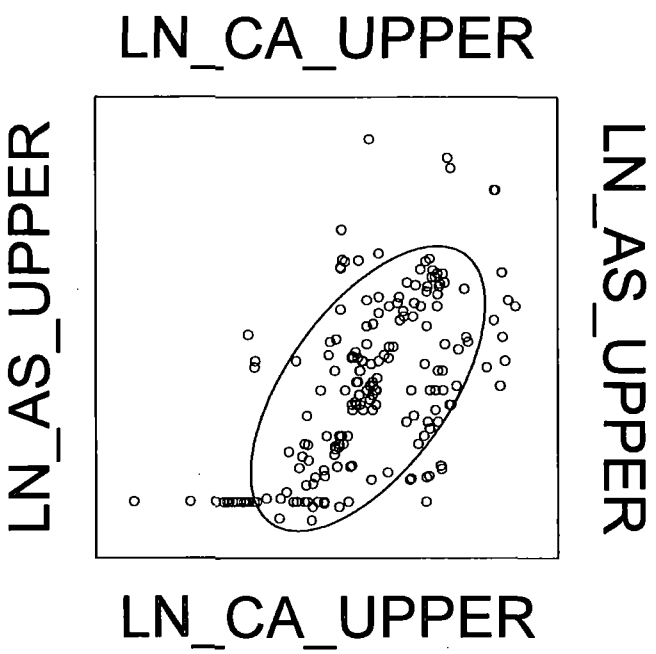
>Rem CORR
>PEARSON LN_AS_UPPER*LN_CA_UPPER / PAIRWISE BONF

Means

LN_AS_UPPER	LN_CA_UPPER
0.662217	11.704187

Pearson correlation matrix

	LN_CA_UPPER
LN_AS_UPPER	0.595694



Bartlett Chi-square statistic: 82.615 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_CA_UPPER
LN_AS_UPPER	1.00000E-15

Number of observations: 191

ARSENIC vs. CALCIUM IN INTERMEDIATE AQUIFER WELLS

>Rem CORR

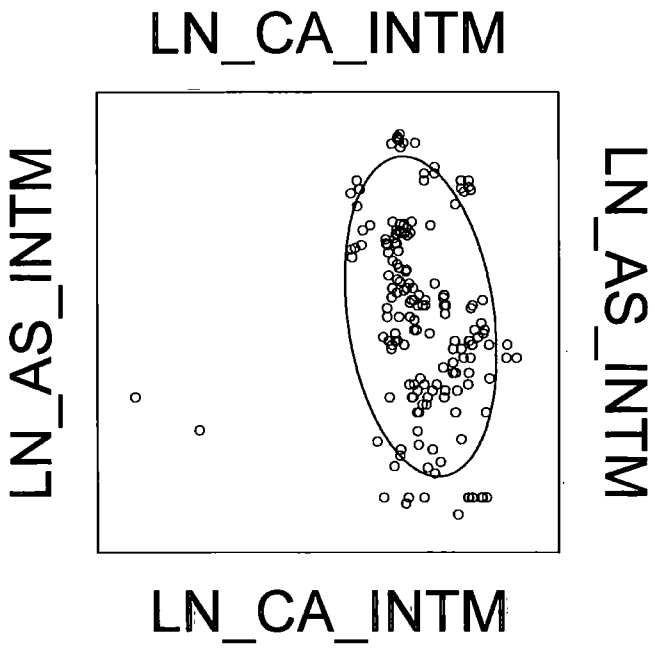
>PEARSON LN_AS_INTM*LN_CA_INTM / PAIRWISE BONF

Means

LN_AS_INTM	LN_CA_INTM
1.169276	11.477584

Pearson correlation matrix

	LN_CA_INTM
LN_AS_INTM	-0.232974



Bartlett Chi-square statistic: 9.738 df=1 Prob= 0.002

Matrix of Bonferroni Probabilities

	LN_CA_INTM
LN_AS_INTM	0.001805

Number of observations: 177

ARSENIC vs. CALCIUM IN LOWER AQUIFER WELLS

>Rem CORR

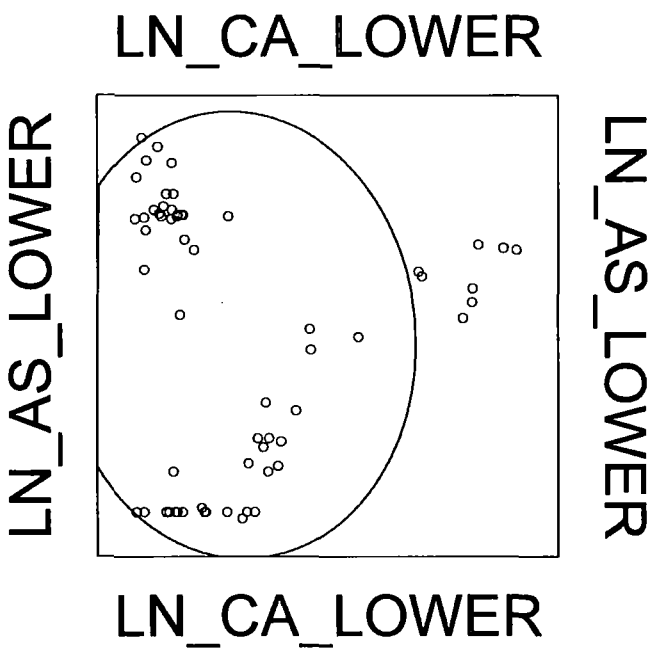
>PEARSON LN_AS_LOWER*LN_CA_LOWER / PAIRWISE BONF

Means

LN_AS_LOWER	LN_CA_LOWER
0.973053	10.984320

Pearson correlation matrix

	LN_CA_LOWER
LN_AS_LOWER	-0.039993



Bartlett Chi-square statistic: 0.092 df=1 Prob= 0.762

Matrix of Bonferroni Probabilities

	LN_CA_LOWER
LN_AS_LOWER	0.761592

Number of observations: 60

```
>USE "I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 Systat Data (all data Sulfate x
Ca)site.SYD"
SYSTAT Rectangular file I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 Systat Data
(all data Sulfate x Ca) site.SYD,
created Thu Nov 22, 2012 at 14:20:07, contains variables:

WELL$        SULFATE$     SULFATE      LN_SULFATE   D_SULFATE$   CALCIUM$
CALCIUM      LN_CALCIUM   D_CALCIUM$   DETECTION$
```

SULFATE vs. CALCIUM IN UPPER, INTERMEDIATE AND LOWER AQUIFER WELLS

```
>Rem CORR


>PEARSON LN_SULFATE*LN_CALCIUM / PAIRWISE BONF
```

Means

LN_SULFATE	LN_CALCIUM
4.091606	11.511251

Pearson correlation matrix

	LN_CALCIUM
LN_SULFATE	0.720037

Bartlett Chi-square statistic: 310.204 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_CALCIUM
LN_SULFATE	1.00000E-15

Number of observations: 427

```
>USE "I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 As VS Fe Data (3 intermed
wells).SYD"

LOCATION$          ARSENIC            LN_ARSENIC         IRON               LN_IRON            DETEC'
CALCIUM            LN_CALCIUM         GROUP$             CUBE_ARSENIC       CUBE_CALCIUM
```

ARSENIC vs. CALCIUM IN THE INTERMEDIATE AQUIFER WELLS WT106B AND WT121B (DOWNGRADIENT WELLS)

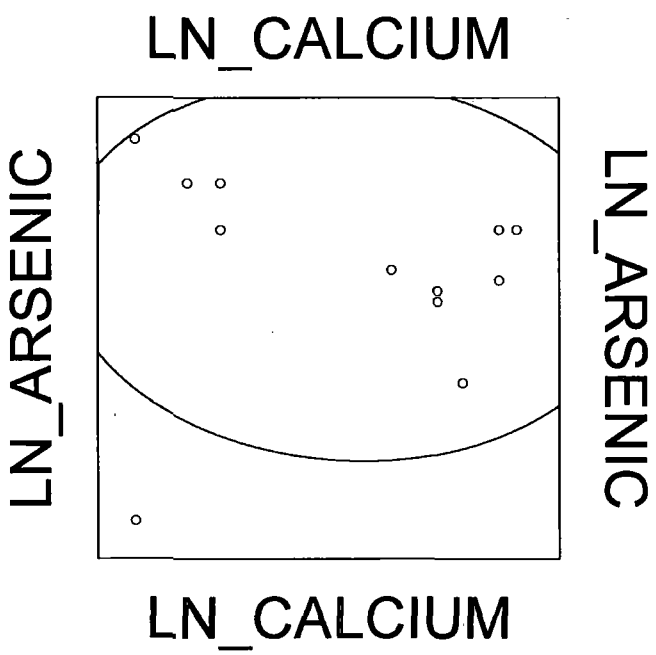
```
>SELECT LOCATION$="WT106B" OR LOCATION$="WT121B"
>Rem CORR
>PEARSON LN_ARSENIC*LN_CALCIUM / PAIRWISE BONF
Data for the following results were selected according to:
      LOCATION$="WT106B" OR LOCATION$="WT121B"
```

Means

LN_ARSENIC	LN_CALCIUM
2.501082	11.746913

Pearson correlation matrix

	LN_CALCIUM
LN_ARSENIC	-0.064018



Bartlett Chi-square statistic: 0.039 df=1 Prob= 0.843

Matrix of Bonferroni Probabilities

	LN_CALCIUM
LN_ARSENIC	0.843314

Number of observations: 12

ARSENIC vs. CALCIUM IN THE INTERMEDIATE AQUIFER WELL WT114C (CROSS-GRADIENT WELL)

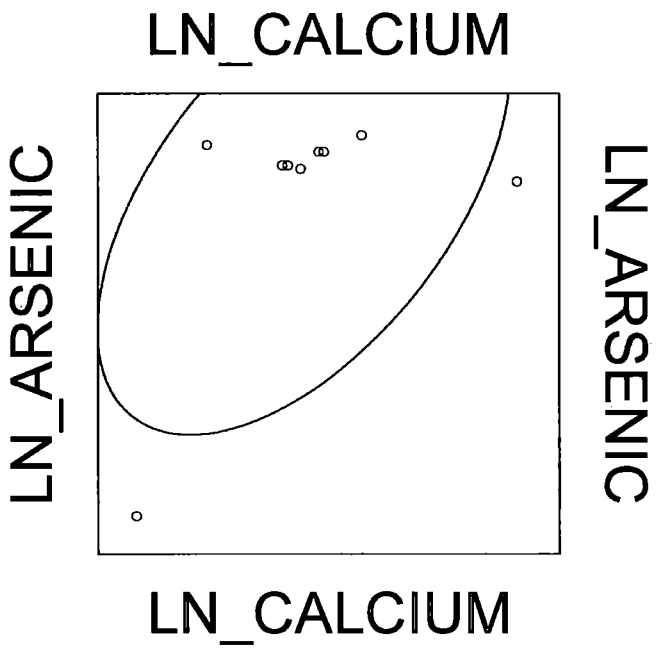
```
>SELECT LOCATION$="WT114C"
>Rem CORR


>PEARSON LN_ARSENIC*LN_CALCIUM / PAIRWISE BONF
Data for the following results were selected according to:
      LOCATION$="WT114C"
```

Means

LN_ARSENIC	LN_CALCIUM
2.858845	11.279683

Pearson correlation matrix

	LN_CALCIUM
LN_ARSENIC	0.552390



Bartlett Chi-square statistic: 2.366 df=1 Prob= 0.124

Matrix of Bonferroni Probabilities

	LN_CALCIUM
LN_ARSENIC	0.123008

Number of observations: 9

ARSENIC vs. IRON IN THE INTERMEDIATE AQUIFER WELLS WT106B AND WT121B (DOWNGRADIENT WELLS)

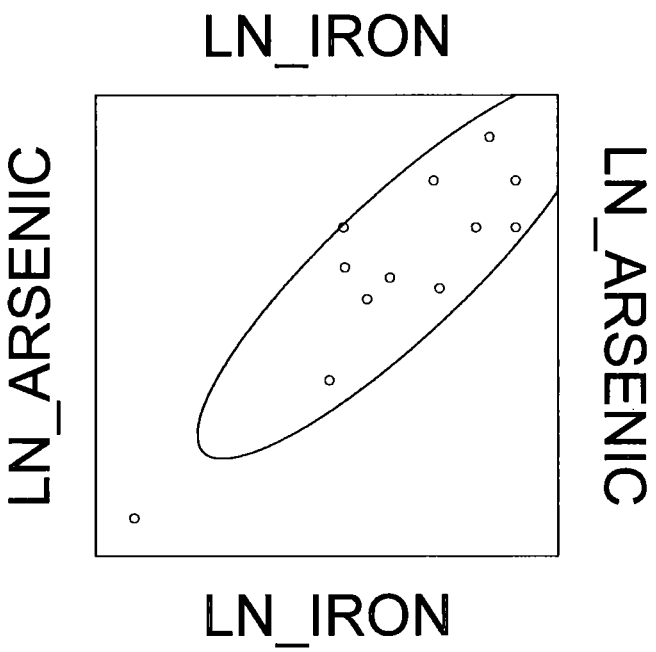
```
>SELECT LOCATION$="WT106B" OR LOCATION$="WT121B"
>Rem CORR
>PEARSON LN_ARSENIC*LN_IRON / PAIRWISE BONF
Data for the following results were selected according to:
      LOCATION$="WT106B" OR LOCATION$="WT121B"
```

Means

LN_ARSENIC	LN_IRON
2.501082	8.657910

Pearson correlation matrix

	LN_IRON
LN_ARSENIC	0.875083



Bartlett Chi-square statistic: 13.789 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_IRON
LN_ARSENIC	0.000194

Number of observations: 12

ARSENIC vs. IRON IN THE INTERMEDIATE AQUIFER WELL WT114C (CROSS-GRADIENT WELL)

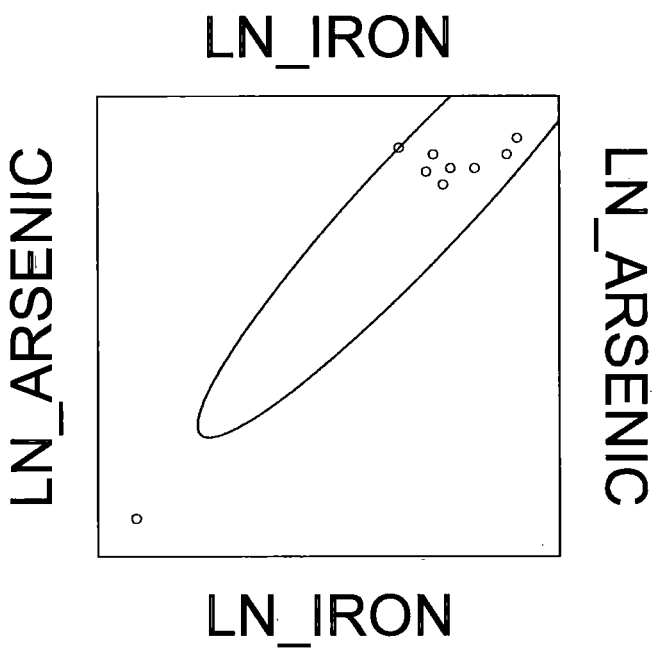
```
>SELECT LOCATION$="WT114C"
>Rem CORR

>PEARSON LN_ARSENIC*LN_IRON / PAIRWISE BONF
Data for the following results were selected according to:
      LOCATION$="WT114C"
```

Means

LN_ARSENIC	LN_IRON
2.858845	8.079065

Pearson correlation matrix

	LN_IRON
LN_ARSENIC	0.948682



Bartlett Chi-square statistic: 14.967 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_IRON
LN_ARSENIC	0.000096

Number of observations: 9

```
>USE "I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 APPA FE x AS.SYD"
SYSTAT Rectangular file I:\EAMGROUP\39611 (HIMCO Site, Indiana)\Correlation Study\39611 APPA FE x
AS.SYD,
created Mon Nov 26, 2012 at 16:02:02, contains variables:

 AS_UPPER$          LN_AS_UPPER        IRON_UPPER$        LN_IRON_UP         AS_INTM$           LN_AS
 IRON_INTM$         LN_IRON_INTM       AS_LOWER$          LN_AS_LOWER        IRON_LOWER$        LN_IR
```

ARSENIC vs. IRON IN UPPER AQUIFER WELLS

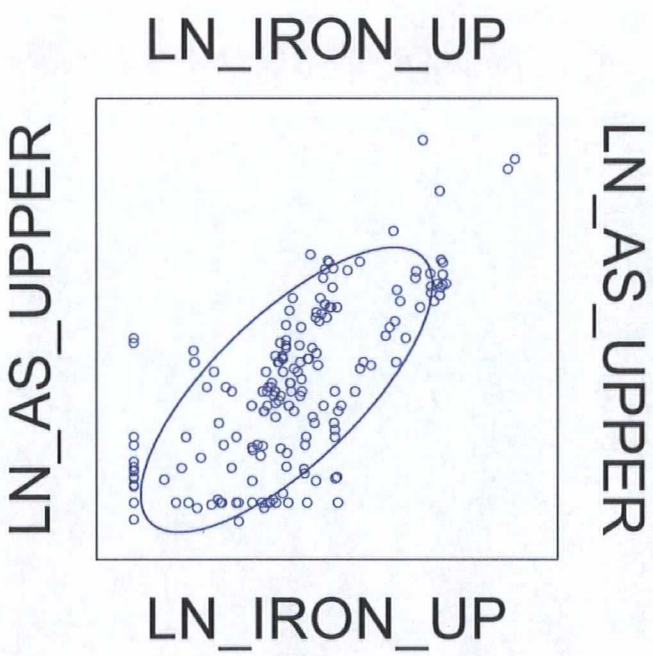
```
>Rem CORR
>PEARSON LN_AS_UPPER*LN_IRON_UP / PAIRWISE BONF
```

Means

LN_AS_UPPER	LN_IRON_UP
0.662217	7.182242

Pearson correlation matrix

	LN_IRON_UP
LN_AS_UPPER	0.738458



Bartlett Chi-square statistic: 148.569 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_IRON_UP
LN_AS_UPPER	1.00000E-15

Number of observations: 191

ARSENIC vs. IRON IN INTERMEDIATE AQUIFER WELLS

>Rem CORR

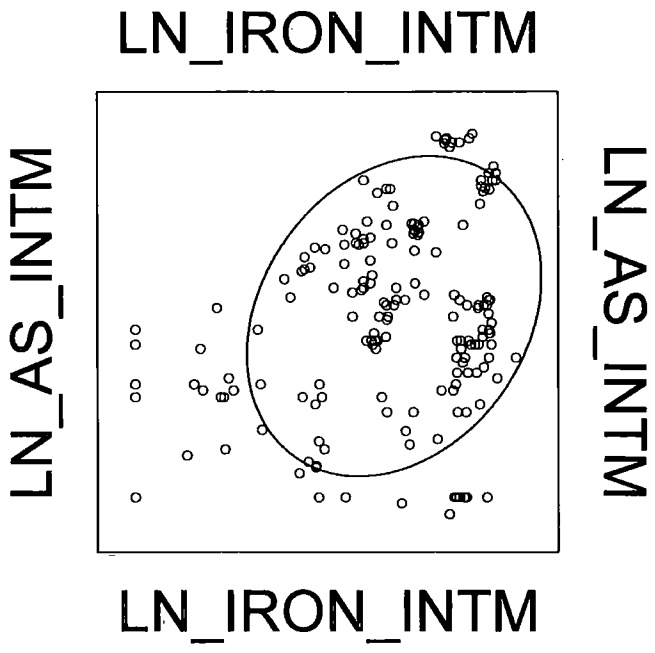
>PEARSON LN_AS_INTM*LN_IRON_INTM / PAIRWISE BONF

Means

LN_AS_INTM	LN_IRON_INTM
1.169276	7.410338

Pearson correlation matrix

	LN_IRON_INTM
LN_AS_INTM	0.241990



Bartlett Chi-square statistic: 10.530 df=1 Prob= 0.001

Matrix of Bonferroni Probabilities

	LN_IRON_INTM
LN_AS_INTM	0.001174

Number of observations: 177

ARSENIC vs. IRON IN LOWER AQUIFER WELLS

>Rem CORR

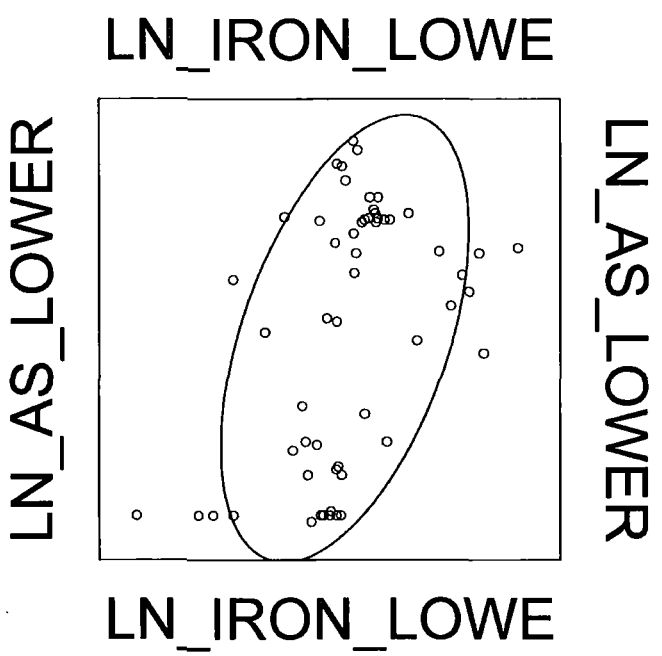
>PEARSON LN_AS_LOWER*LN_IRON_LOWE / PAIRWISE BONF

Means

LN_AS_LOWER	LN_IRON_LOWE
0.973053	6.573750

Pearson correlation matrix

	LN_IRON_LOWE
LN_AS_LOWER	0.489797



Bartlett Chi-square statistic: 15.773 df=1 Prob= 0.000

Matrix of Bonferroni Probabilities

	LN_IRON_LOWE
LN_AS_LOWER	0.000071

Number of observations: 60

FIGURE F.1

RELATIONSHIP BETWEEN IRON AND ARSENIC IN AQUIFER UNITS

SUPPLEMENTAL FIGURE FOR

ARSENIC INVESTIGATION IN GROUNDWATER MEMORANDUM

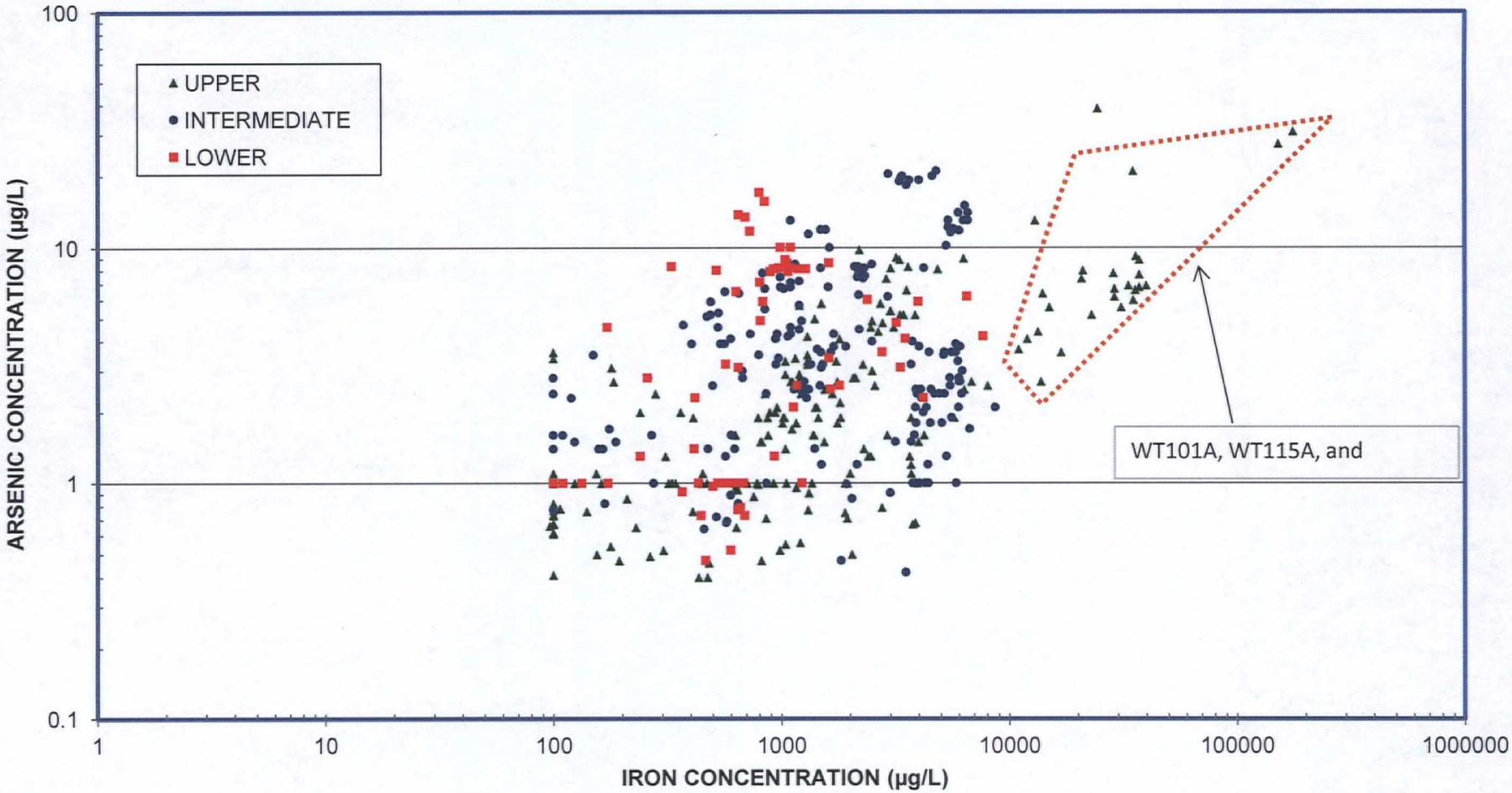


figure F.1

IRON AND ARSENIC IN ALL AQUIFERS
HIMCO SITE
Elkhart, Indiana

039611-00(34) Feb 21 2012