



September 9, 2016

Mr. Todd Davis  
Site Assessment Manager  
U.S. Environmental Protection Agency, Region 7  
11201 Renner Boulevard  
Lenexa, Kansas 66219

**Subject: Quality Assurance Project Plan for a Phase II Targeted Brownfields Assessment**  
**1302 Locust Street**  
**Carter Lake, Pottawattamie County, Iowa**  
**EPA Region 7, START 4, Contract No. EP-S7-13-06, Task Order No. 0002.019.022**  
**Task Monitor: Todd Davis, Site Assessment Manager**

Dear Mr. Davis:

Tetra Tech, Inc. is pleased to submit the attached Quality Assurance Project Plan for a Phase II Targeted Brownfields Assessment (TBA) of the property at 1302 Locust Street in Carter Lake, Iowa.

If you have any questions or comments, please contact the Project Manager at (816) 412-1742.

Sincerely,

A handwritten signature in blue ink that reads 'Kaitlyn Bahr'.

Kaitlyn Bahr  
START Project Manager

A handwritten signature in blue ink that reads 'Ted Faile'.

Ted Faile, PG, CHMM  
START Program Manager

Enclosures

cc: Debra Dorsey, START Project Officer (cover letter only)

**QUALITY ASSURANCE PROJECT PLAN  
FOR A PHASE II TARGETED BROWNFIELDS ASSESSMENT**

**1302 LOCUST STREET  
CARTER LAKE, IOWA**

**Superfund Technical Assessment and Response Team (START) 4**

**Contract No. EP-S7-13-06, Task Order 0002.019.022**

Prepared For:

U.S. Environmental Protection Agency  
Region 7  
11201 Renner Boulevard  
Lenexa, Kansas 66219

September 9, 2016

Prepared By:

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## CONTENTS

<u>Section/Table</u>	<u>Page</u>
QUALITY ASSURANCE PROJECT PLAN FORM.....	1
TABLE 1: SAMPLE SUMMARY .....	5
TABLE 2: DATA QUALITY OBJECTIVES SUMMARY.....	6

## APPENDICES

### Appendix

- A SITE-SPECIFIC INFORMATION REGARDING 1302 LOCUST STREET
- B FIGURES



**Region 7 Superfund Program**  
**Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)**  
**for 1302 Locust Street, Carter Lake, Iowa**

**1.7 Documentation and Records:**

- ☒ Field Sheets      ☒ Site Log      ☐ Trip Report      ☒ Site Maps      ☐ Video  
☒ Chain of Custody      ☒ Health and Safety Plan      ☒ Letter Report      ☒ Photos
- ☒ Sample documentation will follow EPA Region 7 SOP 2420.05.  
☒ A copy of this QAPP and any future amendments will be available to all personnel throughout sampling activities. Original documents will be maintained by EPA.  
☒ Other: Analytical information will be handled according to procedures identified in Table 2. A Phase II TBA Report will be completed.

**2.0 Measurement and Data Acquisition:**

**2.1 Sampling Process Design:**

- ☐ Random Sampling      ☐ Transect Sampling      ☒ Biased/Judgmental Sampling      ☐ Stratified Random Sampling  
☐ Search Sampling      ☐ Systematic Grid      ☐ Systematic Random Sampling      ☒ Definitive Sampling  
☐ Screening w/o Definitive Confirmation      ☒ Screening w/ Definitive Confirmation  
☒ Sample Map Attached
- ☒ Other (Provide rationale behind each sample): See Appendix A for additional sampling information.

The proposed sampling scheme will be a combination of biased/judgmental sampling with definitive laboratory analysis in accordance with the *Guidance for Performing Site Inspections Under CERCLA*, Office of Solid Waste and Emergency Response (OSWER) Directive #9345.1-05, September 1992. Judgmental sampling is subjective (biased) selection of sampling locations based on historical information, visual inspection, and best professional judgment of sampler(s). All samples will be submitted for analysis to an off-site laboratory subcontracted by START. See Appendices A and B for additional site-specific information and figures.

A summary of the anticipated maximum number of samples to be collected for laboratory analysis is in Table 1. The proposed number of samples represents a balance between cost and coverage, and a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical Brownfields Assessment.

Sample Summary Location	Matrix	# of Samples*	Analysis
On-site Geoprobe boring locations	Soil	4	VOCs, semivolatile organic compounds (SVOC), total petroleum hydrocarbons-extractables (TPH-e), TPH-purgeables (TPH-p), Resource Conservation and Recovery Act (RCRA) metals (including mercury)
On-site Geoprobe boring locations	Groundwater	7	VOCs, SVOCs, TPH-e, TPH-p, total and dissolved metals (including mercury)

\*NOTE: Quality control (QC) samples are not included with these totals. See Table 1 for a complete sample summary.

**2.2 Sample Methods Requirements:**

Matrix	Sampling Method	EPA SOP(s) or other Method
Soil	Soil samples will be collected by use of a Geoprobe direct-push apparatus, using Macro-Core samplers fitted with disposable polyvinyl chloride (PVC) liners; the samples then will be transferred to the appropriate sample containers.	SOPs 4230.07, 4230.03, & 4231.2012; Method 5035
Groundwater	Groundwater samples will be collected from Geoprobe temporary monitoring wells through Geoprobe rods via use of disposable polyethylene tubing and a peristaltic pump or check valve.	SOPs 4230.07 and 4231.2007

**2.3 Sample Handling and Custody Requirements:**

- ☒ Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06.  
☒ COC will be maintained as directed by Region 7 EPA SOP 2420.04.  
☐ Samples submitted to the EPA Region 7 laboratory will be accepted according to Region 7 EPA SOP 2420.01.  
☒ Other (Describe): Samples will be accepted in accordance with procedures established by the START-contracted laboratory.

**2.4 Analytical Methods Requirements:**

- ☒ Identified in attached table.  
☒ Rationale: The requested analyses have been selected based on historical information about the site and program experience with similar types of sites.  
☐ Other (Describe):

**Region 7 Superfund Program**  
**Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)**  
**for 1302 Locust Street, Carter Lake, Iowa**

**2.5 Quality Control (QC) Requirements**

- ☐ Not Applicable
- ☒ Identified in attached table.
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Field QC Samples: For this investigation, field QC samples will include one field blank (water) and one equipment rinsate blank (water), both prepared with deionized (DI) water. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during sampling and laboratory procedures. The equipment rinsate will evaluate effectiveness of procedures to decontaminate Geoprobe soil and groundwater sampling equipment. In addition, one water trip blank prepared by the subcontracted laboratory will be analyzed to assess whether contamination will have been potentially introduced during transportation of the containers/samples. The QC samples will be submitted for the analyses listed in the attached tables. Evaluation of blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results from the blank samples will be evaluated on a qualitative basis by the EPA Project Manager and EPA contractor to determine a general indication of field-introduced or laboratory-introduced contamination. No field duplicates will be collected because evaluation for total method precision is not necessary for this project.
- ☐ Other (Describe):

**2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:**

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Testing, inspection, and maintenance of analytical instrumentation will accord with the previously referenced SOPs and/or manufacturers' recommendations. Testing, inspection, and maintenance of field instruments (Global Positioning System [GPS] units, PID units, etc.) will accord with manufacturers' recommendations.

**2.7 Instrument Calibration and Frequency:**

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Calibration of laboratory equipment will proceed as described in the previously referenced SOPs and/or manufacturers' recommendations.
- ☒ Other (Describe): Calibration checks of field instruments will occur daily, as specified in the manufacturers' recommendations.

**2.8 Inspection/Acceptance Requirements for Supplies and Consumables:**

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers*.
- ☐ Other (Describe):

**2.9 Data Acquisition Requirements:**

- ☐ Not Applicable
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☒ Previous data or information pertaining to the site (including other analytical data, reports, photos, maps, etc., that are referenced in this QAPP) have been compiled by EPA and/or its contractor(s) from other sources. Some of that data have not been verified by EPA and/or its contractor(s); however, that unverified information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data or information.
- ☐ Other (Describe):

**2.10 Data Management:**

- ☐ All data acquired by the EPA Region 7 laboratory will be managed in accordance with Region 7 EPA SOP 2410.01.
- ☒ Other (Describe): Laboratory data acquired at the START-contracted laboratory will be managed in accordance with the laboratory's established procedures.

**Region 7 Superfund Program**  
**Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)**  
**for 1302 Locust Street, Carter Lake, Iowa**

**3.0 Assessment and Oversight:**

**3.1 Assessment and Response Actions:**

- ☒ Peer Review
 ☒ Management Review
 ☐ Field Audit
 ☐ Lab Audit
- ☐ Assessment and response actions pertaining to analytical phases of the project associated with the EPA Region 7 laboratory are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
- ☒ Other (Describe): Assessment and response actions pertaining to analytical phases of the project will accord with procedures established by the START-contracted laboratory

**3.1A Corrective Action:**

- ☒ Corrective actions will be at the discretion of the EPA Project Manager whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.
- ☐ Other (Describe):

**3.2 Reports to Management:**

- ☐ Audit Report
 ☒ Data Validation Report
 ☐ Project Status Report
 ☐ None Required
- ☒ A Phase II TBA report will be completed by START and submitted to EPA.
- ☒ Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☐ Other (Describe):

**4.0 Data Validation and Usability:**

**4.1 Data Review, Validation, and Verification Requirements:**

- ☐ Identified in attached table.
- ☒ Data review and verification will accord with the Generic Quality Assurance Project Plan for Superfund Site Assessment and Targeted Brownfields Assessment Programs (updated October 2012).
- ☐ Data review and verification of analytical results generated by the EPA Region 7 laboratory will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
- ☒ Other (Describe): The analytical data package from the START-contracted laboratory will be validated internally by the contracted laboratory in accordance with the laboratory's established SOPs. A Tetra Tech chemist will conduct an external verification and validation of the laboratory data package applying a method consistent with a Stage 2B validation, as described in the EPA Contract Laboratory Program (CLP) *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009). A Stage 2B validation includes verification and validation based on a completeness and compliance check of sample receipt conditions and sample-related and instrument-related QC results. The EPA Project Manager will be responsible for overall validation and final approval of the data, in accordance with the projected use of the results.

**4.2 Validation and Verification Methods:**

- ☐ Identified in attached table.
- ☐ The data generated by the EPA Region 7 laboratory will be validated in accordance with Region 7 EPA SOPs 2430.06, 2430.12, and 2410.10.
- ☒ The EPA Project Manager will inspect the data to provide a final review. The EPA Project Manager will also compare the sample descriptions with field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
- ☒ Other (Describe): START chemists will validate data generated by START-contracted laboratories in accordance with EPA-approved procedures.

**4.3 Reconciliation with User Requirements:**

- ☐ Identified in attached table.
- ☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded, and re-sampling or re-analysis of the subject samples may be required by the EPA Project Manager.
- ☐ Other (Describe):

**Region 7 Superfund Program**  
**Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)**  
**for 1302 Locust Street**

**Table 1: Sample Summary**

<b>Site Name:</b> 1302 Locust Street				<b>Location:</b> Carter Lake, Iowa			
<b>START Project Manager:</b> Kaitlyn Bahr				<b>Activity/ASR #:</b> Not applicable		<b>Date:</b> September 2016	
No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Methods	Analytical Method
<b>Soil Samples</b>							
4	Soil	On-site, direct-push technology (DPT) boring locations	To assess potential soil contamination	2-foot interval between 0 and 15 feet below ground surface (bgs) based on field screening by use of a photoionization detector (PID)	VOCs, SVOCs, TPH-e, TPH-p, RCRA metals (including mercury)	EPA SOPs 4230.07, 4230.03, & 4231.2012; EPA Method 5035	EPA Methods 5035/8260, 8270, 8015, 6010, & 7471
2	Soil	On-site, surface soil samples	To assess potential soil contamination	0 to 6 inches bgs	RCRA metals (including mercury)	4231.2012	EPA Methods 7471
<b>Groundwater Samples</b>							
4	Water	On-site, DPT boring locations	To assess potential groundwater contamination	Near the top of the shallow aquifer	VOCs, SVOCs, TPH-e, TPH-p, total and dissolved RCRA metals (including mercury)	EPA SOPs 4230.07 & 4231.2007	EPA Methods 8260, 8270, 8015, 6020, & 7470
3	Water	On-site, DPT boring locations	To assess potential groundwater contamination	Near the top of the shallow aquifer	VOCs, TPH-e, TPH-p	EPA SOPs 4230.07 & 4231.2007	EPA Methods 8260, 8015
<b>QC Samples</b>							
1	Water	Rinsate Blank	To evaluate effectiveness of procedures to decontaminate DPT sampling equipment	Not applicable (NA)	VOCs, SVOCs, TPH-e, TPH-p, RCRA metals (including mercury)	NA	EPA Methods 8260, 8270, 8015, 6010, & 7470,
1	Water	Field Blank	To assess field-introduced and laboratory-derived contamination	NA	VOCs, SVOCs, TPH-e, TPH-p, total and dissolved RCRA metals (including mercury)	NA	EPA Methods 8260, 8270, 8015, 6010, & 7470,
1	Water	Trip Blank	To assess transportation-related contamination	NA	VOCs, TPH-p	NA	EPA Method 8260, 8015



**Region 7 Superfund Program**  
**Addendum to the Generic QAPP for Superfund Site Assessment and Targeted Brownfields Assessment Programs (October 2012)**  
**for 1302 Locust Street, Carter Lake, Iowa**

**Table 2: Data Quality Objectives Summary**

Site Name: 1302 Locust Street				Location: Carter Lake, Iowa				
START Project Manager: Kaitlyn Bahr				Activity/ASR #: Not applicable			Date: September 2016	
Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
Soil (Surface and Subsurface)								
VOCs, SVOCs, TPH-e, TPH-p, RCRA metals (including mercury)	See Table 1	Per analytical method	Per analytical method	Judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.
Groundwater								
VOCs, SVOCs, TPH-e, TPH-p, total and dissolved RCRA metals (including mercury)	See Table 1	Per analytical method	Per analytical method	Judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.

## **APPENDIX A**

### **SITE-SPECIFIC INFORMATION REGARDING 1302 LOCUST STREET**

## **INTRODUCTION**

Tetra Tech, Inc. (Tetra Tech) Region 7 Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct a Phase II Targeted Brownfields Assessment (TBA) of an approximately 9-acre property at 1302 Locust Street in the northwest portion of Section 21, Township 75 North, Range 44 West, in Carter Lake, Pottawattamie County, Iowa (subject property). The subject property has historically been used as a gas station, a residential property, and a commercial use that is unknown. Although exact dates of historical uses of the subject property are unknown, based on historical aerial photographs, the subject property was used as a gas station from sometime between 1938 and 1949 until sometime between 2006 and 2007. A residential structure on the west central portion of the subject property and what appears to be a commercial structure were present on the south central portion of the subject property from sometime between 1960 and 1970 until sometime between 1982 and 2005. The property is currently vacant with no structures other than concrete slabs and bleachers.

The primary purpose of the Phase II TBA is to assess possible impact on the subject property from hazardous substances or petroleum products that may have been released into the soil and groundwater, confirming or eliminating recognized environmental conditions (REC) identified during Tetra Tech START's Phase I TBA of the subject property in August 2016 (Tetra Tech 2016). The Phase II TBA will accord with industry standard practice for Phase II Environmental Site Assessments (ESA).

Upon completion of site activities, START will prepare a Phase II TBA, offering recommendations for further investigation or removal. Depending on results of the Phase II investigation, START will also prepare an Analysis of Brownfield Cleanup Alternatives (ABCA) and Remediation Plan. This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

## **SITE LOCATION/DESCRIPTION**

For the purposes of this TBA, the subject project is an approximately 9-acre vacant lot. The property is owned by the Omaha Tribe of Nebraska. The subject property is at 1302 Locust Street in Carter Lake, Pottawattamie County, Iowa (see Appendix B, Figures 1 and 2).

The subject property is depicted on the U.S. Geological Survey (USGS) 7.5-minute series Omaha North, Nebraska topographic quadrangle map (USGS 1994) in the northwest portion of Section 21, Township 75

North, Range 44 West (see Appendix B, Figure 1). Coordinates at the approximate center of the subject property are 44° 17' 7.70" north latitude and 95° 54' 43.94" west longitude.

### **Physical Setting**

The subject property is in a mixed use area in the southeast area of Carter Lake, Iowa. Figure 2 in Appendix B illustrates the subject property location and boundaries. The subject property is an approximately 9-acre vacant lot. The subject property is bounded north by Avenue K with residential development beyond; east by a Super 8 hotel and a former Dollar auto sales, with a lake beyond; south by a vacant lot with hotels beyond; and west by a bank and a Dollar General, with a Kwik Shop beyond. Uses of surrounding properties include residential, commercial, and light industrial. Other than bleacher seats, no structures currently are on the subject property. A concrete pad is present on the southwest portion of the subject property and another concrete pad is present on the south central portion of the subject property where the former gas station and commercial structure were located (Tetra Tech 2016).

Pottawattamie County lies in the western portion of the Central Plains physiographic province. Geologic stratigraphy of the area consists of the Dakota Group, which consists of soft sandstone and shale of Cretaceous age, ranging in thickness from 10 to 100 feet. On the surface, some insignificant remnants of Tertiary deposits may be present, but these are otherwise covered directly by Quaternary sediments (Tetra Tech 2016).

According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil survey, soil at the subject property is Sarpy-Urban land complex (1 to 3 percent slopes). Sarpy-Urban land complex is excessively drained with a low available water capacity. The subject property is depicted on the USGS 7.5-minute series Omaha North, Nebraska, topographic quadrangle map (USGS 1994); the subject property is approximately 980 feet above mean sea level (amsl) (Tetra Tech 2016). The topographic gradient of the area is generally flat, with a very gradual slope to the north toward Carter Lake.

Regionally, the subject property is within the Great Plains aquifer system, which is exposed at the land surface in a band that extends from south-central Kansas to northeastern Nebraska. This aquifer system consists of two sandstone aquifers in Cretaceous rocks, separated by a shale confining unit. Although the Great Plains aquifer system extends in the subsurface throughout Kansas and Nebraska, it contains saline water in many places north and west of the area where it is exposed. A thick confining unit composed of Cretaceous shale, chalk, and limestone formations overlies the Great Plains aquifer system and separates it from the High Plains aquifer in most places. The subject property is in the Big Papillion-Mosquito

Watershed. Water on the subject property likely infiltrates the ground or goes toward storm drains on surrounding streets (Tetra Tech 2016).

## **PREVIOUS INVESTIGATIONS**

Tetra Tech START conducted a Phase I TBA of the subject property in August 2016, identifying the following RECs to the subject property (Tetra Tech 2016):

- The subject property was listed in the Iowa (IA) Leaking Underground Storage Tank (LUST), IA Underground Storage Tank (UST), IA Financial Insurance, IA Recovered Government Archive (RGA) LUST, US Brownfields, Facility Index System/Facility Registry System (FINDS), and Enforcement & Compliance History Information (ECHO) databases. Tetra Tech contacted the Iowa Department of Natural Resources (IDNR) for additional information regarding listings of the subject property. According to Ms. Bonnie Garrison and Mr. Matt Graesch, IDNR Project Managers, the subject property was historically used as a gas station since the 1930s and had one 300-gallon UST and one 500-gallon gasoline UST. The two orphaned tanks were found during work at East Locust Street in 2011. The tanks were removed in May 2011. High levels of petroleum contamination were identified in the soil during the removal. Groundwater sampling during a Phase II ESA in July 2016 revealed light non-aqueous phase liquid (LNAPL) in wells. Based on historical use of the subject property and known petroleum contamination, these listings pose a REC and a vapor encroachment condition (VEC) to the subject property.
- The subject property is part of the Omaha Lead National Priorities List (NPL) site. The Omaha Lead site is a former lead smelting site that operated from the early 1870s until 1996. The subject property is within the boundaries of the Omaha Lead Site. Known widespread lead contamination associated with the Omaha Lead site poses a REC to the subject property.
- The 1655 East Locust Street/ Abbott Airport Parking Garage and Car Wash facility was listed in the IA ALLSITES, NE UST, and NE LUST databases. The facility is at 1491-1655 East Locust Street, adjacent to and south of the subject property. Based on information from the IDNR Contaminated Sites Database, the site historically hosted a LUST and landfill. In 1988, it began operations as Abbott Parking, which provided surface parking for travelers using the Omaha Airport. The site is not currently in use; however, the parking lot is still present. High levels of lead and arsenic were found in the soil on site, and arsenic was detected in groundwater; however, according to IDNR, the site is currently used for an asphalt parking lot that reportedly covers the site. In addition to the soil contamination, one exceedance of the statewide standard for arsenic in groundwater was detected. Because no known receptors are nearby, the arsenic detected in groundwater does not appear to pose a threat to human health at this time. IDNR has not required any additional investigation at this time. Based on the known high levels of lead and arsenic at this adjacent site, this listing poses a REC to the subject property.
- The Kwik Shop #520 facility was listed in the IA LUST, IA UST, and IA SPILLS databases. The facility is at 1202 E Locust Street, approximately 255 feet west-southwest of the subject property. This facility was listed in two LUST records. One record has been closed, but the other is still listed as high risk. Based on close proximity to the subject property and known contamination on site, this listing poses a REC and a VEC to the subject property.

- The Former Clapp's Services Station was listed in the IA LUST database. The facility is at 902 East Locust Street, approximately 0.225 mile west of the subject property. One 540-gallon diesel UST was removed on December 14, 1998, and one 560-gallon waste oil UST was removed on December 14, 1998. The facility is listed as a high risk LUST site. Based on distance from the subject property and regulatory status, this listing poses a REC to the subject property.
- The Lakeside Auto Recyclers facility was listed in the IA Brownfields, IA ALLSITES, and US Brownfields databases. The facility is at 2813 North 9<sup>th</sup> Street, approximately 0.259 mile west-southwest of the subject property. However, according to Google Earth, the eastern boundary of this facility is actually 415 feet west-southwest of the subject property. According to the IDNR Contaminated Sites database, the facility has been used as a salvage yard since the 1960s. Soil and groundwater contamination are present on the property from leaking automobiles, the car crusher, and possibly from aboveground storage tanks (AST) with no secondary containment (IDNR 2016). Based on known contamination at this facility, this listing poses a REC and a VEC to the subject property.
- The Paxton 7 Vierling Steel Company was listed in the IA ALLSITES database. The facility is at 501 Avenue H, approximately 0.490 mile southwest of the subject property. However, according to Google Earth, this facility is actually 0.390 mile southwest of the subject property. According to the IDNR Contaminated Sites database, groundwater contamination present on site is likely from the two neighboring bulk petroleum storage facilities—Magellan Pipeline to the south and Sapp Brothers to the west. Both facilities have significant levels of petroleum contamination on their properties (IDNR 2016). Based on the upgradient location and known widespread contamination in the area, this listing poses a REC to the subject property.

## **SAMPLING STRATEGY AND METHODOLOGY**

A review of the physical characteristics of the site and the data generated during this investigation will help determine what further response, if any, would be appropriate. Sampling procedures will follow standard operating procedures (SOP) outlined in this QAPP. Pertinent data, including analyses to be performed and exact sample locations (depths and Global Positioning System [GPS] coordinates), will be recorded on a field sheet for each sample. Investigation-derived wastes (IDW) are expected to consist of disposable sampling supplies (gloves, paper towels, etc.) that will be disposed of off site as uncontaminated solid waste.

A summary of all anticipated samples for this project is in Table 1 of the attached QAPP form. The SOPs and chain-of-custody procedures referenced in the QAPP will be followed throughout sampling activities to verify integrity of the samples from time of collection until submittal to the laboratory for analyses. Samples will be delivered to a subcontracted laboratory for analyses according to the SOPs and methods referenced or described in the QAPP.

Descriptions of proposed sampling during this Phase II TBA are as follows:

### **Soil Sampling**

Four soil cores will be advanced the groundwater table or 15 feet bgs whichever is encountered first around the subject property (see Figure 2, Appendix B). One soil sample will be collected at each of the four coring locations. Collection of these soil samples will be from the 2-foot depth interval within which the greatest photoionization detector (PID) reading is induced or where soil staining appears. If no staining or readings on the PID are detected, a default sample collection from the 2-foot interval above the water table will occur. Sample collection will proceed by use of a Geoprobe direct-push technology (DPT) rig. Soil cores will be collected by use of Geoprobe 4-foot-long, Macro-Core samplers with disposable polyvinyl chloride (PVC) liners. Soil borings will be logged in the field. Soil samples for analysis for volatile organic compounds (VOC) via EPA Method 8260 and for TPH-purgeables (TPH-p) via EPA Method 8015 will be collected by use of Method 5035 kits or *EnCore* samplers provided by the subcontracted laboratory. Remaining soil will be collected in 4- or 8-ounce jars for analyses for SVOCs via EPA Method 8270, TPH-extractables (TPH-e) via EPA Method 8015, and RCRA metals via EPA Method 6010 (including mercury via Method 7471).

Two soil samples will also be collected within 0 to 6 inches bgs in the northeast and northwest quadrants of the subject property (see Figure 2, Appendix B). Soil samples for analysis for RCRA metals via EPA Method 6010 (including mercury via Method 7471) will be collected in 4- or 8-ounce jars.

All soil samples will be stored in coolers maintained at or below a temperature of 4 degrees Celsius (°C) pending submittal to the subcontracted laboratory.

### **Groundwater Sampling**

Tetra Tech will install temporary monitoring wells at seven boring locations, at four of which groundwater sampling will be collocated with soil sampling. The other three groundwater samples will be collected on the east, south, and west subject property boundaries to determine if groundwater contamination is entering the property from adjacent properties (see Figure 2, Appendix B). Groundwater samples will be collected from the temporary monitoring wells by use of a Screen Point 16 sampling apparatus containing a stainless steel or disposable 4-foot-long PVC screen. At each location, the screen will be deployed near the top of the shallow aquifer, and a sample will be collected through disposable polyethylene tubing by use of either a peristaltic pump or a check valve placed at the bottom of the tubing.

The four groundwater samples collocated with soil sampling will be submitted to a subcontracted laboratory for analyses for VOCs, SVOCs, TPH-e, TPH-p, and RCRA metals (total and dissolved [including mercury]). The three groundwater samples collected at the east, south, and west subject property boundaries will be analyzed for VOCs, TPH-e, and TPH-p only. Groundwater samples for analyses for VOCs and TPH-p via EPA Methods 8260 and 8015, respectively, will be collected into three 40-milliliter (mL) vials preserved with hydrochloric acid. Samples for analyses for SVOCs and TPH-e via EPA Methods 8270 and 8015, respectively, will be collected in two unpreserved 1-liter amber glass bottles. Samples for analysis for total RCRA metals will be collected in 500-mL plastic containers pre-preserved with nitric acid. Samples for analysis for dissolved RCRA metals will be field-filtered before they are transferred to preserved containers. RCRA metals analysis will proceed via EPA Methods 6020 and 7470 (mercury). All groundwater samples will be stored in coolers maintained at temperature at or below 4 °C pending submittal to the subcontracted laboratory.

### **Quality Control Samples**

A sampling equipment rinsate blank and a field blank will be collected to evaluate sample quality control (QC), as specified in Section 2.5 of the QAPP form and Table 1 of the QAPP form. A water trip blank prepared by the subcontracted laboratory will also be submitted for VOCs and TPH-p analyses.

### **ANALYTICAL METHODS**

All soil and groundwater samples will be submitted to a subcontracted laboratory for analysis. All samples will be analyzed according to the subcontracted laboratory's SOPs and analytical methods referenced in the QAPP. Standard turnaround times and detection limits for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help verify that representative analytical results are obtained.

A summary of all anticipated samples for this project is in Table 1 of the attached QAPP form. A summary of data quality objectives for this project is in Table 2 of the attached QAPP form.

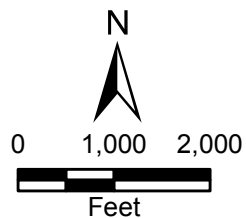
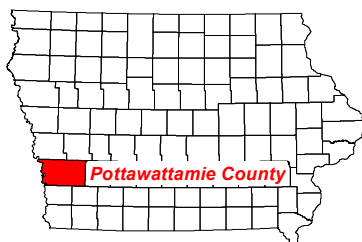
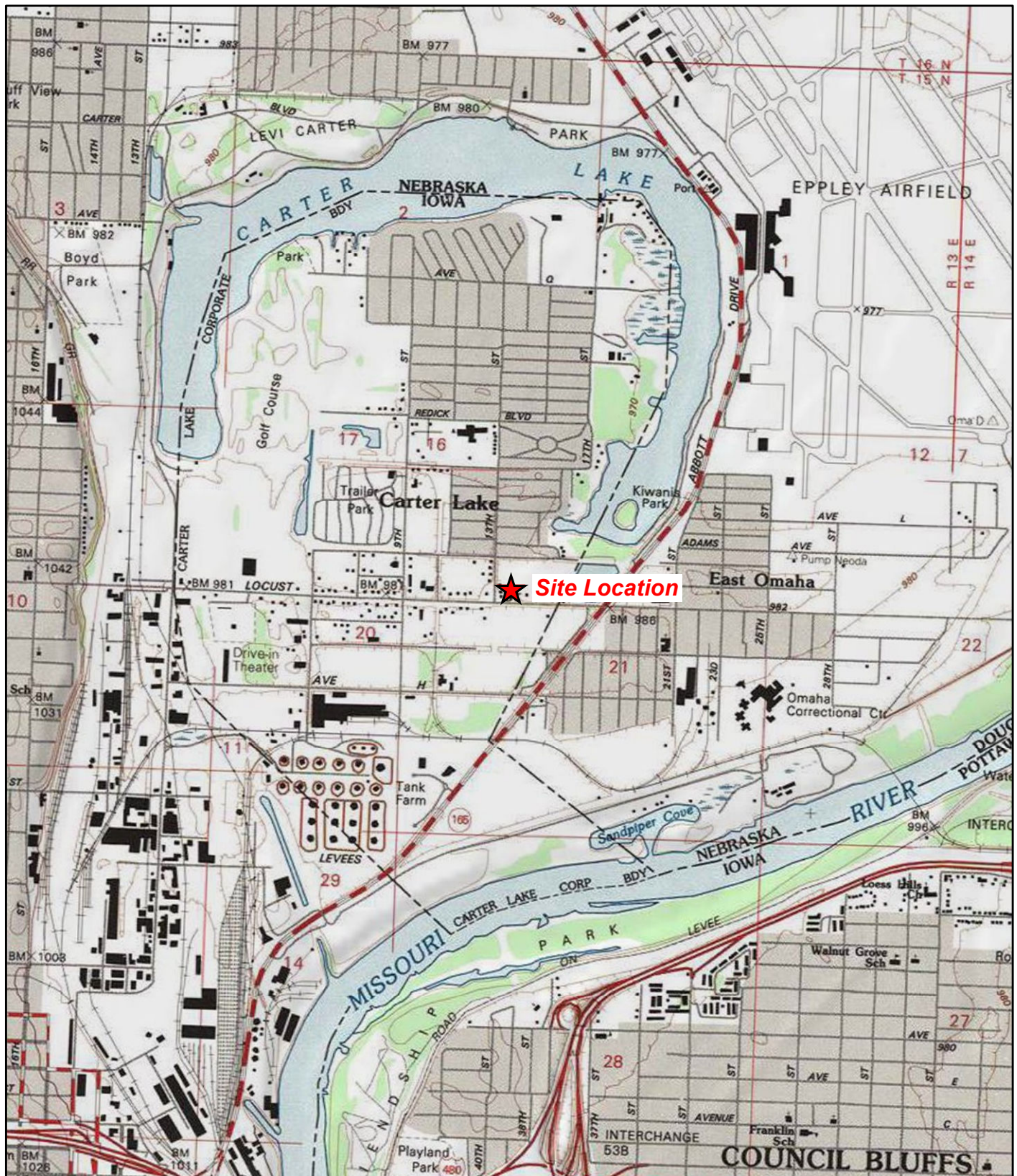


## **REFERENCES**

- Tetra Tech, Inc. (Tetra Tech). 2016. Phase I Targeted Brownfields Assessment, 1302 Locust Street, Carter Lake, Pottawattamie County, Iowa. August.
- U.S. Geological Survey (USGS). 1994. Omaha North, Nebraska Quadrangle. USGS 7.5-Minute Topographic Series.

## **APPENDIX B**

### **FIGURES**



Omaha Tribe of Iowa  
1302 Locust Street  
Carter Lake, Iowa

**Figure 1**  
Site Location Map







#### Legend

Proposed sample locations

● DPT groundwater

● DPT soil and groundwater

■ Surface soil



Approximate parcel boundary

DPT Direct push technology

Omaha Tribe of Iowa  
1302 Locust Street  
Carter Lake, Iowa

**Figure 2**  
Proposed Sample Location Map

