TOEROEK
ASSOCIATES, INC.

March 2, 2022

Mr. Bradley Roberts
Task Order Contracting Officer's Representative
U. S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Subject: Contract No. 68HERH19D0018; Task Order (TO) No. 68E0719F0190
Sampling Approach Memorandum, Revision 01
Former Clinton Engines
605 and 607 East Maple Street, Maquoketa, Iowa

Dear Mr. Roberts:

Toeroek Associates, Inc. (Toeroek) and our teaming subcontractor, Tetra Tech, Inc. (Tetra Tech), (hereafter "Toeroek Team") are pleased to provide you this revised sampling approach memorandum outlining our proposed scope of work to conduct a Phase II Environmental Site Assessment (ESA) at the Former Clinton Engines site located at 605 and 607 East Maple Street in Maquoketa, Iowa (the Site). This document has been revised to incorporate comments received from EPA on February 23.

This deliverable has been reviewed internally as part of Tetra Tech's quality assurance program, as well as Toeroek's quality assurance program, and is consistent with Toeroek's Quality Management Plan for the Resource Conservation and Recovery Act (RCRA) Enforcement and Permitting Assistance (REPA) contract. Documentation of this review is retained in the Toeroek Team's project files.

If you have any questions or comments, please contact Greg Hanna at 720-898-4102 or Kaitlyn Mitchell at 816-412-1742.

Sincerely,

Greg Hanna
Toeroek Team Program Manager

for Kaitlyn Mitchell
Toeroek Team Project Manager

Enclosure: Sampling Approach Memorandum

cc: Leeanna Balsley, EPA Region 7
Lisa Dunning, EPA Region 7
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TARGETED BROWNFIELDS ASSESSMENT
SAMPLING APPROACH MEMORANDUM, REVISION 01

FORMER CLINTON ENGINES
605 AND 607 EAST MAPLE STREET
MAQUOKETA, IOWA

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 7

Task Order	:	68E0719F0190
Subtask	:	009.02
EPA Region	:	7
Date Prepared	:	March 2, 2022
Contract No.	:	68HERH19D0018
Prepared by	:	Toeroek Associates, Inc.
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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) tasked Toeroek Associates, Inc. (Toeroek) and its teaming subcontractor, Tetra Tech, Inc. (Tetra Tech), (hereafter "Toeroek Team") with providing technical support to the EPA Region 7 Brownfields Program under Contract #68HERH19D0018, Task Order (TO) 68E0719F0190. EPA Region 7 requested that the Toeroek Team prepare a Sampling Approach Memorandum for a Phase II Environmental Site Assessment (ESA) at the Former Clinton Engines site located at 605 and 607 East Maple Street in Maquoketa, Jackson County, Iowa (the Site). The Site is owned in part by the City of Maquoketa (the City) and the Jackson County Historical Society and consists of three parcels of land, Jackson County Parcels 145181938200700, 145181938200800, and 145181938200900 (Beacon 2021).

The following proposed scope of work for the Site is based on findings and recommendations from: (1) 2013, 2014 and 2019 Site investigation activities performed by Impact7G, Inc. (Impact7G) under direction from the Iowa Land Recycling Program (LRP); (2) an Impact7G Professional Service Agreement from November 2020 (Impact7G 2020); and (3) the Superfund Technical Assessment and Response Team (START) Integrated Site Assessment (ISA) consisting of a combined Preliminary Assessment (PA)/Site Inspection (SI) and Removal Site Evaluation (RSE) in April 2021 (Tetra Tech 2021).

2.0 BACKGROUND

The City is located on the south bank of the Maquoketa River in Jackson County, Iowa. According to the U.S. Census Bureau, it has an estimated population of approximately 6,000 people (U.S. Census Bureau 2019). The Site is located in a mixed-use area consisting of residential, agricultural, and commercial land. Surrounding the Site to the north is commercial property, to the east is commercial and agricultural land, to the south is agricultural land, and to the west is single-family residential housing. The Site was initially developed for industrial purposes in 1945 by The Maquoketa Company. Clinton Engines Company acquired the property in 1950. Prior to operation by the Maquoketa Company, the Site was used for agricultural purposes. The Maquoketa Company and the Clinton Engines Company both produced small engines used the Site for production of small engines.

The former Clinton Engines Company production facility included a foundry, machine shops, cast and painting operations, and at least six underground storage tanks (USTs). Four previously identified USTs (two 1,000-gallon gasoline, one 2,000-gallon gasoline, and one 1,000-gallon hazardous waste) located near the north side of the former machine shop were removed in 1986 (Missman, Stanley & Associates, P.C. [MSA] 1999). The Clinton Engines Company facility officially closed in 1999 and the property was donated to the City in 2000 (Tetra Tech 2021). Presently, the Clinton Engines Museum building (Museum) is located on the northwestern portion of the Site. The Museum was formerly an office building used by the Clinton Engines Company.

On May 23, 2005, the Iowa Department of Natural Resources (IDNR) notified the City that the Site was being transferred to the Contaminated Sites Section (IDNR 2005a). An Initial Site Screening (ISS) was completed on June 2, 2005, results of the ISS indicated that additional investigations were needed (IDNR 2005b). The Site was enrolled in the Voluntary LRP in April 2008. According to the Voluntary LRP enrollment application, additional Site investigation activities were conducted in 2006, including the installation and sampling of eight groundwater monitoring wells (MW-10 through MW-17). Groundwater sampling from MW-10, located southeast of the Museum contained toluene (up to 3,000 micrograms per liter [µg/L]), *cis*-1,2-dichloroethene (DCE) (up to 776 µg/L), trichloroethene (TCE) (up to 524 µg/L), and vinyl chloride (VC) (up to 147 µg/L). In addition, soil sampling results indicated detections of toluene (up to 285 milligrams per kilogram [mg/kg]), TCE (up to 8.37 mg/kg), *cis*-1,2-DCE (up to 3.31 mg/kg), and VC (up to 0.112 mg/kg) in borings advanced to the east of the Museum. Information pertaining to the removal of three USTs (two 20,000-gallon and one 8,000-gallon) from 2001 to 2002 was also included in the enrollment application.

Since 2006, further site assessment activity has been sporadic, focusing primarily on delineations of the extent of on-site and off-site groundwater contamination, and on-site vapor intrusion (VI). High concentrations of chlorinated solvents, have been reported in groundwater in on-site groundwater monitoring wells and off-site temporary wells as far as 900 feet to the north-northwest of the Site at the following maximum concentrations:

- TCE at 9,580 µg/L, off-site well;
- *cis*-1,2-DCE at 7,190 µg/L, off-site well;
- *trans*-1,2-DCE at 1,044 µg/L, off-site well;
- 1,1,2-Trichloroethane (TCA) at 132 µg/L, off-site well;
- VC at 319 µg/L, off-site well; and
- Toluene at 247,000 µg/L, on-site well.

Given the elevated chlorinated solvent concentrations in groundwater, IDNR required vapor sampling at the Museum. Sub-slab samples collected at the Museum in 2014 and 2015 reported TCE concentrations as high as 930 micrograms per cubic meter ($\mu g/m^3$). In response, cracks in the Museum basement were repaired, chemicals stored in the basement were relocated, and the sump pit area was passively vented. In December 2019, follow-up indoor air sampling at the Museum documented indoor air exceedances above LRP Residential Vapor Intrusion Risk Levels. As a result, two HE1X1NH energy recovery ventilators (ERVs) were installed at the Museum in September 2020 (IDNR 2020). These units have a typical air flow range of 925 cubic feet per minute (CFM) per unit, producing a total of 1.3 air exchanges per hour.

IDNR requested federal assistance in a letter dated February 17, 2020, regarding the potential impact of off-site groundwater contamination to nearby residential and commercial properties (IDNR 2020). In addition, IDNR requested assistance related to VI sampling at surrounding properties in proximity to areas known to contain groundwater contamination to further determine potential impact (Tetra Tech 2021).

In June and July 2020, Tetra Tech START collected indoor air samples at 28 locations—23 residential and five commercial properties. Ambient air samples were collected at two residential properties. During the second mobilization in July 2020, Tetra Tech START collected soil-gas samples at 12 locations, subsurface soil samples at six locations near a sanitary sewer line leading from the Site, and domestic and municipal well samples from eight locations. In June 2020, air samples were analyzed for TCE only, with quick turnaround times to quickly assess the magnitude of risk to nearby residents. Air samples collected

in July 2020 were analyzed for TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, VC, and toluene. Sample concentrations were compared to EPA Removal Management Levels (RMLs) and Superfund Chemical Data Matrix (SCDM) Cancer Risk Screening Levels for consideration into the Superfund program. Soil samples and groundwater samples from drinking water wells were analyzed for the full suite of volatile organic compounds (VOCs) (Tetra Tech 2021).

Results from the initial round of air sampling in June 2020 indicated low concentrations of TCE in all but one sub-slab sample (3.1 µg/m^3), and in one indoor air sample (1.9 µg/m^3). Both detections were below EPA RMLs (Tetra Tech 2021).

Subsequent sub-slab vapor and indoor air sampling at 15 other properties in July 2020 yielded similar low concentrations. TCE was identified in two sub-slab vapor samples with a maximum concentration of 0.76 µg/m^3 and in four indoor air samples with a maximum concentration of 0.64 µg/m^3. No concentrations of *cis*-1,2-DCE, *trans*-1,2-DCE, or VC were detected in any sub-slab vapor samples; however, these compounds were reported at low concentrations in four indoor air samples with a maximum concentration of 0.79 µg/m^3 of *trans*-1,2-DCE. Toluene was detected in three sub-slab vapor samples with a maximum concentration of 7.0 µg/m^3. Elevated toluene concentrations (up to 1,700 µg/m^3), and frequent detections (15 of 16 samples) were reported in indoor air samples, suggesting an indoor source rather than VI from subsurface soil or groundwater (Tetra Tech 2021).

In February 2021, seven properties where TCE had been detected in either a sub-slab vapor or indoor air sample from the June or July 2020 sampling event were resampled to identify seasonal variations in TCE concentrations. In February 2021, TCE was detected at 1.0 µg/m^3 in a sub-slab vapor sample where the concentration was 3.1 µg/m^3 in June 2020. Toluene was reported at 16 µg/m^3 in a sub-slab sample where the concentration was 7.0 µg/m^3 in July 2020. Indoor air sampling in February 2021 reported TCE at 0.38 µg/m^3 at two residences. Previous reported TCE concentrations had been 1.9 µg/m^3 and 0.2 µg/m^3 at these residences. This concentration was below the residential RML (2 µg/m^3) and the SCDM Cancer Risk Screening Concentration (0.478 µg/m^3). In a commercial building, *trans*-1,2-DCE was detected at 0.46 µg/m^3—well below the Commercial RML and SCDM Non-Cancer Risk Screening Concentration. Toluene was detected in 6 of 7 indoor air samples at concentrations ranging from 2.2 to 460 µg/m^3. All detected concentrations of toluene were well below the residential RML and SCDM non-cancer screening level (Tetra Tech 2021).

The 12 soil-gas samples collected off-site and analyzed in the field via mobile laboratory did not report any concentrations of TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, VC, and toluene. These results suggest that vapor migration from the groundwater plume to shallow soils may not pose a significant threat off-site.

Soil sampling near the sewer line to the north and west of the Site yielded detections of TCE and *cis*-1,2-DCE at three locations to the north of the Site. The highest TCE concentrations were detected in the samples collected within 15 to 16 feet below ground surface (bgs). These contaminants were not detected in soil samples collected within 9 to 10 feet bgs at these two locations, suggesting contamination may be a result of fluctuations in groundwater elevation. At one boring, SB-03, concentrations of TCE at 73 micrograms per kilogram (µg/kg) and *cis*-1-2-DCE at 31 µg/kg were detected in the sample collected within 9 to 10 feet bgs (Tetra Tech 2021).

Groundwater samples collected from five downgradient domestic wells and three municipal wells did not have detections of VOCs other than the common laboratory contaminant, acetone (Tetra Tech 2021).

3.0 GENERAL APPROACH

The Toeroek Team recommends additional subsurface soil, soil-gas, and groundwater sampling to determine plume dynamics. Further, an assessment of plume stability—horizontal and vertical—is a requirement for the Iowa LRP. The Toeroek Team will also complete an Analysis of Brownfield Cleanup Alternatives (ABCA) for potential source areas at the Site.

Based on the IDNR letter dated September 26, 2019, Impact7G recommended installation of up to 14 permanent groundwater monitoring wells at depths ranging from 55 to 80 feet bgs to monitor TCE and chlorinated solvent plume dynamics associated with historical operations at the Site (Impact7G 2019).

Additionally, the Toeroek Team recommends the advancement of four additional groundwater monitoring wells into the underlying bedrock. The bedrock monitoring wells will be advanced to the first occurrence of groundwater in the underlying Silurian bedrock aquifer (Impact7G 2020). Monitoring well installations that occur off-site in easements or right-of-way areas owned by the City may require additional access agreements or permitting.

Monitoring well construction will accord with EPA Guidance entitled *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells* (EPA 1991). Monitoring wells installed into bedrock will be cased across the bedrock interface.

IDNR private well construction permits are required for all monitoring wells except those installed as part of an IDNR-required contamination investigation or cleanup action, or if total depth of the monitoring wells will be less than 20 feet below normal surface grade. All monitoring well construction must occur under direct supervision of an IDNR Certified Well Contractor who is on-site and in direct control of the provided well services (IDNR 2021).

Soil samples will be collected continuously during groundwater monitoring well installation by use of a split spoon core sampler or as recommended based on conditions encountered. Each of the samples from respective intervals will be divided into two aliquots—one for field screening purposes and the other for possible laboratory analysis (Impact7G 2020). Soil-gas samples will be collected from the location of each monitoring well or from locations identified in the field using a hand auger or other equivalent hand-operated equipment.

The Toeroek Team proposes quarterly groundwater sampling events following well construction. Installed groundwater monitoring wells will not be abandoned and will be available for future groundwater sampling.

The Toeroek Team will prepare a Phase II ESA Report conveying findings and offering recommendations. The report will include a groundwater plume map and map outlining known soil concentrations; other relevant figures; photographs; and other supplemental information necessary to assist our presentation of findings.

The Toeroek Team will coordinate with the IDNR LRP to ensure the extent of sampling meets all regulatory requirements.

4.0 SAMPLING METHODOLOGY

An in-depth sampling methodology will be provided in the Quality Assurance Project Plan (QAPP) for the Site. The sampling proposed by the Toeroek Team will meet the following requirements.

- Soil samples will be collected continuously during monitoring well installation by use of a split spoon core sampler or as recommended based on conditions encountered. Each of the samples from respective intervals will be divided into two aliquots—one for field screening purposes and the other for possible laboratory analysis. The Toeroek Team will screen soil samples in the field for presence of VOCs by use of a photoionization detector (PID). Soil sample(s) from each boring exhibiting the highest PID reading will be submitted to an EPA-approved laboratory for analysis for VOCs via EPA Method 8260C.
- Groundwater samples will be collected at each permanent groundwater monitoring well. Prior to groundwater sampling, the Toeroek Team will measure the static groundwater level at each location to determine groundwater flow direction and groundwater elevation contours. Each monitoring well will be purged of at least three well volumes prior to groundwater collection. The Toeroek Team will measure field parameters including pH, oxidation-reduction potential (ORP), temperature, conductivity, dissolved oxygen (milligrams per liter [mg/L]), and turbidity until these will have stabilized. This collection method also specifies a purge rate of groundwater expectedly low enough not to depress the water table. Each groundwater sample will be submitted to an EPA-approved laboratory for analysis for VOCs via EPA Method 8260C.
- Soil-gas will be collected as grab samples directly from a temporary soil boring by use of a Summa® canister. Number and location of soil-gas samples will be determined based on soil and groundwater sampling results. Samples will be submitted to an EPA-approved laboratory for analysis for VOCs via EPA Method TO-15.

5.0 REFERENCES

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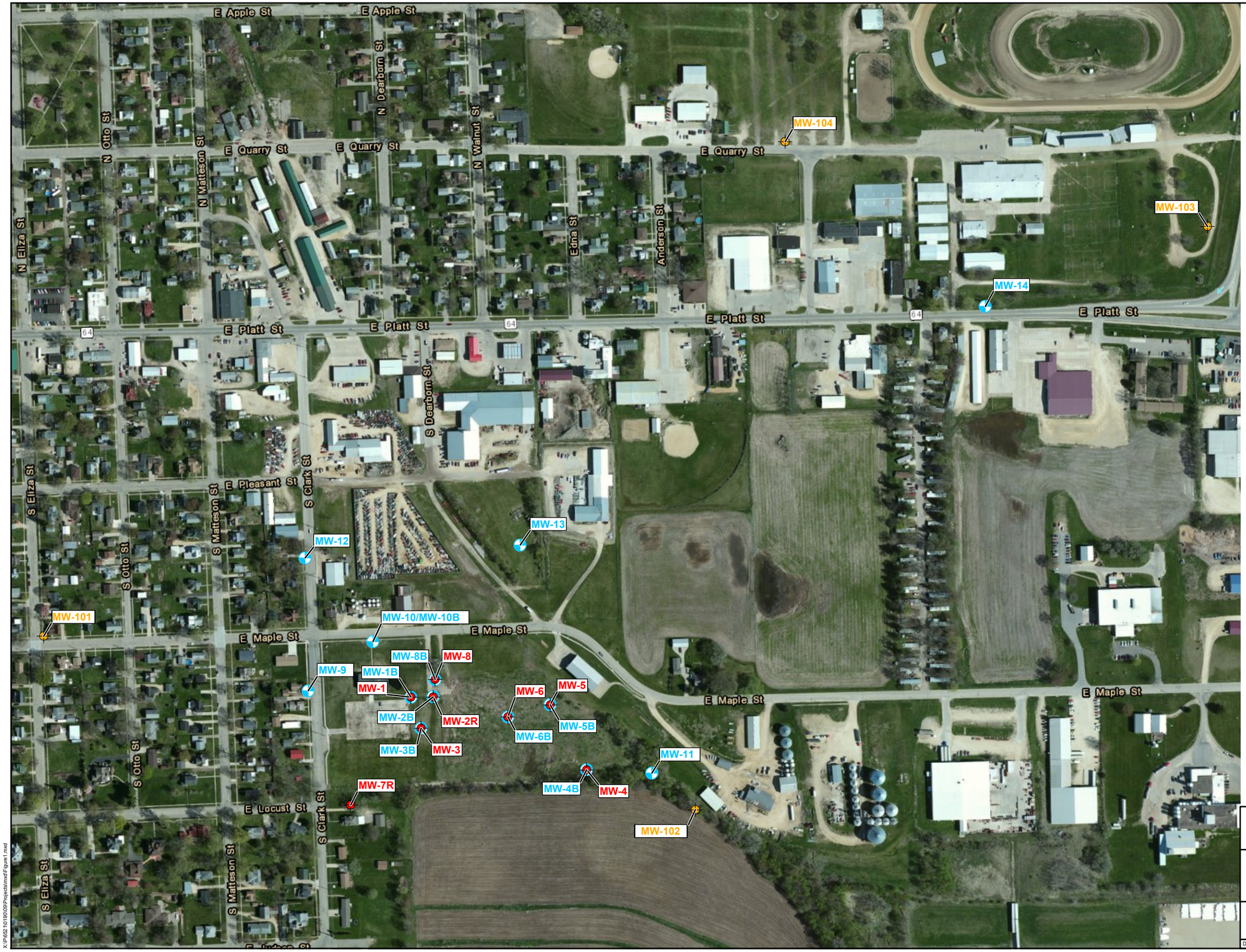

Legend

- Existing monitoring well location
- Proposed monitoring well location
- Proposed monitoring well location (bedrock well)

N

0 165 330

Feet

Source: Esri, ArcGIS Online, World Imagery (Clarity)

TCE Clinton Engines
Maquoketa, Iowa

Figure 1

Monitoring Well Location Map

TETRA TECH

Date: 2/25/2022 Drawn By: Nick Wiederholt Project No: 103G6521.0190

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