

# Proposed Monitoring Work Plan

C6 Zero Iowa, LLC  
810 East South Street  
Marengo, Iowa 52301  
Contaminated Sites ID: 2733

May 16, 2025

**Prepared for:**

C6 Zero Iowa, LLC  
130 McGhee Road, STE 106  
Sandpoint, ID 83864

**Prepared by:**

EcoSource, LLC  
1001 Raccoon Street  
Des Moines, Iowa





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## **1.0 PROJECT UNDERSTANDING**

### **1.1 Introduction**

As requested by the Iowa Department of Natural Resources (IDNR) in an IDNR letter dated May 6, 2025, EcoSource is pleased to submit the Proposed Monitoring Work Plan (henceforth referred to as “Plan”) to fully delineate the plume and establish plume dynamics at the C6 Zero facility in Marengo, Iowa. This Plan details proposed sampling efforts to establish plume dynamics, document soil and groundwater conditions, in an attempt to demonstrate a stable/declining plume from the C6 Zero release in Marengo, Iowa.

The contents of this Plan include the placement and methodologies for the installation of permanent and temporary monitoring wells, soil and groundwater sampling procedures and data evaluation standards. Soil and groundwater samples obtained will be analyzed via EPA Method 8260D for Volatile Organic Compounds, Method 8270 E for Semi-volatile Organic Compounds, EPA Method 1633 for Per- and Polyfluoroalkyl Substances (PFAS), and Iowa Method OA-2 for Total Extractable Hydrocarbons (TEH).

Data collected from the onsite sampling activities will be evaluated utilizing the IDNR’s State Wide Standards (SWS). At a minimum, two (2) years of semi-annual groundwater sampling is required to demonstrate a stable/declining plume. The data collected onsite will be utilized to determine if an environmental covenant prohibiting residential use may be required by the IDNR prior to site closure.

## **2.0 GENERAL SITE GEOLOGY AND SITE HYDROLOGY**

The C6 Zero facility sits on approximately 26 acres of industrial land on the eastern edge of the City of Marengo. According to the USDA Web Soil Survey computer program, the site consists predominantly of Bremer silty clay loam, with pockets of Zook and Nevin silty clay loams. USDA Soil survey map was included in the previous Site Assessment Plan dated April 13, 2023.

The topography of the site is relatively flat, with a slight fall from south to north. There is a drainage ditch on the eastern edge of the property, as well as another north of the building. A topographic map was included within the previous Site Assessment Plan dated April 13, 2023, and shows gradual slopes to the northeast, which is where drainage is conveyed. Once off-site, drainage is conveyed, via a drainage ditch on the south side of East South Street, towards a regional detention basin approximately 0.7 miles to the east of the subject property. This basin collects water on the upstream side of a levy system, which is ultimately discharged into the Iowa River.

Using the USGS StreamStats computer program, the watershed, which includes the entire subject property, was delineated to determine the potential extents of the surface water impacts resulting from the release. The outlet of the regional detention basin was chosen as the point of delineation for the watershed, as it represents the most downstream location prior to discharge into the Iowa River. The delineation shows that the C6 Zero facility is part of a 1.4 square mile natural watershed, which includes land located predominantly to the southeast of the subject property. This boundary includes only the areas that naturally surface flow to the detention area. It is worth noting that there



is a wastewater lagoon within the watershed, which suggests that additional flow from the City of Marengo may be conveyed to that location for treatment. A copy of the StreamStats report was included within the previous Site Assessment Plan dated April 13, 2023.

During a review of the U.S. Fish and Wildlife Service National Wetland Inventory, EcoSource discovered a variety of wetlands on the downstream side of the levy, adjacent to the Iowa River. Both freshwater emergent and freshwater forested/shrub wetlands are present. A copy of the National Wetland Inventory map for this area was included within the previous Site Assessment Plan dated April 13, 2023.

According to the IDNR Facility Explorer database, there is one (1) water well located within 1,000' of the subject property. IDNR Well No. 61838 is reportedly located 267' from the project site and is relatively shallow (reported at 37' deep). The IDNR Facility Explorer well search report was included in prior reports. Well No. 61838 is no longer operational, and the landowner no longer uses the well. On March 10, 2025, samples were obtained by EcoSource from Well No. 61838. Analytical results from the prior site investigation indicated concentrations of Carbon Disulfide. The concentrations of Carbon Disulfide are not indicative of the C6 Zero release in Marengo, Iowa.

### **3.0 MONITORING WELL INSTALLATION, GROUNDWATER SAMPLING, DRINKING WATER AND SOIL SAMPLING**

#### **3.1 Safety**

EcoSource has a 100% commitment to the safety of all its employees. As such, and in accordance with our Incident and Injury Free safety culture, EcoSource will update our project Safety Plan for use by our personnel during field services. Prior to commencement of on-site activities, EcoSource will hold a meeting to review health and safety needs for this specific project. Currently, we anticipate performing fieldwork in an EPA Level D work uniform consisting of hard hats, safety glasses, protective gloves, and steel-toed boots. It may become necessary to upgrade this level of protection during sampling activities if petroleum or chemical constituents are encountered in soils or groundwater that present an increased risk for personnel exposure.

#### **3.2 Soil Borings and Soil Sampling**

EcoSource proposes a total of four (4) soil borings to be completed. Two (2) soil borings will be located to the north perimeter of the subject property, and two (2) soil borings will be located to the east perimeter of the subject property. A site diagram indicating the proposed locations of the soil borings can be found in **Appendix A** as Exhibit 2. EcoSource personnel will conduct the drilling and soil sampling activities.

During drilling activities, at all boring locations, grab samples will be collected from 1-foot intervals. The soil will be field screened for organic vapors with a Photoionization Gas Detector (PID) at 1-foot intervals to ensure that the sample is obtained from the depth of maximum observable hydrocarbon contamination, where applicable. This device provides a direct reading in parts per million (ppm) of volatile organic vapors. The PID is a nonspecific total vapor detector and cannot be used to identify unknown substances; it can only roughly quantify them. The PID will be calibrated in accordance



with the manufacturer's recommendations before and after field activities with 100 ppm isobutylene. The soil samples collected during activities for field screening; will be used to direct the depth of the boring and for the selection of samples for laboratory analysis, if applicable. Upon removal of the sampler from the borehole, EcoSource will cut a portion of the sample and seal it in a clear plastic bag. After a stabilization period, EcoSource will screen the headspace above the soil using the PID equipped with a 10.6 eV lamp source. Gross contamination (free product, obvious odors, discoloration, and/or elevated PID readings) will be documented during drilling and sampling activities. The boring logs, indicating the depth of soil samples, PID readings, and soil descriptions, will be submitted in the Monitoring Report. At each soil boring samples will also be obtained at the surficial (0-1 ft.) of topsoil.

Drilling services will be performed by an EcoSource State of Iowa Certified Well Contractor. The soil borings will be completed utilizing a Geoprobe® drilling rig equipped with a core barrel and disposable poly vinyl chloride (PVC) liners. Drilling equipment is cleaned using a high-pressure washer prior to mobilization to the subject site. Non-dedicated, PFAS free sampling equipment is cleaned using Alconox® wash and PFAS free deionized water between each core. Additional field decontamination and cleaning of the drilling equipment, drill rig, and other equipment occur as needed to prevent cross contamination between locations.

The soil samples will be submitted for analysis to an Iowa certified laboratory, Eurofins Laboratories, located in Cedar Falls, Iowa. The portions of the samples collected for laboratory analysis will immediately be packed into laboratory provided, PFAS free containers with appropriately lined lids and placed in a cooler containing ice and kept at 40 degrees Fahrenheit until they are released to Eurofins with the completed chain-of-custody. The samples will be submitted for laboratory analysis via EPA Method 8260D for Volatile Organic Compounds, Method 8270 E for Semi-volatile Organic Compounds, EPA Method 1633 for PFAS, and Iowa Method OA-2 for TEH.

### **3.3 Monitoring Well Location**

Once the soil borings have been completed, EcoSource proposes to convert the borings to groundwater monitoring wells. The four (4) soil borings converted to permanent groundwater monitoring wells, will be completed with a lockable steel riser. A proposed monitoring well installation site map is shown in **Appendix A** as Exhibit 2.

These monitoring wells will be advanced to provide further subsurface information with respect to soil and groundwater. The borings/wells will be installed surrounding the source area from the previous site investigations. The locations will account for documenting triangulated groundwater flow direction (assumed to the north/northeast) and provide definition of impacts in the gradient directions from the source area. It should be noted that additional wells may be necessary to further bracket any soil, groundwater, or contaminant plume(s) that are identified during field operations.

### **3.4 Monitoring Well Construction**

Construction of the monitoring wells will be performed by a State of Iowa certified well contractor using hollow stem or continuous flight augers. The drilling equipment will be cleaned using a high-pressure wash prior to beginning the project. Additional field decontamination and cleaning of the



drilling equipment (clean augers and drill rods), drill rig, and other equipment will be conducted as needed using Alconox® wash and PFAS free deionized water between wells to prevent cross contamination between locations.

The four (4) permanent monitoring wells will be constructed with 10 feet of 2-inch diameter 0.010 machine slotted PVC for well screen at the bottom of the well with a threaded bottom plug. The screen is installed with 2-inch diameter PVC riser pipe extending to above the ground surface. The screen is placed with an annular graded silica sand pack around the well screen from the bottom of the well to approximately one foot above the top of the screen. Medium chip bentonite is placed in the borehole annulus from the top of the sand pack to within approximately one foot of the ground surface.

The ground surface and top of casing elevations will be measured for all monitoring wells. The wells will be surveyed to a known reference point benchmark in feet converted to the United States Geological Survey (USGS) elevation above sea level (ASL). The ground surface elevations will be surveyed to an accuracy of +/- 0.01 feet and the horizontal location will be determined by measuring the existing structures and/or with global positioning system (GPS) satellite location data.

### **3.5 Groundwater Sampling**

Groundwater sampling will be conducted at the proposed four (4) monitoring wells. EcoSource will also obtain groundwater samples from seven (7) existing monitoring wells on site (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, and MW-8). On March 3, 2025, monitoring wells MW-7, MW-8, and MW-9 were installed on the south perimeter of the property. Analytics indicated no detections on all soil and groundwater samples obtained from these locations on the south perimeter of the property. EcoSource proposes only obtaining a groundwater sample from MW-8 to continue monitoring for possible COC's to the south of the plume.

At a minimum, two (2) years of semi-annual groundwater sampling is required to demonstrate a stable/declining plume. The data collected onsite will be utilized to determine if the plume is stable, declining, or migrating and sampling can be modified if needed.

Prior to groundwater sampling, the depth to water level measurements will be collected from each monitoring well using a Geotech® or Solinst® water meter probe that is accurate to +/- 0.1 feet according to the manufacturer. The wells will be purged according to low-flow procedures at a rate of 200-400 gallons per minute utilizing a peristaltic pump and disposable PFAS free polyethylene tubing dedicated to each well or disposable PFAS free polyethylene bailers. Once groundwater stabilization has been obtained, a groundwater sample will be collected from each well. If a well does not stabilize during low flow procedures, five saturated well casing volumes will be removed, and the well will be sampled. If a well dries before low flow stabilization, the well will be allowed to return to static condition and a groundwater sample will be collected. Non-dedicated, PFAS free sampling equipment will be cleaned before and after each use and between wells-using an Alconox® and PFAS free deionized water.

The groundwater samples will be submitted for analysis to an Iowa certified laboratory, Eurofins Laboratories, located in Cedar Falls, Iowa. The portions of the samples collected for laboratory analysis will immediately be packed into laboratory provided PFAS free containers with



appropriately lined lids and placed in a cooler containing ice and kept at 40 degrees Fahrenheit until they are released to Eurofins with the completed chain-of-custody. The samples will be submitted for laboratory analysis via EPA Method 8260D for Volatile Organic Compounds, Method 8270 E for Semi-volatile Organic Compounds, EPA Method 1633 for PFAS, and Iowa Method OA-2 for TEH.

#### **4.0 LABORATORY ANALYSIS**

##### **4.1 Soil Analysis**

Soil analysis will be submitted for laboratory analysis via EPA Method 8260D for Volatile Organic Compounds, Method 8270 E for Semi-volatile Organic Compounds, EPA Method 1633 for PFAS, and Iowa Method OA-2 for TEH as requested in the IDNR letter dated September 13, 2024.

##### **4.2 Groundwater Analysis**

Groundwater analysis will be submitted for laboratory analysis via EPA Method 8260D for Volatile Organic Compounds, Method 8270 E for Semi-volatile Organic Compounds, EPA Method 1633 for PFAS, and Iowa Method OA-2 for TEH as requested in the IDNR letter dated September 13, 2024.

#### **5.0 DATA EVALUATION**

Analytical results obtained from the soil and groundwater samples will be reviewed and compiled to depict current environmental conditions in the subsurface to establish plume dynamics, document soil and groundwater conditions, to demonstrate a stable/declining plume from the C6 Zero release in Marengo, Iowa. At a minimum, two (2) years of semi-annual groundwater sampling is required to demonstrate a stable/declining plume. The data collected onsite will be utilized to determine if the plume is stable, declining, or migrating and sampling can be modified if needed.

The data will be tabled and compared to the Iowa Statewide Standards (SWS) for protected groundwater, non-protected groundwater, and soil, taking into consideration hydrogeologic characteristics and potentially affected receptors. Isoconcentration maps depicting concentration plumes of individual chemicals of concern (COCs) will be developed, presented and compared to prior investigations.

#### **6.0 REPORTING**

Once semi-annual field activities are complete and laboratory results have been received, an annual Monitoring Report will be prepared to present the findings of the investigations. The report will include the following information and be submitted to the IDNR Contaminated Sites Section for review:

- Description of field activities and methodologies.
- Scaled site diagram with sampling locations.
- Boring logs and laboratory reports.
- Tabled analytical results to demonstrate a stable/declining plume.
- Plume maps for elevated COCs in soil and groundwater, if applicable.



- Conclusions and Recommendations.

## **7.0 SCHEDULE**

The following is a tentative schedule for implementing the steps outlined in this Monitoring Plan, pending IDNR approval. EcoSource proposes that field activities and a report due date to be determined only once financial payment for the outlined services in the Monitoring Plan are secured.

- Complete field activities – within 60 days following Monitoring Plan approval and financial payment is secured.
- Submit annual Monitoring Report – Within 30 days of receiving all analytical results from semi-annual field activities completed for sampling locations listed in the Monitoring Plan.
- Complete semi-annual field activities and annual Monitoring Reports for a minimum of two (2) years as required to demonstrate a stable/declining plume.

Please note, this schedule is tentative and will be dependent upon the timing of laboratory results, weather, budget approval, financial securement, and obtaining a site access agreement from property owner. EcoSource will provide regular updates during field activities and provide an updated schedule, if necessary.

## **8.0 GENERAL COMMENTS**

### **8.1 Standard of Care**

EcoSource's services will be performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. EcoSource makes no warranties, either express or implied, regarding the findings, conclusions, or recommendations. Please note, EcoSource does not warrant the work of laboratories, or other third parties supplying information used in the preparation of the report.

### **8.2 Additional Scope Limitations**

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during these investigations. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services. Future site activities may determine the need for additional site work outside of the scope of this Plan and lengthen the project schedule. In addition, following review of the Plan and/or Monitoring Report the IDNR may require additional site work outside of the scope of these services.



If you have any questions or comments regarding this Supplemental Site Assessment Work Plan, please feel free to contact us at (515) 250-6695 or via email at [darren@ecosourceiowa.com](mailto:darren@ecosourceiowa.com).

Sincerely,

**EcoSource, LLC**

A handwritten signature in black ink, appearing to read "Darren Fife", written over a horizontal line.

Darren Fife, CGP #2058  
Environmental Director  
[darren@ecosourceiowa.com](mailto:darren@ecosourceiowa.com)

A handwritten signature in black ink, appearing to read "Arthur J. Kern", written over a horizontal line.

Arthur J. Kern  
Environmental Services Director  
[arthur@ecosourceiowa.com](mailto:arthur@ecosourceiowa.com)

**Appendix A**

Exhibit A

Facility Map

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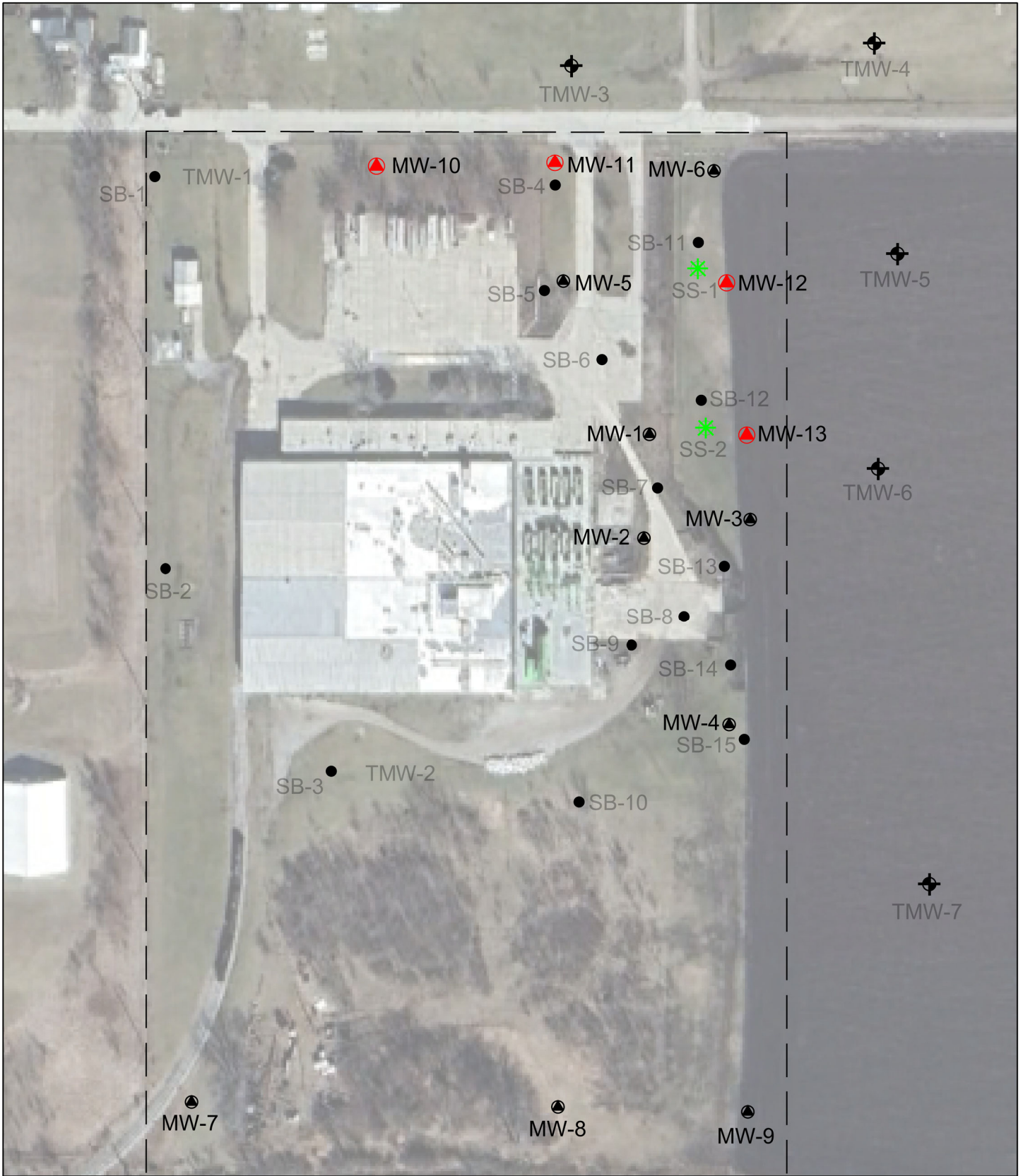


**Appendix A**

Exhibit B

Monitoring Well and Sampling Map

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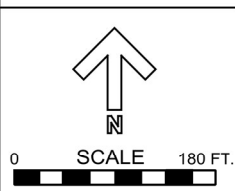


MONITORING WELL AND SAMPLING MAP

MAY 2025

Appendix A, Exhibit B

1001 Raccoon Street  
Des Moines, Iowa 50309  
Phone: 515.250.6695  
www.ecosourceiowa.com



SITE ASSESSMENT REPORT - C6-ZERO  
810 EAST SOUTH STREET  
MARENGO, IOWA

- Proposed Monitoring Well/ Soil Boring
- Monitoring Well
- Sample Location
- Temporary Monitoring Well
- Sediment Sample Location
- Property Boundary

