

Ms. Christine Matlock
Senior Environmental Engineer
Hazardous Waste Section
Waste Management & Radiological Protection Division
Michigan Department of Environment, Great Lakes and Energy
525 West Allegan Street
Constitution Hall, Atrium North
Lansing, MI 48909

Arcadis of Michigan, LLC
28550 Cabot Drive
Suite 500
Novi
Michigan 48377
Phone: 248 994 2240
Fax: 248 994 2241
www.arcadis.com

Date: August 11, 2021
Our Ref: 30075941

Subject: 1,4-Dioxane Monitoring Well Installation and Test Well Abandonment Work Plan
RACER Trust Industrial Land, Plants 2 and 3, Lansing, Michigan

Dear Ms. Matlock,

This scope of work has been prepared by Arcadis on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust for Plants 2 and 3 located in Lansing, Michigan (Site). This proposed scope of work describes additional weathered bedrock vertical aquifer profile (VAP) sampling and installation of an additional biosparge performance monitoring well on northern Plant 2, VAP sampling and installation of a perched monitoring well to evaluate 1,4-dioxane at MW-20-130, and abandonment of ten weathered bedrock pilot test wells located on Plants 2 and 3.

Northern Plant 2 Weathered Bedrock VAP and Performance Monitoring Well Installation

The current lower 1,4-dioxane plume monitoring network does not include any monitoring wells installed within the core of the plume in the area where the plume enters Plant 2 from the north. VAP sampling is proposed as part of this workplan to recharacterize the plume in this area, followed by installation of a weathered bedrock monitoring well to facilitate performance monitoring of the biosparge remedy.

Scope of Work

A total of three VAP borings will be advanced into the weathered bedrock to the east of MW-14-63 using rotary-sonic drilling methods. At each location:

- Borings will be advanced approximately 10 feet into the weathered bedrock for an approximate depth of 85 feet below ground surface (bgs). Care will be taken to avoid using water during drilling.
- Continuous soil cores will be obtained from the ground surface to the target well depth at each boring location. An Arcadis geologist will log and describe the soils in accordance with the Arcadis Soil Description Standard Operating Procedures. Boring logs will be generated based on the field descriptions.

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- VAP groundwater samples will be collected from the weathered bedrock using a retractable stainless-steel screen and submersible pump.
- Groundwater samples will be submitted to Merit Laboratories (Merit) for 1,4-dioxane analysis using United States Environmental Protection Agency (USEPA) Method 8260 SIM on a 24-hour turnaround time.
- The boreholes will remain cased using the outer drill casing, pending analytical results.

Analytical results from the VAP groundwater samples will be used to determine the approximate location of the lower 1,4-dioxane plume core. The VAP boring best approximating the core of the plume (i.e., the boring with the highest 1,4-dioxane concentration), will be converted to a permanent performance monitoring well and used to aid in evaluating the effectiveness of the biosparge remedy south of Plant 3 and north of the Plant 2 “Transect B” biosparge wells. The monitoring well will be constructed with a 5-foot stainless-steel wire-wrapped 0.010-slot screens and 2-inch PVC riser. An appropriate sand pack will be placed around the screen interval to a depth of 1 foot above the well screen followed by 1 to 2 feet of choker sand and then bentonite grout to grade. The well will be completed with a steel flush mount cover and locking cap. The new monitoring well will be developed using surge and purge methods until reasonably free of fine-grained material.

The two borings not converted to permanent monitoring wells will be abandoned by grouting from the bottom up using a tremie pipe and bentonite grout.

Plant 2 PFAS Area 1,4-Dioxane Investigation

MW-20-130 is a double cased weathered bedrock monitoring well installed to evaluate the potential for vertical migration of PFAS from the perched zone within the Plant 2 PFAS source area. The new weathered bedrock well was initially sampled for 1,4-dioxane during December 2020 and contained a concentration of 61 micrograms per liter ($\mu\text{g/L}$). MW-20-130 was sampled again in June of 2021 and contained a 1,4-dioxane concentration of 115 $\mu\text{g/L}$. PFOS and PFOA have not been detected in MW-20-130 despite elevated concentrations of PFOS and PFOA in above perched groundwater. VAP sampling of the weathered bedrock using a rotary sonic drill rig is proposed to further characterize the 1,4-dioxane detected in MW-20-130. Additionally, the installation of a perched monitoring well in this area is proposed to evaluate the presence of 1,4-dioxane within the perched zone to aid in evaluating if concentrations detected in MW-20-130 are related to localized leaching, or related to migration from another source are (e.g., Plant 2 LNAPL area). The proposed VAP and monitoring well locations are shown on **Figure 1**.

Scope of Work

Weathered Bedrock VAP Sampling

A total of three VAP borings will be advanced into the weathered bedrock to north, east, and south of using rotary-sonic drilling methods. At each location:

- Borings will be advanced approximately 10 feet into the weathered bedrock for an approximate depth of 60-75 feet below ground surface (bgs). Care will be taken to avoid using water during drilling.
- Continuous soil cores will be obtained from the ground surface to the target sampling depth at each boring location. An Arcadis geologist will log and describe the soils in accordance with the Arcadis Soil Description Standard Operating Procedures. Boring logs will be generated based on the field descriptions.

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- VAP groundwater samples will be collected from the weathered bedrock using a retractable stainless-steel screen and submersible pump.
- Groundwater samples will be submitted to Merit for 1,4-dioxane analysis using USEPA Method 8260 SIM on a 24-hour turnaround time.
- The boreholes will remain cased using the outer drill casing, pending analytical results.
- The VAP groundwater analytical results will be evaluated and if it is determined the location can be utilized as a sentinel monitoring well the boring will be converted to a permanent weathered bedrock monitoring well following the same procedures and construction methods described above for the northern Plant 2 performance monitoring well.
- Any VAP boring not converted to a well will be abandoned by grouting from the bottom up using a tremie pipe and bentonite grout.

Perched Monitoring Well Installation

One perched monitoring well will be installed approximately 10 feet from weathered bedrock monitoring well MW-20-130 using a rotary sonic drill rig. Continuous soil cores will be obtained from the ground surface to an approximate depth of 30 feet bgs. Arcadis will log and describe the soils in accordance with the Arcadis Soil Description Standard Operating Procedures. The monitoring well will be constructed with a 5-foot stainless-steel wire-wrapped 0.010-slot screens and 2-inch PVC riser. An appropriate sand pack will be placed around the screen interval to a depth of 1 foot above the well screen followed by 1 to 2 feet of choker sand and then bentonite grout to grade. The well will be completed with a steel flush mount cover and locking cap. The new monitoring well will be developed using surge and purge methods until reasonably free of fine-grained material.

Following development, the new monitoring well will be sampled using low-flow sampling methods. A sample will be submitted to Merit for 1,4-dioxane analysis using USEPA Method 8260 SIM and analysis of 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List (EGLE, 2020) using modified USEPA Method 537 with isotope dilution per Department of Defense Quality Service Manual (DoD QSM) 5.3. Following review of the initial analytical results, the new monitoring well will be integrated into the revised Interim Groundwater Monitoring Plan for PFAS and 1,4-dioxane monitoring (Arcadis 2019).

Pilot Test Well Abandonment

The following weathered bedrock test wells (**Figure 2**) were installed to support 1,4-dioxane remedy pilot tests, are no longer utilized for monitoring, and are in close proximity to other monitoring wells, rendering them redundant:

- Plant 2:
 - AS-16-01
 - AS-16-02
 - TW-14-04
 - TW-14-05
 - TW-15-13
 - TW-16-01

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- Plant 3:
 - TW-14-07
 - TW-14-08
 - TW-14-09
 - TW-15-10

Abandonment of the wells listed above is proposed using the following procedures:

- Well casings will be pressure grouted from the bottom up with a thick bentonite grout and allowed to setup for 24 hours.
- Once the grout is set up, the upper portion of each well will be over drilled using a rotary sonic drill rig to a depth at least two feet into the underlying clay till (approximately 20-30 feet bgs). Sonic casing diameter will be selected to remove all annular materials (8-inch diameter with the exception of TW-15-10 which will require 12 inch diameter casing).
- Once the drill casing and annular materials are removed, the boreholes extending into the underlying clay will be abandoned from the bottom up with neat cement using a tremie pipe to seal the borehole.

Reporting

Following completion of this scope of work, Arcadis will prepare a memorandum summarizing the results of the VAP borings, monitoring well installation, and well abandonment. The memorandum will contain boring and well construction logs for the completed VAP borings and monitoring wells, as well as laboratory analytical results, and well abandonment logs.

If you have any questions regarding the scope of work described above, please contact Patrick Curry (Arcadis) at 810-225-1926 or Dave Favero (RACER Trust) at 217-741-6235.

Sincerely,



Patrick Curry, PG, CPG
Technical Expert

CC. Mr. Dave Favero – RACER

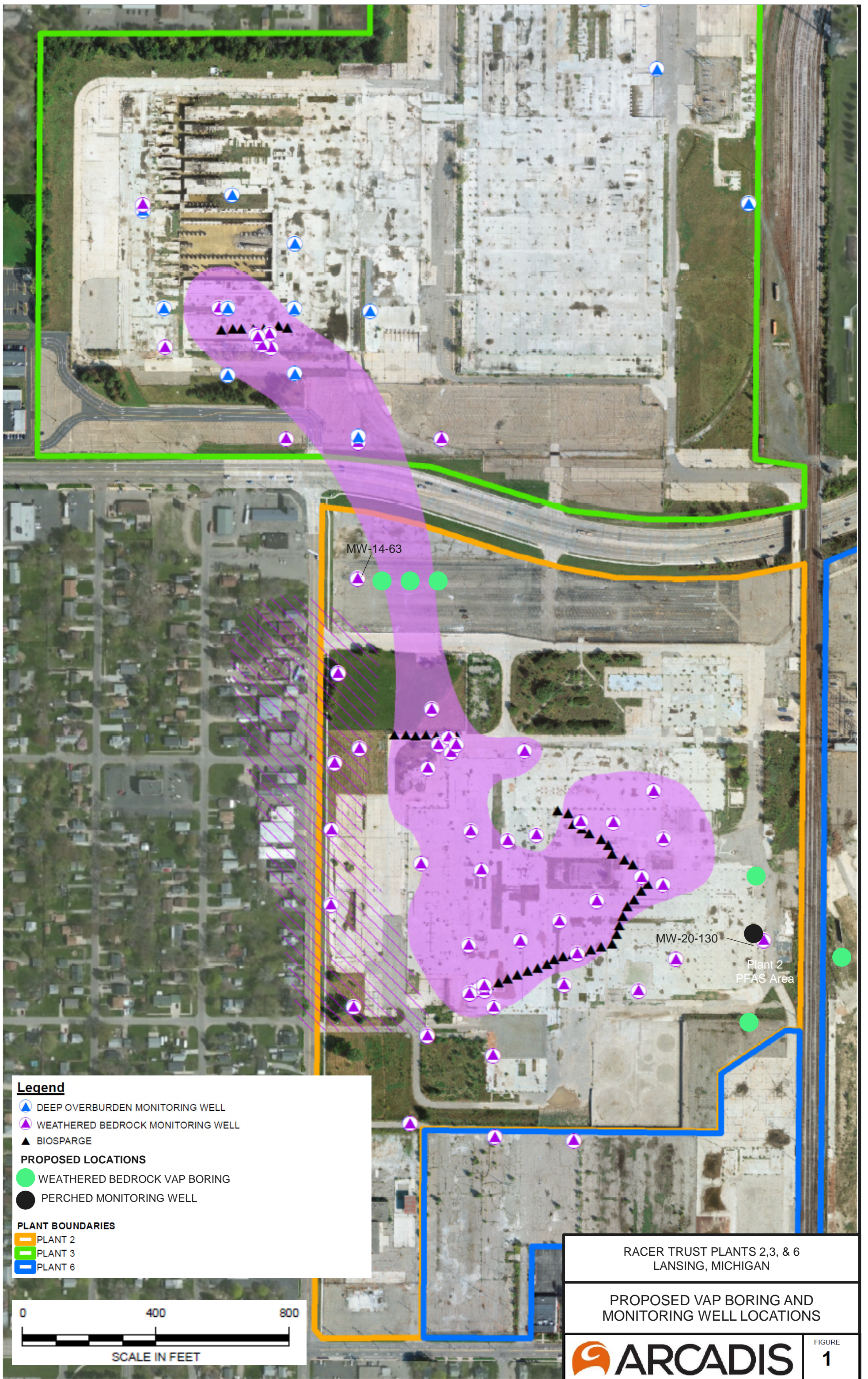
References:

Arcadis. 2019. Revised Interim Groundwater Monitoring Plan - 2019. RACER Trust, Plants 2, 3 and 6, Lansing, Michigan. October 28.

Enclosures:

Figure 1 – Proposed VAP Boring and Monitoring Well Locations

Figure 2 – Propose Well Abandonment Locations



Legend

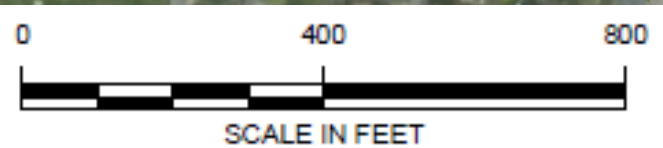
- ▲ DEEP OVERBURDEN MONITORING WELL
- ▲ WEATHERED BEDROCK MONITORING WELL
- ▲ BIOSPARGE

PROPOSED LOCATIONS

- WEATHERED BEDROCK VAP BORING
- PERCHED MONITORING WELL

PLANT BOUNDARIES

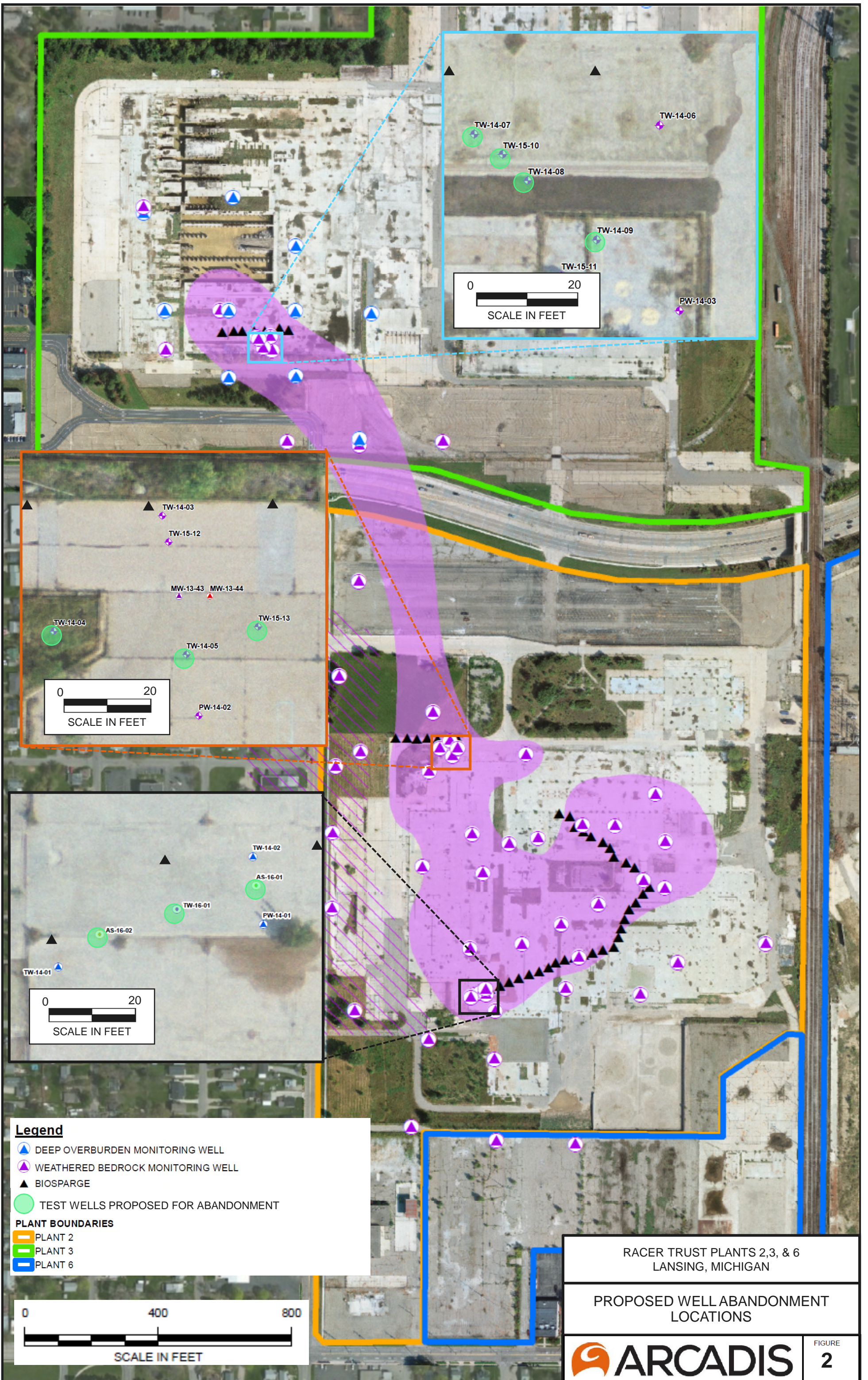
- PLANT 2
- PLANT 3
- PLANT 6



RACER TRUST PLANTS 2,3, & 6
LANSING, MICHIGAN

PROPOSED VAP BORING AND
MONITORING WELL LOCATIONS

FIGURE
1

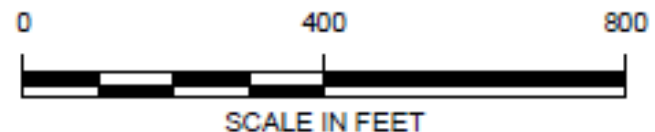


Legend

- ▲ DEEP OVERBURDEN MONITORING WELL
- ▲ WEATHERED BEDROCK MONITORING WELL
- ▲ BIOSPARGE
- TEST WELLS PROPOSED FOR ABANDONMENT

PLANT BOUNDARIES

- PLANT 2
- PLANT 3
- PLANT 6



RACER TRUST PLANTS 2, 3, & 6
LANSING, MICHIGAN

PROPOSED WELL ABANDONMENT
LOCATIONS

