RACER TRUST
LANSING PLANTS 2, 3, & 6

2022 First Quarter Progress Report | April 15, 2022

More detailed reports are available on RACER's Webpage for this Site:
https://www.racertrust.org/properties/lansing-plant-2-industrial-land

Site Introduction

- Remediation at the RACER Lansing Site is being performed through the Resource Conservation and Recovery Act (RCRA) Corrective Action program under the oversight of the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Current activities include focused site characterization, interim remedial actions, and evaluation of remedial alternatives.

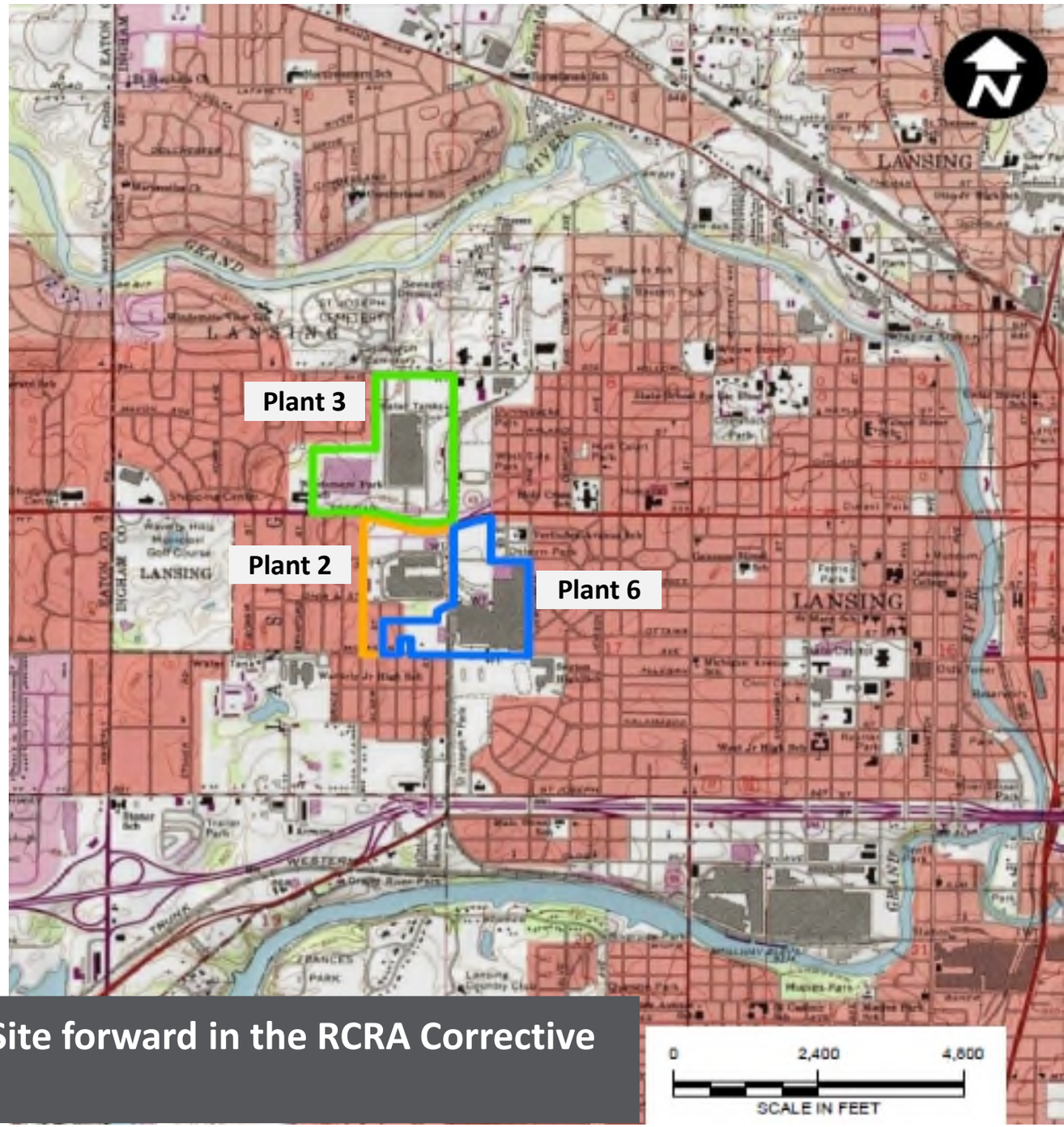
- There is currently no known exposure pathways for area residents associated with the site contaminants.

- Characterization of the 1,4-dioxane plume in weathered bedrock at a depth of approximately 60 to 75 feet below the ground surface is complete. Remediation of 1,4-dioxane in the weathered bedrock includes operation of the Plant 2 and Plant 3 biosparge systems (Plant 2 system started operations during the third quarter of 2020). It is anticipated that portions of the Plant 2 biosparge system may need to operate for 10 to 15 years. See the appendix at the end of this report for more information on biosparging.

- Characterization of per and polyfluoroalkyl substances (PFAS) is ongoing to the north, east, and south of Plant 6. Interim actions for PFAS include storm sewer modifications on Plants 2, 3, and 6 to eliminate groundwater containing PFAS from infiltrating into and then discharging off-site through the storm sewers.

- Monitoring of potential soil vapor intrusion (VI) to indoor air is ongoing and will continue in the northeast portion of Plant 6 and the adjacent off-site area.

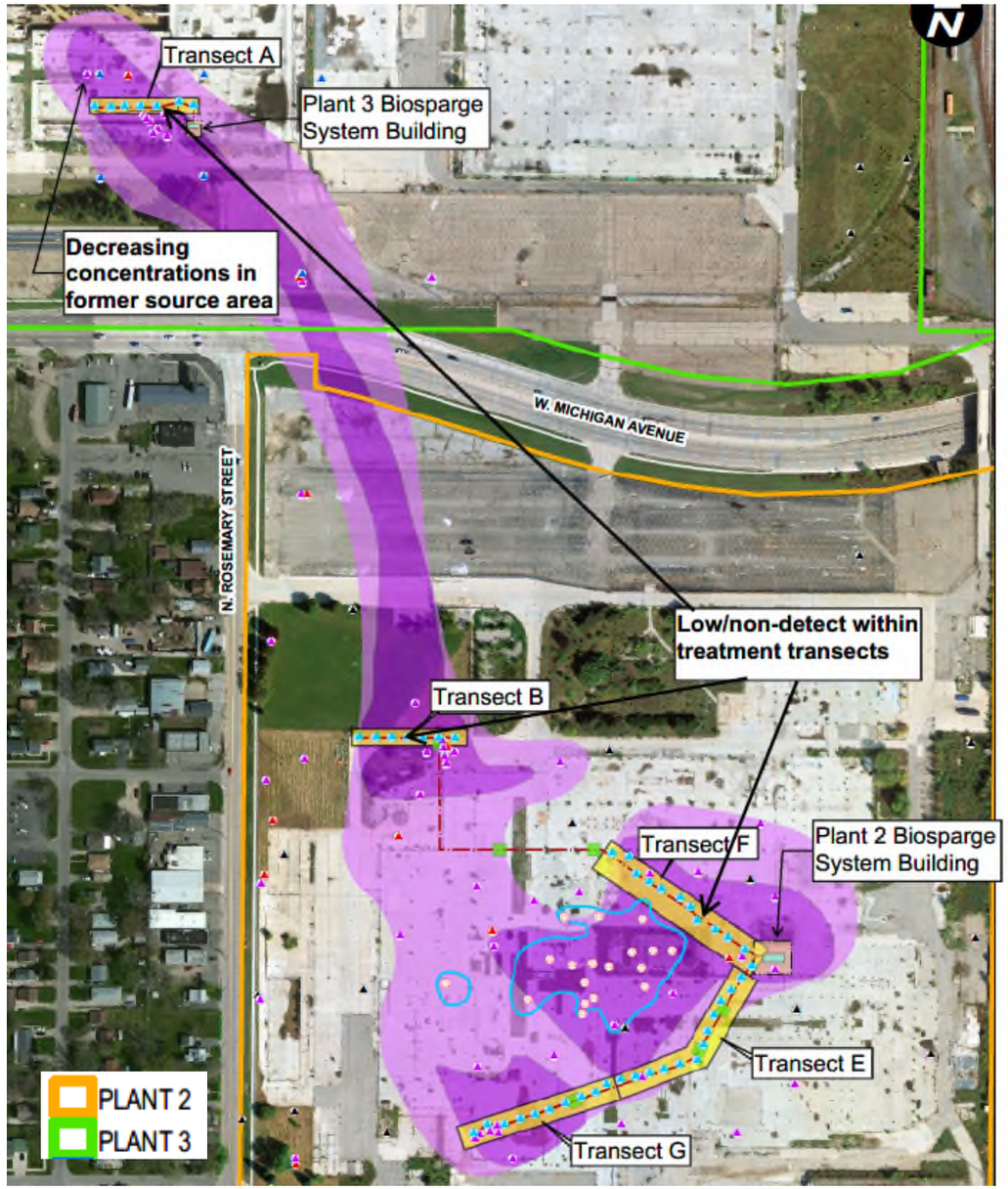
- Routine groundwater monitoring on Plants 2, 3, & 6 in the shallow (perched) zone, weathered bedrock, shallow bedrock, and deep bedrock is ongoing and is anticipated to continue for 25 to 30 years.



Activities completed during this period move the Site forward in the RCRA Corrective Action process

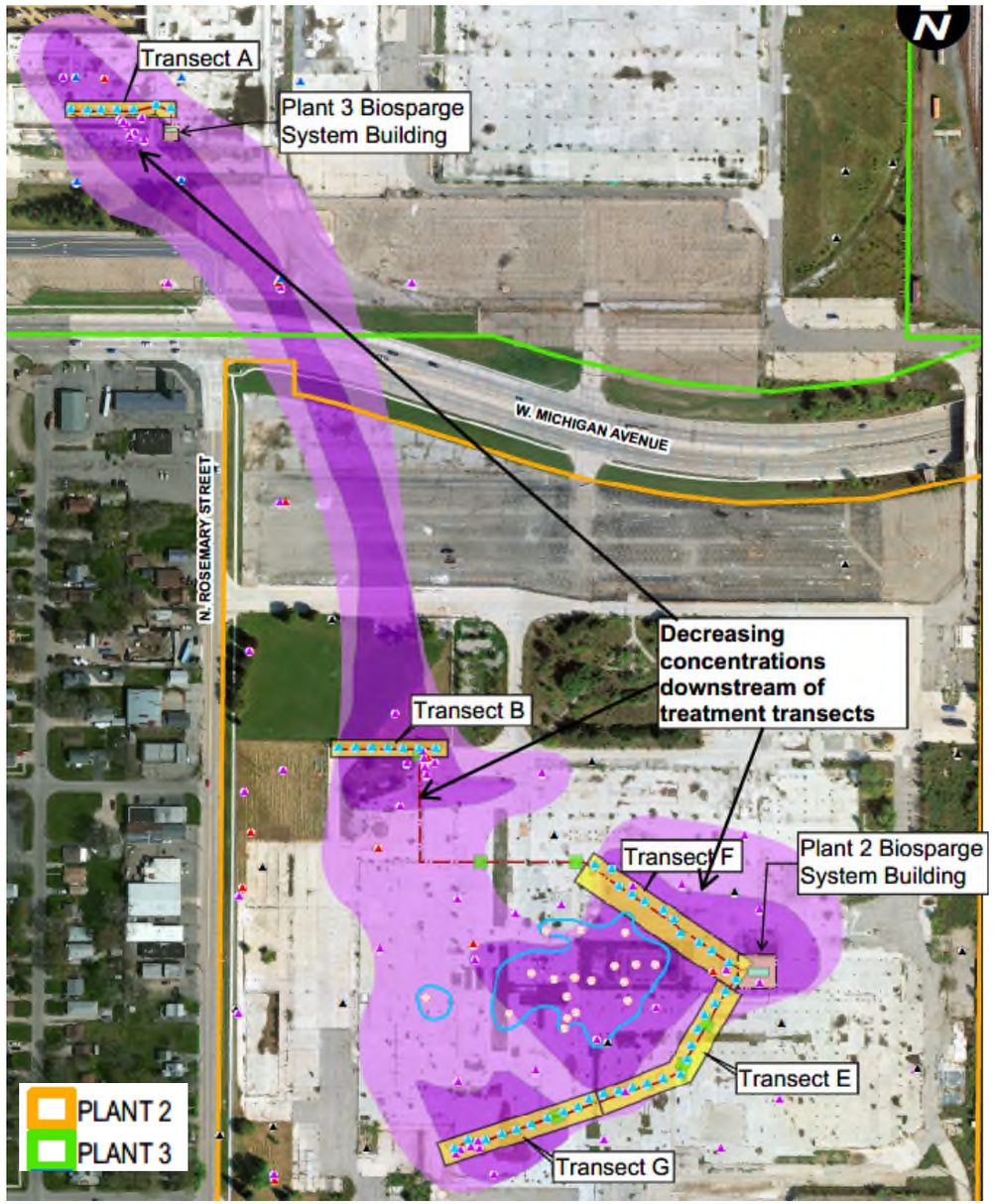
Remediation of 1,4-Dioxane in Weathered Bedrock

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Plants 2 and 3 – greater than 94% uptime since August 2020
  - Minimal downtime related to equipment upgrades/replacement or regular system maintenance
  - Re-development of 8 wells completed in January 2022 for preventative system maintenance
  - Nutrient injection completed in March 2022
- Results from the Fourth Quarter 2021 performance monitoring show that concentrations of 1,4-Dioxane at Plant 2 and Plant 3 continue to decrease:
  - 1,4-dioxane concentrations upstream of biosparge treatment transect on Plant 3 is decreasing, indicating that the former source of contamination is depleted and attenuating
  - Due to seasonal changes in water levels/flow, small upticks are observed in Transect B at Plant 2
  - 1,4-dioxane concentrations in groundwater downstream of the biosparge treatment transects have started to decrease as treated groundwater flows downstream



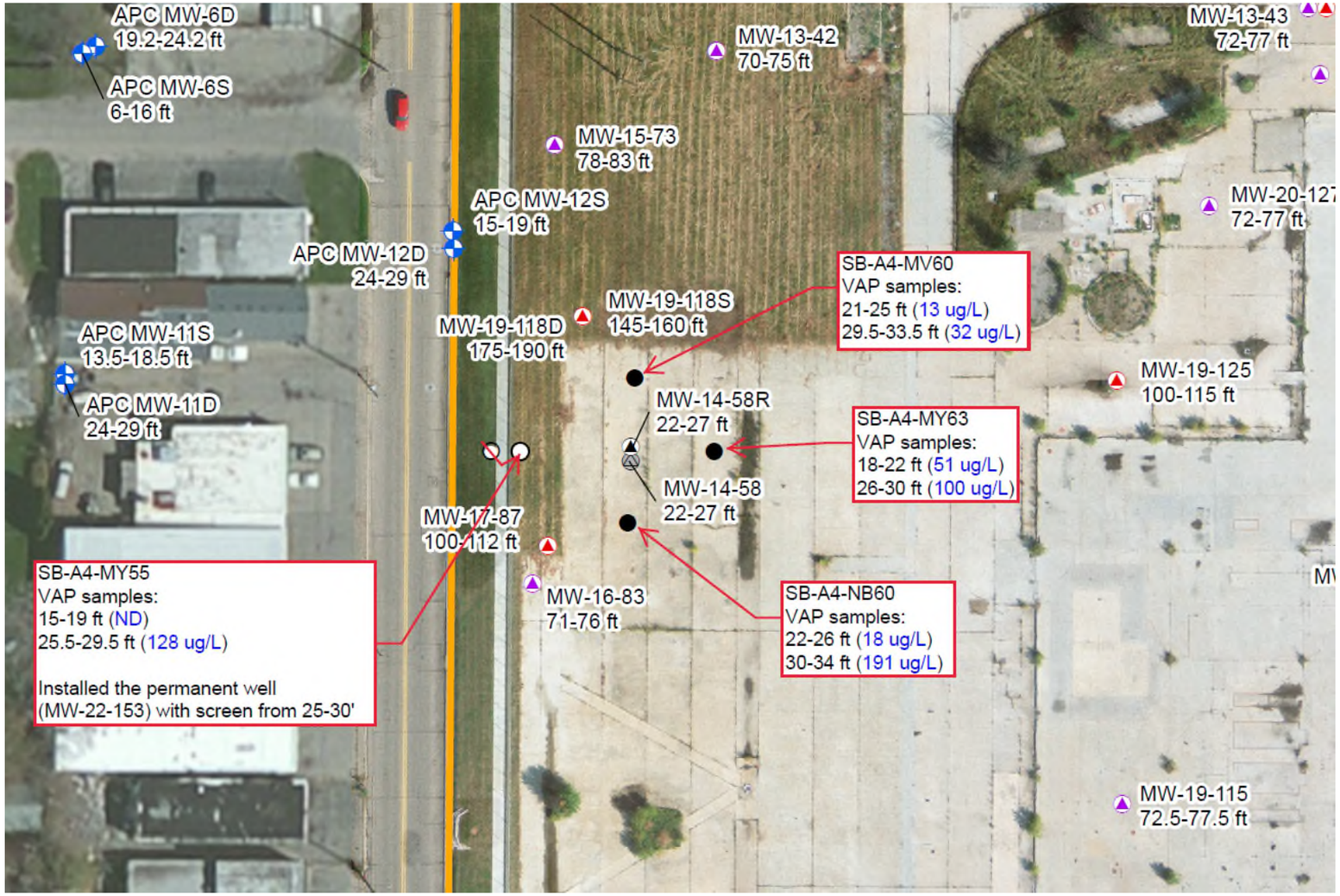
Remediation of 1,4-Dioxane in Weathered Bedrock

- Results show that the biosparge systems are achieving the short-term objective of reducing 1,4-dioxane concentrations and mass along the core of the weathered bedrock plume
- A subset of the routine performance monitoring locations were sampled in First Quarter 2022 and the results will be summarized in the 2022 Second Quarter Progress Report
- A full round of performance monitoring will be conducted in Second Quarter 2022 and then again in Fourth Quarter 2022 to continue with the semi-annual sampling schedule for 2022
- The results of performance monitoring conducted in 2021 will be summarized in the Annual Lower 1,4-Dioxane Biosparge Progress Report targeted to be submitted to EGLE in April 2022



Investigation of 1,4-Dioxane in Perched Zone Plant 2

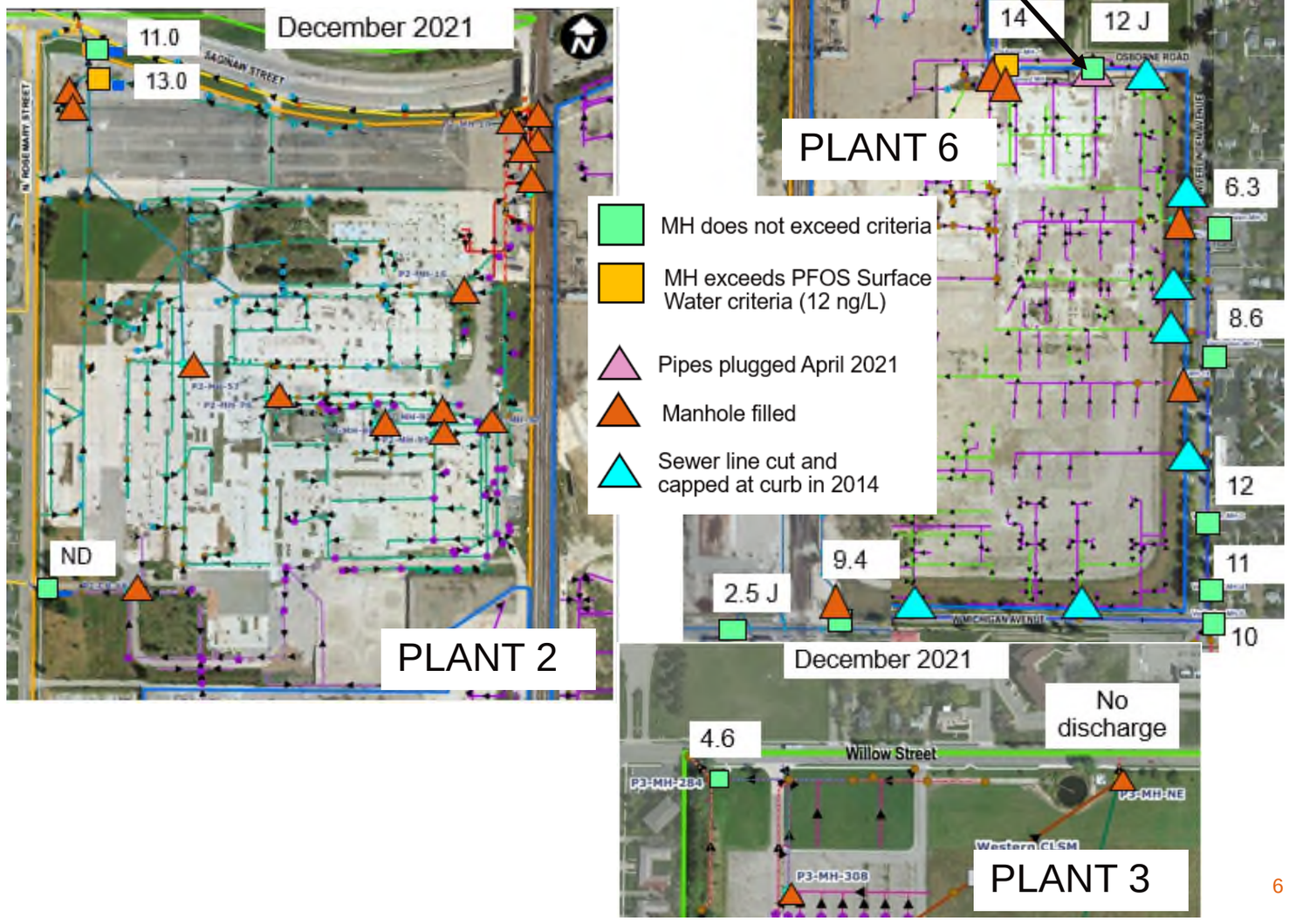
- Due to damage to MW-14-58 a replacement well was installed (MW-14-58R) and sampled
- Higher concentrations of 1,4-dioxane were detected in the groundwater sample collected from MW-14-58R than samples collected from original MW-14-58
- Additional investigation activities were conducted in March 2022 in the area of MW-14-58R:
  - Impacted seam is ~25-30 ft below ground surface and extends under Rosemary Street to the west
  - Unclear why there is a disparity between MW-14-58 and 58R
    - MW-14-58 - 38 µg/L (6/20)
    - MW-14-58R58R - 520 µg/L (2/22)
- Evaluation continuing



Remediation of PFAS Impacts

Sewer Modifications and Performance Sampling

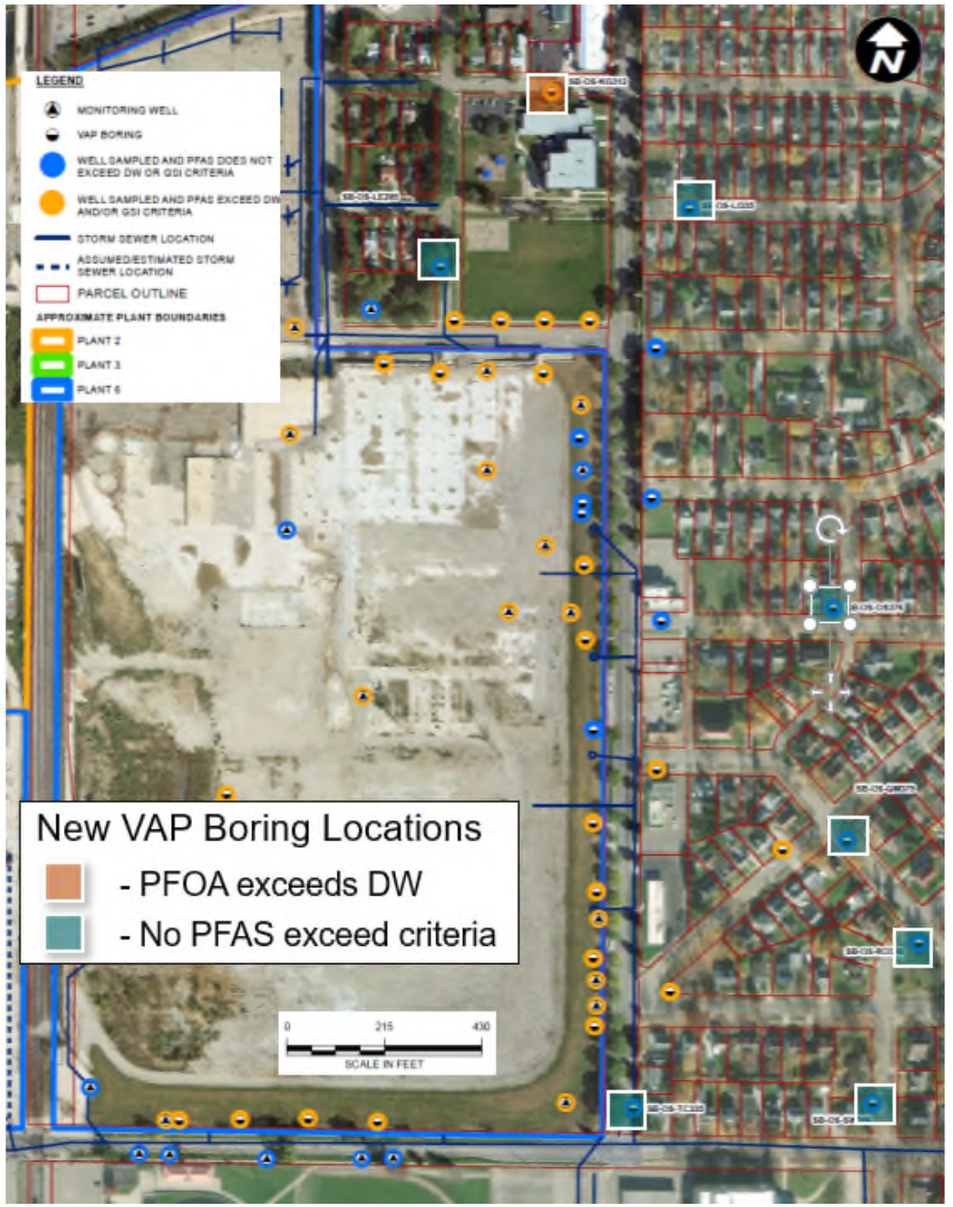
- Fourth Quarter site wide performance monitoring of storm sewers was conducted in December and additional sampling of P2-MH-30 was conducted in January 2022. Results for Perfluorooctanesulfonic acid (PFOS), the specific PFAS of concern, are depicted on figures to the right.
- First Quarter site wide performance monitoring of storm sewers was conducted in March 2022. Results will be summarized in the Second Quarter Progress Report.



PFAS Investigation

Plant 6 Off-site Investigation

- A total of 10 off-site monitoring wells were installed in March 2022 in the general locations of the prior vertical aquifer profile (VAP) sampling locations (See Figure to Right). The locations were selected based on the results of the September 2021 PFAS GW investigation.
- A Plant 6 PFAS Off-Site Investigation Summary Report was prepared to summarize the September 2021 investigation and proposed monitoring well installation and was submitted to EGLE in January 2022
- The monitoring wells were sampled in March 2022 and results will be summarized in the Second Quarter Progress Report
- The monitoring wells will be sampled on a quarterly basis during 2022
- There are no known complete exposure pathways to PFOA in the groundwater for residents and therefore PFOA present in shallow groundwater is not expected to pose a risk to residents



Work in Progress and Near-Term Milestones Anticipated During the Second Quarter of 2022

Activity	Schedule
Remediation of 1,4-Dioxane in the Weathered Bedrock	
Plants 2 and 3 Biosparge System Operation	Ongoing
Biosparge Update Report	April 2022
Investigation of 1,4-Dioxane in Perched Zone	
Plant 2 1,4 Dioxane MW-14-58R Investigation Summary Report	May 2022
Remediation and Investigation of PFAS	
Plant 6 Off-Site Well Installation and Sampling Summary Report	May 2022
Quarterly Storm Sewer Sampling	June 2022
Other investigations and Sampling	
Plant 6 Final VI Summary Report	May 2022
P2 and P3 Corrective Measures Work Plan – Excavation and Cover Placement	June 2022
Updates to IGMP	June 2022
2021 Annual Groundwater Monitoring Report Submittal	May 2022
Second Quarter 2022 Groundwater Monitoring and Biosparge Performance Monitoring	May 2022

ARCADIS Design & Consultancy for natural and built assets

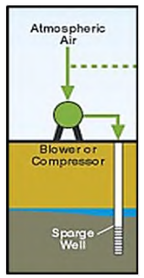
Appendix

BIOSPARGING TREATMENT OF 1,4-DIOXANE

Lansing Industrial Land, Lansing and Lansing Township, Michigan

WHAT IS BIOSPARGING?

- Air and small amounts of propane are injected into the ground through wells
- Promotes biodegradation of chemicals in groundwater, much faster than it would occur naturally
- 1,4-dioxane is treated in the ground, so minimal waste is generated
- Nearby wells are sampled to make sure treatment is occurring



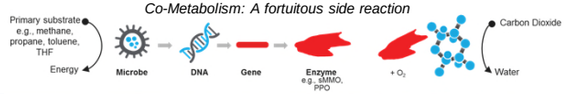
TREATMENT OBJECTIVES

- Reduce onsite concentrations of 1,4-dioxane in the top/weathered zone of the bedrock aquifer
- Prevent off-site migration of 1,4-dioxane

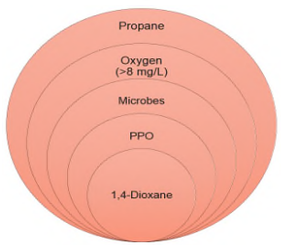
CO-METABOLIC BIODEGRADATION OF 1,4-DIOXANE:

Metabolism: the goal is to produce energy

Co-Metabolism: A fortuitous side reaction



Propane + Oxygen + Microbes = 1,4-Dioxane Treatment

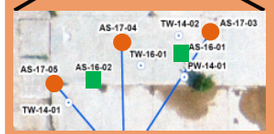


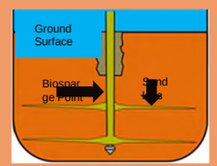
SYSTEM SETUP

Propane

Compressor

Biosparge Points



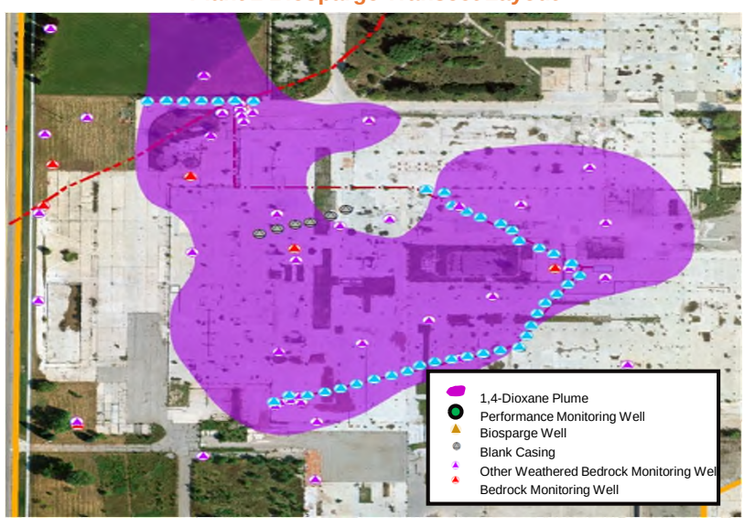


Sand Enhancements

Biosparge Transect With Hoses in Gravel Cover

2016 Pilot Test Biosparge Points
2018 Pre-Design Study Biosparge Points With Sand Enhancements
Weathered Bedrock Monitoring Well

Plant 2 Biosparge Transect Layout



CONCLUSIONS

- Biosparging is a low cost, effective, safe and sustainable method for treating 1,4-dioxane
- Installation of sand enhancements improves treatment
- Continual monitoring of the treatment system improves results
- Technology can be scaled up to treat the rest of the site

FULL-SCALE DESIGN

- 5 transects with 48 air sparge wells across Plants 2 and 4
- Nearly 5 miles of air hose and an air/propane injection network
- Groundwater flows from northwest to southeast and is cleaned by each transect
- Tubing installed above grade to save on costs and to accommodate future development
- Network of monitoring wells to track treatment progress

Plant 2 Biosparge Unit and Nutrient Injection Tanks