RACER TRUST
LANSING PLANTS 2, 3, & 6

2023 Third Quarter Progress Report | October 16, 2023

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

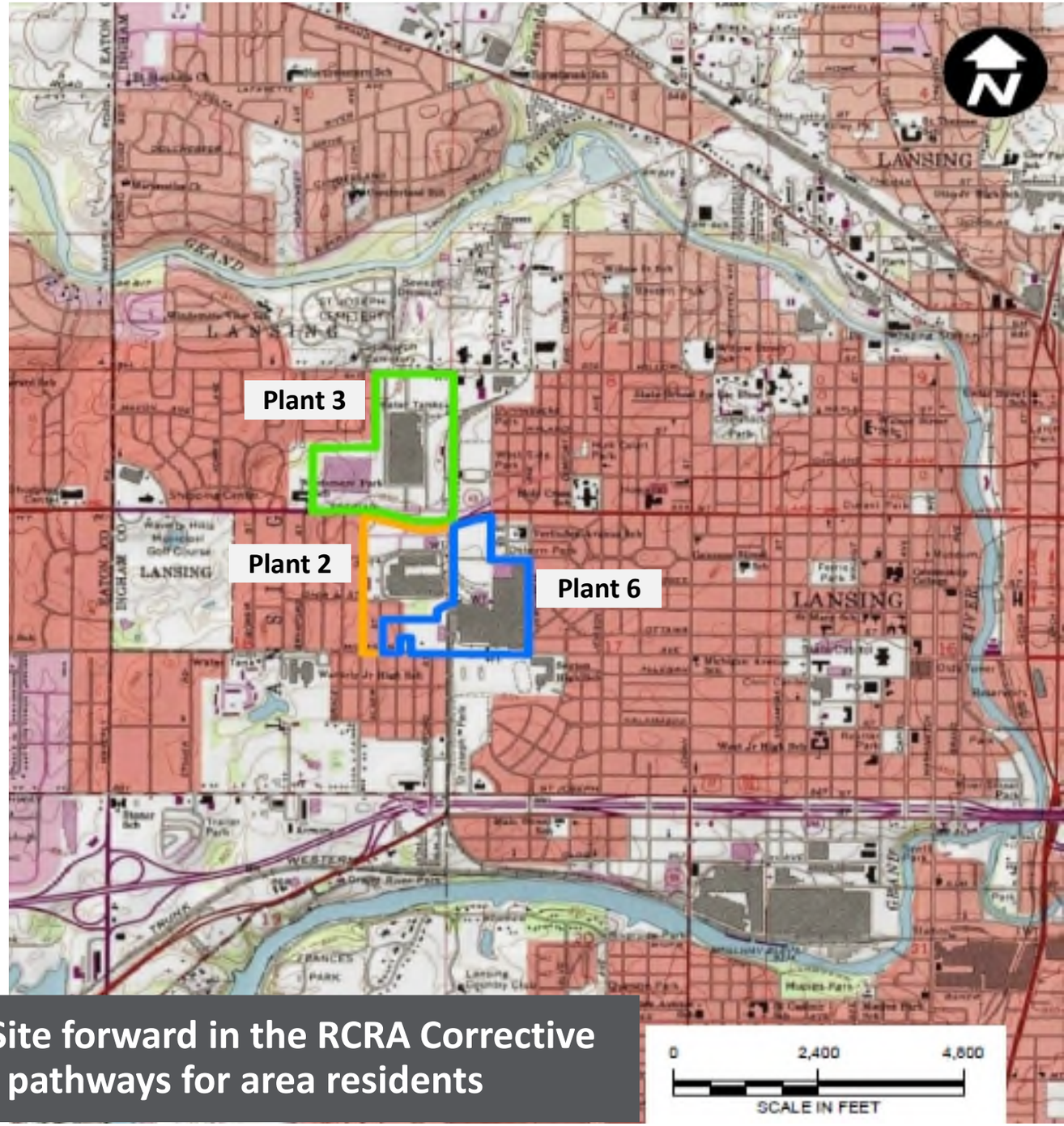
Site Introduction

- 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, and interim remedial actions.

- 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 (The Plant 3 system began operating in 2019 and the Plant 2 system began operating in 2020). It is anticipated that portions of the Plant 2 and Plant 3 biosparge systems may need to operate for several more years. See the appendix at the end of this report for more information on biosparging.

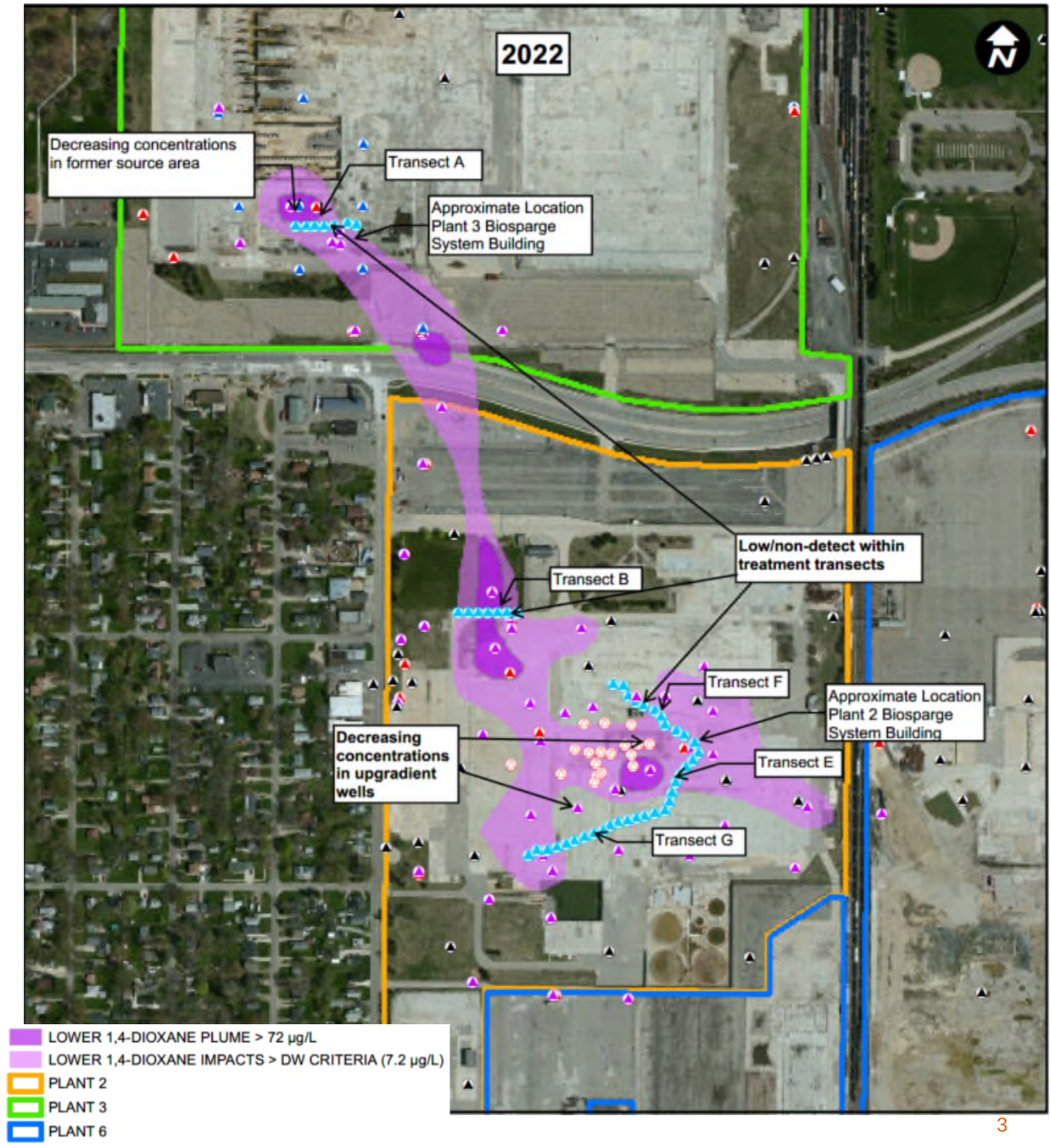
- Routine groundwater monitoring on and in certain areas adjacent to Plants 2, 3, & 6 in the shallow (perched) zone, weathered bedrock, shallow bedrock, and deep bedrock is ongoing and is anticipated to continue for many years.



Activities completed during this period move the Site forward in the RCRA Corrective Action process and verified no complete exposure pathways for area residents

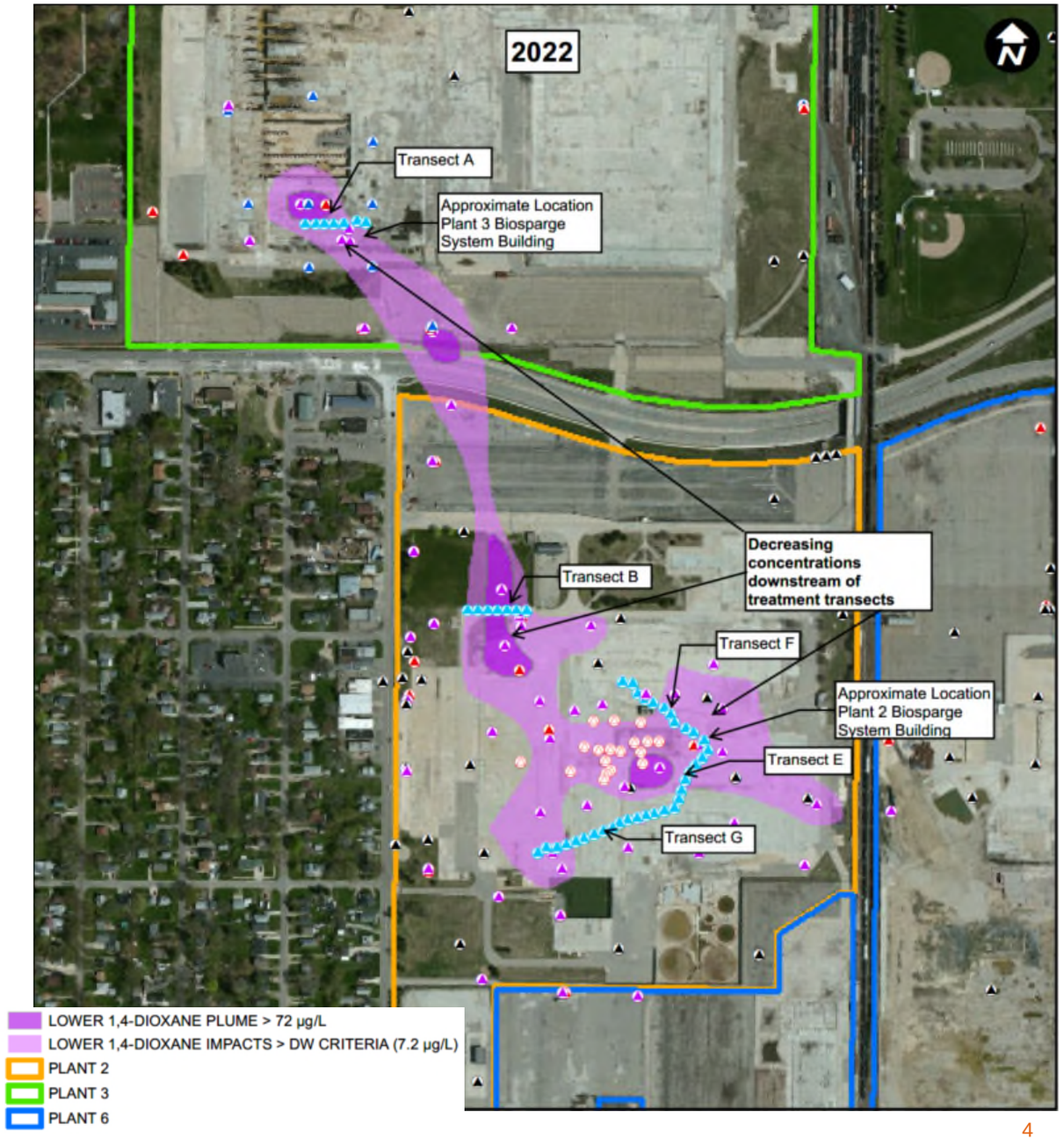
Remediation of 1,4-Dioxane in Weathered Bedrock

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Minimal downtime at the Plant 3 system related to equipment repairs or regular system maintenance
  - Plant 2 system had a 4-week shutdown due to an electrical surge that damaged electrical equipment and was restarted after repairs were made
- Results of performance monitoring 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



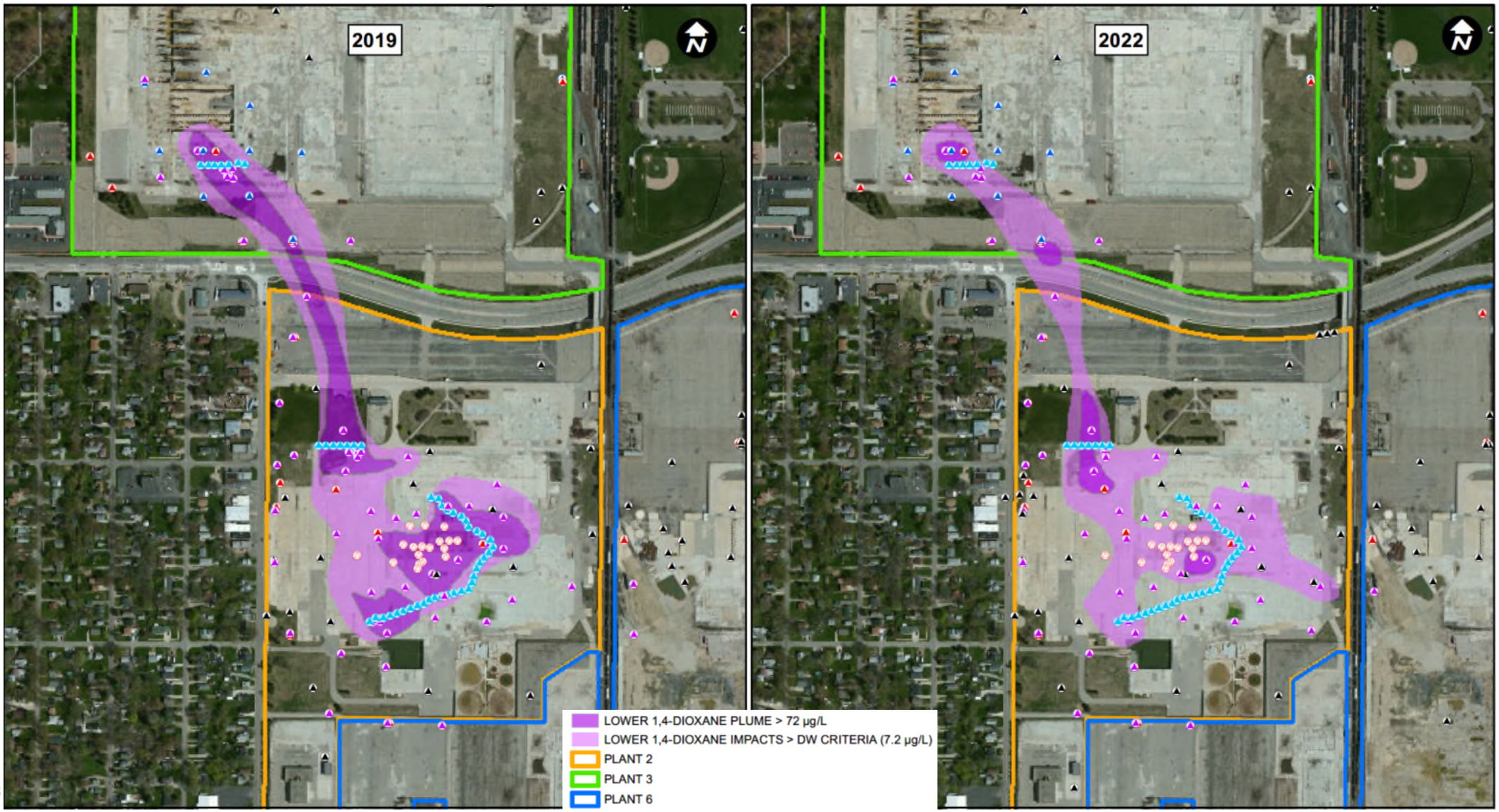
Remediation of 1,4-Dioxane in Weathered Bedrock

- The second full round of performance monitoring will be conducted in Fourth Quarter 2023 to continue with the semi-annual sampling schedule for 2023
- Nutrient injections for the system were completed in September 2023
- An annual Biosparge Summary Report summarizing the 2023-year data is anticipated to be submitted to EGLE during the First Quarter of 2024



Remediation of 1,4-Dioxane in Weathered Bedrock

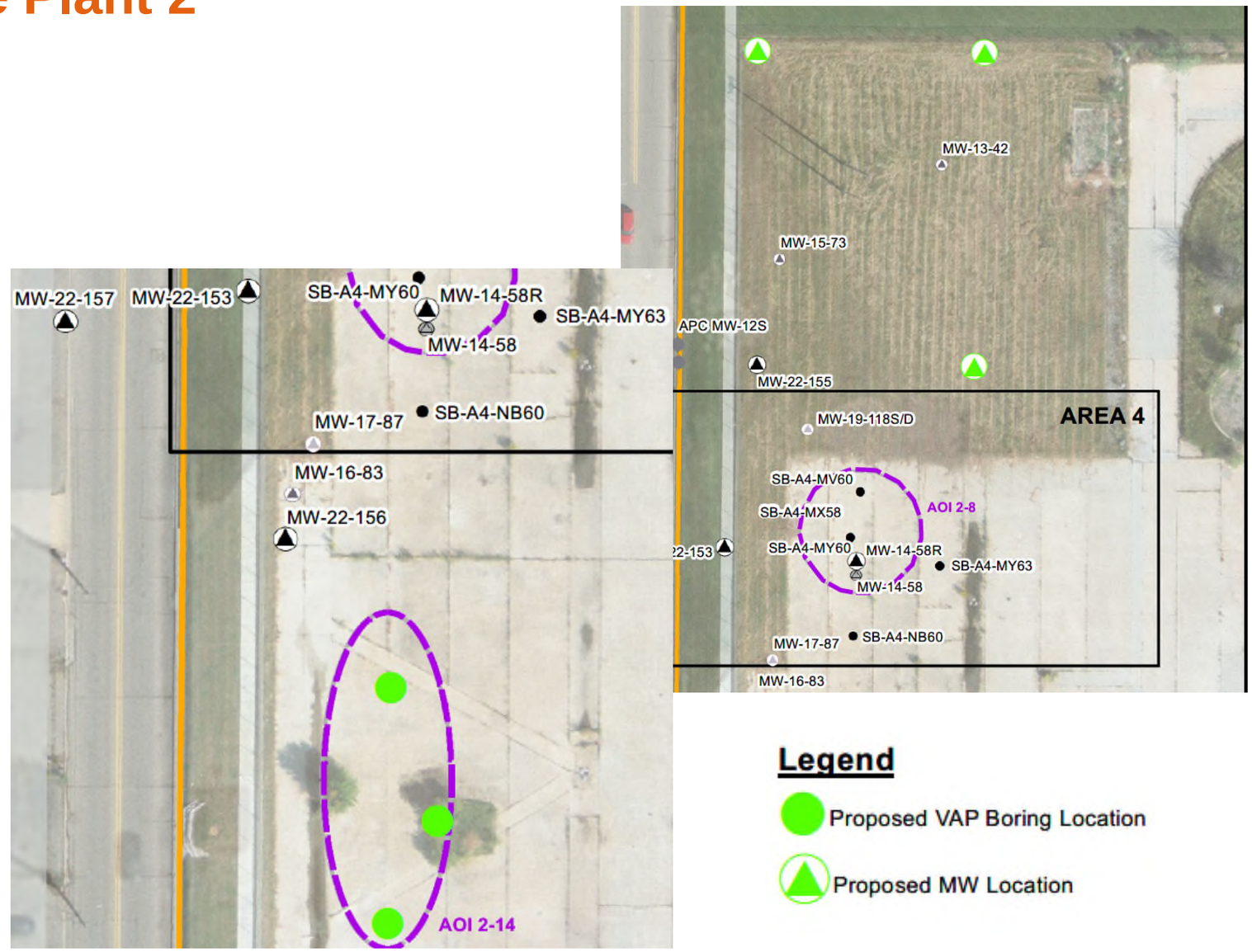
- Visual depiction of 1,4-dioxane plume distribution in 2019 vs. 2022



Groundwater Sampling and Investigation - 1,4-Dioxane in Perched Zone Plant 2

- Third Quarter sampling was completed in September 2023
- Additional 1,4-dioxane investigation was completed near Rosemary Street along the east-central boundary of Plant 2
- The investigation included the installation of three permanent monitoring wells north of monitoring well MW-14-58R and three vertical aquifer profile (VAP) borings to evaluate current groundwater conditions south of monitoring well MW14-58R
- Results of the sampling and investigation will be reported in the Fourth Quarter Progress Report

Note: Vertical Aquifer Profile (VAP) borings are an investigation method used to characterize an aquifer at targeted depth intervals. The use of VAP borings in an investigation can help determine where impacts are within an aquifer, can help identify source areas, and can be used to gather data needed to determine contaminant mass flux in groundwater.



Monitoring of PFAS Impacts

Sewer Monitoring

- Third Quarter site wide monitoring of storm sewers was conducted in July 2023, following the updated 2023 sampling plan approved by EGLE.
- Fourth Quarter site wide monitoring of storm sewers is planned to be completed in November 2023.
- The results of the Third and Fourth Quarter sampling will be summarized in the Fourth Quarter Progress Report.

Reports Submitted to EGLE Third Quarter 2023

- 2023 Proposed Additional MW-14-58R Area Investigation – Submitted on 8/23/23
- 2023 Semi-Annual Groundwater Sampling Report – Submitted on 9/19/23
- Plant 2 Toxic Substances Control Act (TSCA-PCBs) Soils Interim Measure Work Plan – Submitted on 10/11/23
- Reports can be viewed or downloaded from the RACER Website for the Lansing Property: https://www.racertrust.org/properties/lansing-plant-2-industrial-land

Work in Progress and Near-Term Milestones Anticipated During the Fourth Quarter of 2023

Activity	Schedule
Remediation of 1,4-Dioxane in the Weathered Bedrock	
Plants 2 and 3 Biosparge System Operation	Ongoing
Biosparge Shut Down Test	Upon EGLE Concurrence
Investigation of 1,4-Dioxane in Perched Zone	
Plant 2 1,4 Dioxane MW-14-58R Area Continued Evaluation and Groundwater Monitoring	October 2023
MW014-58R Area Investigation Summary Report	Fourth Quarter 2023
Remediation and Investigation of PFAS	
Quarterly Storm Sewer Sampling	November 2023
Plant 3 and Plant 6 Storm Sewer Cleaning and Modifications	October-November 2023
Other investigations and Sampling	
Plants 2 Area 2 Excavation and Plants 2 and 3 Exposure Barrier Placement Work Plan	October 2023
Fourth Quarter 2023 Groundwater Monitoring	October-November 2023

ARCADIS Design & Consultancy for natural and built assets

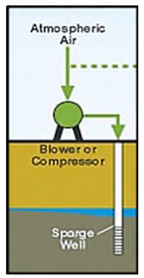
Appendix

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



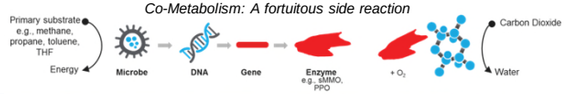
TREATMENT OBJECTIVES

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

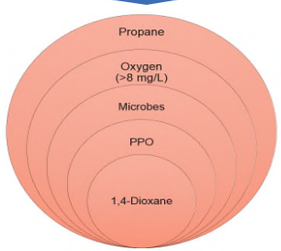
CO-METABOLIC BIODEGRADATION OF 1,4-DIOXANE:

Metabolism: the goal is to produce energy

Co-Metabolism: A fortuitous side reaction



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

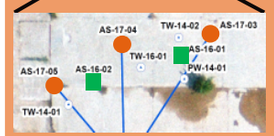


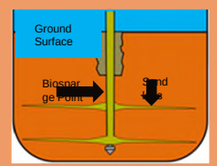
SYSTEM SETUP

Propane

Compressor

Biosparge Points



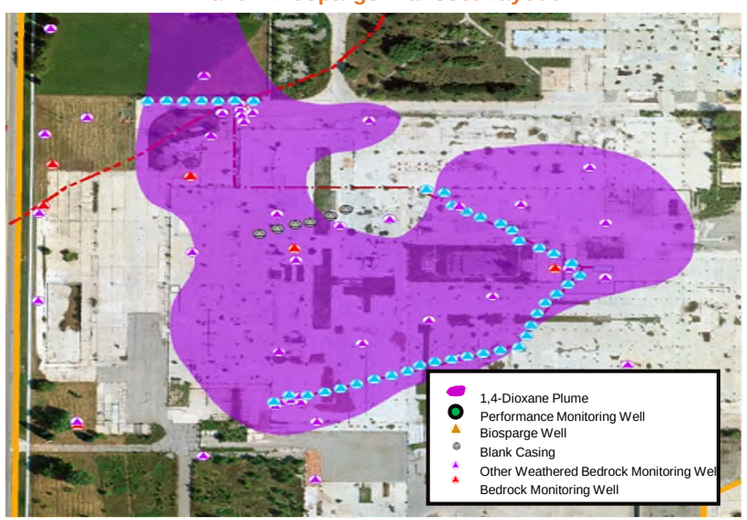


Sand Enhancements

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