RACER TRUST
LANSING PLANTS 2, 3, & 6

2023 Second Quarter Progress Report | July 17, 2023

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

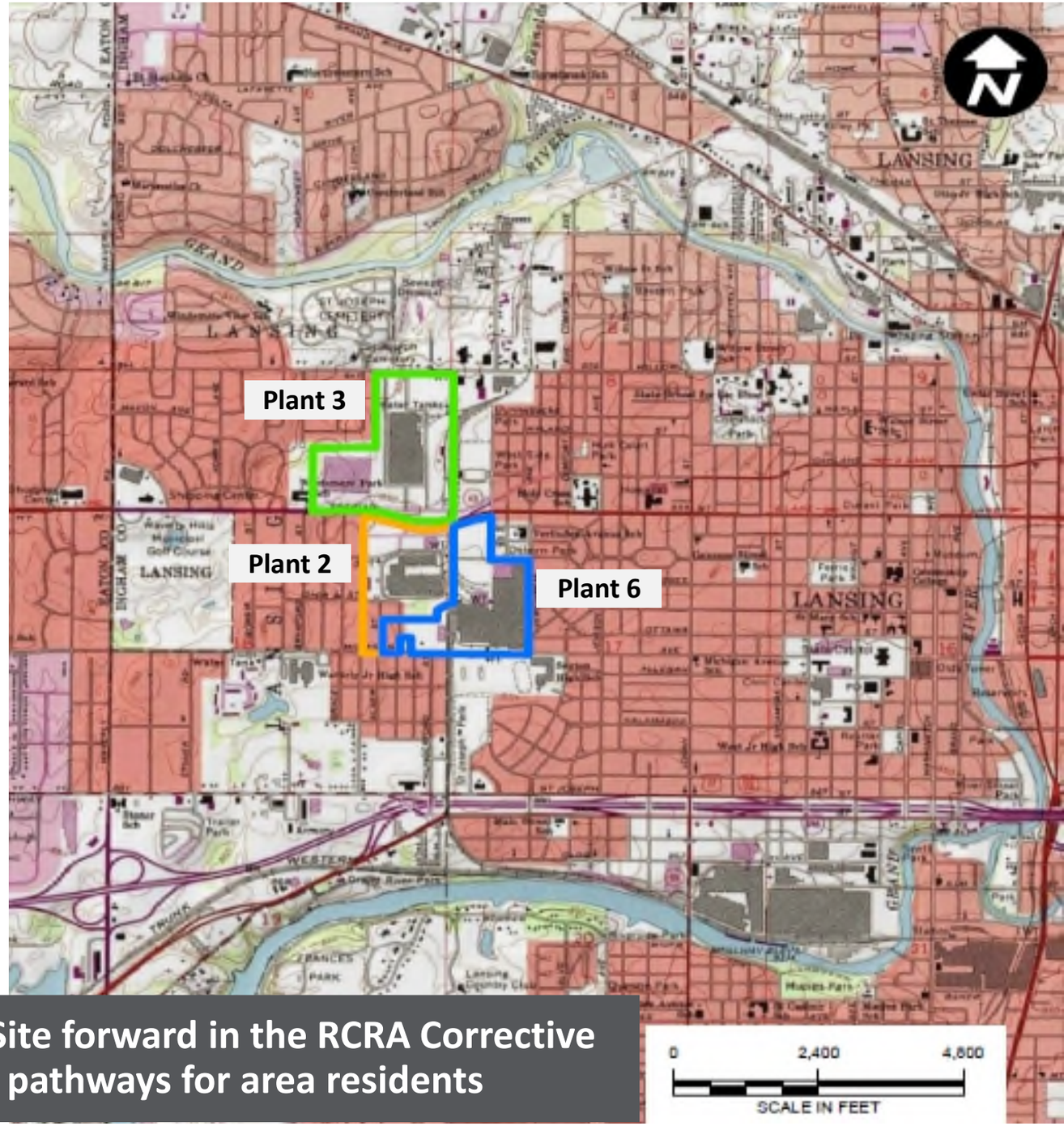
Site Introduction

- 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 (Plant 2 system started operations during the third quarter of 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.

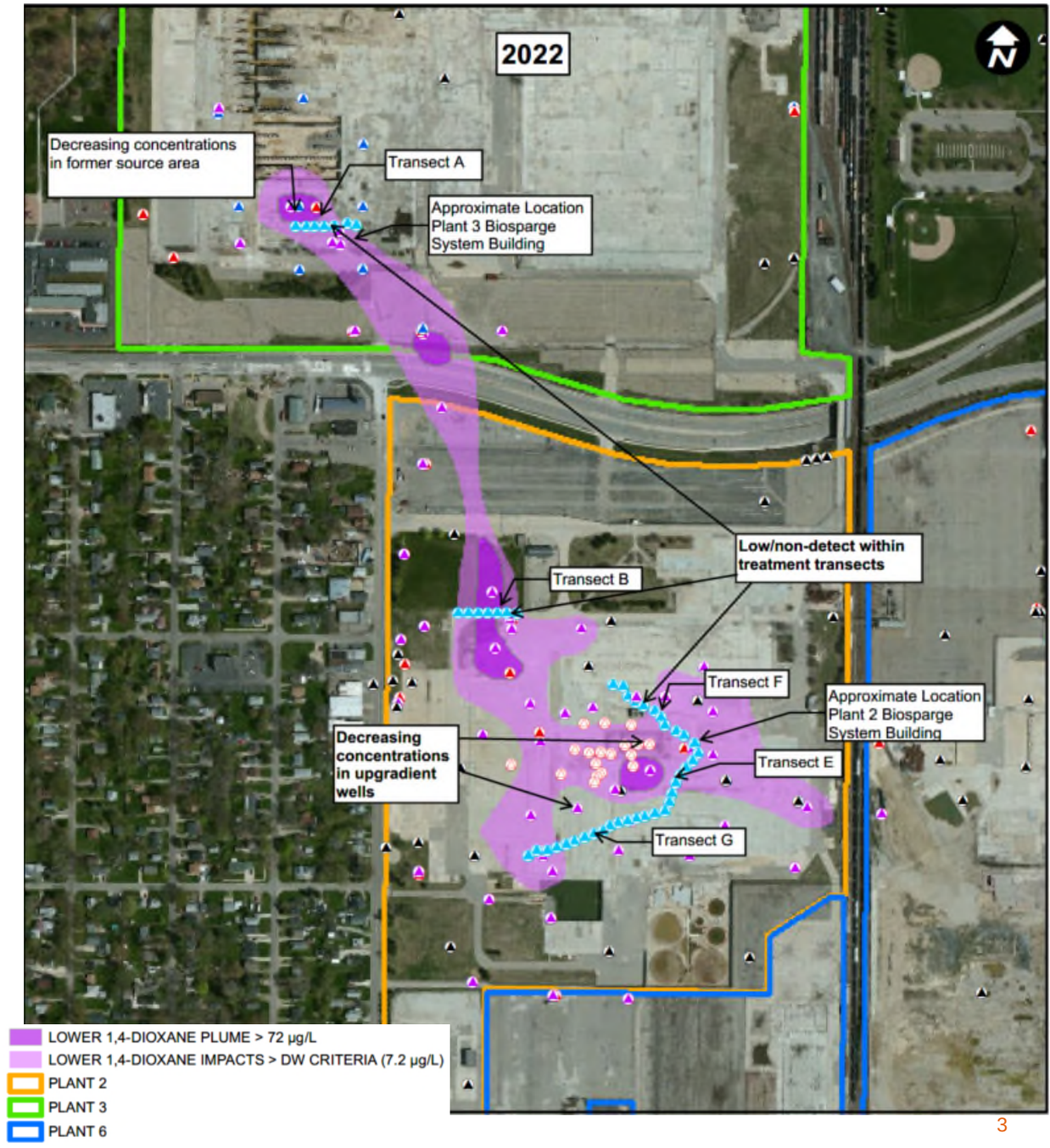
- Routine groundwater monitoring on Plants 2, 3, & 6 in the shallow (perched) zone, weathered bedrock, shallow bedrock, and deep bedrock is ongoing and is anticipated to continue for many years.



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

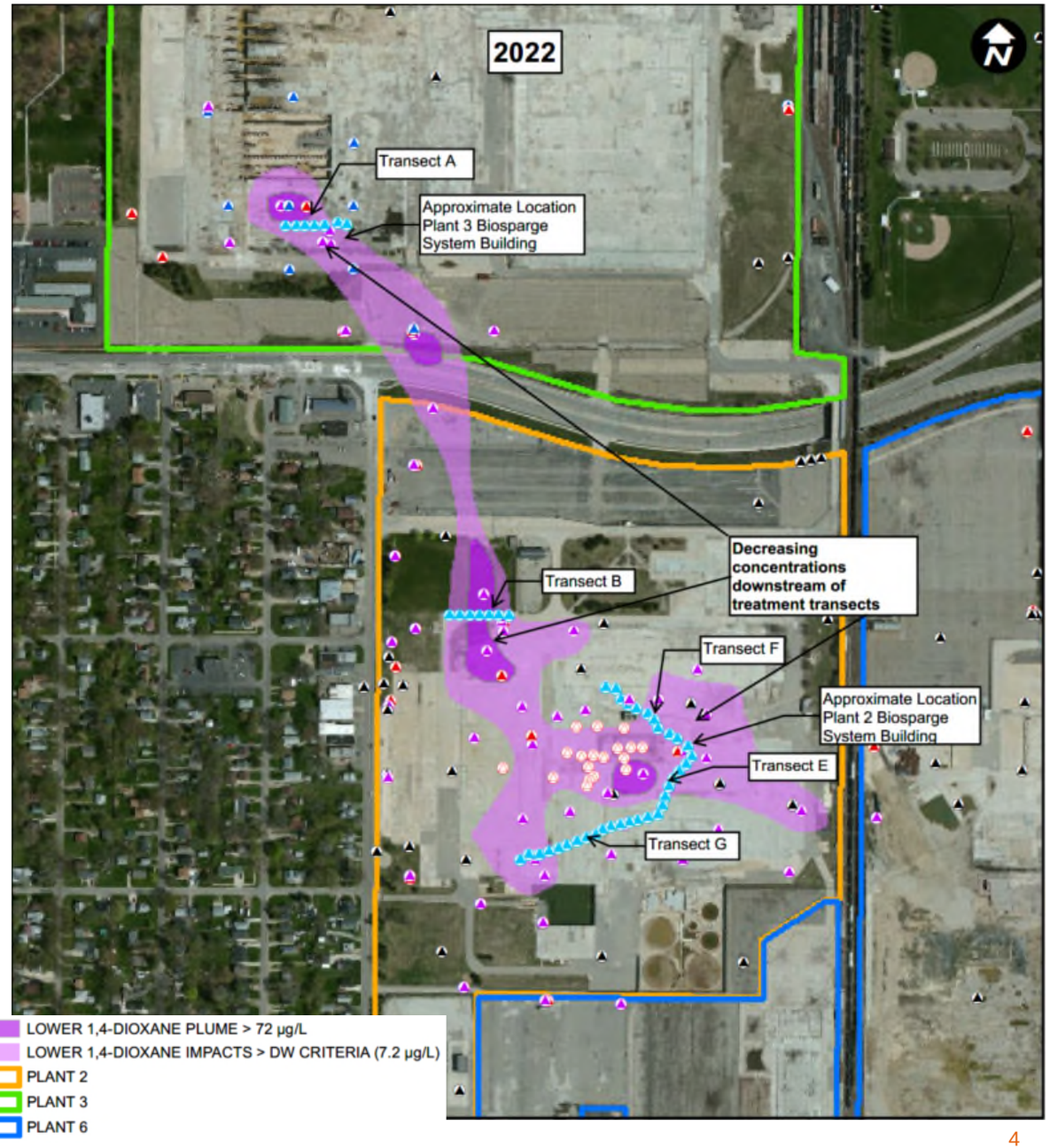
Remediation of 1,4-Dioxane in Weathered Bedrock

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Minimal downtime related to equipment repairs or regular system maintenance
- Semi-Annual performance monitoring was completed during 2Q 2023 – results are consistent with prior sampling events
- 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



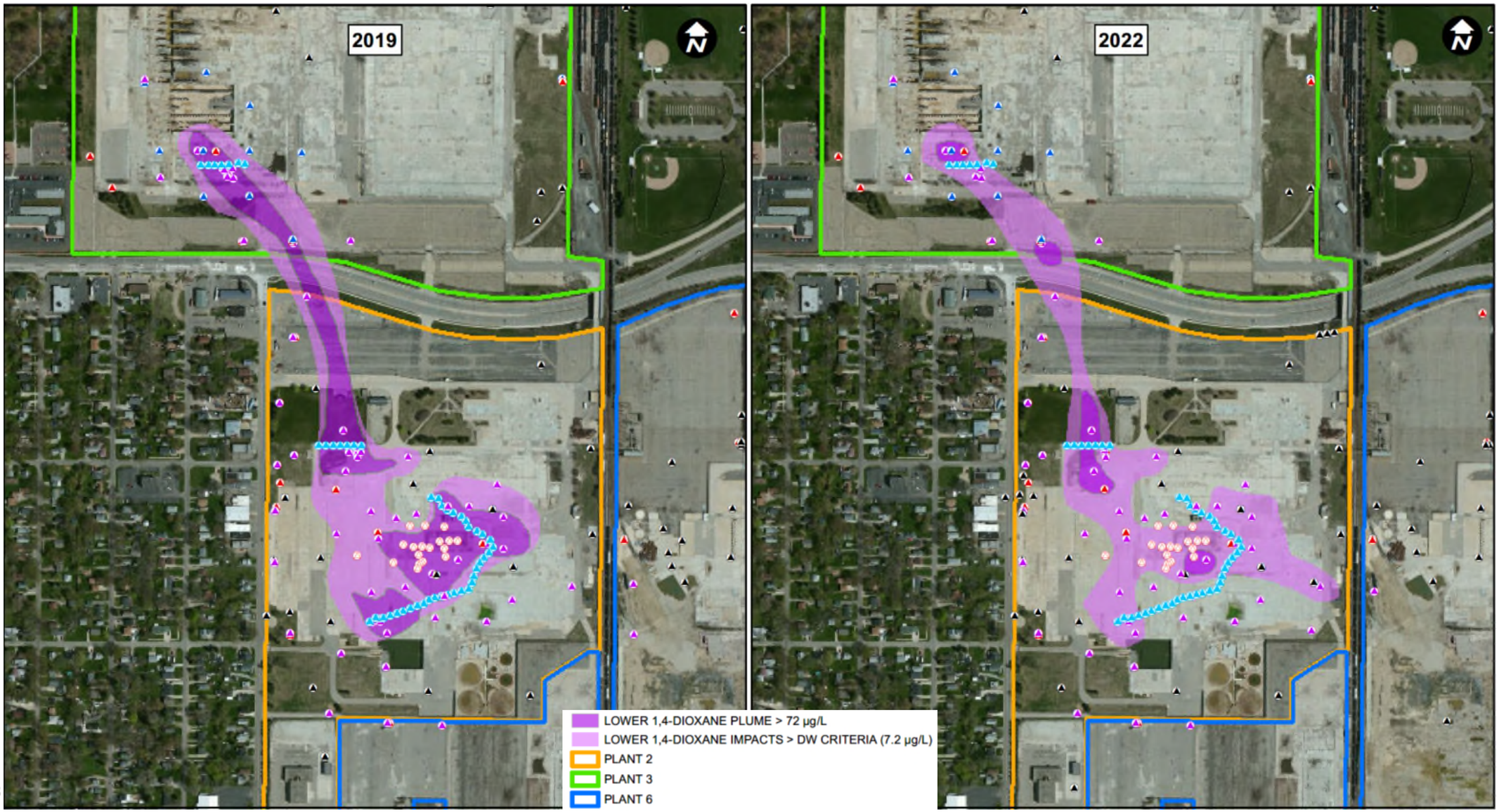
Remediation of 1,4-Dioxane in Weathered Bedrock

- A full round of performance monitoring was conducted in Second Quarter 2023 to continue with the semi-annual sampling schedule for 2023
- Based on the Annual Lower 1,4-Dioxane Biosparge Progress Report submitted to EGLE on March 27, 2023 proposed shut down evaluation for Transects A and G will be initiated upon concurrence from EGLE. This report is also available on RACER's Webpage for this Site: https://www.racertrust.org/properties/lansing-plant-2-industrial-land
- This evaluation will provide us data to assess if or how much 1,4-dioxane concentrations in the groundwater will increase after system operation is stopped



Remediation of 1,4-Dioxane in Weathered Bedrock

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



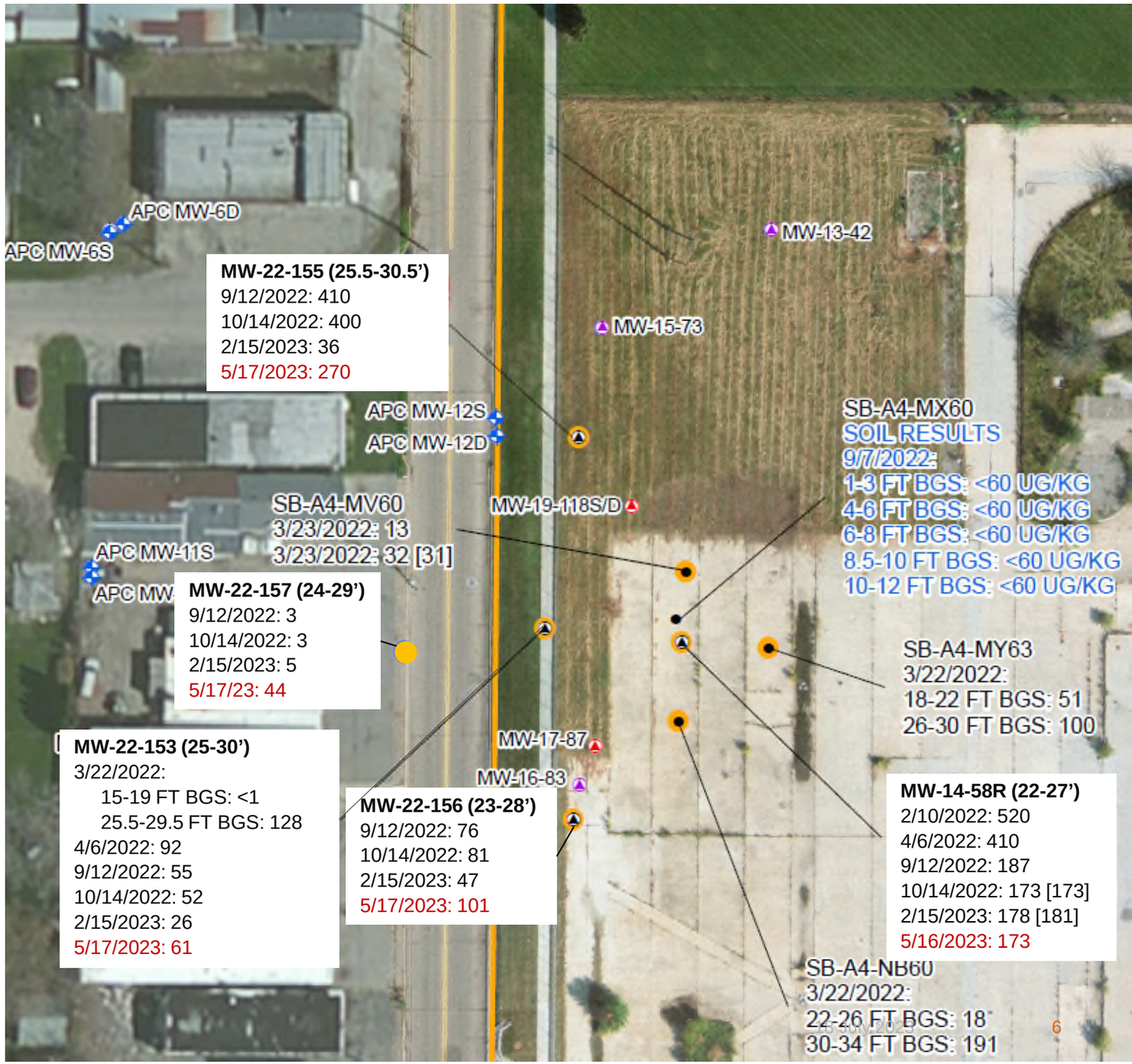
Second Quarter Groundwater Sampling 1,4-Dioxane in Perched Zone Plant 2

Concentrations during 2nd quarter sampling increased across the area

- Will resample MW-22-157 in 3rd quarter to verify results
- Additional 1,4-dioxane investigation is proposed to the north and south of MW14-58R

Legend

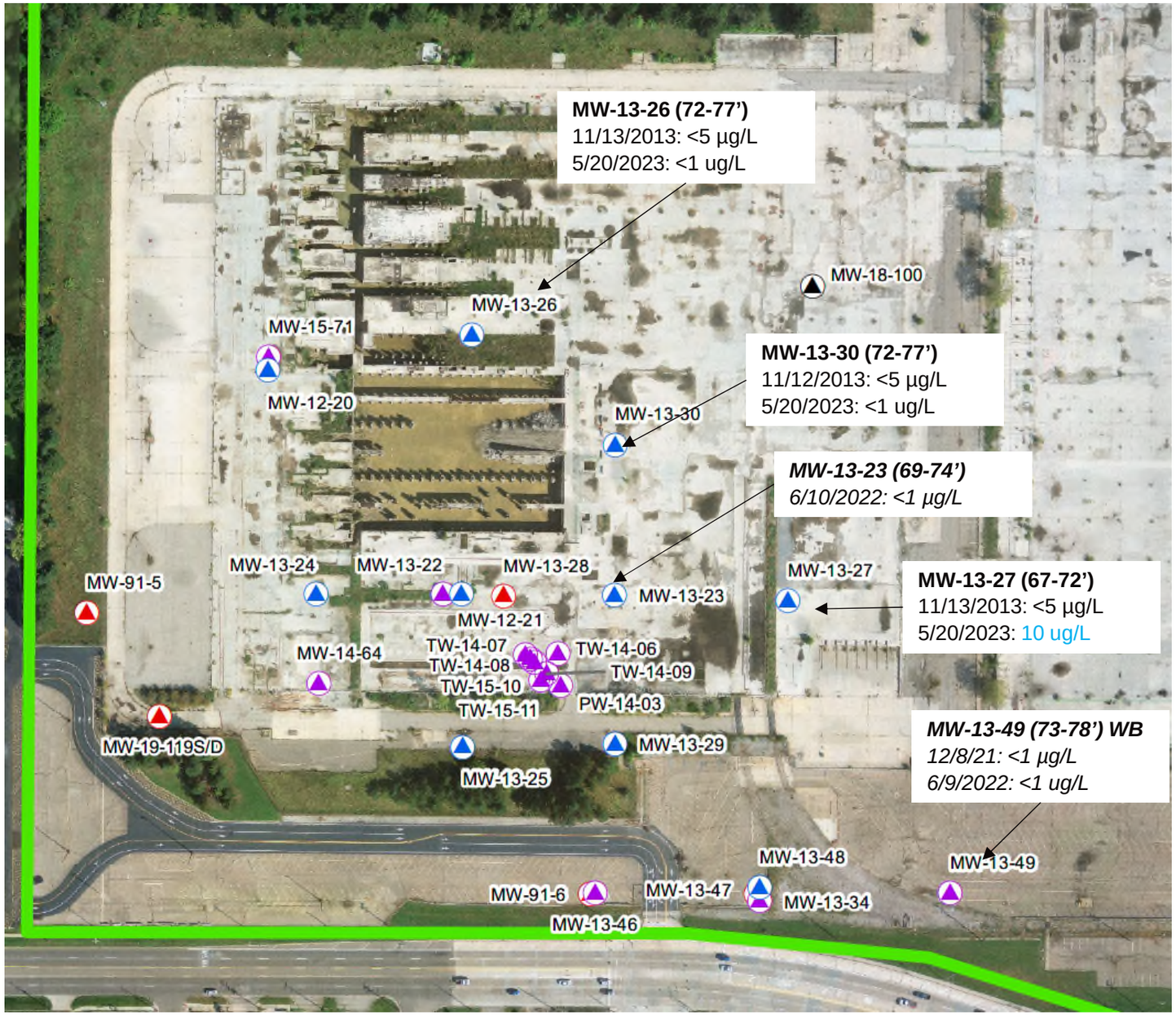
- LNAPL MONITORING WELL
- PERCHED ZONE MONITORING WELL
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- APC MW
- VAP BORING
- WELL SAMPLED AND NON-DETECT ORDR DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND EXCEEDS DW CRITERIA (7.2 µg/L)



Plant 3 Lower 1,4-Dioxane Northeast Monitoring Wells Sampling

EGLE requested additional sampling northeast of the lower 1,4-dioxane Plant 3 source area to confirm no additional migration

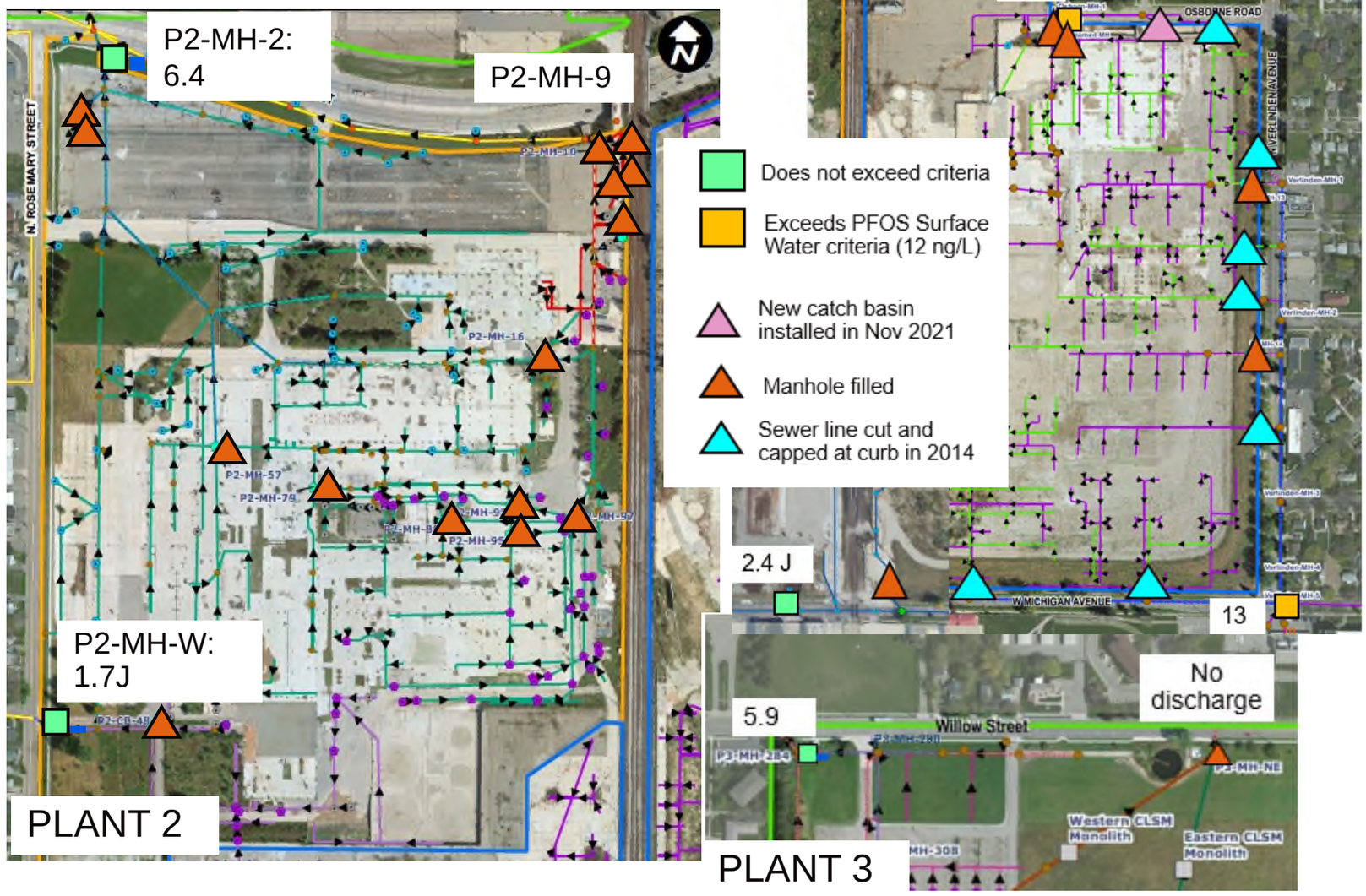
- Completed sampling of three deep overburden wells to evaluate potential migration
- MW-13-27 had a detection of 1,4-dioxane above drinking water Criteria
- Will sample MW-13-23 and MW-13-27 again during the annual event in December 2023



Monitoring of PFAS Impacts

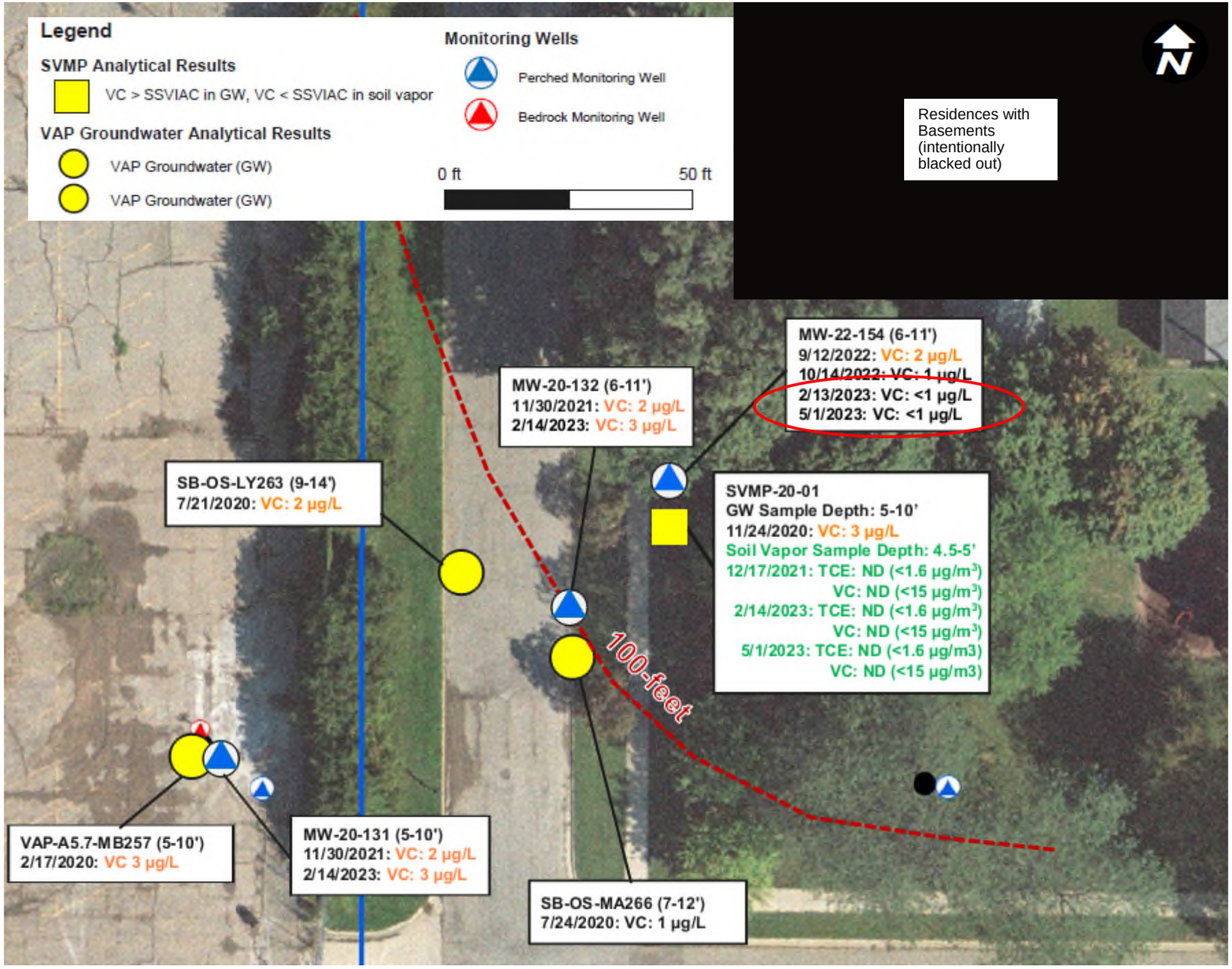
Sewer Monitoring

- Second Quarter site wide monitoring of storm sewers was conducted in April 2023, following the updated 2023 sampling plan approved by EGLE. Results for Perfluorooctanesulfonic acid (PFOS), the specific PFAS of concern, are depicted on figures to the right. Results are at or below the relevant criteria for all but two sample locations at Plant 6.
- Third Quarter site wide monitoring of storm sewers is planned to be completed in July 2023. Results will be summarized in the Third Quarter Progress Report.



Plant 6 VI Evaluation Update

- Vinyl Chloride at MW-22-154 was 1 µg/L in in Oct 2022 and <1 µg/L in Feb and May 2023
- Extent of chlorinated volatile organic compounds in groundwater currently defined
- TCE and VC not detected in soil gas at SVMP-20-01 sampled May 2023
- Monitoring will continue



Work in Progress and Near-Term Milestones Anticipated During the Third 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	Third Quarter upon EGLE Concurrence
Investigation of 1,4-Dioxane in Perched Zone	
Plant 2 1,4 Dioxane MW-14-58R Continued Evaluation and Proposed Investigation	August 2023
Remediation and Investigation of PFAS	
Quarterly Storm Sewer Sampling	July 2023
Other investigations and Sampling	
Revised Toxic Substance Control Act (TSCA) Plan for Soil in Central Portion of Plant 2	Third Quarter 2023
Third Quarter 2023 Groundwater Monitoring	August 2023
2023 Semi-Annual Groundwater Monitoring Report	Third Quarter 2023

ARCADIS Design & Consultancy for natural and built assets

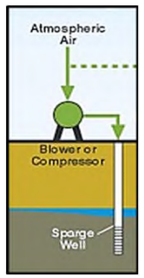
Appendix

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



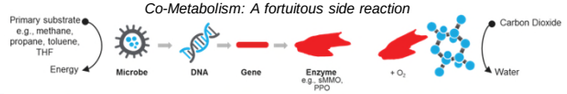
TREATMENT OBJECTIVES

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

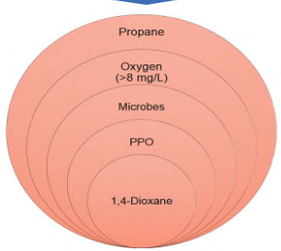
CO-METABOLIC BIODEGRADATION OF 1,4-DIOXANE:

Metabolism: the goal is to produce energy

Co-Metabolism: A fortuitous side reaction



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

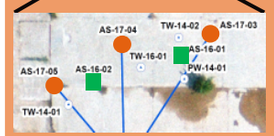


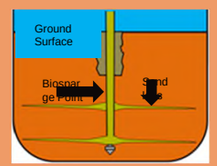
SYSTEM SETUP

Propane

Compressor

Biosparge Points



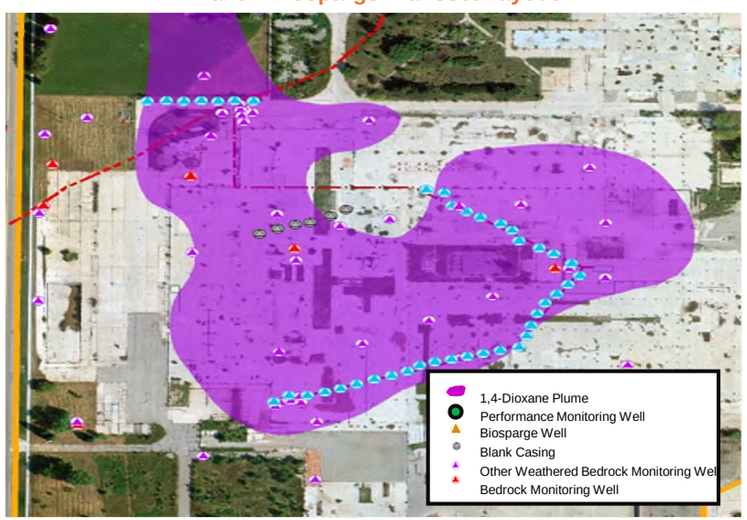


Sand Enhancements

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