



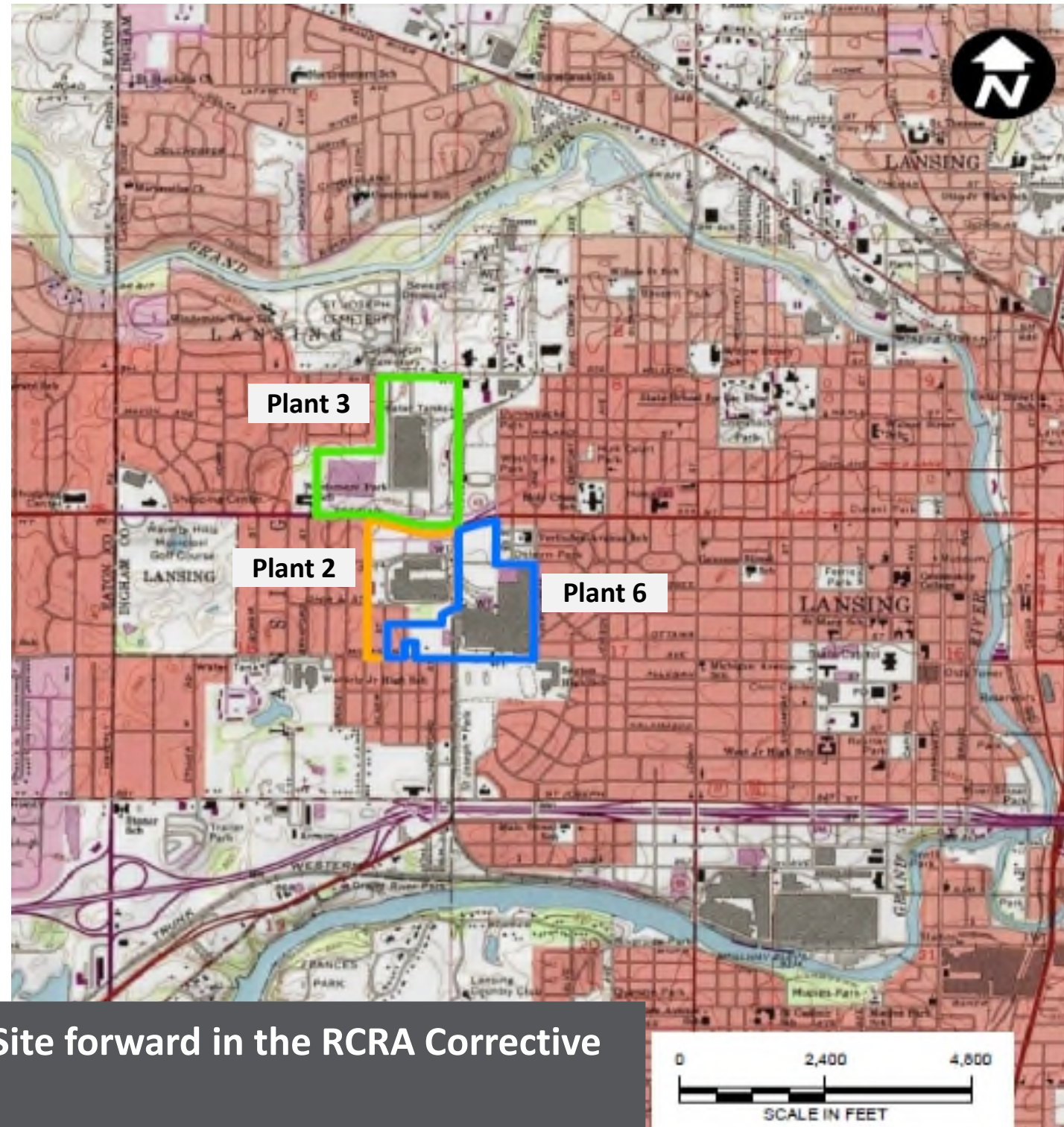
# RACER TRUST LANSING PLANTS 2, 3, & 6

2023 First Quarter Progress Report | April 14, 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

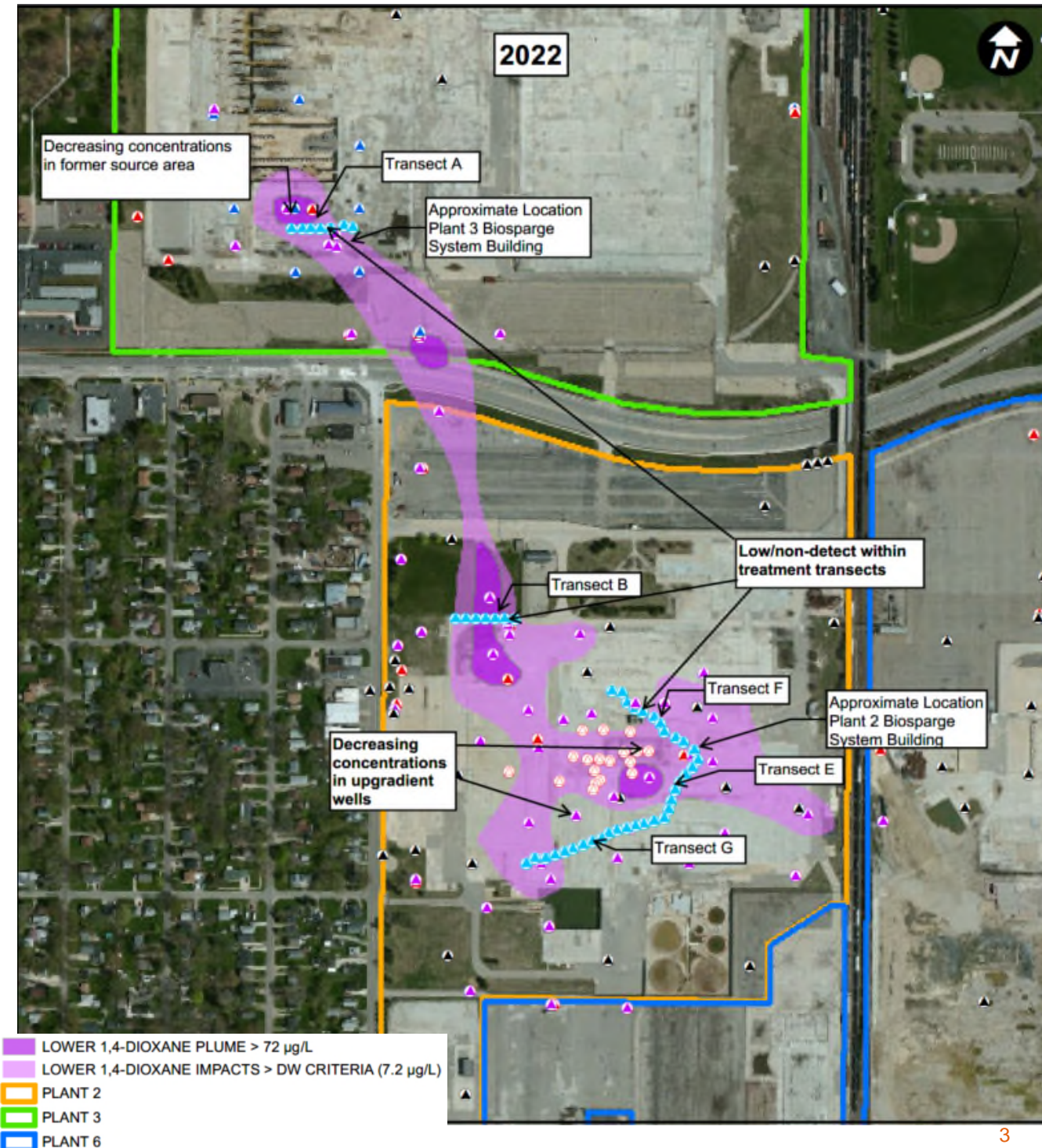
- Remediation at the RACER Lansing Site is being performed through the Resource Conservation and Recovery Act (RCRA) Corrective Action program under the oversight of the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Current activities include focused site characterization, interim 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) in groundwater is ongoing to the east of Plant 6. Interim actions for PFAS include storm sewer modifications on Plants 2, 3, & 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 many years.



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

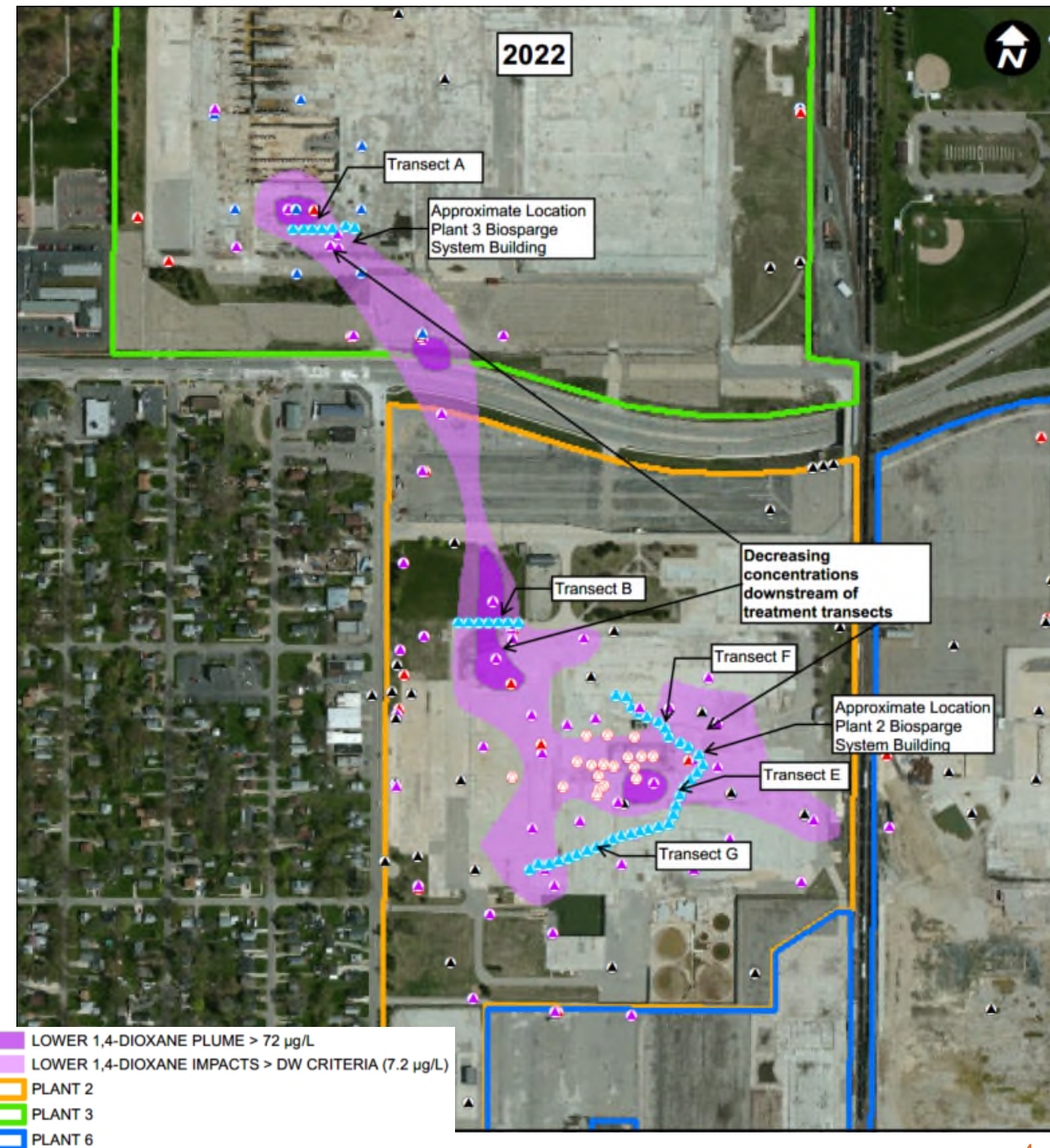
# Remediation of 1,4-Dioxane in Weathered Bedrock

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Minimal downtime related to equipment upgrades/replacement or regular system maintenance
- Select performance wells were sampled during 1Q 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



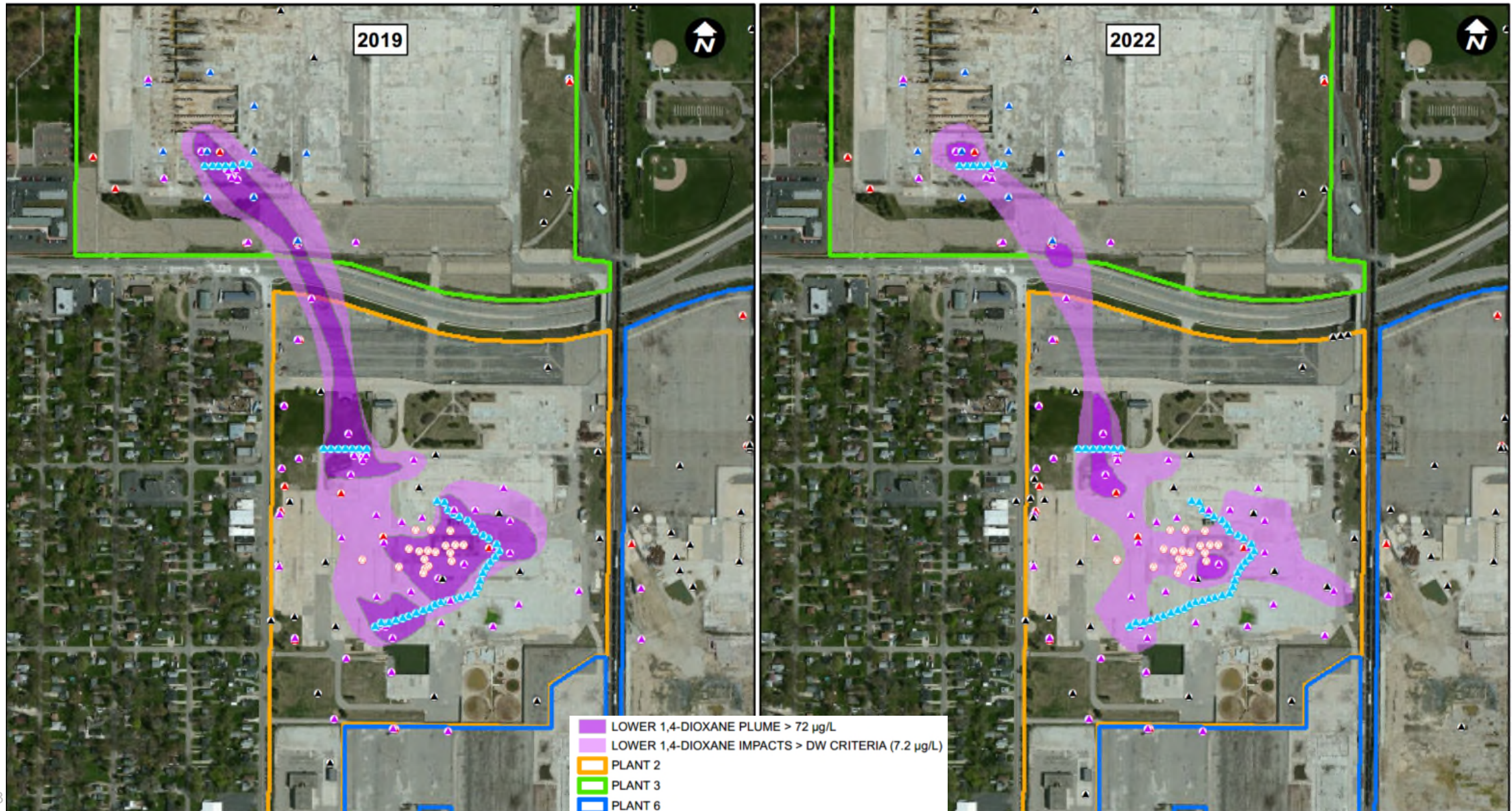
# Remediation of 1,4-Dioxane in Weathered Bedrock

- A full round of performance monitoring will be conducted in Second Quarter 2023 to continue with the semi-annual sampling schedule for 2023
- Results of performance monitoring conducted in 2022 is summarized, and a proposal to temporarily shut down portions of the system and monitor for potential increases in 1,4-dioxane concentrations is presented in the Annual Lower 1,4-Dioxane Biosparge Progress Report submitted to EGLE on March 27, 2023. This report is also available on RACER's Webpage for this Site:  
<https://www.racertrust.org/properties/lansing-plant-2-industrial-land>
- Nutrient injection was conducted on March 27<sup>th</sup> and 28<sup>th</sup>, 2023. Next nutrient injection is planned for September 2023.



# Remediation of 1,4-Dioxane in Weathered Bedrock

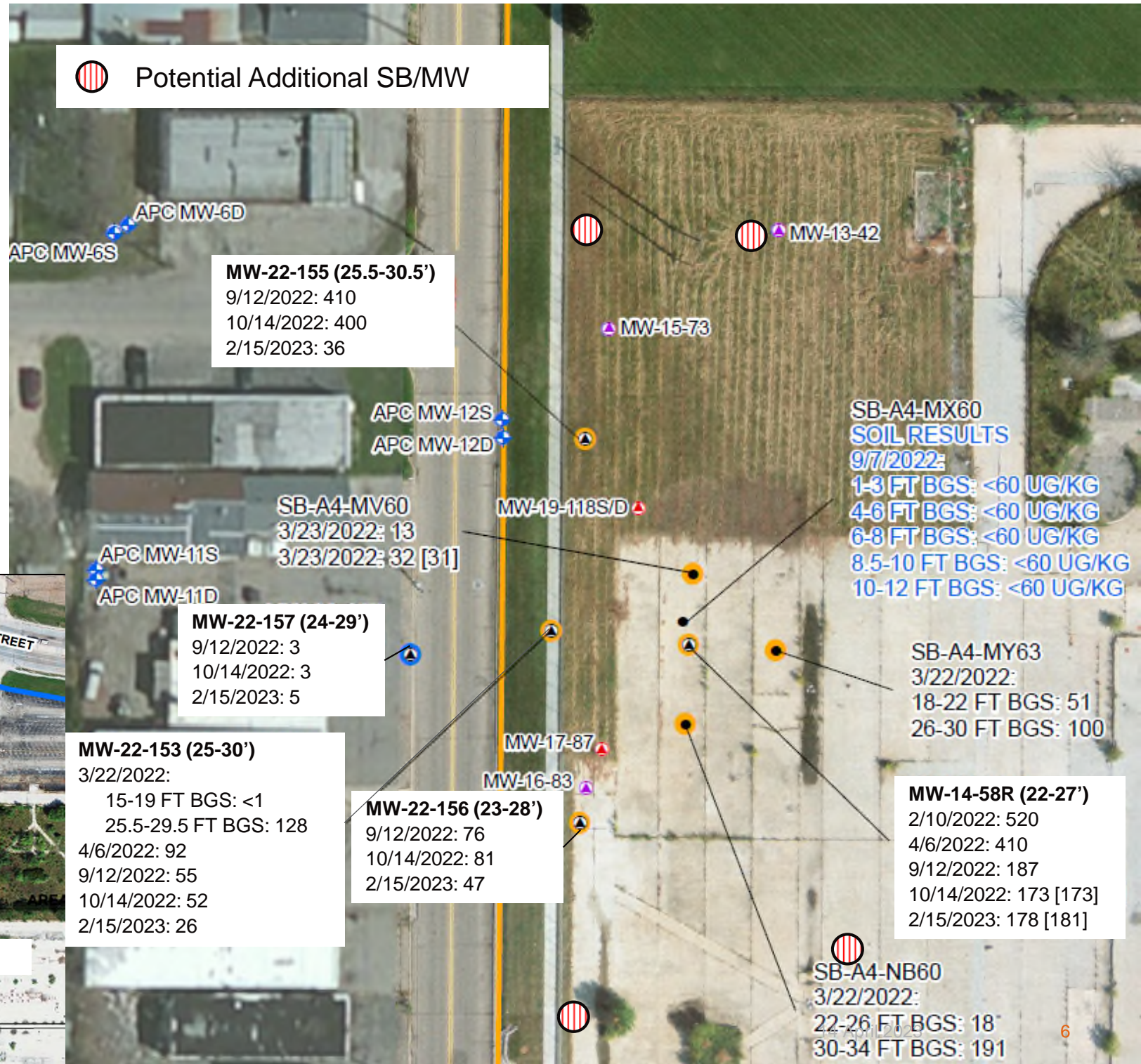
- Visual depiction of 1,4-dioxane plume distribution in 2019 vs. 2022



# First Quarter 2023 Groundwater Sampling 1,4-Dioxane in Perched Zone Plant 2

Concentrations decreased north of MW-14-58R area, propose:

- Monitor trends through 2<sup>nd</sup> quarter 2023
- Based on results consider additional 1,4-dioxane delineation to the north and south (as shown)



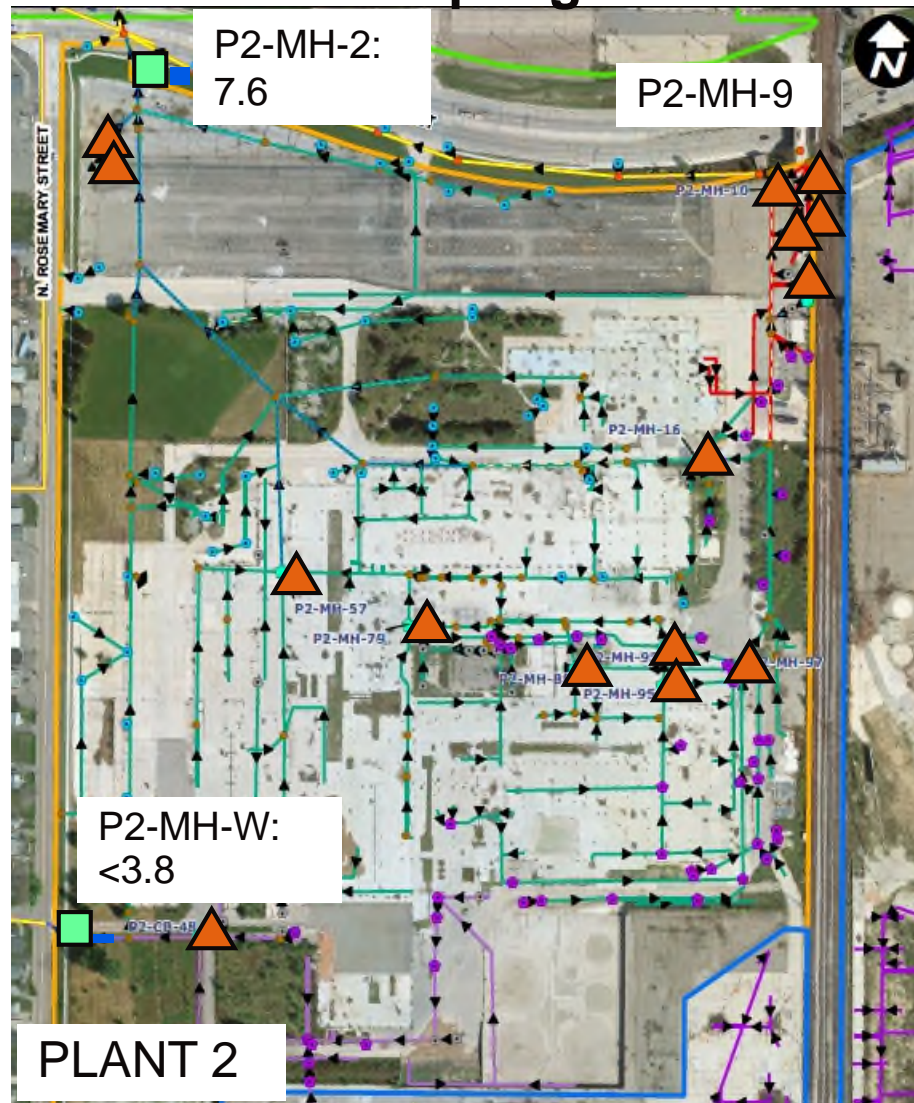
**Legend**

- ▲ PERCHED ZONE MONITORING WELL
- ▲ DEEP OVERBURDEN MONITORING WELL
- ▲ WEATHERED BEDROCK MONITORING WELL
- ▲ BEDROCK MONITORING WELL
- ▲ ADAMS PLATING MONITORING WELL
- VERTICAL AQUIFER PROFILE BORING
- WELL SAMPLED AND NON-DETECT OR OR DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND EXCEEDS DW CRITERIA (7.2 µg/L)

# Monitoring of PFAS Impacts

## Sewer Modifications and Performance Sampling

- First Quarter site wide performance monitoring of storm sewers was conducted in February 2023, following the updated 2023 sampling plan. 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 one sample location.
- Second Quarter site wide performance monitoring of storm sewers is planned to be completed in April 2023. Results will be summarized in the Second Quarter Progress Report.

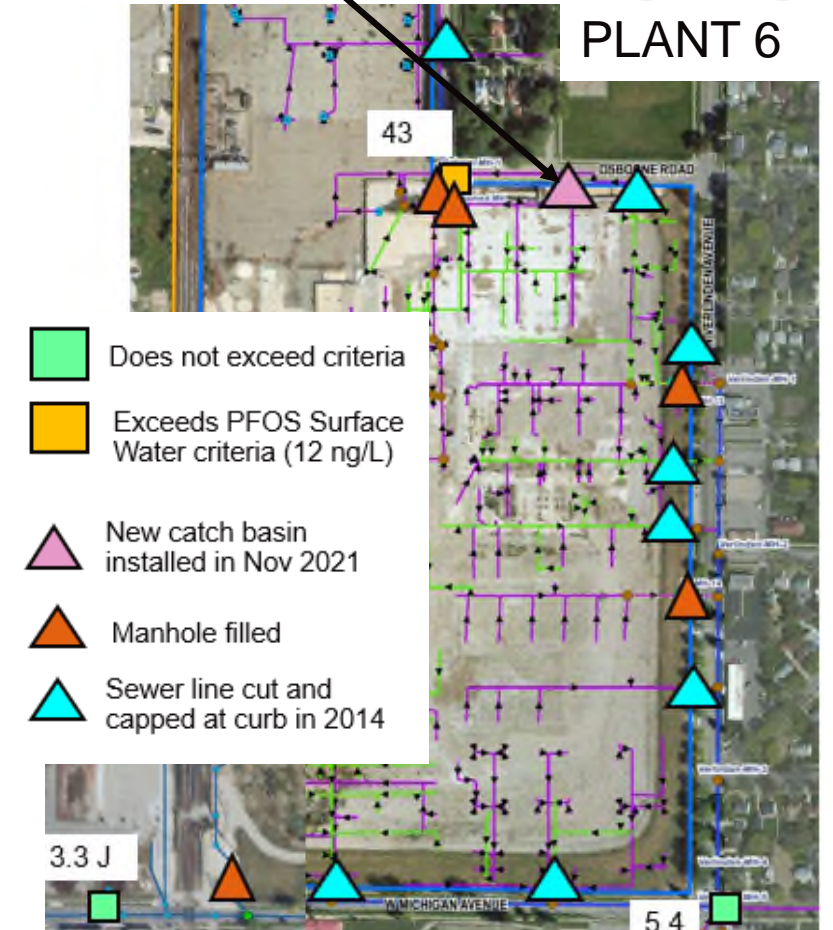


PLANT 2

Catch basin structure replaced in Nov 2021



PLANT 6



PLANT 3

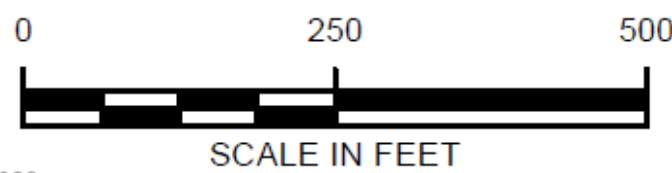


# Plant 6 Off-Site PFAS Investigation and Monitoring

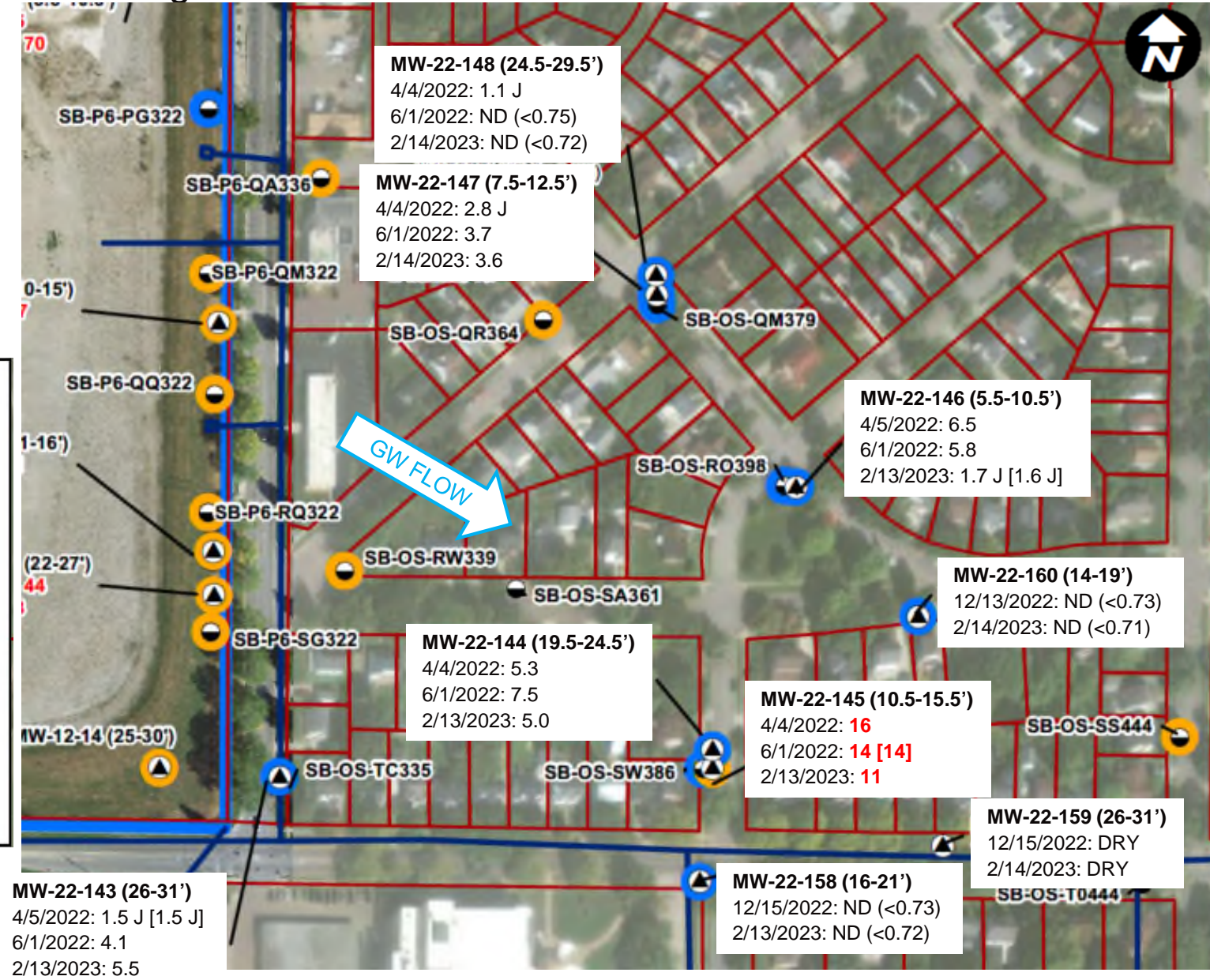
- Off-site Plant 6-related PFOA currently defined to Part 201 Criteria
- USEPA Proposed MCLs may need to be considered in the future for additional delineation
- Continue monitoring

**LEGEND**

- ▲ MONITORING WELL
- VAP BORING
- WELL SAMPLED AND PFOA DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND PFOA EXCEED DW CRITERIA
- STORM SEWER LOCATION
- - - ASSUMED/ESTIMATED STORM SEWER LOCATION
- ▭ PARCEL OUTLINE
- APPROXIMATE PLANT BOUNDARIES**
- ▭ PLANT 2
- ▭ PLANT 3
- ▭ PLANT 6

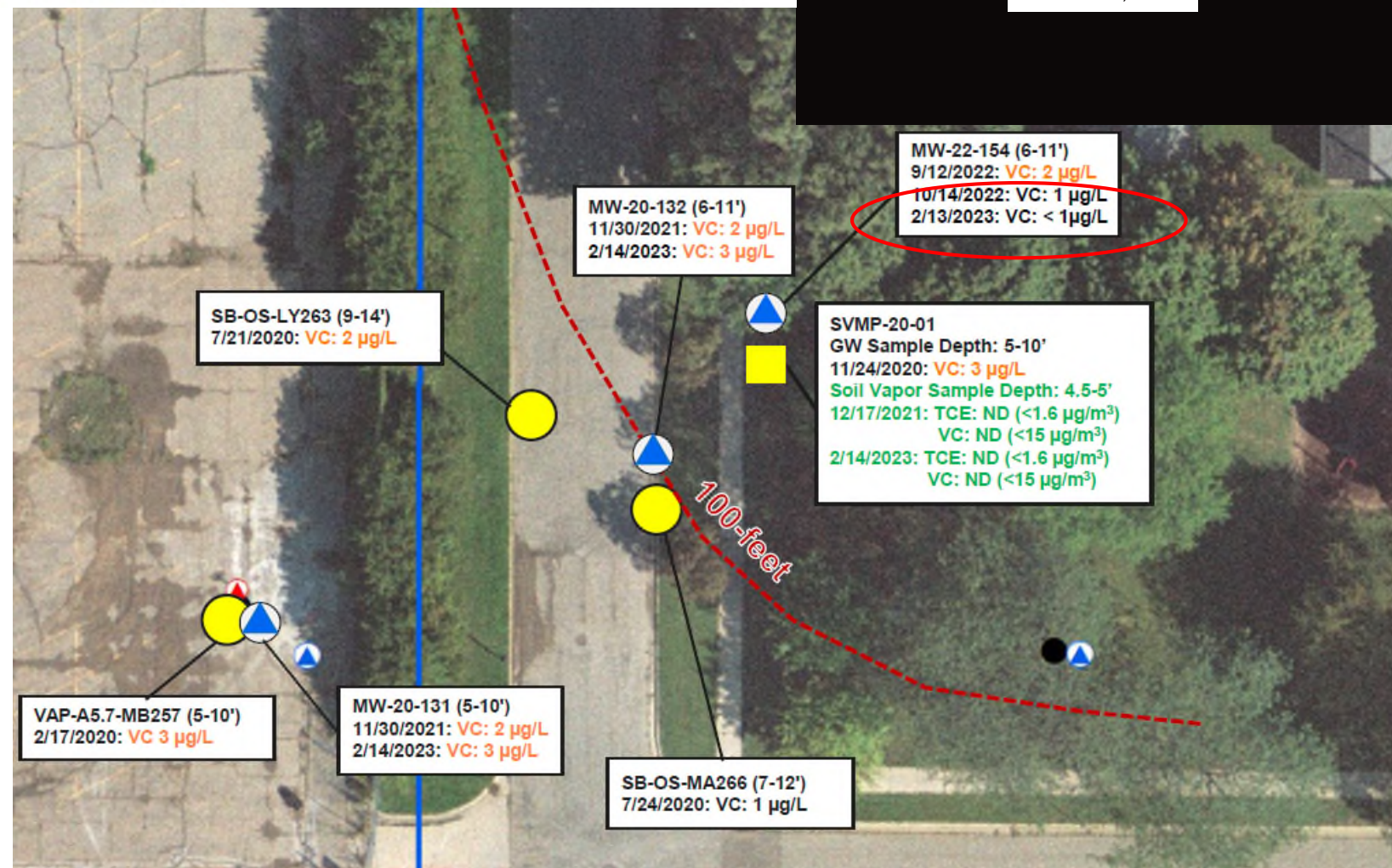
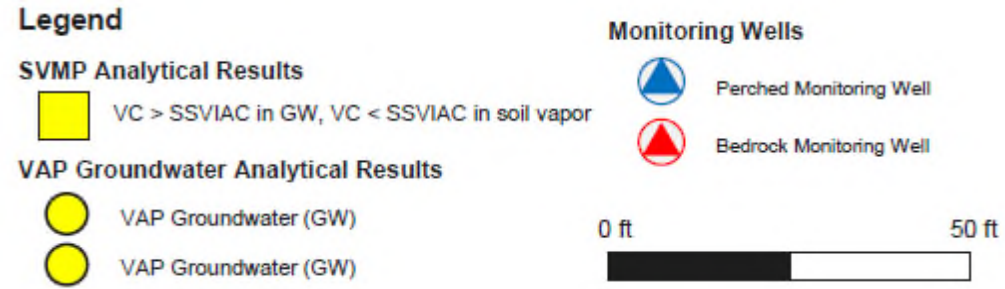


PFOA figure



# Plant 6 VI Evaluation Update

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



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



Activity	Schedule
<b>Remediation of 1,4-Dioxane in the Weathered Bedrock</b>	
Plants 2 and 3 Biosparge System Operation	Ongoing
Semi-Annual Biosparge Performance Monitoring	Second Quarter 2023
<b>Investigation of 1,4-Dioxane in Perched Zone</b>	
Plant 2 1,4 Dioxane MW-14-58R Continued Evaluation	June 2023
<b>Remediation and Investigation of PFAS</b>	
Plant 6 Off-Site PFAS Monitoring Well Installation Report	April 2023
2022 TOP Assay Summary Memo	April/May 2023
Quarterly Storm Sewer Sampling	April 2023
<b>Other investigations and Sampling</b>	
P2 and P3 Soil Corrective Measures Work Plan and Toxic Substance Control Act (TSCA) Plan Updates	Second Quarter 2023
Finalization of Interim Groundwater Monitoring Plan (IGMP)	April/May 2023
Second Quarter 2023 Groundwater Monitoring	May/June 2023
2022 Annual Groundwater Monitoring Report	May 2023

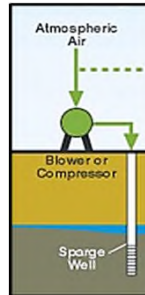
# Appendix

# BIOSPARGING TREATMENT OF 1,4-DIOXANE

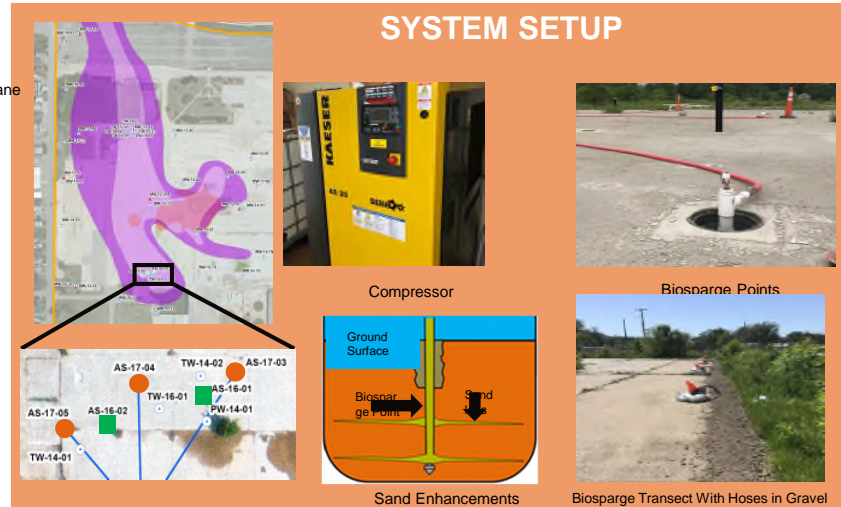
## Lansing Industrial Land, Lansing and Lansing Township, Michigan

### 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

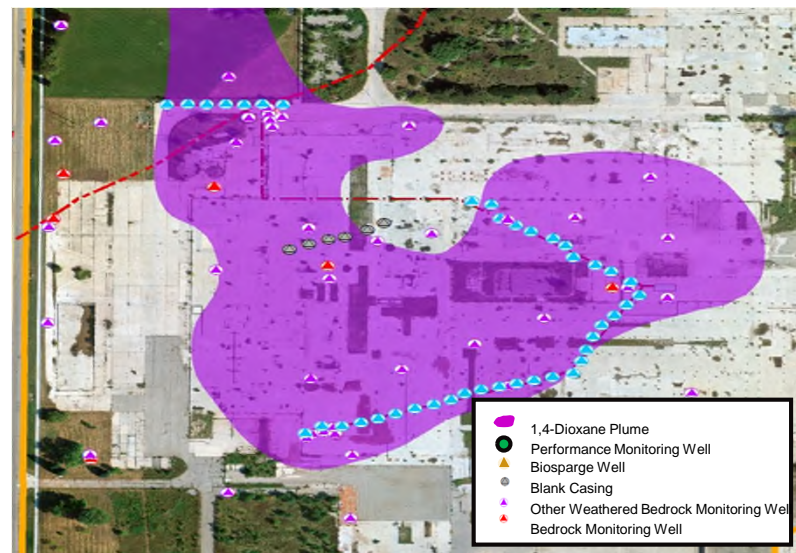


### SYSTEM SETUP



- 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

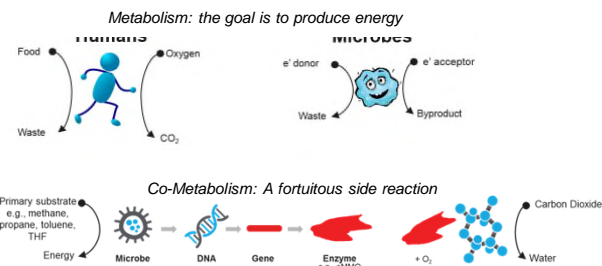
- 5 transects with 48 air sparge wells across Plants 2 and 4
- Nearly 5 miles of air hose and an air/propane injection network
- Groundwater flows from northwest to southeast and is cleaned by each transect
- Tubing installed above grade to save on costs and to accommodate future development
- Network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



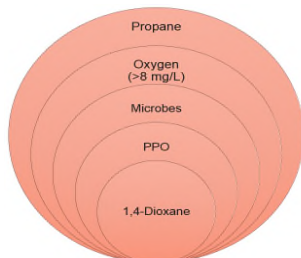
### TREATMENT OBJECTIVES

- 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:



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



Plant 2 Biosparge Unit and Nutrient Injection Tanks