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Subject:
Revised Interim Groundwater Monitoring Work Plan
RACER Trust, Plants 2, 3, & 6, Lansing, Michigan

ENVIRONMENT

Dear Mr. Quackenbush:

Date:
January 30, 2017

In support of the RCRA Facility Investigation and Corrective Measures Study (CMS) prepared for RACER Trust Plants 2, 3 and 6 located in Lansing, Michigan (Site; **Figure 1**), Arcadis is providing this revised Interim Groundwater Monitoring Work Plan (IGMP) to outline continued interim groundwater monitoring activities at the Site. The overall goal of the interim groundwater monitoring is to evaluate potential changing groundwater conditions and plume stability at the Site, and to verify the results of the Preliminary Geochemical and Plume Stability Assessment Report (Arcadis 2014a) and the updated plume stability evaluations included as part of the Annual Groundwater Monitoring Reports (Arcadis 2015a, 2016).

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The site investigation, along with the plume stability and geochemical evaluation completed to date, suggests that concentrations of volatile organic compounds (VOCs) and metals are generally stable to decreasing with some elevated concentrations of metals a result of regional or Site-related geochemistry (Arcadis 2016). Based on the results of the plume stability evaluation and discussion with the Michigan Department of Environmental Quality (MDEQ), the IGMP is being revised to reduce overall sampling frequency and focus on the primary contaminants of concern (COCs) at the Site. The revised IGMP, as outlined below, identifies groundwater monitoring activities at the Site through Spring 2020.

Our ref:
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The overall objectives of the IGMP are to:

- Continue to evaluate the stability of the perched 1,4-dioxane plume, VOC impacts, and areas where metals may be of concern including:
 - areas with elevated metals concentrations in perched groundwater near the site boundary (RFI Areas 6, 7, 5-7, 5-8 and 16); and
 - areas with metals known to be site-related (Plant 3, former plating area);

- Evaluate the stability of the deep overburden/weathered bedrock 1,4-dioxane plume (lower 1,4-dioxane plume).
- Detect vertical or horizontal migration of constituents of concern (COCs) via a network of sentinel wells.
- Periodically evaluate perched groundwater in areas identified with semi-volatile organic compounds (SVOCs) in soil to verify SVOCs are not leaching to groundwater above MDEQ Part 201 Criteria.
- Monitor light non-aqueous phase liquid (LNAPL) thickness at monitoring wells to verify LNAPL is stable and not migrating, and remove LNAPL on a quarterly basis.
- Monitor storm sewer discharge during dry weather flow at Plant 6 to verify COCs leaving the Site will not exceed surface water quality standards at the Grand River.
- Monitor the Lansing Township municipal wells TWP-WELL#3, TWP-WELL#4, TWP-WELL#5, located west of Plants 2 and 3, for 1,4-dioxane.

Data collected as part of the interim groundwater monitoring will be evaluated after each event and used to propose changes to the monitoring program as necessary. Annual summary reports will be submitted to MDEQ beginning in first quarter 2017 (Note, the first annual report will include groundwater monitoring data collected in 2016). An interim groundwater monitoring review will be completed in Spring 2020 to evaluate corrective measures implemented at the Site and include recommendations for a transition to a long-term groundwater monitoring plan.

INTERIM MONITORING PLAN SCOPE OF WORK

As discussed with MDEQ and implemented beginning fourth quarter 2016, the IGMP is being revised to reduce overall sampling frequency and focus on the primary contaminants of concern (COCs). The 2014 approved IGMP consisted of sampling 35 perched wells, 37 deep overburden and weathered bedrock wells, and 12 bedrock wells. The following revised IGMP consists of sampling 49 perched wells, 51 deep overburden and weathered bedrock wells, and 18 bedrock wells. The revised plan incorporates additional monitoring wells installed in weathered bedrock along the western Plant 2 boundary and in the central portion of Plant 2 around the toe of the lower 1,4-dioxane plume. The sampling frequency and COCs for each monitoring well are summarized on **Table 1**. The location of monitoring wells, along with the sampling frequency is illustrated on **Figures 3, 4, 5 and 6**.

Groundwater Elevation Gauging

Groundwater elevation and LNAPL thickness monitoring will be completed as outlined in **Table 1** and **Figure 2**. The site-wide groundwater elevation gauging event will be completed annually and rotated between semi-annual events to evaluate seasonal variability. Wells sampled during the non-site wide gauging event will be gauged as part of that event, but not include additional monitoring wells.

Measurement of LNAPL thickness at Plant 2 and Plant 3 will be completed quarterly, along with any removal of LNAPL, as outlined below.

Groundwater Sampling

Interim groundwater sampling will be completed as outlined in **Table 1** and **Figures 3 through 6** which summarize wells planned for groundwater sampling, the proposed sampling frequency, and current defined groundwater impact areas.

In general, the more comprehensive site-wide sampling event (including the Lansing Township municipal wells) will be conducted on an annual basis. Semi-annual sampling will also be conducted on bedrock wells and wells key to evaluating plume stability and potential migration. New wells with less than four samples will be sampled semi-annually, with the exception of weathered bedrock wells MW-16-81, MW-16-82 and MW-16-84, adjacent to the Plant 2 LNAPL area, which will initially be sampled quarterly to evaluate potential 1,4-dioxane flux from the Plant 2 LNAPL area. Once a minimum of four samples have been collected at a newly installed monitoring well, the appropriate sampling frequency and COCs will be evaluated based on observed concentrations and a preliminary stability analyses. Proposed changes to the sampling frequency or COCs for specific monitoring wells will be presented to the MDEQ for consideration as part of the next routine report.

Field sampling and gauging methods as well as quality assurance/quality control procedures will be consistent with the Field Sampling Plan (Arcadis 2011a) and Quality Assurance Project Plan (QAPP) (Arcadis 2011b). Groundwater samples will be collected utilizing low-flow sampling methods using a submersible pump and submitted under chain of custody protocol to the analytical laboratory (Merit Laboratories [Merit] of Lansing is currently providing laboratory services but another equally qualified laboratory may be used in the future). Field parameters, including dissolved oxygen, oxidation-reduction potential, turbidity and specific conductivity will be monitored for stability during sampling and recorded as a field data summary. Groundwater samples will be submitted to the laboratory for one or more of the following analyses:

- 1,4-Dioxane on-site monitoring wells will be analyzed using USEPA Method 8260B selected-ion method (SIM). The Lansing Township municipal wells will be analyzed using USEPA Method 522.
- Target Compound List (TCL) VOCs - defined in Table 3 of the QAPP (Arcadis 2011b), by USEPA Method 8260B.
- Select total metals – metals identified with consistent drinking water criteria exceedances (arsenic, nickel, lead, vanadium, chromium, and copper) - by USEPA Method 6020, and hexavalent chromium in Area 14 at Plant 3.
- Select dissolved metals - if turbidity below 10 nephelometric turbidity units (NTU) cannot be achieved during sampling, the sample will be filtered and submitted for dissolved metals analysis, in addition to the total metals analysis, using USEPA Method 6020.
- SVOCs – evaluated every other biennial event (i.e., once every four years), for select areas of the Site identified with SVOCs in soil that could potentially leach to perched water. Maps illustrating the historical SVOC detections in soil are included as **Attachment 1**. Note that although phthalates have been consistently detected at concentrations slightly above drinking water criteria at the Site, these detections are considered ubiquitous laboratory contaminants. Correspondence with Merit has indicated a history of phthalate cross-contamination and review of laboratory QA/QC reporting has indicated phthalate detections in method blanks. Non-phthalate SVOC groundwater criteria exceedances have been detected in only 4 of 761 groundwater samples over the sampling record at

four different monitoring well locations. Additional details regarding interim monitoring of each groundwater bearing unit are provided below.

Perched Zone

- 1,4-Dioxane - selected perched monitoring wells throughout the core of the perched 1,4-dioxane plume, surrounding the Plant 2 LNAPL, as well as downgradient and side gradient of the plume will be monitored on an annual basis. The exception is monitoring well MW-14-58, which will be monitored semi-annually given the proximity to the Site boundary. The remaining monitoring locations for perched 1,4-dioxane will be included in the biennial sampling event beginning second quarter of 2018.
- VOCs - samples from wells located within VOC impacted areas and from sentinel wells just outside impacted areas will be analyzed for VOCs annually. The exception is monitoring well MW-12-18, which will be monitored semi-annually given the proximity to the Site boundary, as shown on **Figure 4**.
- Metals - semi-annual sampling of metals will be limited to select wells located near Site boundaries where exceedances of DW criteria (excluding aesthetic criteria) have been observed. Annual sampling will be completed in areas of Site-related metals impacts such as the former plating line at Area 14. Biennial monitoring will continue in areas internal to the Site and located near discrete VOC-impacted areas with reducing conditions that may locally mobilize metals. Analysis for hexavalent chromium will be limited to the former plating area at Plant 3 (well CH-14-RO). All other metals monitoring will occur on a biennial basis to monitor changes in the various impacted areas. Wells proposed for metals sampling are shown on **Figure 5**.
- SVOCs - samples from areas with soil containing a potential source of SVOCs, will be collected every other biennial event to evaluate potential changes to site conditions, as shown on **Figure 6**. Maps illustrating the historical SVOC detections in soil are included as **Attachment 1**. The next sampling event for SVOCs would be completed second quarter 2020. Select wells will be sampled for SVOCs in the following areas:
 - Plant 2: Area 1, Area 2, Area 5-1, Area 5-2, and Area 5-5.
 - Plant 3: Area 16 and Area 17.
 - Plant 6: Area 5-6, Area 7, and south central portion of Plant 6 (i.e. P6-SB-07).

Deep Overburden and Weathered Bedrock

- 1,4-Dioxane – select monitoring wells located within or around the lower 1,4-dioxane plume and in the central portion of Plant 3 will be sampled either semi-annually or annually, except for MW-16-81, MW-16-82 and MW-16-84, which will be sampled quarterly (**Figure 3**). Select upgradient wells in both locations will be sampled biennially to monitor for changes in Site conditions.
- VOCs – select monitoring wells located within the lower 1,4-dioxane plume will be sampled either annually or biennially, except for MW-16-81, MW-16-82 and MW-16-84, which will be sampled semi-annually (**Figure 4**). Other wells located below VOC impacted areas (e.g. Plant 3, Area 14) will be sampled annually or biennially.
- Metals – analysis for metals in the deep overburden and weathered bedrock will be limited to an annual or biennial analysis of wells serving as sentinel monitoring points for vertical migration of perched impacts and wells located near the site boundary, as shown on **Figure 5**.

- SVOCs – SVOC sampling will not be completed within the deep overburden and weathered bedrock unless warranted due to changing site conditions.

Bedrock

- 1,4-Dioxane – bedrock wells along the axis and perimeter of the lower 1,4-dioxane plume and in the central portion of Plant 3 will be sampled for 1,4-dioxane semi-annually to monitor for changing site conditions. Additional bedrock wells around the site will be sampled for 1,4-dioxane on a biennial basis as shown on **Figure 3**. The Lansing Township municipal wells TWP-WELL#3, TWP-WELL#4, TWP-WELL#5 will be sampled annually. The location of the municipal wells are provided as **Attachment 2**.
- VOCs – bedrock wells along the core of the lower 1,4-dioxane plume will be sampled for VOCs annually, as shown on **Figure 4**. Other bedrock wells around the site will be sampled for VOCs on a biennial basis.
- Metals – metals sampling will not be completed within bedrock unless warranted due to changing site conditions.
- SVOCs – SVOC sampling will not be completed within bedrock unless warranted due to changing site conditions.

LNAPL Monitoring and Recovery

As noted above, LNAPL gauging will be completed quarterly at LNAPL monitoring wells located on Plants 2 and 3, as shown on **Figure 1**. LNAPL will be removed from monitoring wells with excess LNAPL consistent with the 2015 LNAPL Removal Work Plan (Arcadis, 2015b). LNAPL removal will be completed quarterly if more than one foot of LNAPL is present in a monitoring well. Monitoring wells that typically indicate greater than a foot of LNAPL include LMW-12-03D, LMW-14-12D, LMW-14-15D, and LMW-14-16D at Plant 2, and LMW-12-10 located at Plant 3. LNAPL removal activities will be evaluated annually.

Storm Sewer Sampling

Historical storm sewer sampling is summarized in the RCRA Facility Investigation Supplemental Phase 2 Activities Summary Report (Arcadis, 2014b). Storm sewer sampling began in 2012, of the ten sampling locations, only the southern outfall of Plant 6 (P6-MH2-SW) has indicated sporadic detections of metals and xylenes slightly above groundwater-surface water interface (GSI) criteria. Soils impacted with xylenes were recently excavated from the southern Plant 6 area (Areas 7 and 9) and sampling at the southern Plant 6 outfall in December 2015 and December 2016 were non-detect for xylenes, and metals were below GSI criteria.

To verify concentrations of COCs remain below GSI criteria, storm sewer monitoring will continue annually at the southern Plant 6 outfall, as shown on **Figure 7**. A grab sample will be collected at location P6-MH2-SW using a peristaltic pump. Water samples will only be collected from the structure after an extended period (5 days or more) of less than ¼-inch of cumulative precipitation. Samples will be submitted to the laboratory for analysis of TCL VOCs, 1,4-dioxane, and total analyte list (TAL) metals as specified in Table 3 of the QAPP (Arcadis, 2011b). Sampling at the Plant 6 outfall will continue until four consecutive sampling events indicate all COCs are below GSI criteria.

REPORTING

A summary of groundwater monitoring results will be provided to the MDEQ following each semi-annual sampling event. A semi-annual report will be prepared following the second quarter sampling event and consist of a brief memorandum describing the results of the sampling and the results of the quarterly sampling of monitoring wells MW-16-81, MW-16-82, and MW-16-84. The semi-annual report will include the following attachments summarizing the results of the semi-annual monitoring event:

- A table summarizing analytical data for the semi-annual event
- A table summarizing groundwater elevation and LNAPL thickness for the semi-annual event
- A table summarizing LNAPL removal for the semi-annual event
- Figures summarizing COC criteria exceedances for the semi-annual event
- Copies of the laboratory analytical reports (including QA/QC results) for the semi-annual event;
- A summary of the field parameters recorded at each well during low-flow sampling for the semi-annual event;
- Proposed IGMP modifications.

An annual report will be submitted following the fourth quarter sampling event and provide a more detailed narrative documenting any changes observed at the Site. The annual report will also propose changes to the IGMP, as appropriate, based on the results of the sampling. Attachments to the annual report will include the following:

- A table summarizing analytical data for both the semi-annual and annual monitoring events;
- A table summarizing groundwater elevation for the semi-annual and annual monitoring events;
- A table summarizing the LNAPL thickness measured for the four quarterly monitoring events;
- A table summarizing LNAPL removal for the four quarterly events;
- A table summarizing storm sewer sampling results;
- LNAPL thickness trend graphs;
- Groundwater concentration trend graphs with Mann-Kendall analysis completed for new wells, wells at the perimeter of the Site, or wells that have indicated increasing concentrations in the past;
- Figures summarizing COC criteria exceedances for the annual event;
- Figures summarizing groundwater elevation contours for each water bearing unit;
- Groundwater elevation trend graphs;
- A summary of the field parameters recorded at each well during low-flow sampling during the annual event;
- Copies of the laboratory analytical reports (including QA/QC results).

Mr. Quackenbush
January 30, 2017

Should you need further information, or have any questions, please contact Dave Favero of RACER Trust at 217.741.6235 (dfavero@racertrust.org), or Patrick Curry at 810.225.1926 (patrick.curry@arcadis-us.com).

Sincerely,

Arcadis of Michigan, LLC

A handwritten signature in black ink, appearing to read 'Patrick Curry', with a stylized flourish at the end.

Patrick Curry, PG, CPG
Principal Geologist

Copies:

Dave Favero, RACER Trust
File

Enclosures:

Tables

- 1 Revised Interim Groundwater Monitoring Summary

Figures

- 1 Site Location
- 2 Groundwater and LNAPL Gauging Plan
- 3 1,4-Dioxane Monitoring Plan
- 4 VOCs Monitoring Plan
- 5 Metals Monitoring Plan
- 6 SVOC Monitoring Plan
- 7 Stormwater Monitoring Plan

Attachments

- 1 Historical SVOC Detections in Soil
- 2 Lansing Township Municipal Well Locations

References

- Arcadis 2011a. Field Sampling Plan. RACER Trust, Lansing Plants 2, 3, and 6 Industrial Land, Lansing, Michigan. August 26.
- Arcadis 2011b. Quality Assurance Project Plan. RACER Trust, Lansing Plants 2, 3, and 6 Industrial Land, Lansing, Michigan, August 26.
- Arcadis 2014a. Preliminary Groundwater Geochemistry and Plume Stability Assessment. RACER Trust, Plants 2, 3, and 6, Industrial Land, Lansing, Michigan. April.
- Arcadis 2014b. RCRA Facility Investigation Supplemental Phase 2 Activities Summary Report, RACER Trust, Plants 2, 3 & 6, Lansing, Michigan, February 26.
- Arcadis 2014c. Interim Groundwater Sampling Work Plan. RACER Trust, Plants 2, 3, & 6, Lansing, Michigan. November 14.
- Arcadis 2015a. 2014-2015 Annual Groundwater Monitoring Report. RACER Trust Plants 2, 3, and 6, Lansing, Michigan. June 26.
- Arcadis 2015b. 2015 LNAPL Removal Work Plan. RACER Trust, Plant 2, Lansing, Michigan. March 4.
- Arcadis 2016. 2015-2016 Annual Groundwater Monitoring Report, RACER Trust, Plants 2, 3, & 6 Industrial Land, Lansing, Michigan. June 27.

TABLES



Table 1
Revised Interim Groundwater Monitoring Summary

Revised January 30, 2017
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan



Well	Gauging ⁺	Analyte				Primary Function
		VOCs	1,4-Dioxane	Select Metals ^{**}	SVOCs [†]	
Plant 2						
Perched						
MW-01(2)	A	A				VOC sentinel
MW-03(2)	A	B		B		groundwater elevation monitoring
MW-12-09	A	B	A			perched 1,4-dioxane sentinel
MW-12-18	SA	SA		B		VOC sentinel
P2-MW-04	A		A		B [†]	perched 1,4-dioxane monitoring, SVOC evaluation
P2-SB-20	A	B	A			perched 1,4-dioxane sentinel
LMW-12-01	Q					LNAPL Monitoring
LMW-12-02	Q					LNAPL Monitoring
LMW-12-03D	Q					LNAPL Monitoring
LMW-12-03S	Q					LNAPL Monitoring
LMW-12-04	Q					LNAPL Monitoring
LMW-12-05	Q					LNAPL Monitoring
LMW-12-06	Q					LNAPL Monitoring
LMW-12-07	Q					LNAPL Monitoring
LMW-12-08	Q					LNAPL Monitoring
LMW-14-12D	Q					LNAPL Monitoring
LMW-14-13D	Q					LNAPL Monitoring
LMW-14-14D	Q					LNAPL Monitoring
LMW-14-15D	Q					LNAPL Monitoring
LMW-15-16D	Q					LNAPL Monitoring
LMW-15-17D	Q					LNAPL Monitoring
PMW-01	Q					LNAPL Monitoring
PMW-02	Q					LNAPL Monitoring
PMW-03	Q					LNAPL Monitoring
P2-SB-37	Q					LNAPL Monitoring
MW-02(2)	A	B			B [†]	SVOC evaluation
MW-12-07	A	B				groundwater elevation monitoring
MW-12-08	A					groundwater elevation monitoring
MW-12-17	A	B				groundwater elevation monitoring
P2-MW-01	A					groundwater elevation monitoring
P2-MW-02	A	B				groundwater elevation monitoring
P2-MW-03	A					groundwater elevation monitoring
P2-SB-03	A	B	B			groundwater elevation monitoring
P2-SB-06	A		B		B [†]	SVOC evaluation
MW-14-54	A	A			B [†]	VOC monitoring, SVOC evaluation
MW-14-55	A	A				VOC monitoring
MW-14-57	A	A	A			perched 1,4-dioxane monitoring
MW-14-58	SA	A	SA			perched 1,4-dioxane monitoring
MW-14-59	A	A	A		B [†]	perched 1,4-dioxane monitoring, SVOC evaluation
MW-14-60	A	A	A		B [†]	perched 1,4-dioxane monitoring, SVOC evaluation
MW-14-62	A	A	A		B [†]	perched 1,4-dioxane monitoring, SVOC evaluation
Deep Overburden and Weathered Bedrock						
MW-13-42	A					groundwater elevation monitoring
MW-13-43	SA		SA			lower 1,4-dioxane monitoring
MW-13-45	SA	B	SA			lower 1,4-dioxane monitoring
MW-13-51	A		B			groundwater elevation monitoring
MW-14-56	SA	B	SA	B		lower 1,4-dioxane sentinel
MW-14-61	A	B	A			lower 1,4-dioxane sentinel
MW-14-63	SA	B	SA			lower 1,4-dioxane sentinel
MW-15-72	SA	A	SA			lower 1,4-dioxane monitoring, <4 samples‡
MW-15-73	SA	A	SA	B		lower 1,4-dioxane sentinel, <4 samples‡
MW-16-74	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-75	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-76	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-77	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-78	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-79	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-80	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-81	Q	SA	Q			lower 1,4-dioxane monitoring, <4 samples‡
MW-16-82	Q	SA	Q			lower 1,4-dioxane monitoring, <4 samples‡
MW-16-83	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
MW-16-84	Q	SA	Q			lower 1,4-dioxane monitoring, <4 samples‡
MW-16-85	SA	A	SA			lower 1,4-dioxane sentinel, <4 samples‡
PW-14-01	SA		SA			lower 1,4-dioxane monitoring
PW-14-02	SA	A	SA			lower 1,4-dioxane monitoring
TW-14-02	SA	A	SA			lower 1,4-dioxane monitoring
Bedrock						
MW-12-01	SA	B	SA			bedrock sentinel
MW-12-02	SA	B	SA			bedrock sentinel
MW-12-05	SA	B	SA			bedrock sentinel
MW-13-44	SA	B	SA			bedrock sentinel
MW-12-06	SA	B	SA			bedrock sentinel
Lansing Township Wells						
TWP-03	-		A ⁽¹⁾			Municipal Well
TWP-04	-		A ⁽¹⁾			Municipal Well
TWP-05	-		A ⁽¹⁾			Municipal Well

Notes:

* Site wide gauging to alternate between semi-annual events to account for seasonal variability. Semi-annual gauging includes all wells sampled semi-annually.

** Select metals includes arsenic, nickel, lead, vanadium, chromium, and copper.

† SVOCs will be sampled every other biennial event, or once every four years (first event: 2020)

‡ New wells will to be sampled semi-annually until sampling frequency is reevaluated after collection of four data points.

(1) - Analyzed for 1,4-dioxane via low-level USEPA Method 522

New wells will be added to the figures and incorporated into the annual monitoring once 4 samples are collected and a COC list is determined

SA = semi-annual A = annual

Q = quarterly B = biennial (starting 2nd quarter of 2018)

NA - Insufficient data, or data did not meet criteria for statistical evaluation (i.e. non-detect or below criteria)

Table 1
Revised Interim Groundwater Monitoring Summary

Revised January 30, 2017
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan



Well	Gauging*	Analyte					Primary Function
		VOCs	1,4-Dioxane	Select Metals**	Hexavalent Chromium	SVOCs†	
Plant 3							
Perched							
CH-14-RO	A	B		A	A		metals monitoring
MW-05(3)	A	A					VOC sentinel
MW-06(3)	A	A				B [†]	VOC sentinel, SVOC evaluation
MW-13-31	SA			SA		B [†]	boundary monitoring, SVOC evaluation
MW-13-32	SA			SA			boundary monitoring
MW-13-33	A			B			boundary monitoring
UNK-09	A						groundwater elevation monitoring
UNK-10	A	A				B [†]	VOC sentinel, SVOC evaluation
UNK-11	A	A		B			VOC sentinel
LMW-12-09	Q						LNAPL Monitoring
LMW-12-10	Q						LNAPL Monitoring
LMW-12-11	Q						LNAPL Monitoring
UNK-13	Q						LNAPL Monitoring
UNK-14	Q						LNAPL Monitoring
MW-04(3)	A						groundwater elevation monitoring
MW-12-19	A						groundwater elevation monitoring
P3-SB-07	A						groundwater elevation monitoring
P3-SB-28	A	B				B [†]	SVOC evaluation
UNK-15	A						groundwater elevation monitoring
MW-14-65	A	A				B [†]	VOC sentinel, SVOC evaluation
Deep Overburden and Weathered Bedrock							
MW-12-20	A	B	B				lower 1,4-dioxane sentinel
MW-12-21	SA	A	SA	B			lower 1,4-dioxane monitoring
MW-13-22	A	A	A				lower 1,4-dioxane monitoring
MW-13-23	A		A				lower 1,4-dioxane sentinel
MW-13-24	A		A				lower 1,4-dioxane sentinel
MW-13-25	SA	B	SA				lower 1,4-dioxane monitoring
MW-13-26	A		B				lower 1,4-dioxane sentinel
MW-13-29	A		A				lower 1,4-dioxane monitoring
MW-13-30	A	B	B				lower 1,4-dioxane sentinel
MW-13-34	SA	A	SA				lower 1,4-dioxane monitoring
MW-13-40	A		A				lower 1,4-dioxane/metals sentinel
MW-13-41	A		A	B			lower 1,4-dioxane/metals sentinel
MW-13-46	SA	B	SA				lower 1,4-dioxane monitoring
MW-13-48	SA	A	SA				lower 1,4-dioxane monitoring
MW-13-49	A	B	A				lower 1,4-dioxane
MW-19	A	B	A				lower 1,4-dioxane sentinel
MW-22	A	B	B	A			metals sentinel
MW-23	A	B	B	A			metals sentinel
MW-91-2	A	B	A	A	A		lower 1,4-dioxane/metals sentinel
MW-02-02(3)	A	B	A	B			lower 1,4-dioxane sentinel
MW-02-04(3)	A		A	B			lower 1,4-dioxane sentinel
MW-02-01(3)	A						groundwater elevation monitoring
MW-02-03(3)	A						groundwater elevation monitoring
MW-04-03(3)	A	B					VOC Sentinel
MW-04-04(3)	A	B					VOC Sentinel
MW-13-27	A						groundwater elevation monitoring
MW-14-64	A	B	A				lower 1,4-dioxane sentinel
MW-15-71	A		A				lower 1,4-dioxane sentinel
PW-14-03	SA	A	SA				lower 1,4-dioxane monitoring
Bedrock							
MW-91-5	SA	B	SA				bedrock sentinel
MW-91-6	SA	B	SA				bedrock sentinel
MW-13-28	SA	B	SA				bedrock sentinel
MW-13-38	SA	B	SA				bedrock sentinel
MW-13-39B	A						groundwater elevation monitoring
MW-13-47	SA	B	SA				bedrock sentinel
MW-04-01(3)	A	B	B				bedrock sentinel
MW-04-02(3)	A	B					bedrock sentinel
MW-12-04	A						groundwater elevation monitoring
MW-13-37	A						groundwater elevation monitoring
MW-88-1	A						groundwater elevation monitoring
MW-91-3	A	B	B				bedrock sentinel
MW-91-4	A	B					bedrock sentinel

Notes:

* Site wide gauging to alternate between semi-annual events to account for seasonal variability. Semi-annual gauging includes all wells sampled semi-annually.

** Select metals includes arsenic, nickel, lead, vanadium, chromium, and copper.

† SVOCs will be sampled every other biennial event, or once every four years (first event: 2020)

‡ New wells will to be sampled semi-annually until sampling frequency is reevaluated after collection of four data points.

New wells will be added to the figures and incorporated into the annual monitoring once 4 samples are collected and a COC list is determined

SA = semi-annual A = annual

Q = quarterly B = biennial (starting 2nd quarter of 2018)

NA - Insufficient data, or data did not meet criteria for statistical evaluation (i.e. non-detect or below criteria)

Table 1
Revised Interim Groundwater Monitoring Summary



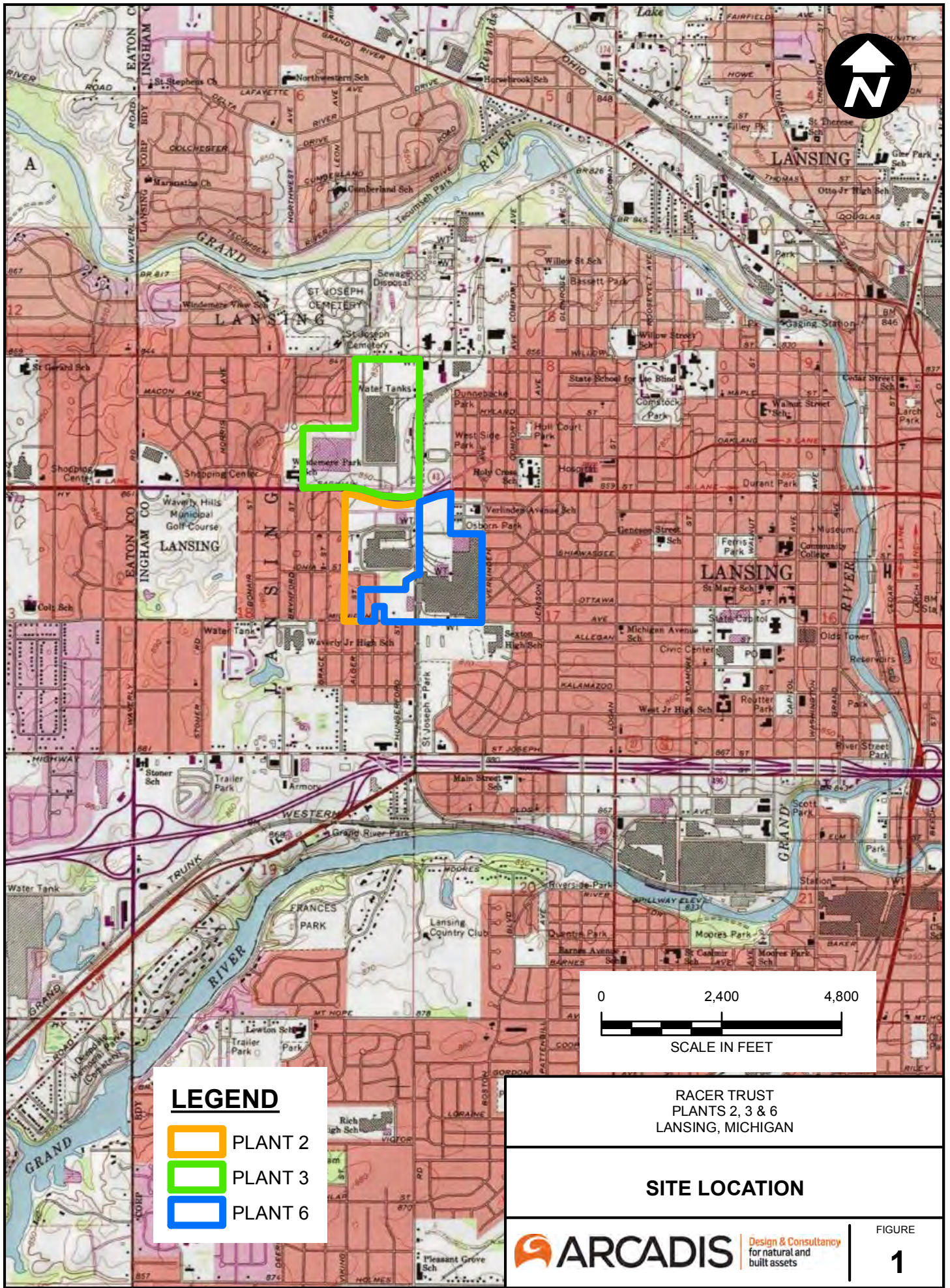
Revised January 30, 2017
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan

Well	Gauging*	Analyte					Primary Function
		VOCs	1,4-Dioxane	Select Metals**	TAL Metals***	SVOCs†	
Plant 6							
Perched							
MW-02-03(6)	A	A	A			B†	perched 1,4-dioxane monitoring, SVOC evaluation
MW-03-04	A	B	A				perched 1,4-dioxane monitoring
MW-03-06	A	A	A	B		B†	perched 1,4-dioxane sentinel, SVOC evaluation
MW-03-08	A	A	A				perched 1,4-dioxane/ VOC monitoring
MW-04-05(6)	A	A	A	B			perched 1,4-dioxane/ VOC sentinel
MW-12-11	SA			SA			boundary monitoring
MW-12-12	SA			SA			boundary monitoring
MW-12-13	SA			SA			boundary monitoring
MW-12-16	SA	B		SA			boundary monitoring
MW-13-35	SA	B		SA			boundary monitoring
MW-13-36R	SA			SA			boundary monitoring
MWBP-10-UST5-6	SA	A		SA			boundary monitoring
MWBP-11-UST1-4	A	A		B			VOCs/metal monitoring
MWBP-12A-UST1-4	A	A		B			VOCs/metal monitoring
MWBP-12-UST1-4	A	A		B		B†	VOCs/metal monitoring, SVOC evaluation
P6-SB-18	A						groundwater elevation monitoring
P6-SB-35	A						groundwater elevation monitoring
P6-SB-37	A						groundwater elevation monitoring
MW-02-01(6)	A						groundwater elevation monitoring
MW-02-02(6)	A					B†	SVOC evaluation
MW-03-02	A			B			groundwater elevation monitoring
MW-03-05	A	A	A				perched 1,4-dioxane sentinel
MW-03-07	A						groundwater elevation monitoring
MW-12-09	A						groundwater elevation monitoring
MW-12-10	A						groundwater elevation monitoring
MW-12-14	A						groundwater elevation monitoring
MW-12-15	A	B					groundwater elevation monitoring
MWBP-12-UST5-6	A						groundwater elevation monitoring
MWBP-13A-UST1-4	A	B		B			groundwater elevation monitoring
P6-MW-01	A						groundwater elevation monitoring
P6-SB-07	A					B†	SVOC evaluation
P6-SB-21	A						groundwater elevation monitoring
SME-MW-02	A						groundwater elevation monitoring
MW-14-66	A	B		B			perched 1,4-dioxane/metals sentinel
MW-14-67	A	B		B			perched 1,4-dioxane/metals sentinel
MW-14-68	A						sentinel (DRY)
MW-14-69	A						sentinel (DRY)
MW-14-70	A						groundwater elevation monitoring
Deep Overburden and Weathered Bedrock							
MW-13-52	A	B	B				groundwater elevation monitoring
MW-13-53	A	B	B				groundwater elevation monitoring
Bedrock							
MW-04-01(6)	A	B	B				bedrock sentinel
MW-04-04R	A	B	B				bedrock sentinel
MW-04-06R	A	B	B				bedrock sentinel
MW-12-03	A						groundwater elevation monitoring
MW-13-50	A	B	B				bedrock sentinel
Storm Sewer							
P6-MH2-SW	A	A	A		A		Storm sewer GSI monitoring

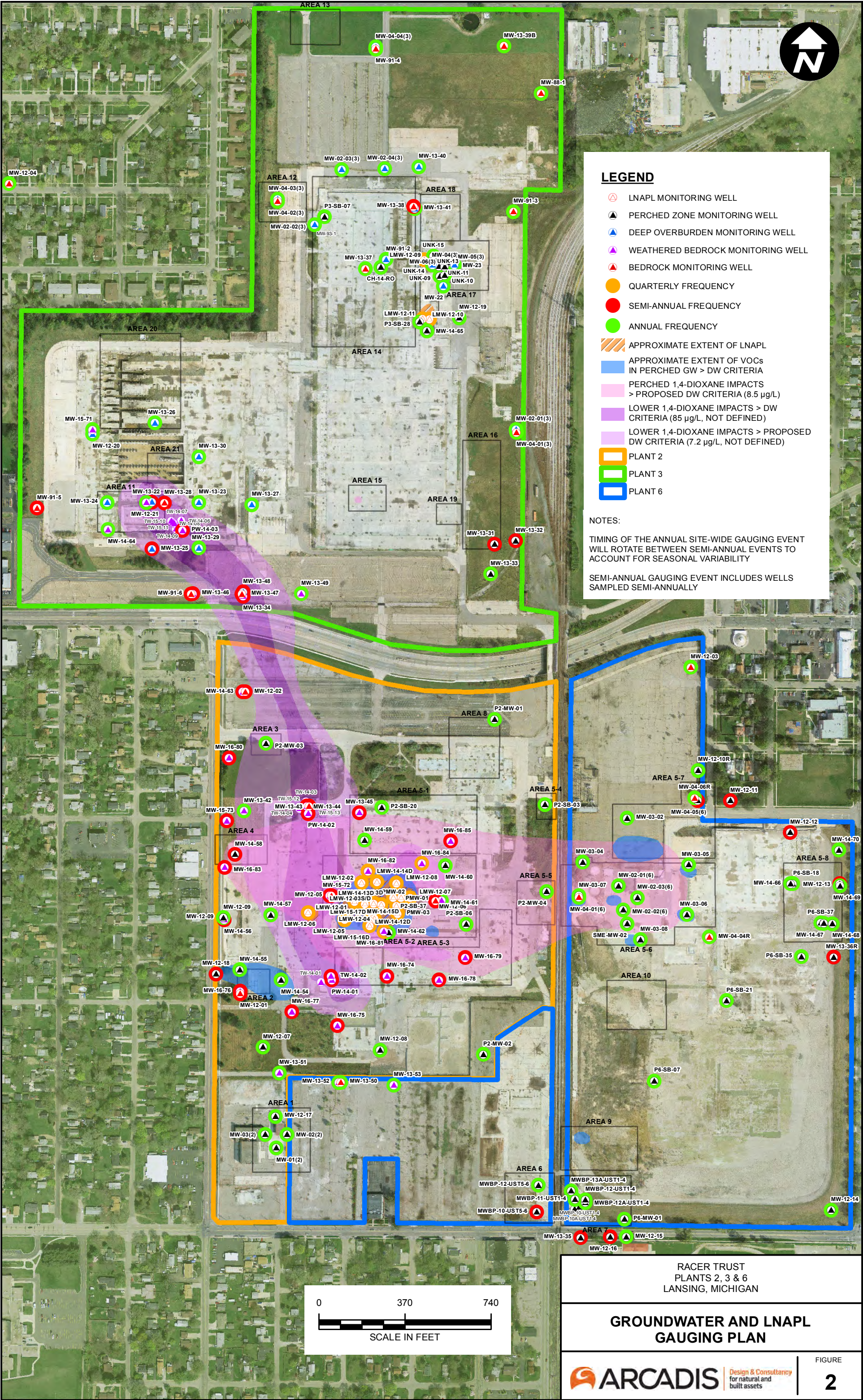
Notes:
* Site wide gauging to alternate between semi-annual events to account for seasonal variability. Semi-annual gauging includes all wells sampled semi-annually.
** Select metals includes arsenic, nickel, lead, vanadium, chromium, and copper.
***TAL metals defined in Table 3 of the Quality Assurance Project Plan (ARCADIS 2011b).
† SVOCs will be sampled every other biennial event, or once every four years (first event: 2020)
‡ New wells will to be sampled semi-annually until sampling frequency is reevaluated after collection of four data points.
New wells will be added to the figures and incorporated into the annual monitoring once 4 samples are collected and a COC list is determined
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FIGURES

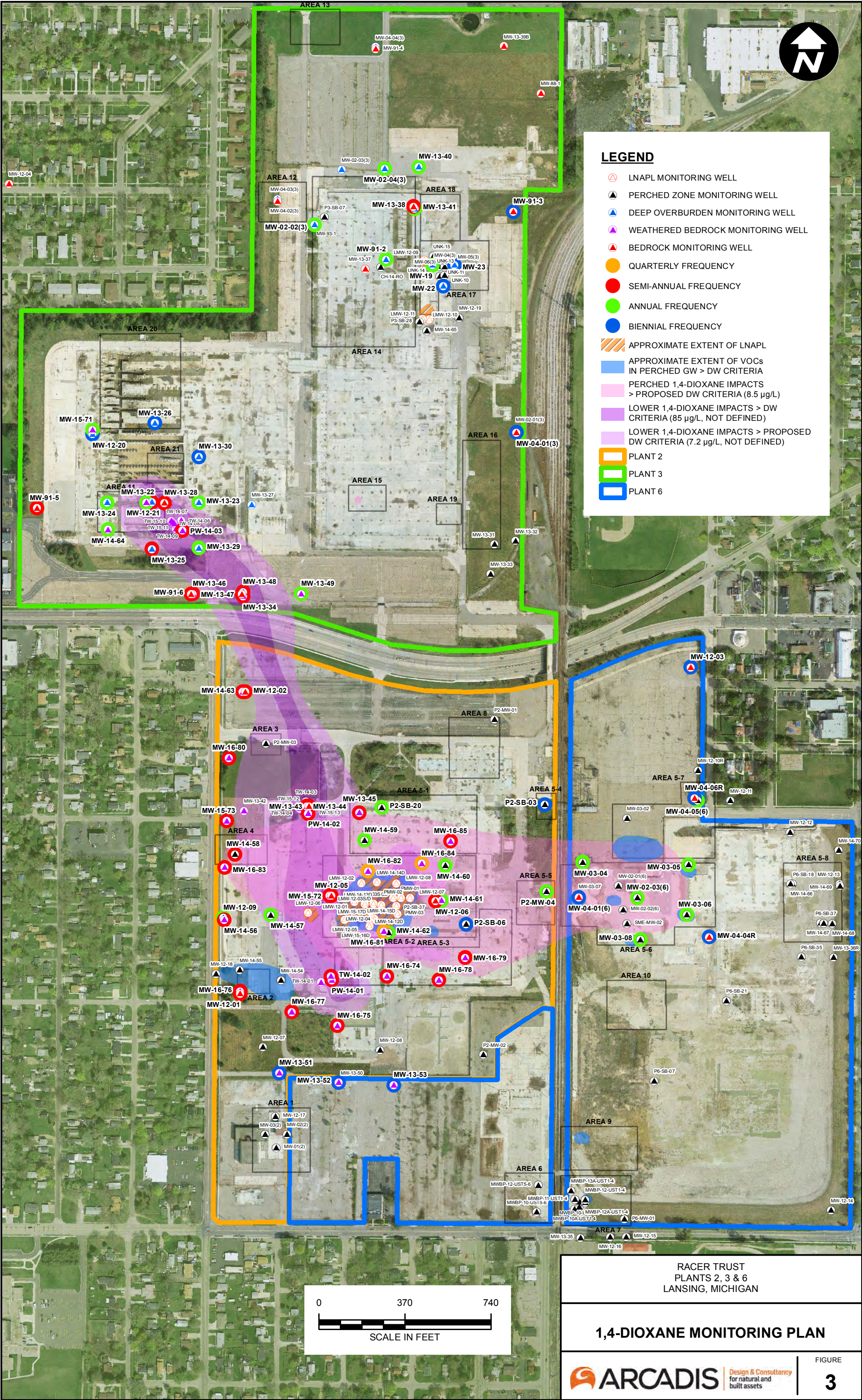




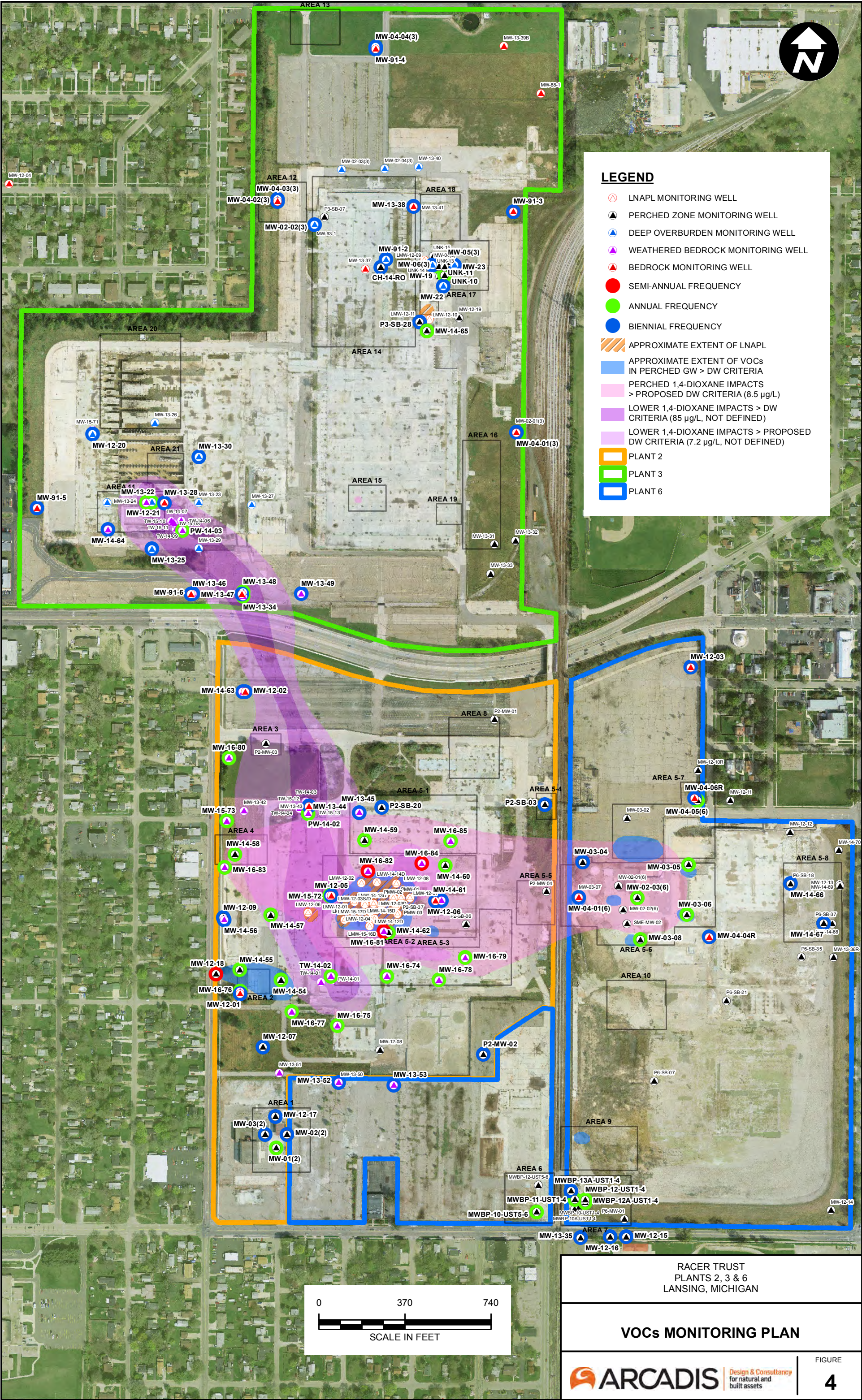
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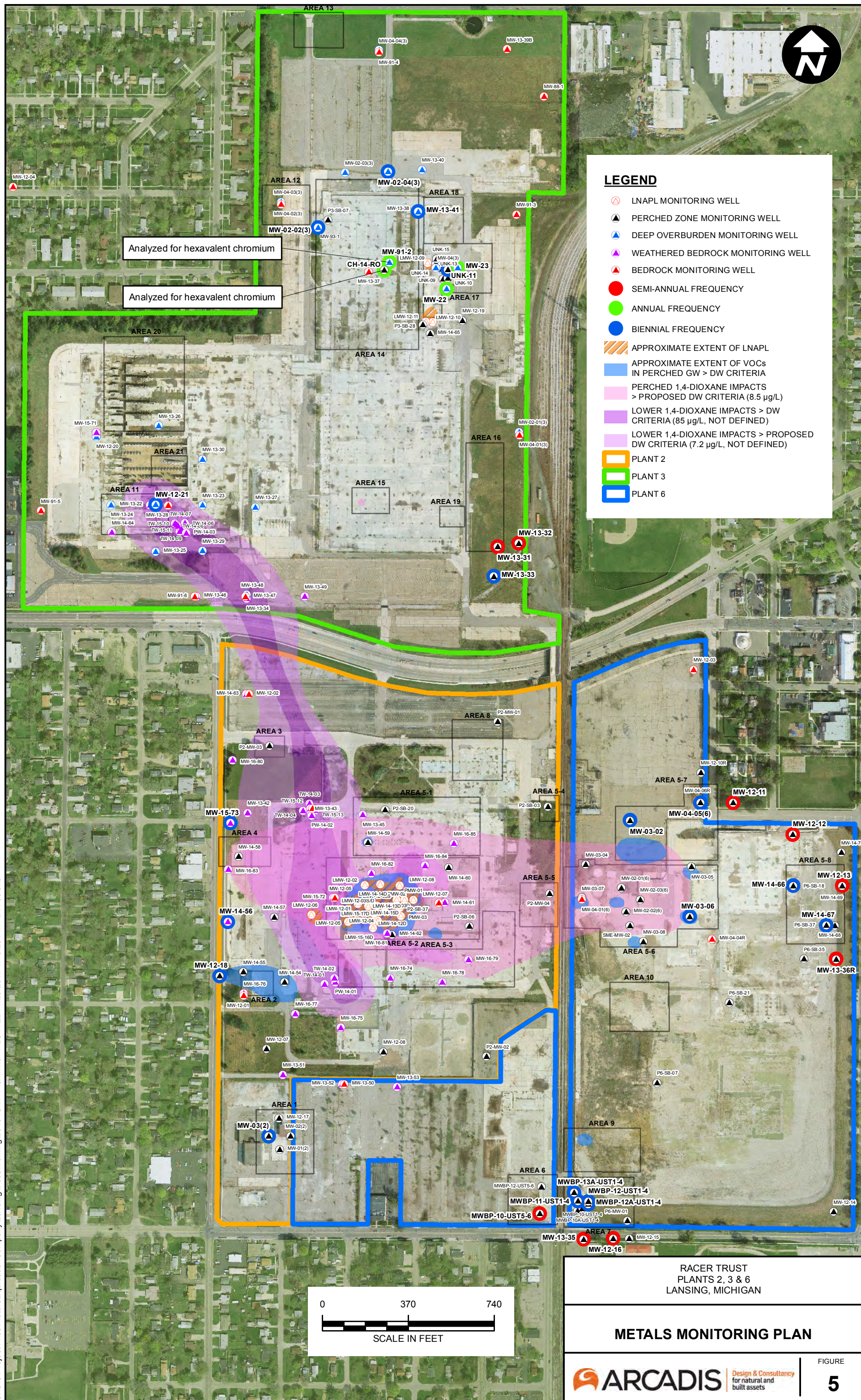


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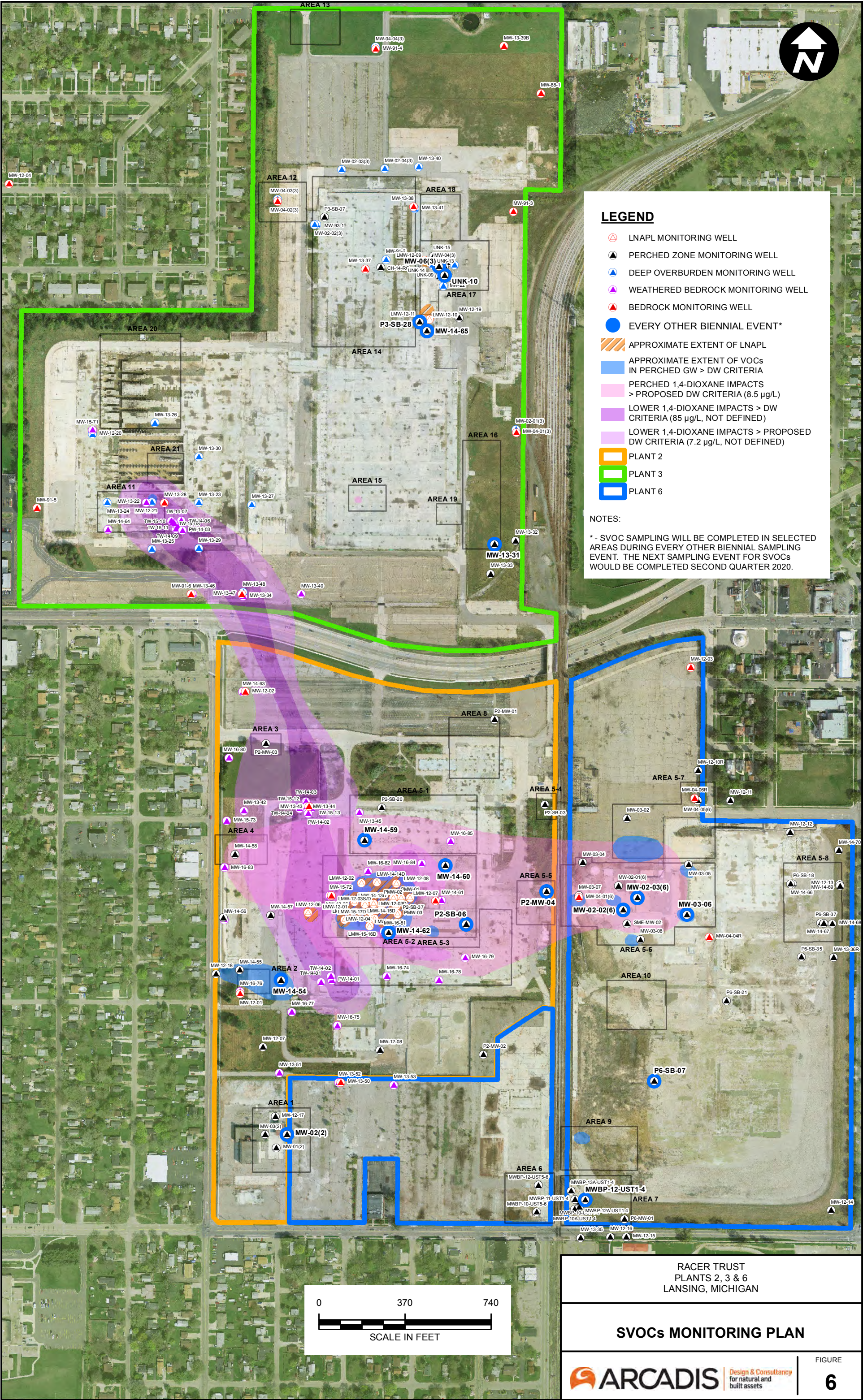


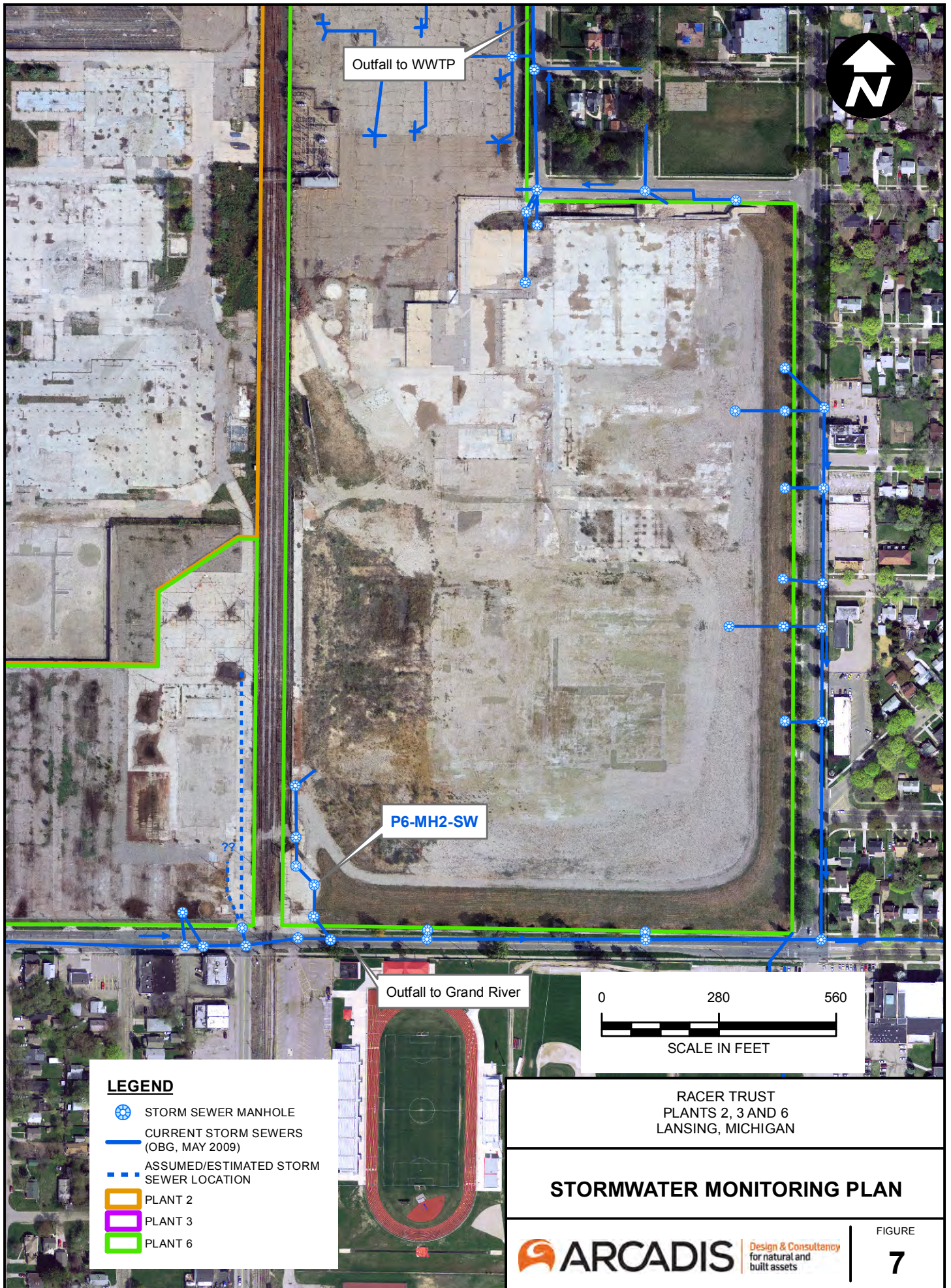
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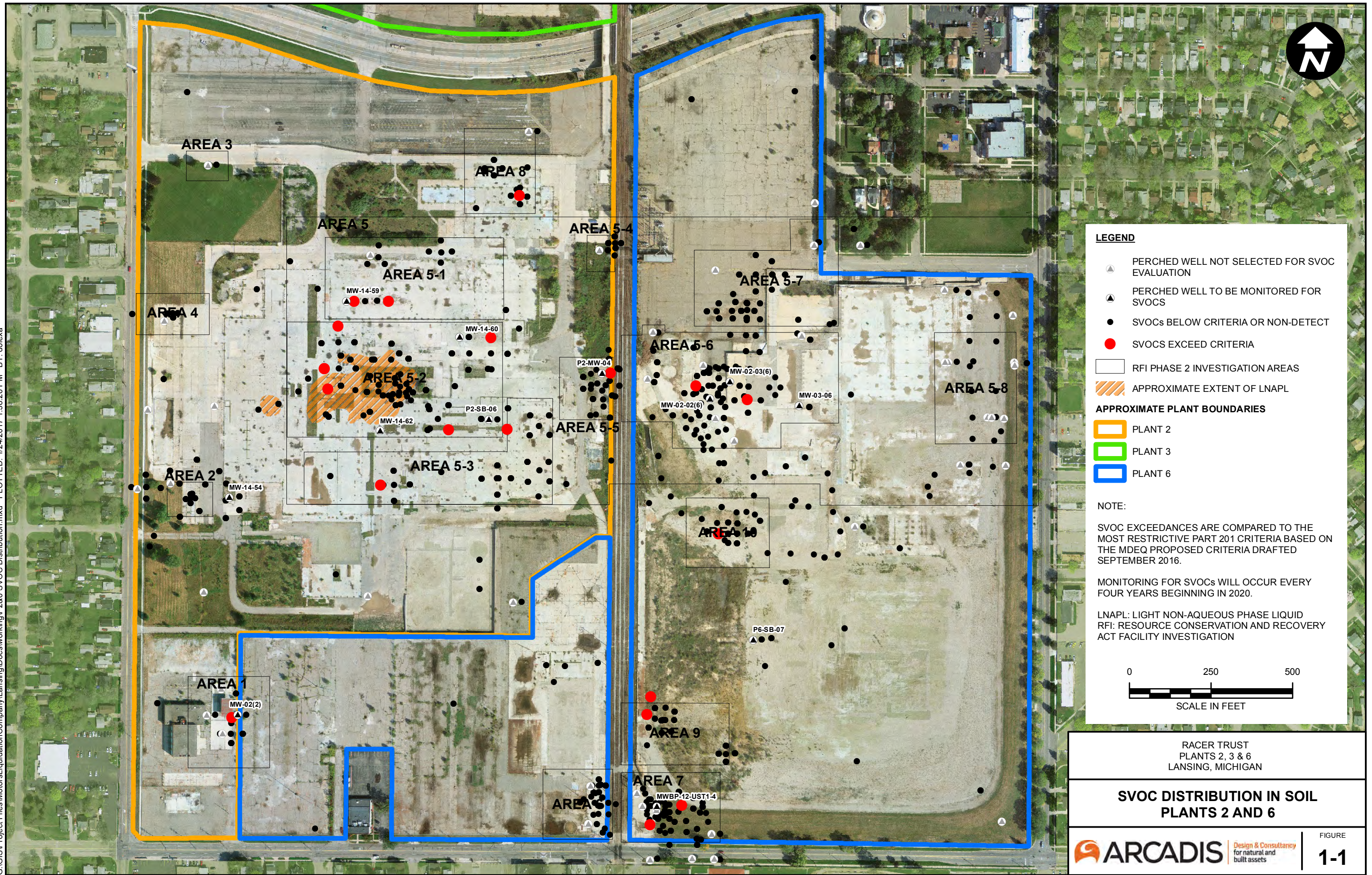


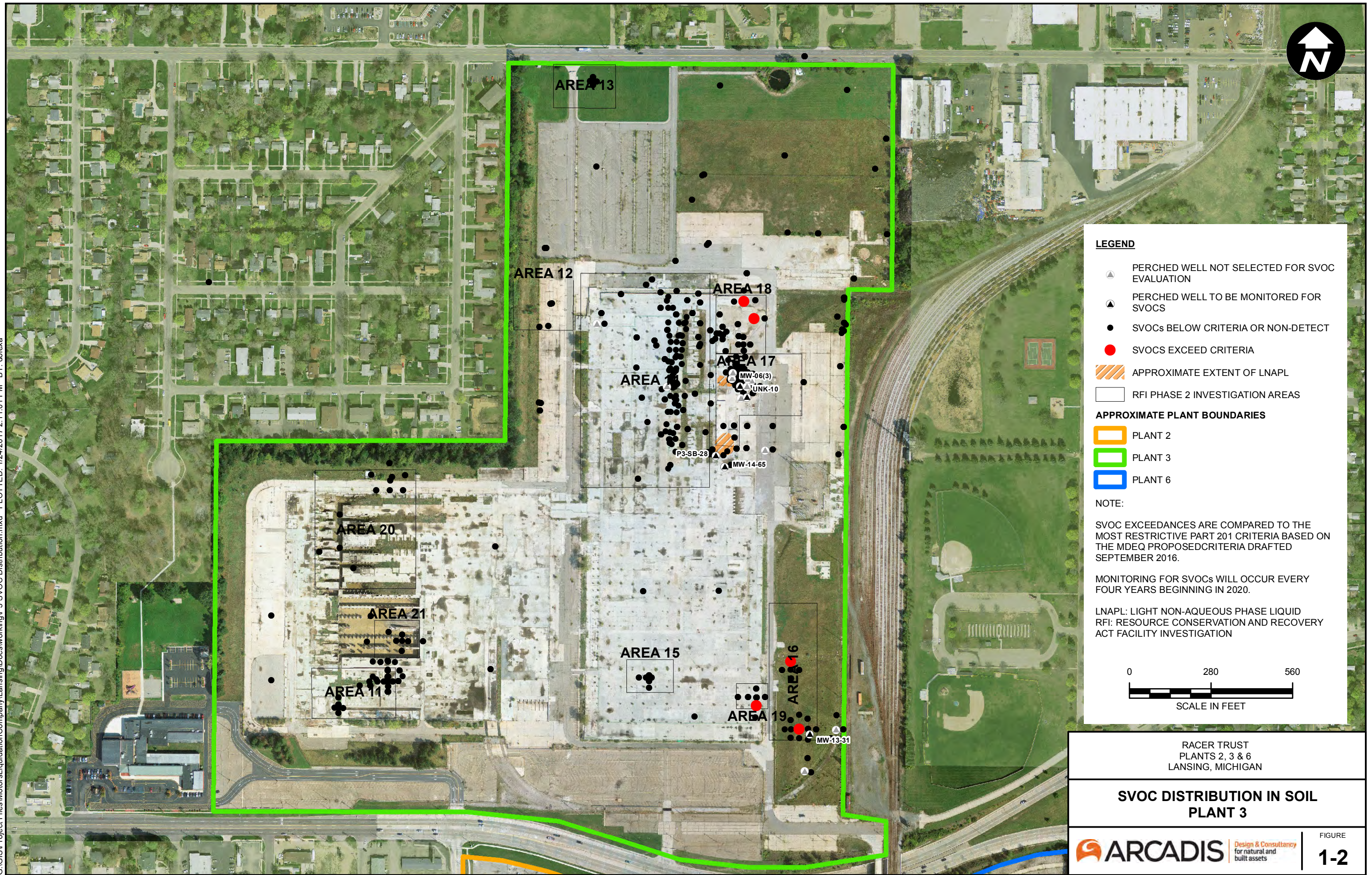


ATTACHMENT 1

Historical SVOC Detections in Soil







ATTACHMENT 2

Lansing Township Municipal Well Locations



