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Date:

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Arcadis Project No.:

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Subject:

LNAPL Pilot Recovery System Assessment Summary

RACER Trust, Buick City, Flint, Michigan

On behalf of RACER Trust, Arcadis of Michigan, LLC (Arcadis) has prepared this memo to present the results of light non-aqueous-phase liquid (LNAPL) skimming pilot test activities conducted in 2023 at the Buick City Site (site) in Flint, Michigan.

Background and Objectives

In 2022, an evaluation was performed to assess any remaining potential concerns related to LNAPL recoverability and to update previous remedial recommendations. Part of the assessment included a round of LNAPL transmissivity testing was completed at selected wells in areas previously identified as locations of measurable in-well LNAPL accumulation. LNAPL transmissivity values calculated from the 2022 transmissivity tests indicated that two areas, LNAPL Area #3 and Area #8, contained LNAPL where removal may be feasible as a remedial action (**Figure 1**). The observed transmissivity values associated with this conclusion were 4.15 ft²/d at 20-FP8, located in LNAPL Area #3 (**Figure 2**), and 1.42 ft²/d at RFI-86-03, located in LNAPL Area #8 (**Figure 3**). These tests were conducted on October 17, 2022. Additional information on the transmissivity testing and results can be found in the LNAPL Recoverability Assessment Summary Memorandum submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) on February 14, 2023.

Based on the results of the transmissivity tests for LNAPL Area #3 and Area #8, a LNAPL skimming pilot test using automated pneumatic pumps was conducted to support an evaluation of longer-term feasible

LNAPL recovery rates, or sustainable LNAPL yield, and support evaluation of the cost-benefit relationship of such recovery efforts via the established LNAPL Decision Tree logic Higher (**Attachment 1**). The pilot test at each location is described in the sections below.

LNAPL Skimming and Recovery Monitoring

The design for the LNAPL recovery system consisted of the following equipment:

- A two-inch diameter bottom-loading controllerless pneumatic pump, with pumping rate and cycles driven by the presence and recharge rate of liquid in and surrounding the pump.
- Compressed nitrogen gas cylinders used to provide power to the pump.
- LNAPL and water collected by the pump were discharged to a 55-gallon drum located adjacent to the well, within secondary containment.
 - A pneumatic tank-full shutoff was installed on the drum to cut off pneumatic power to the pump if a high-level condition in the drum was reached.
- The system equipment was mounted on a fabricated steel pallet to provide stability.

On February 28, 2023, LNAPL skimming systems were setup at monitoring wells 20-FP8 and RFI-86-03. Due to the availability of specific parts required for the compressed nitrogen gas manifolds used to power the skimming pumps, the start of each of the recovery systems was delayed. The following is a timeline of the LNAPL skimming and recovery efforts:

- On March 6, 2023, LNAPL skimming and recovery began at monitoring well 20-FP8 and on March 7, 2023, LNAPL skimming discontinued due to the nitrogen tank being empty and the skimming pump was no longer operational. Approximately 10-gallons of recovered LNAPL was present in the system storage drum.
- On March 7, 2023, LNAPL skimming and recovery began at monitoring well RFI-86-03. LNAPL skimming was discontinued at RFI-86-03 on March 8, 2023, due to the nitrogen tank being empty. No LNAPL was recovered from RFI-86-03 during the LNAPL skimming. The pump was installed at a vertical depth that would recover LNAPL if present and able to flow into the pump; however, due to the observed viscosity of the LNAPL no LNAPL was recovered and only approximately 12 gallons of water was recovered.
 - Further recovery efforts were halted at both monitoring well locations until a more robust method of powering the skimming pump could be set in place; however, monitoring of the well locations continued and the gauging data is provided in **Table 1**.
- On March 20, 2023, additional equipment was obtained and installed to support longer-term pump operation, and LNAPL skimming and recovery resumed at monitoring well location 20-FP8. However, minimal LNAPL was present, and automated recovery was discontinued again on March 21, 2023, due to lack of LNAPL in the well. LNAPL skimming at monitoring well RFI-86-03 did not resume since little to no LNAPL was observed in the well since the initial recovery effort on March 7, 2023.
- From March 21, 2023, to April 10, 2023, LNAPL monitoring continued periodically at each monitoring well location (**Table 1**). No LNAPL was observed in either monitoring well during this time and the pilot LNAPL recovery systems were decommissioned.

- From April 10, 2023, to June 5, 2023, LNAPL monitoring continued periodically and limited LNAPL was observed at each location ranging from 0.1 to 0.4 feet thick at RFI-86-03 and 0.04 to 0.15 feet thick at 20-FP8.

Results

Based on the LNAPL recovery pilot test completed at monitoring wells 20-FP8 and RFI-86-03 it was determined that despite the transmissivity values calculated in 2022, the LNAPL present in Area #3 and Area #8 is not conducive to practical hydraulic recovery, and hydraulic recovery efforts are not expected to result in a significant reduction in LNAPL mass within these areas. The difference between previously developed estimates of LNAPL transmissivity from the 2022 baildown testing and the conclusions from automated recovery efforts is due to the different time-scales of measurement involved in these two measurement approaches. Baildown testing, which examines short-term recharge after a single removal of LNAPL from the well, is a short-term measurement that can be susceptible to variations in local LNAPL saturation. In contrast, longer-term automated recovery imposes a hydraulic stress on the well over a longer period and can influence LNAPL over a larger spatial area surrounding the wellbore. For example, a small 'pocket' of flowable LNAPL adjacent to the casing or filter pack of a well may lead to a relatively high LNAPL transmissivity result from a baildown test, but not to recovery that is sustainable over a longer time frame or conducive to longer recovery efforts. A management-in-place approach for these LNAPL areas is recommended, with ongoing natural source zone depletion (NSZD) providing remedial benefit in terms of hydrocarbon mass destruction.

A sitewide review of the LNAPL areas, including information on previously completed interim measures, recommendations from the 2016 Remedy Recommendations Report, the conclusions from the 2017 LNAPL Summary Memo, and conclusions from the 2022 and 2023 evaluation is provided in **Table 2**.

The following are based on the LNAPL pilot recovery efforts at monitoring wells 20-FP8 and RFI-86-03:

- Low recovery rates and limited accumulation of LNAPL in monitoring wells 20-FP8 and RFI-86-03 indicate that hydraulic LNAPL recovery efforts, such as skimming, are not practical for LNAPL Area #3 and LNAPL Area #8.
- A management-in-place approach for these LNAPL areas is recommended, with ongoing NSZD providing remedial benefit in terms of hydrocarbon mass destruction.

Figures

- Figure 1 LNAPL Areas – Northend
Figure 2 LNAPL Area #3
Figure 3 LNAPL Areas #8

Tables

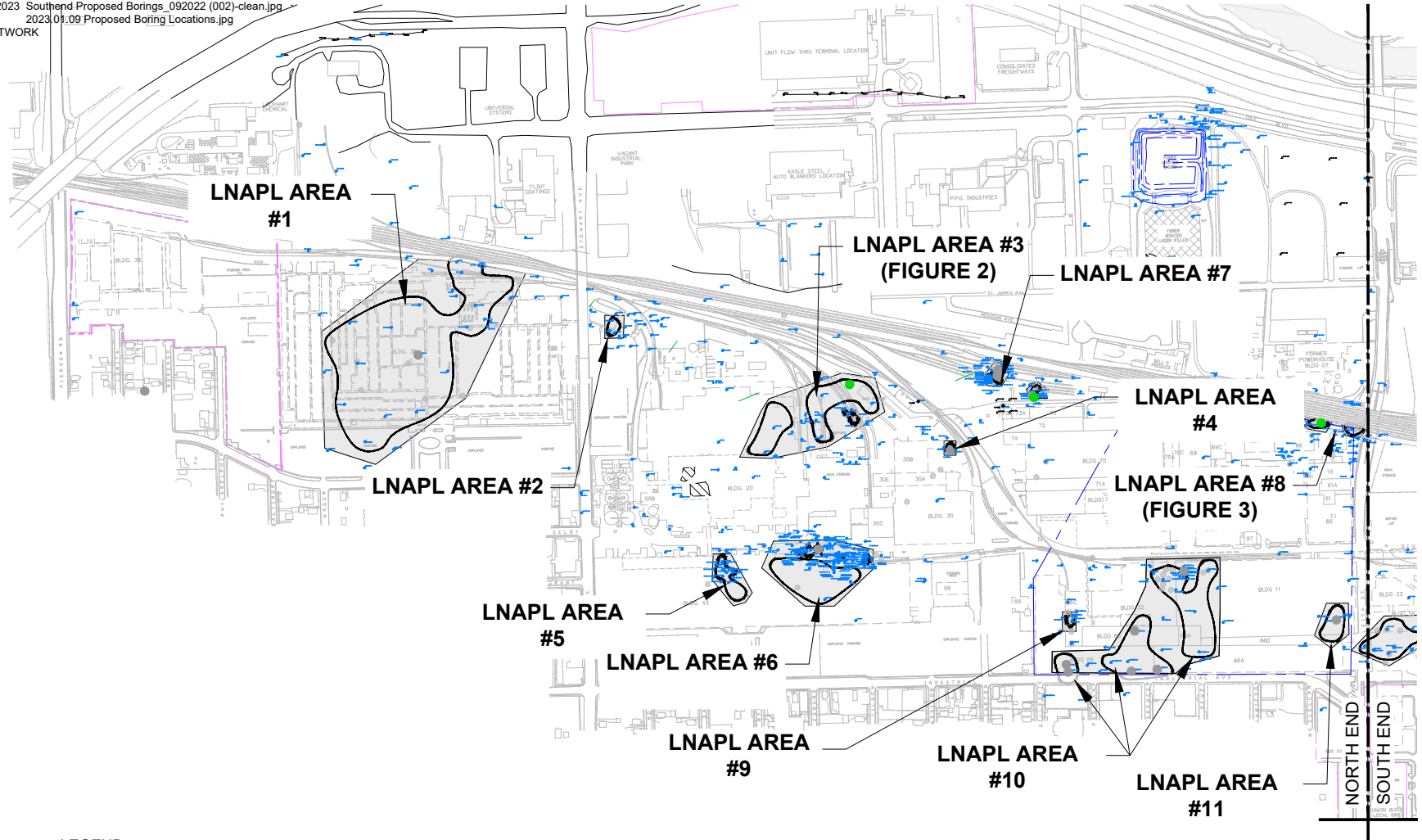
- Table 1 Summary of LNAPL Monitoring
Table 2 Summary of LNAPL Areas, Recent Data Collection, and Recommendations

MEMO

Attachments

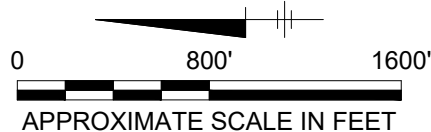
Attachment 1 Annotated LNAPL Decision Tree and LNAPL Area to AOI Cross-Reference Table

XREFS: IMAGES: PROJECTNAME: ---
 X-AREAS LNAPL 2022.10.06 Southend new borings.jpg
 X-SITE BASE-2023 Southend Proposed Borings_092022 (002)-clean.jpg
 X-BDR-RC-LA 2023.01.09 Proposed Boring Locations.jpg
 X-SAMPLE NETWORK
 X-BDR F34x22



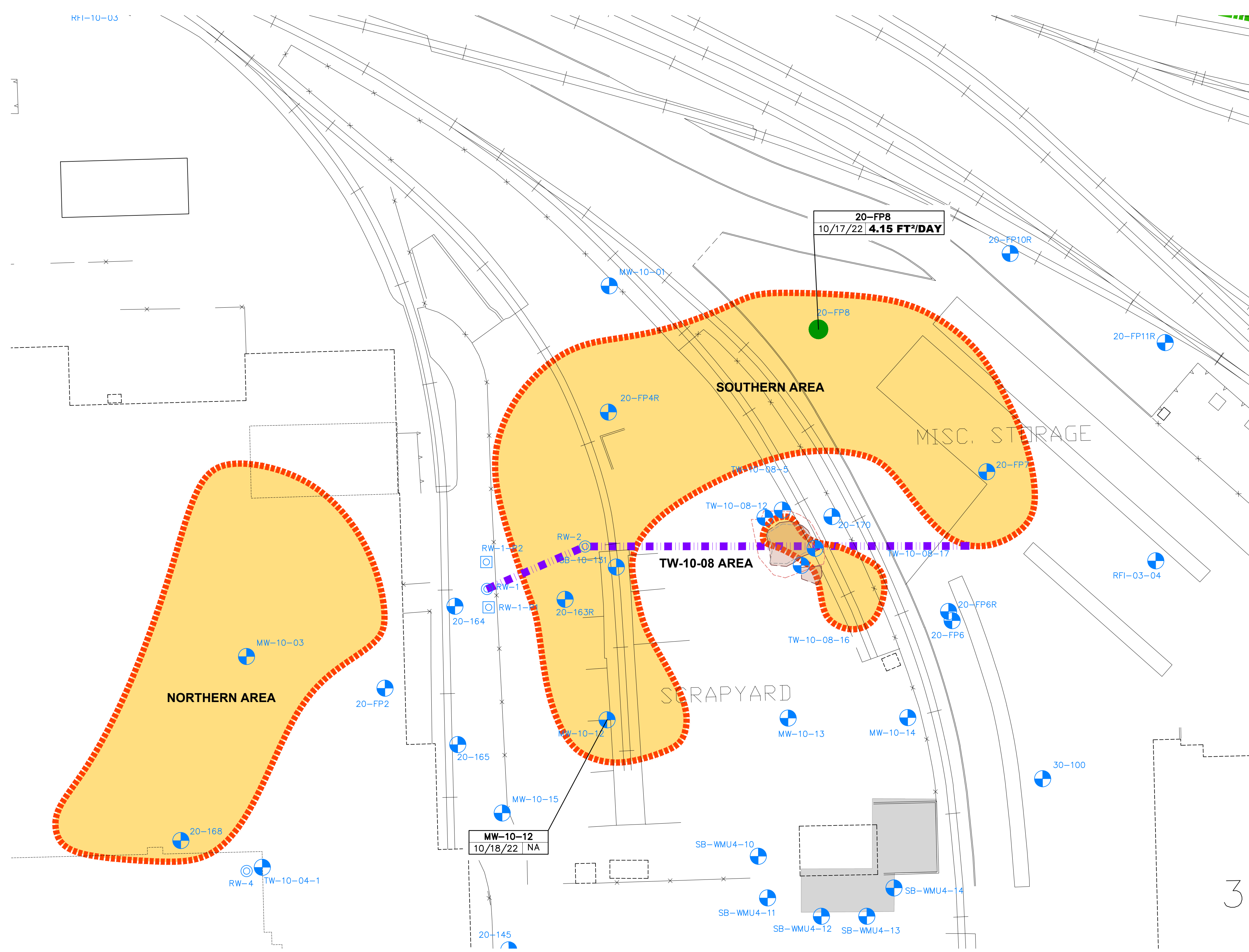
LEGEND:

- - - - - PROPERTY BOUNDARY
- APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
- EXTENT OF PROPOSED RESTRICTED AREA
- TRANSMISSIVITY TESTING RESULTS GREATER THAN 0.5 FT²/DAY
- TRANSMISSIVITY TESTING RESULTS LESS THAN 0.5 FT²/DAY



RACER TRUST BUICK CITY FLINT, MICHIGAN RESTRICTIVE COVENANT	
LNAPL AREAS - NORTHEND	
	FIGURE 1

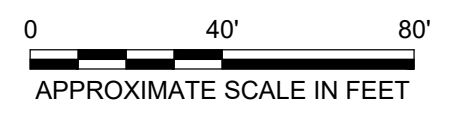
C:\Users\JDLoving\OneDrive - Arcadis\Documents\Projects\202301\Progress\01-DWG\GEN\FIG1-14-LNAPL TRANS.dwg LAYOUT: 4 SAVED: 2/13/2023 9:47 AM ACADVER: 23.1S (LMS TECH) PAGES: 1/1 PLOTSTYLETABLE: PLOTSTYLETABLE.ctb PLOTTED: 2/13/2023 9:51 AM BY: LOVING, JEFF



LEGEND:

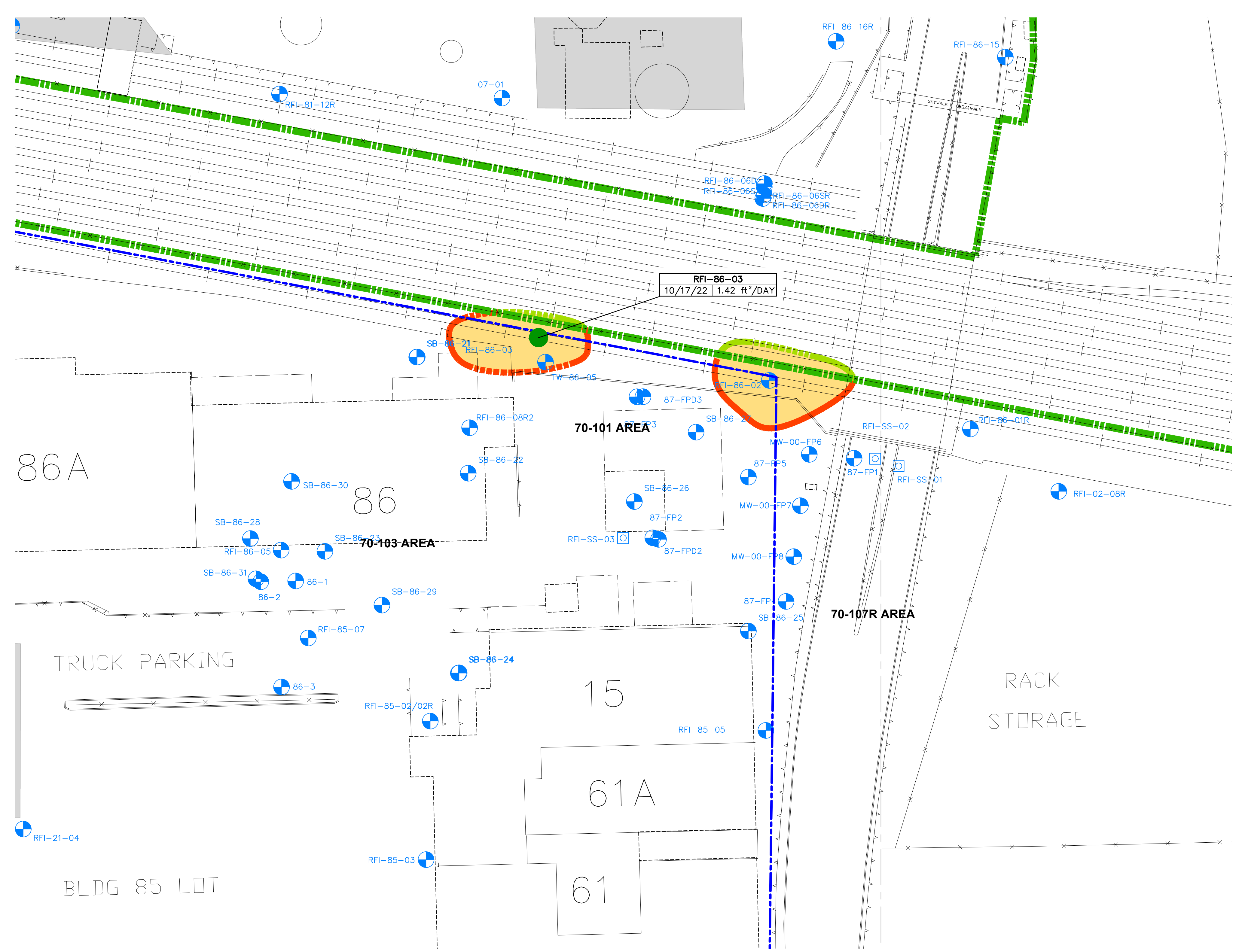
- - - RACER PROPERTY BOUNDARY
- ACTIVE MONITORING WELL
- APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
- RECOVERY TRENCH
- TRANSMISSIVITY TESTING RESULTS GREATER THAN 0.5 FT²/DAY
- TRANSMISSIVITY TESTING RESULTS LESS THAN 0.5 FT²/DAY

- NOTES:**
- BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100. AERIAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 6/12/2013.
 - BASED ON INFORMATION AVAILABLE AS OF 11/16/2022.
 - LNAPL TRANSMISSIVITY OF 0.5 FT²/DAY (SQUARE FEET PER DAY) IS LOWER BOUND THRESHOLD WHERE LNAPL RECOVERY USING HYDRAULIC METHODS IS NOT TYPICALLY PRACTICABLE (MDEQ, 2014).
 - ALL RESULTS ARE LNAPL TRANSMISSIVITY, TN (FT²/DAY)
 - LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID.
 - TRANSMISSIVITY RESULTS ARE BASED ON BOUWER AND RICE AND COOPER AND JACOB TRANSMISSIVITY DETERMINATION METHODS.



RACER TRUST BUICK CITY FLINT, MICHIGAN	
LNAPL AREA #3	
	FIGURE 2

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- LEGEND:
- - - RACER PROPERTY BOUNDARY
 - ACTIVE MONITORING WELL
 - APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
 - - - RECOVERY TRENCH
 - TRANSMISSIVITY TESTING RESULTS GREATER THAN 0.5 FT²/DAY
 - TRANSMISSIVITY TESTING RESULTS LESS THAN 0.5 FT²/DAY

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1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100. AERIAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 6/12/2013.
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 3. LNAPL TRANSMISSIVITY OF 0.5 FT²/DAY (SQUARE FEET PER DAY) IS LOWER BOUND THRESHOLD WHERE LNAPL RECOVERY USING HYDRAULIC METHODS IS NOT TYPICALLY PRACTICABLE (MDEQ, 2014).
 4. ALL RESULTS ARE LNAPL TRANSMISSIVITY, TN (FT²/DAY)
 5. LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID.
 6. TRANSMISSIVITY RESULTS ARE BASED ON BOUWER AND RICE AND COOPER AND JACOB TRANSMISSIVITY DETERMINATION METHODS.

RACER TRUST BUICK CITY FLINT, MICHIGAN	
LNAPL AREA #8	
ARCADIS	FIGURE 3

Table 1
 Summary of LNAPL Monitoring
 LNAPL Pilot Recovery System Assessment Summary
 RACER Trust - Buick City

Date	Well Elevation ¹	Depth to Water (ft)	Depth to LNAPL (ft)	LNAPL Thickness (ft)	Groundwater Elevation (AMSL)	LNAPL Elevation (AMSL)	Notes
RFI-86-03							
10/11/2022	736.57	8.10	7.5	0.60	728.47	729.07	
2/28/2023	736.57	6.67	6.37	0.30	729.90	730.20	
3/7/2023	--	--	--	--	--	--	System started
3/8/2023	--	--	--	--	--	--	System off, ran out of nitrogen, drum 25% full of water
3/13/2023	736.57	5.43	5.43	0.00	731.14	731.14	No measurable product, but some observed on probe
3/20/2023	736.57	5.61	5.55	0.06	730.96	731.02	
3/27/2023	736.57	5.31	5.31	0.00	731.26	731.26	No measurable product
4/10/2023	736.57	3.77	3.77	0.00	732.80	732.80	No measurable product, but some observed on probe, system decommissioned. 14 gallons of water and 0.05 gallons of product removed.
4/28/2023	736.57	5.50	5.1	0.40	731.07	731.47	
5/2/2023	736.57	5.39	5.11	0.28	731.18	731.46	
5/11/2023	736.57	5.55	5.27	0.28	731.02	731.30	
5/22/2023	736.57	5.84	5.59	0.25	730.73	730.98	
5/28/2023	736.57	6.00	5.82	0.18	730.57	730.75	
6/5/2023	736.57	6.10	6	0.10	730.47	730.57	
20-FP8							
10/11/2022	748.73	10.03	8.38	1.65	738.70	740.35	
2/28/2023	748.73	11.60	7.95	3.65	737.13	740.78	
3/6/2023	--	--	--	--	--	--	System started
3/7/2023	--	--	--	--	--	--	System stopped, ran out of nitrogen, 6 inches of product in drum
3/20/2023	--	--	--	--	--	--	System re-started
3/21/2023	748.73	10.13	10.13	0.00	738.60	738.60	System stopped, only purging water, no measurable product
3/22/2023	748.73	10.02	10.02	0.00	738.71	738.71	No measurable product
3/27/2023	748.73	9.97	9.97	0.00	738.76	738.76	No measurable product
4/10/2023	748.73	8.50	8.50	0.00	740.23	740.23	No measurable product, system decommissioned. 10 gallons of product and 70 gallons of water removed from well
4/28/2023	748.73	9.12	9.12	0.00	739.61	739.61	No measurable product
5/2/2023	748.73	9.07	9.07	0.00	739.66	739.66	No measurable product
5/11/2023	748.73	9.22	9.22	0.00	739.51	739.51	No measurable product
5/22/2023	748.73	9.50	9.46	0.04	739.23	739.27	
5/28/2023	748.73	9.70	9.62	0.08	739.03	739.11	
6/5/2023	748.73	9.90	9.75	0.15	738.83	738.98	

Notes:

1. All depth to water and LNAPL measurements from Top of Casing.

Abbreviations:

-- Not available
 ft Feet
 LNAPL Light non-aqueous phase liquid
 AMSL Above mean sea level

Footnotes:

¹ Top of Casing Elevation is in feet National Vertical Geodetic Datum (1988)

Table 2. Summary of LNAPL Areas, Recent Data Collection, and Recommendations
RACER Buick City Site, Flint, Michigan.

LNAPL Area	AOI Area	2016 RRR Conclusions	2016 RRR - Completed Interim Measures and Recommended Remedies	2017 LNAPL Summary Memo Conclusions	Previous Transmissivity Estimates (date) *highest result if multiple areas	Scope of Work Completed in 2022	2022 Transmissivity Results	Current Recommendations	LNAPL Decision Tree Status*
1	36-1/36-2	LNAPL in northwestern portion of LNAPL area indicated recovery not practical. LNAPL recovery will not result in beneficial reduction in overall LNAPL mass or exposure risk.	1 - Factory 36 LNAPL recovery system along CSX property boundary (IM completed) 2 - Outfall 001 and 002 infiltration pathway elimination (IM completed) 3 - 002 recovery trench monitoring (IM completed) 4 - Multi-phase extraction system (Pilot test completed, MPE not recommended) 5 - Surface cover (IM completed) 6 - Institutional controls (In progress)	LNAPL not recoverable	36-FP7 - 0.2 ft ² /day (4/25/2013)	Gauged wells 36-FP7, RFI-36-07R, MW-36-42, MW-36-6 Baildown test at well MW-36-42	MW-36-42 - 0.02 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
2	36-5	LNAPL recovery system operated at plume for ~20 years; partial and effective LNAPL recovery already been completed and transition to institutional controls appropriate	1 - Tank farm (source area) excavated (IM completed) 2 - Passive recovery trenches ~20 years of LNAPL recovery (IM completed) 3 - Outfall 002 storm sewer bulkhead (IM completed) 4 - 002 passive recovery trench monitoring (IM completed) 5 - Institutional controls (In progress)	LNAPL area not included in evaluation	2014 RRR - Transmissivity testing has not been completed as there is insufficient LNAPL present to conduct	None	None	No further action at this time; area is interpreted to be low-risk and further assessment is not worthwhile given access/feasibility constraints. If conditions change, consider follow-up monitoring to update data set.	LNAPL is either immobile or mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
3	10-1/10-4	LNAPL found to not be migrating, but mobile and infiltrating Outfall 003 storm sewer. Transmissivity testing at 20-FP7 indicated LNAPL recoverable, but recovery system operated at this plume for ~13 years with declining rate of success.	1 - ~13 years of LNAPL removal (IM completed) 2 - Storm sewer laterals bulkhead to eliminate LNAPL migration pathway (IM completed) 3 - Outfall 003 pathway elimination (IM completed) 4 - 003 recovery trench monitoring (IM completed) 5 - Target excavation (IM completed) 6 - Maintain surface cover (IM completed) 7 - Institutional controls (In progress)	LNAPL may be recoverable in Southern area, but not recoverable in Northern area and TW-10-08	20-FP7 - 1.0 ft ² /day (4/25/2013)	Gauged wells 20-FP7, 20-FP8, MW-10-12 Baildown test at well 20-FP8, MW-10-12	20-FP8 - 4.15 ft ² /d MW-10-12 - NA	Conduct follow-up skimming at well 20-FP8. Following skimming at 20-FP8, no further action is recommended due to low recovery rates and limited accumulation of LNAPL.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
4	AOI 03-1	Historic IM addressed partial and effective LNAPL removal already completed.	1 - A recovery sump addressed the suspected source area for this plume (IM completed) 2 - Institutional controls (In progress)	LNAPL area not included in evaluation	2014 RRR - Transmissivity testing has not been completed as there is insufficient LNAPL present to conduct	Gauged wells 03-03-R2, TW-03-03-2, TW-03-03-3 Baildown test at well 03-03-R2	03-03-R2 - 0.31 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
5 and 6	05-1/05-5	LNAPL found to not be migrating, but mobile and infiltrating Outfall 003 storm sewer. Historic IM's indicate past LNAPL has been recoverable.	1 - 15 years of LNAPL removal from passive recovery trenches at AOI 05-1 (IM completed) 2 - ~5 years of LNAPL removal from recovery wells at AOI 05-5 (IM completed) 3 - Outfall 003 pathway elimination (IM completed) 4 - Targeted excavation (IM completed) ¹ 5 - Institutional controls (In progress)	LNAPL may be recoverable in AOI 05-5, DH-RW-1, DH-RW-2, and DH-RW-3, but not recoverable at AOI 05-1, Western area, and 43-165	TW-DH-RW-01-01 - 0.74 ft ² /day (11/1/2016) TW-DH-RW-03-36 - 0.76 ft ² /day (2/23/2016)	Gauged wells TW-05-05-01, TW-05-05-02, TW-43-165-7, TW-DH-RW-01-01, TW-DH-RW-02-07 Baildown test at well TW-DH-RW-02-07	TW-DH-RW-02-07 - 0.14 ft ² /d	No further action at this time due to low transmissivity result. Manage in place with NSZD. Note Area 5 not assessed as part of this evaluation; area is interpreted to be low-risk and further assessment not warranted.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
7	81-2	LNAPL found to not be migrating or infiltrating Outfall 003. LNAPL recovery system with passive recovery trench and well operated for ~17 years.	1 - Passive recovery trench ~17 years of LNAPL removal (IM completed) 2 - Targeted excavation (Partially completed, IM being re-evaluated due to the presence of PFAS) ¹ 3 - Institutional controls (In progress)	LNAPL may be recoverable in 70-101 area, but not recoverable in 70-103 and 70-107R areas	TW-70-101-02 - 1.5 ft ² /day (11/1/2016)	Gauged wells TW-70-101-2, TW-70-101-7, TW-70-103-11, TW-70-107R, TW-70-107R-9 Baildown test at well TW-70-101-2, TW-70-101-7, TW-70-103-11, TW-70-107R, TW-70-107R-9	TW-70-101-2 - 0.04 ft ² /d TW-70-101-7 - 0.06 ft ² /d TW-70-103-11 - NA TW-70-107R - 0.80 ft ² /d TW-70-107R-9 - 0.25 ft ² /d	No further action at this time due to low transmissivity results; 107R result is above 0.5 ft ² /d but removal is not anticipated to have a significant effect on potential risk or to be cost-effective. Manage in place with NSZD.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
8	86-1	LNAPL found to not be migrating, but mobile and infiltrating Outfall 004 storm sewer.	1 - Tank farm (source area) excavated (IM completed) 2 - Two recovery wells ~5 years of LNAPL removal (IM completed) 3 - LNAPL bailing and monitoring ~4 years (IM completed) 4 - Outfall 004 infiltration pathway elimination (IM completed) 5 - 004 recovery trench monitoring (IM completed) 6 - Institutional controls (In progress)	LNAPL area not included in evaluation	2014 RRR - Transmissivity testing has not been completed as there is insufficient LNAPL present to conduct	Gauged wells RFI-86-02, RFI-86-03 Baildown test at well RFI-86-03	RFI-86-03 - 1.42 ft ² /d	Conduct follow-up skimming at well RFI-86-03. Following skimming at RFI-86-03, no further action is recommended due to low recovery rates and limited accumulation of LNAPL.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
9	83/84-4	LNAPL is not migrating or readily recoverable.	1 - Institutional controls (In progress)	LNAPL not recoverable	RFI-83/84-07 - 0.03 ft ² /day (4/24/2013)	Gauged wells RFI-83/84-07, RFI-83/84-45	NA	No further action at this time due to low transmissivity results; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is either immobile or mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
10	83/84-2 and 83/84-5	83/84-2 LNAPL may be recoverable in southern portion of plume. Outfall 003 and 005 bulkheaded in this portion of site so no mobility concerns. 83/84-5 LNAPL may be readily recoverable in portion of LNAPL area.	AOI 83/84-2 1 - Building 32 recovery well (IM completed) 2 - Bulkheaded sections of outfall 003 and 005 to eliminate GSI pathway (IM completed) 3 - Maintain surface cover to address particulate soil inhalation and direct contact in soil concerns (IM Completed) 4 - Targeted excavation of PCB impacts (IM re-evaluated, recommendation eliminated) ¹ 5 - Institutional controls (In progress) AOI 83/84-5 1 - Storm sewer lateral bulkhead to eliminate LNAPL migration pathway (IM completed) 2 - LNAPL recovery (Evaluated in 2022, recovery not feasible) ¹ 3 - Institutional controls (In progress)	83/84-2 and 83/84-5 LNAPL may be recoverable	RFI-83/84-53 - 4.1 ft ² /day (4/24/2013) MW-83/84-07 - 1.6 ft ² /day (8/6/2013)	Gauged wells MW-83/84-22, RFI-83/84-49, RFI-83/84-53, MW-83/84-07, MW-83/84-12, MW-83/84-19, MW-83/84-34, MW-83/84-36, MW-83/84-38 Baildown test at well RFI-83/84-49, RFI-83/84-53, MW-83/84-07, MW-83/84-12, MW-83/84-19, MW-83/84-34, MW-83/84-36, MW-83/84-38	RFI-83/84-49 - 0.13 ft ² /d RFI-83/84-53 - NA MW-83/84-07 - 0.33 ft ² /d MW-83/84-12 - NA MW-83/84-19 - 0.03 ft ² /d MW-83/84-34 - 0.07 ft ² /d MW-83/84-36 - 0.08 ft ² /d MW-83/84-38 - 0.06 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
11	83/84-1	LNAPL is not migrating, but is mobile and likely infiltrating Outfall 004. LNAPL may not be readily recoverable.	1 - Outfall 004 infiltration pathway elimination (IM completed) 2 - 004 passive recovery trench monitoring (IM completed) 3 - Institutional controls (In progress)	LNAPL may be recoverable	MW-83/84-15 - 0.71 ft ² /day (6/11/2015)	Gauged wells MW-83/84-15R Baildown test at well MW-83/84-15R	MW-83/84-15R - 0.07 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
12	12-A, 12-B, 12-C	LNAPL is mobile and infiltrating Outfall 004. LNAPL not readily recoverable.	1 - LNAPL recovery was attempted at two recovery wells (RFI-12-02/02R and RFI-12-11-D) for ~2 years; however, removal was not successful (IM Completed) 2 - Outfall 004 pathway elimination (IM completed) 3 - 004 recovery trench monitoring (IM completed) 4 - Maintain surface cover (IM completed) 5 - Institutional controls (In progress)	LNAPL area not included in evaluation	RFI-12-23 - 0.4 ft ² /day (9/19/2012)	Gauged wells RFI-12-09R, RFI-12-22R, RFI-12-23, RFI-12-35, RFI-12-38 Baildown test at well RFI-12-23	RFI-12-23 - 0.06 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
13	02-B	LNAPL is not migrating and Outfall 006 that services area has been bulkheaded. LNAPL not readily recoverable.	1 - Institutional controls (In progress)	LNAPL area not included in evaluation	2014 RRR - LNAPL too viscous to accurately measure	Gauged wells RFI-02-15, RFI-02-19 Baildown test at well RFI-02-19	RFI-02-19 - 0.50 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.
14	40-A, 40-B, 16-C	LNAPL is not migrating or infiltrating Outfall 009 or 010. Historical IM's include LNAPL bailing program.	1 - LNAPL bailing and recovery (IM completed) 2 - Outfall 009 and 010 bulkhead installation (IM completed) 3 - Institutional controls (In progress)	LNAPL area not included in evaluation	RFI-40-7R2 - 1.9 ft ² /day (6/12/2012)	Gauged wells RFI-40-14R, SB-40-23, RFI-16-08, RFI-16-10 Baildown test at well RFI-40-14R	RFI-40-14R - 0.08 ft ² /d	No further action at this time due to low LNAPL transmissivity; potential benefit of LNAPL recovery is not expected to outweigh costs. Manage in place with NSZD and controls.	LNAPL is mobile/flowable within a stable perimeter, but not readily recoverable. Manage via NSZD and controls.

Footnotes:

1 - Select IMs proposed in the 2016 RRR were modified or eliminated following additional testing, investigation and/or evaluation of Site conditions.

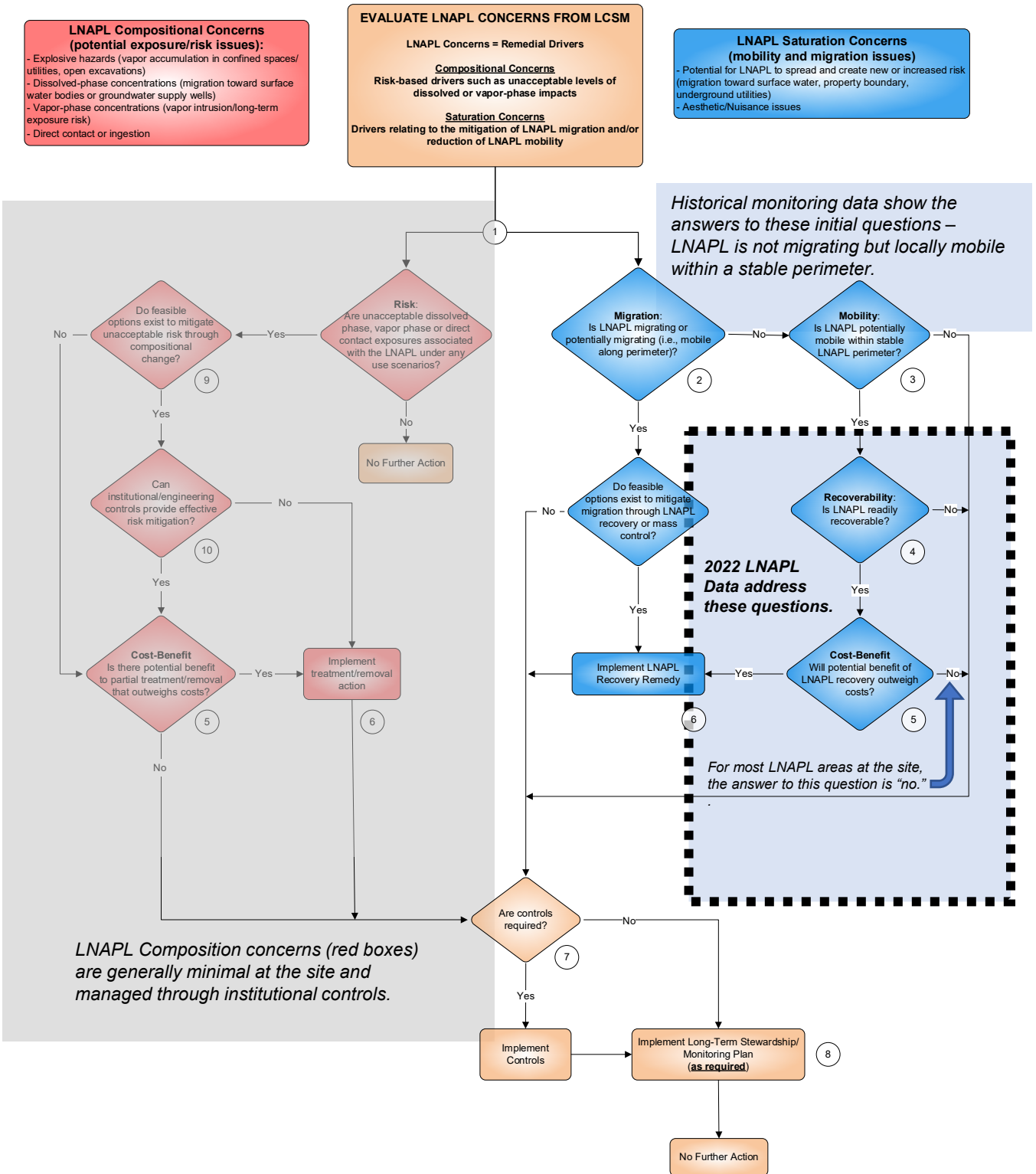
Notes:

RRR: Remedy Recommendation Report

ft²/d: square feet per day. A value of 0.5 ft²/d or less is used by EGLE as an indication that recovery efforts have reached the extent practicable.

NSZD: Natural source zone depletion

Attachment 1. Annotated Example of RACER LNAPL Decision Tree



Area	Matrix	Area
LNAPL Area #1	LNAPL	AOI 36-1/36-2 Area
LNAPL Area #2	LNAPL	AOI 36-5 Fuel Oil Area
LNAPL Area #3	LNAPL	AOIs 10-1/10-4 Hydraulic Oil Areas
LNAPL Area #4	LNAPL	AOI 03-1 Quench Oil Area
LNAPL Area #5	LNAPL	AOI 05-5 Cutting Oil Area
LNAPL Area #6	LNAPL	AOI 05-1 Cutting Oil Area
LNAPL Area #7	LNAPL	AOI 81-2 Cutting Oil Area
LNAPL Area #8	LNAPL	AOI 86-1 Fuel Oil Area ²
LNAPL Area #9	LNAPL	AOI 83/84-4 Cutting Oil Area
LNAPL Area #10	LNAPL	AOI 83/84-2 Cutting Oil Area
LNAPL Area #10	LNAPL	AOI 83/84-5 Cutting Oil Area
LNAPL Area #11	LNAPL	AOI 83/84-1 Cutting Oil Area
LNAPL Area #12	LNAPL	AOIs 12-A, B, & C Hydraulic Oil Areas ²
LNAPL Area #13	LNAPL	AOI 02-B Hydraulic Oil Area
LNAPL Area #14	LNAPL	AOI 40-A,B and 16-C Fuel Oil Areas