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Our ref: 012607A-LTR-3

January 14, 2022

Ms. Jennifer Stanhope
U.S. Environmental Protection Agency, Region 5
Land, Chemicals, and Redevelopment Division
77 West Jackson Blvd., LR-16J
Chicago, Illinois 60604 3590

2nd 2021 Semi-Annual Progress Report
Performance Based Administrative Order on Consent
Docket Number RCRA 05 2011 0025
Eckles Road Site, Livonia, Michigan
USEPA ID No. MID 005 356 621

Dear Ms. Stanhope

In accordance with the Performance Based Administrative Order on Consent between the U.S. Environmental Protection Agency Region 5 (USEPA) and Revitalizing Auto Communities Environmental Response Trust (RACER), please find the attached progress report for the 2nd half of 2021 (July 1, 2021 through December 31, 2021).

Please let us know if you would like to discuss further. Thank you.

Regards,

A handwritten signature in blue ink, appearing to read "Chris Meincke", is written over a horizontal line.

Chris Meincke, P.E.
Associate

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CJM/lg/LTR-3

Encl: Attachment A – 2nd Semi-Annual 2021 Progress Report

cc: Jacob Runge, EGLE
Tessy Jose, GLWA
Grant Trigger, RACER
Dave Favero, RACER
Jeff Crum, Hamp, Mathews & Associates

Attachments

Attachment A

2nd Semi-Annual 2021 Progress Report Performance-Based Administrative Order on Consent Eckles Road Site, Livonia, Michigan July 1, 2021 to December 31, 2021

1. Description of Work Completed

- Continued operation of the Area 1 French Drain Collection Trench and Groundwater Treatment system (GWTP). The historical Groundwater Treatment System was shut down on August 10, 2021 and the bag filters and granular activated carbon (GAC) vessel were moved to an exterior pallet, replumbed, and restarted to allow for demolition of the GWTP building. The bag filters and GAC vessel were moved into a Conex box on September 21, 2021. New controls, programming and pump were incorporated and the new system was commissioned on October 21, 2021. The GAC was changed on December 1, 2021. GLWA has been updated on operations and required effluent samples were collected and reported to GLWA. During the second half of 2021 the system collected and discharged 2,131,546 gallons of groundwater. Monthly discharge totals are presented in Table 1. Groundwater elevation measurements were collected periodically from the French drain sump located within Area 1 and select monitoring wells. Monitoring locations are provided on Figure 1. Groundwater elevation measurement information is provided in Table 2 and on Figure 2.
- Submitted the 1st 2021 Semi-Annual Progress Report dated July 16, 2021 to USEPA.
- Continued discussions and evaluations with developer to incorporate capping integrated with development of Area 1 as an interim corrective measure, including off-site soil being brought to the Site for fill material.
- Continued grading and site preparation activities.
- Submitted the Revised Interim Measures Work Plan for Area 1 to USEPA and EGLE on July 20, 2021. USEPA approved the Revised Interim Measures Work Plan for Area 1 on September 29, 2021.
- Submitted updates via email to USEPA and EGLE regarding construction schedule and progress updates.
- Participated in virtual meetings on July 22, 2021 and August 19, 2022 with USEPA and EGLE, to discuss questions and comments on the Interim Measures Work Plan – Area 1 – Former Plating Area, and to provide an update regarding Construction Status and Materials Management Plan details.
- Completed Construction Area 1 Groundwater Monitoring sampling activities August 23 to 25, 2021. Construction groundwater monitoring sample results are provided in Table 3. Construction monitoring well locations are presented on Figure 1.
- Installed new and replacement performance monitoring wells located inside the Area 1 soil-bentonite barrier wall and contingent northern French drain prior to installation of HDPE liner material.
- Submitted a Liner System Installation Construction Quality Assurance/Quality Control Plan to USEPA and EGLE on September 3, 2021.
- Submitted a Method for Repair of Soil-Bentonite Barrier Wall Penetrations to USEPA and EGLE via email on September 9, 2021.
- Submitted a Focused Remedial Feasibility Analysis to USEPA and EGLE via email on September 25, 2021.
- Construction activities including installation of foundations, geopiers, wall panels, and roof for the approximately 365,000 square foot building within the Area 1 soil-bentonite barrier wall. Installation of Site utilities, including penetrations and repairs to the Area 1 soil-bentonite barrier wall were also completed.

- Installation of approximately 35,000 square yards of geotextile, HDPE liner, drainage layer and cover material over the area between the newly constructed building and the existing Area 1 soil-bentonite barrier wall, including drainage trench and laterals, as detailed in the July 20, 2021 Revised Interim Measures Work Plan – Area 1. Dipole testing and destructive seam tests were completed to confirm liner, seam, boot, and repair integrity as detailed in the Liner System Installation Construction Quality Assurance/Quality Control Plan dated September 3, 2021.
- Participated in a Site visit with EGLE on September 29, 2021.
- Submitted EA Budget Amendment Request No. 1 to USEPA and EGLE on October 8, 2021. USEPA approved EA Budget Amendment Request No.1 on October 12, 2021.
- Submitted supplemental Materials Management Plan information to EGLE via email on November 3, 2021.
- Submitted a signed 2022 Annual Environmental Action Budget Request to USEPA on December 1, 2021. USEPA approved the 2022 Annual Environmental Action Budget Request on December 1, 2021.
- Collected groundwater samples from existing AOI 31 monitoring wells and soil gas probes/vapor pins during December 2021, as access to residential properties permitted.
- Conducted an inspection and performance evaluation of the Home 7 (October 29, 2021) and Home 8 (August 30, 2021) vapor mitigation systems.
- Installed off-site monitoring wells MW-OS-15S/D and MW-OS-17S/D on December 18 and 19, 2021, as described in the draft Groundwater Characterization Activities and Review of Subsurface Conditions Memorandum to USEPA, date June 30, 2021.

2. Data Collected

- A Summary of Monthly Groundwater Treatment Plant Discharge Volumes is provided in Table 1.
- Groundwater elevations and sample results associated with the Area 1 Construction Monitoring activities are provided in Tables 2 and 3, respectively. A summary and evaluation of Construction Monitoring activities and initial performance monitoring results will be submitted with IM implementation details under separate cover.
- Groundwater sample results and soil vapor sample results associated with AOI 31 sampling activities will be submitted under separate cover.

3. Problems Encountered

- None.

4. Estimated Percent Complete and Information Summary for Selected Activities

- O&M of the Groundwater Pump & Treat System (GWTP, Barrier Wall, Cover) 41%
Continued operation of the Area 1 French Drain Collection Trench and Groundwater Treatment system on an as-needed basis. Chromium VI and nickel treatment is no longer required to discharge to the sanitary sewer under GLWA special discharge permit. GAC installed to treat PFOS. Submitted appropriate discharge reports as per the Special Discharge Permit. (Although not applicable to the current Site

remediation strategy, percent complete is estimated as 11 years complete of 27 years estimated in the May 2010 RCES. This metric will be re-evaluated when the interim measures for Area 1 has been implemented and evaluated.) Also see below item - PFAS Remedy/Interim Measure Operation, Maintenance, and Monitoring.

- Long-Term Groundwater Monitoring On-going
Long-Term Groundwater Monitoring Plan proposed 5 years of monitoring to verify continued stability/reduction in off-Site/boundary concentrations (anticipated completion 2006 through 2010). Sampling activities are currently planned to continue pending USEPA approval to cease monitoring. Also see below item - PFAS Remedy/Interim Measure Operation, Maintenance, and Monitoring.

- Maintenance of the AOI 39 Dust Control Plan 100%
- Restrictive Covenants 100%

Prepared a revised Declaration of Restrictive Covenant (DRC) and Termination of the 2007 DRC and submitted to USEPA on June 25, 2015. Recorded revised DRC and 2007 DRC Termination on August 26, 2015. A DRC for the southwest portion (Area 1) was recorded on April 9, 2019. First Amended and Restated Declaration of Restrictive Covenant was recorded on May 12, 2021 for the southwest portion of the Site (Area 1). An amended DRC for Area 1 will be recorded when the interim measure has been implemented.

- Vapor Intrusion Investigation 100%
Vapor Intrusion Investigation has been completed and subsequent mitigation has been implemented at two residences, and a VI pathway sampling plan downgradient of previously investigated homes has been approved and is being implemented. See AOI 31 below for additional activities.

- Installation of Vapor Mitigation System 100%
(Homes 7 & 8: 37780 and 37750 Grantland St.)
Installation completed and system operational at Home 7, 37780 Grantland since September 2012.
Installation completed and system operational at Home 8, 37750 Grantland St. since January 2018.

- O&M and Performance Monitoring of Vapor Mitigation System On-going
System performance monitoring is being implemented at pre-scheduled time periods. Latest system performance monitoring completed August 30, 2021 (Home 8) and October 29, 2021 (Home 7).

- Area 1 Pilot Tests - Alternative Chemicals & Target In-Situ Treatment Injection 100%
Objective was to design, implement, and evaluate a pilot test to use alternative chemicals in the wastewater treatment process that could reduce treatment system operating time and/or operating costs. Also, design and implement an in-situ stabilization treatment in Area 1 that could also reduce treatment system operating time and long-term monitoring duration.

The groundwater treatment plant optimization activities were not conducted due to health and safety concerns associated with handling, storing, and mixing the proposed replacement chemicals.

The Area 1 field pilot test was conducted in November and December 2010. Based on an evaluation of the pilot test results, additional pilot study injection and monitoring activities were recommended to determine if full-scale on-site implementation would significantly reduce dissolved concentrations of chromium and nickel and allow for the groundwater treatment plant activities to be reduced or eliminated.

Additional cost and remedial alternative evaluations were performed in 2013. Additional Area 1 Characterization activities have been implemented. A laboratory treatability study was performed using site groundwater to evaluate the effectiveness of utilizing a permeable reactive barrier wall (PRB) with zero valent iron (ZVI) to treat Area 1 groundwater if the existing groundwater collection and treatment

system operations are ceased. Groundwater modeling activities were also performed to evaluate the optimal location and number of PRBs and the effects on groundwater flow inside and outside of the Area 1 Barrier Wall.

An additional field pilot test injection was completed in November 2013 and monitoring activities were completed through October 2014 with expanded pilot injections in the northern portion of the Area 1 chromium and nickel-impacted groundwater plume proposed in the 2015 Annual EA Budget Request.

Additional expanded pilot study injections were completed in May through June of 2015 including the injection of sodium sulfide, sodium dithionite, or a combination of the two in 83 injections points in the northern portion of the Area 1 chromium and nickel-impacted groundwater plume. Groundwater monitoring concluded in December 2015. An Area 1 ISCR Pilot Study Summary Report was submitted in January 2016.

- Groundwater Treatment System Decommissioning & Removal 100%

Anticipated to be completed in 2037 per May 2010 RCES but was implemented in 2021 to support the Area 1 interim measure. The existing French drain collection system was retained and the treatment system was re-located/upgraded as a contingency to the interim measure.

- Completion Report & Well Abandonment 0%

Anticipated to be completed in 2037 per May 2010 RCES but this is likely to change given the interim measure being implemented for Area 1.

- AOI 31 Long-Term VI Pathway Monitoring and Groundwater TCE Remediation 50%

A Long-Term VI Pathway Monitoring Work Plan was approved May 2016 which included a minimum two years of semi-annual/annual soil vapor and groundwater sample collection to evaluate groundwater plume stability, downgradient extent of the groundwater and soil vapor TCE plume, and spatial and temporal variability in TCE soil vapor concentrations. The first semi-annual event was conducted in June 2016. Based on the results of the first event, additional groundwater delineation activities (Phase I Geoprobe®) were completed during the 1st Quarter of 2017 to further delineate TCE and TCA groundwater plumes and concentrations to determine if modifications are needed to the VI pathway monitoring plan, or if response actions are needed to mitigate potential unacceptable VI risk. Additional permanent monitoring wells and soil vapor probes were installed in June 2017 and were sampled in July 2017, as well as in 2018, 2019 and 2020 in coordination with the annual Groundwater Monitoring Program. Home 1 and Home 8 subsurface soil vapor probes were resampled in December 2017. Soil vapor and Vapor Pin samples were collected November/December 2018, December 2019, and December 2020. Preparation of a Long-Term VI pathway risk summary report based on VI sampling results from 2016 through 2021 will be prepared and submitted at a date to be determined.

Groundwater and soil diagnostic sample and hydraulic data were collected June and October 2018 to assist design of an In-Situ Groundwater Remediation of the TCE plume to lessen vapor intrusion pathway risk assessment and mitigation activities in the future at homes downgradient of the plume's current extent. A Draft Work Plan for In-Situ Chemical Oxidation Remediation of TCE at AOI 31 dated June 13, 2019, and revised August 23, 2019 was submitted to USEPA. USEPA submitted technical review comments on March 10, 2020 which are currently under review by RACER. Per USEPA's approval of the November 16, 2020 scope of work, groundwater monitoring wells MW-103 and MW-202, as well as soil gas well SG-1 were replaced and sampled in January/February 2021 due to construction-related damage. Soil gas and groundwater samples were collected in December 2021. Sample results will be used to refine the vapor source conceptual site model. Refinement of the vapor pathway CSM in the area downgradient of Home 1 (38101 Amrhein) is also under current consideration.

– Area 1 Remedial Implementation - Metals

95%

A request to perform Targeted Area 1 ISCR Injections was submitted to USEPA in April 2016 and approved by USEPA on May 18, 2016. Targeted injections were implemented in August 2016. An Area 1 Full Scale ISCR Work Plan was submitted to USEPA in April 2016 and approved by USEPA on May 18, 2016. Implementation of the work plan activities began September 2016. ISCR injections were completed in November 2016. Performance groundwater monitoring following the ISCR injections was completed in January 2017 and April/May 2017.

An Area 1 Permeable Reactive Gate Evaluation report was submitted to USEPA in September 2017 proposing to install a permeable reactive gate (PRG) along a portion of the eastern alignment of the Area 1 Barrier Wall, to allow groundwater to exit the area surrounded by the barrier wall while being passively treated. An Area 1 Permeable Reactive Gate Work Plan was submitted to USEPA in April 2018. Comments received from USEPA were addressed. The presence of PFAS-impacted groundwater within the Area 1 Barrier wall put implementation of the PRG on hold while the impacts of PFAS being presented were evaluated.

Follow-up targeted injections were conducted in December 2017 along the south and southeastern alignments of the Area 1 Barrier Wall (in the vicinity of French drain collection trench and proposed PRG location, where injections had not previously been conducted). Follow-up groundwater monitoring activities were completed in January 2018 and May 2018. Additional groundwater monitoring activities were completed in October 2019. Two additional injections with sodium dithionite were conducted in December 2019 northwest of the field pilot study injection locations. Additional groundwater monitoring activities were completed in October 2020 and January/February 2021.

An interim measure integrating an impermeable cap with development of Area 1 was mostly implemented in 2021.

– Area 1 PFAS and Metals Characterization

90%

Initial groundwater samples were collected during 2017/2018 to evaluate the potential presence of PFAS-impacted groundwater at the Site. PFAS has been detected in groundwater samples within the former Plating Area and GWTP influent/effluent samples at concentrations greater than the USEPA's 2016 Lifetime Health Advisory of 70 ng/L for PFOA and PFOS. Additional characterization activities were completed in 2019 to evaluate horizontal and vertical extents of PFAS-impacted groundwater within Area 1, and how it may impact potential Area 1 remedies. Additional characterization activities to further evaluate shallow PFAS impacted groundwater were conducted in the northern portion of Area 1 in May 2020. Additional characterization activities were conducted in October 2020 to further delineate shallow PFAS-impacted groundwater in the northern and western portions of Area 1, and outside the southern alignment of the Area 1 Barrier wall.

Off-site characterization of PFAS and metal groundwater impacts was conducted in January/February 2021. Additional monitoring well installation and groundwater sampling activities were proposed to and approved by USEPA. Two monitoring well pairs were installed in December 2021, the remaining proposed monitoring wells will be installed upon implementation of an access agreement with an off-site property owner.

– PFAS Remedy/Interim Measure Evaluation

95%

Potential remedial alternatives to address PFAS-impacted groundwater within Area 1 have been reviewed and summarized. The evaluation will be updated per comments from USEPA and resubmitted. An interim measure has been implemented to integrate an impermeable cap with development of Area 1. Additional Remedy/Interim Measure Evaluation activities may be required pending the results of Interim Measure Performance Monitoring.

– PFAS Treatability Pilot Tests

100%

A USEPA approved Scope of Work for a laboratory treatability study has been completed to evaluate several media to evaluate their effectiveness treating PFAS-impacted groundwater.

- PFAS Remedy/Interim Measure Design 95%
Design of a cap integrated with development of Area 1 has been developed and implemented. The interim measure incorporates capping and development to reduce infiltration and eliminate/minimize the need for ongoing groundwater treatment/operation and maintenance activities. An Interim Measures Work Plan was submitted to USEPA for review in December 2020. Comments from USEPA were received and were addressed in a Revised Interim Measures Work Plan which was submitted to USEPA on July 20, 2021 and approved by USEPA on September 29, 2021.
- PFAS Remedy/Interim Measure Implementation 90%
Installation of the cap (a high density polyethylene liner [HDPE] liner and drainage layer) and cover materials, and construction of a new building, parking and truck dock areas is substantially complete. Interior building slab and finishes are anticipated to be complete during the 1st half of 2022. Implementation and evaluation activities are anticipated to continue in 2022.
- PFAS Remedy/Interim Measure Operation, Maintenance, and Monitoring 5%
The existing groundwater treatment plant (GWTP) was supplemented with granular activated carbon to remove PFAS from collected groundwater. Groundwater was collected and treated by the GWTP on an as-necessary basis (responding to precipitation events and generally maintaining the groundwater within the Area 1 Barrier Wall at depths greater than 3 feet bgs) from December 2018 through January 2021 to manage groundwater elevations within the Area 1 Barrier Wall. Since February 2021 groundwater has been collected and treated on an on-going basis. O&M tasks are anticipated to change based on implementation of the interim measure and will be developed after the interim measure is in place and initial performance monitoring is completed. The groundwater treatment components were removed from the historic GWTP building and relocated into a Conex box. New pump and control components were installed as part of the Interim Measure implementation activities.

5. Summary of Contacts with Interested Parties

- Correspondence with GLWA regarding Special Discharge Permit activities and required reporting
- Coordination regarding redevelopment activities continues as necessary.
- Residents are updated on a one-on-one basis to maintain privacy of VI pathway risk evaluations at their homes.
- Updates to local officials have been provided regarding potential redevelopment of Area 1.

6. Changes in Personnel

- None.

7. Projected Work for Next Reporting Period (January 2022 through June 2022)

- Continue implementation of the cap integrated with development of Area 1 interim measure, including performance groundwater monitoring activities and reporting.
- Continue to work with USEPA and EGLE to address Area 1 impacts and with GLWA to address any discharge issues.
- Continue monitoring groundwater elevations and operation of the Area 1 French Drain Collection Trench and Groundwater Treatment system in accordance with the approved Construction Groundwater Monitoring Plan.
- Continue to evaluate the presence of PFAS and metals outside of the Barrier Wall, including the potential for off-site infiltration to sewers.
- Continue to work toward an interim measure/remedy to mitigate the potential for a future complete VI pathway for off-site AOI 31 receptors. Additional data collection is anticipated to be necessary to develop a proposed remedial technology.
- Prepare summaries of meetings, data reviews, or conference calls with USEPA, as appropriate.
- Prepare the 2nd 2021 Semi-Annual Progress Report.

Attachments: Table 1 – Summary of Monthly Groundwater Treatment Plant Discharge Volume
Table 2 – Summary of Construction Groundwater Monitoring Elevations
Table 3 – Summary of Construction Groundwater Monitoring Analytical Results
Figure 1 – Construction and Performance Monitoring Locations
Figure 2 – Construction Groundwater Monitoring Elevations

Table 1

January 2022

Page 1 of 1

**Summary of Monthly Groundwater Treatment Plant Discharge
AREA 1 - Former Plating Area
Eckles road Site
Livonia, Michigan**

Monthly GWTP Discharge Volume (Gallons)	
Month	
July 2021	241,682
August 2021	405,988
September 2021	234,938
October 2021	176,514
November 2021	432,610
December 2021	639,814
Total July 2021 to December 2021 Discharge	2,131,546

Notes:

New Groundwater Treatment System commissioned in October 2021

Table 2

Area 1 Infiltration Barrier Construction

Monitoring

Eckles Road Site

Livonia, Michigan

Containment		Portion of Shallow		DTW (ft below top of riser)	3-Feb	18-Feb	5-Mar	19-Mar	6-Apr	20-Apr	5-May	27-May	17-Jun	9-Jul	20-Jul	13-Aug	15-Sep	1-Oct	15-Oct	24-Oct	9-Nov	23-Nov	7-Dec	20-Dec	3-Jan
Area	Location	Well ID.	Aquifer																						
Inside		GWTP Sump	Deep	GWTP Sump(Inside)	3.66	9.91	8.65	7.3	6.72	10.45	11.85	7.5	5.65	7.9	8.45	4.38	7.75	7.05	6	5.5	11.89	NM	13.75	12.65	13.15
Outside		PZ-SW-10	Shallow	PZ-SW-10 (Outside)	9.85	10.2	10.25	10.31	10.25	10.22	10.35	10.51	10.28	9.99	9.35	8.96	9	8.38	8.68	damaged	8.62	8.83	8.94	damaged	damaged
Outside		MW68D-16	Deep	MW68D-16 (Outside)	12.82	13.08	13.15	13.17	13.2	13.05	13.02	13.32	13.2	12.9	12.35	11.79	11.81	11.09	11.41	11.65	blocked	11.72	11.99	11.49	12.12
Outside		HA-14	Deep	HA-14(Outside)	11.43	11.8	11.8	11.81	11.45	11.44	11.61	11.99	12	14.72	10.8	9.54	10.68	10.12	10.22	10.46	10	10.36	10.27	10.39	10.47
Outside		HA-15	Deep	HA-15(Outside)	NM	11.86	11.85	11.85	11.75	11.75	11.82	11.95	buried*	damaged	11	buried*	14.32	13.47	13.67	13.82	13.42	13.92	buried	13.8	13.94
Outside		MW-S-7S	Shallow	MW-S-7S(Outside)	12.19	12.19	12.29	12.3	13.22	12.22	12.19	12.42	buried*	11.95	11.22	10.85	11.32	10.68	10.79	10.97	10.41	11	10.95	10.99	10.93
Outside		MW-27	Deep	MW-27(Outside)	11.9	12.02	12.05	12.1	11.95	11.95	12.02	12.14	buried*	11.74	11.1	10.61	11.11	10.06	10.5	10.7	10.25	10.82	10.37	10.68	11.32
Outside		MW-S-8S	Shallow	MW-S-8S(Outside)	11.2	12.35	11.28	11.3	11.18	buried*	buried*	11.38	11.55	12.09	10.71	10.5	10.75	9.99	9.8	9.87	9.72	9.91	9.83	9.91	9.95
Outside		MW-S-8D	Deep	MW-S-8D(Outside)	NM	11.04	11.01	11.01	10.8	buried*	buried*	11.11	11.11	10.8	10.42	10.43	10.53	9.91	10.1	9.99	9.89	10.02	10.06	10.1	10.15
Inside		PZ-SW-9	Shallow	PZ-SW-9 (Inside)	4.9	6.28	6.01	5.95	5.61	6.22	6.49	6.5	5.75	6.79	5.1	4.44	6.42	6.03	5.91	8.81	7.35	8.1	8.21	8.8	8.96
Inside		PZ-SW-18	Shallow	PZ-SW-18(Inside)	3.74	NM	NM	NM	NM	NM	NM	5	damaged	damaged	damaged	damaged	damaged	damaged	damaged	damaged	8.4	8.82	7.36	7.93	8.27
Inside		MW-82S-19-R	Shallow	MW-82S-19-R																	8.88	11.72	11.52	12.12	12.66
Outside		MW-90S-20	Shallow	MW-90S-20																			18.62	19.26	19.2
Inside		MW-92S-20	Shallow	MW-92S-20																				13.13	13.27
Outside		MW-93S-20	Shallow	MW-93S-20																				12.9	13
Inside		MW-94S-20	Shallow	MW-94S-20																			NM	NM	NM
Inside		MW-95S-20	Shallow	MW-95S-20																			NM	NM	NM
Outside		MW-96S-20	Shallow	MW-96S-20																	15.75	NM	11.36	11.17	11.28
Inside		MW-97S-20	Shallow	MW-97S-20																	14.89	NM	12.1	12.5	12.76
Inside		PZ-SW-4-R	Shallow	PZ-SW-4-R																			11.68	11.69	12.09
Outside		PZ-SW-3-R	Shallow	PZ-SW-3-R																			8	7.77	8.23
Inside		PZ-SW-2-R	Shallow	PZ-SW-2-R																			9.6	9.82	10.11
Outside		PZ-SW-1-R	Shallow	PZ-SW-1-R																			5.99	5.47	5.38
TOC ⁽¹⁾					3-Feb	18-Feb	5-Mar	19-Mar	6-Apr	20-Apr	5-May	27-May	17-Jun	9-Jul	20-Jul	13-Aug	15-Sep	1-Oct	15-Oct	24-Oct	9-Nov	23-Nov	7-Dec	20-Dec	3-Jan
Inside		GWTP Sump	705.37	Groundwater Elevation ⁽¹⁾	701.71	695.46	696.72	698.07	698.65	694.92	693.52	697.87	699.72	697.47	696.92	700.99	697.62	698.32	699.37	699.87	693.48		691.8	692.9	692.4
Outside		PZ-SW-10	705.57	PZ-SW-10	695.72	695.37	695.32	695.26	695.32	695.35	695.22	695.06	695.29	695.58	696.22	696.61	696.57	697.19	696.89		696.95	696.74	696.63		
Outside		MW68D-16	707.889	MW68D-16	695.069	694.809	694.739	694.719	694.689	694.839	694.869	694.569	694.689	694.989	695.539	696.099	696.079	696.799	696.479	696.239		696.169	695.899	696.399	695.769
Outside		HA-14	705.95	HA-14	694.52	694.15	694.15	694.14	694.5	694.51	694.34	693.96	693.95	691.23	695.15	696.41	695.27	695.83	695.73	695.49	695.95	695.59	695.68	695.56	695.48
Outside		HA-15	705.35	HA-15		693.49	693.5	693.5	693.6	693.6	693.53	693.4			694.35										
Outside		MW-S-7S	706.07	MW-S-7S	693.88	693.88	693.78	693.77	692.85	693.85	693.88	693.65		694.12	694.85	695.22	694.75	695.39	695.28	695.1	695.66	695.07	695.12	695.08	695.14
Outside		MW-27	705.75	MW-27	693.85	693.73	693.7	693.65	693.8	693.8	693.73	693.61		694.01	694.65	695.14	694.64	695.69	695.25	695.05	695.5	694.93	695.38	695.07	694.43
Outside		MW-S-8S	704.59	MW-S-8S	693.39	692.24	693.31	693.29	693.41			693.21	693.04	692.5	693.88	694.09	693.84	694.6	694.79	694.72	694.87	694.68	694.76	694.68	694.64
Outside		MW-S-8D	704.36	MW-S-8D		693.32	693.35	693.35	693.56			693.25	693.25	693.56	693.94	693.93	693.83	694.45	694.26	694.37	694.47	694.34	694.3	694.26	694.21
Inside		PZ-SW-9	705.69	PZ-SW-9	700.79	699.41	699.68	699.74	700.08	699.47	699.2	699.19	699.94	698.9	700.59	701.25	699.27	699.66	699.78	696.88	698.34	697.59	697.48	696.89	696.73
Inside		PZ-SW-18	705.28	PZ-SW-18	701.54							700.28													
Inside		MW-82S-19-R	Not surveyed	MW-82S-19-R																					
Outside		MW-90S-20	Not surveyed	MW-90S-20																					
Inside		MW-92S-20	Not surveyed	MW-92S-20																					
Outside		MW-93S-20	Not surveyed	MW-93S-20																					
Inside		MW-94S-20	Not surveyed	MW-94S-20																					
Inside		MW-95S-20	Not surveyed	MW-95S-20																					
Outside		MW-96S-20	Not surveyed	MW-96S-20																					
Inside		MW-97S-20	Not surveyed	MW-97S-20																					
Inside		PZ-SW-4-R	Not surveyed	PZ-SW-4-R																					
Outside		PZ-SW-3-R	Not surveyed	PZ-SW-3-R																					
Inside		PZ-SW-2-R	Not surveyed	PZ-SW-2-R																					
Outside		PZ-SW-1-R	Not surveyed	PZ-SW-1-R																					

Notes:

Existing monitoring wells will be utilized if intact and accessible following construction activities, otherwise a replacement monitoring well/temporary well point will be installed as construction activites/completion allows.

TOC - Top of Casing Elevation

ft AMSL - feet above mean sea level.

ft BGS - feet below ground surface.

Buried* - Contractor trailer and gravel installed over monitoring well locations

NM - Not Measured during specific event

⁽¹⁾ Ground surface grading activities may have affected previously surveyed reference points - groundwater elevations may not be accurate until monitoring wells are re-surveyed upon completion of construction activities

Risers repaired/extended or new/replacement monitoring wells installed and have not been surveyex

Table 3
Analytical Results of Groundwater Samples
Area 1 Construction Groundwater Monitoring
Eckles Road Site
Livonia, Michigan

Sample Location Sample Identification Sample Date Sample Type Parameters	Units	EGLE Generic Groundwater Cleanup Criteria(1)			HA-14	HA-15	HA-15	MW-27	MW-68D-16	MW-S-7S	MW-S-8D
		Residential Drinking Water	Non-Residential Drinking Water	Groundwater Surface Water Interface ⁽²⁾	GW-12607-082521-DA-010 08/25/2021	GW-12607-082321-DA-005 08/23/2021	GW-12607-082521-DA-005 08/25/2021	GW-12607-082321-DA-006 08/23/2021	GW-12607-082521-DA-011 08/25/2021	GW-12607-082521-DA-007 08/25/2021	GW-12607-082321-DA-003 08/23/2021
Metals		a	b	c							
Boron	mg/L	0.5	0.5	7.2	1.7 ^{ab}	--	5.5 ^{ab}	0.44	9.8 ^{abc}	0.27	0.75 ^{ab}
Boron (dissolved)	mg/L	0.5	0.5	7.2	--	--	--	--	--	--	0.64 ^{ab}
Chromium	mg/L	0.1	0.1	0.1	0.005 U	--	0.005 U	0.005 U	0.014	0.005 U	0.0083
Chromium (dissolved)	mg/L	0.1	0.1	0.1	--	--	--	--	--	--	0.005 U
Chromium III (trivalent)	mg/L	0.1	0.1	0.1	0.02 U	--	0.02 U	0.02 U	0.014 J	0.02 U	0.0083 J
Chromium VI (hexavalent)	mg/L	0.1	0.1	0.011	0.02 U	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Nickel	mg/L	0.1	0.1	0.073	0.2 ^{abc}	--	5.3 ^{abc}	0.74 ^{abc}	0.022 J	0.13 ^{abc}	0.25 ^{abc}
Nickel (dissolved)	mg/L	0.1	0.1	0.073	--	--	--	--	--	--	0.2 ^{abc}
Per/Polyfluoroalkyl Substances (PFAS)											
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonate	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonate	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Fluorotelomer sulfonic acid (4:2)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Fluorotelomer sulfonic acid (6:2)	ng/L				4.7 U	--	4.5 U	4.7 U	4.6 U	4.5 U	4.9 U
Fluorotelomer sulfonic acid (8:2)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	370	370		3.8 U	--	3.6 U	3.8 U	3.7 U	3.6 U	3.9 U
N-Ethyl perfluorooctane sulfonamidoacetic acid	ng/L				4.7 U	--	4.5 U	4.7 U	4.6 U	4.5 U	4.9 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L				4.7 U	--	4.5 U	4.7 U	4.6 U	4.5 U	4.9 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	420	420		2.0	--	1.4 J	2.1	1.6 J	2.9	1.9 J
Perfluorobutanoic acid (PFBA)	ng/L				11	--	8.3	18	13	17	8.9
Perfluorodecanesulfonic acid (PFDS)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluorodecanoic acid (PFDA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	0.84 J
Perfluorododecanoic acid (PFDoDA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L				1.9 U	--	0.62 J	1.9 U	3.2 I	1.8 U	2.0 U
Perfluoroheptanoic acid (PFHpA)	ng/L				4.2	--	1.1 J	5.0	2.4	2.6	0.85 J
Perfluorohexane sulfonic acid (PFHxS)	ng/L	51	51		6.3 I	--	11 I	3.2	16 I	2.5	20
Perfluorohexanoic acid (PFHxA)	ng/L	400000	400000		5.3	--	1.1 J	6.6	1.6 J	4.8	2.4
Perfluorononane sulfonic acid (PFNS)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluorononanoic acid (PFNA)	ng/L	6	6		1.9 U	--	1.8 U	1.9 U	1.1 J	1.8 U	0.41 J
Perfluorooctane sulfonamide (FOSA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	16	16	12	19 I ^{abc}	--	1.8 U	2.1 U	110 I ^{abc}	1.8 I	10
Perfluorooctanoic acid (PFOA)	ng/L	8	8	12000	12 ^{ab}	--	5.4	4.2	8.7 ^{ab}	5.1	3.8
Perfluoropentane sulfonic acid (PFPeS)	ng/L				0.97 J	--	0.96 J	0.33 J	1.6 J	0.28 J	0.39 J
Perfluoropentanoic acid (PFPeA)	ng/L				3.9	--	1.6 J	4.8	2.2	3.8	1.7 J
Perfluorotetradecanoic acid (PFTeDA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluorotridecanoic acid (PFTTrDA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Perfluoroundecanoic acid (PFUnA)	ng/L				1.9 U	--	1.8 U	1.9 U	1.8 U	1.8 U	2.0 U
Field Parameters											
Conductivity, field	mS/cm				0.983	1.071	1.073	0.626	5.012	0.641	0.667
Dissolved oxygen (DO), field	mg/L				0.78	0.85	0.85	0.99	0.74	2.2	1.13
Oxidation reduction potential (ORP), field	millivolts				86.8	-51.6	-57.2	16.3	-86.1	-12.4	84.9
pH, field	s.u.	6.5 - 8.5	6.5 - 8.5		7.46	7.19	7.17	7.17	7.63	7.39	7.28
Temperature, sample	Deg C				20.2	17.2	17.7	17.2	18.6	20	18.7
Turbidity, field	NTU				6.8	4.16	4.62	3.56	4.11	3.74	410

Notes:
(1) EGLE - Michigan Department of Environment, Great Lakes and Energy (EGLE) Generic cleanup criteria for residential and nonresidential category, administrative rule R 299.44 effective December 30, 2013, pursuant to Part 201 of 1994 PA 451 as amended
U - Not detected at the associated reporting limit.
J - Estimated concentration.
I - Value is EMPC (estimated maximum possible concentration)

Sample Location	MW-S-8D		MW-S-8S	PZ-SW-10
Sample Identification	GW-12607-082321-DA-004		GW-12607-082321-DA-001	GW-12607-082521-DA-012
Sample Date	08/23/2021		08/23/2021	08/25/2021
Sample Type	Duplicate			
Parameters	Units			
Metals				
Boron	mg/L	0.57 ^{ab}	0.18	1 ^{ab}
Boron (dissolved)	mg/L	0.64 ^{ab}	--	--
Chromium	mg/L	0.0043 J	0.005 U	0.014
Chromium (dissolved)	mg/L	0.005 U	--	--
Chromium III (trivalent)	mg/L	0.0043 J	0.02 U	0.014 J
Chromium VI (hexavalent)	mg/L	0.02 U	0.02 U	0.02 U
Nickel	mg/L	0.21 ^{abc}	0.04 U	0.022 J
Nickel (dissolved)	mg/L	0.2 ^{abc}	--	--
Per/Polyfluoroalkyl Substances (PFAS)				
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonate	ng/L	2.0 U	2.0 U	1.8 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L	2.0 U	2.0 U	1.8 U
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonate	ng/L	2.0 U	2.0 U	1.8 U
Fluorotelomer sulfonic acid (4:2)	ng/L	2.0 U	2.0 U	1.8 U
Fluorotelomer sulfonic acid (6:2)	ng/L	5.1 U	5.0 U	4.5 U
Fluorotelomer sulfonic acid (8:2)	ng/L	2.0 U	2.0 U	1.8 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	4.1 U	4.0 U	3.6 U
N-Ethyl perfluorooctane sulfonamidoacetic acid	ng/L	5.1 U	5.0 U	4.5 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L	5.1 U	5.0 U	4.5 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	1.9 J	2.9	2.8
Perfluorobutanoic acid (PFBA)	ng/L	8.7	8.2	17
Perfluorodecanesulfonic acid (PFDS)	ng/L	2.0 U	2.0 U	1.8 U
Perfluorodecanoic acid (PFDA)	ng/L	0.71 J	0.34 J	1.8 U
Perfluorododecanoic acid (PFDoDA)	ng/L	2.0 U	2.0 U	1.8 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L	2.0 U	2.0 U	1.8 U
Perfluoroheptanoic acid (PFHpA)	ng/L	0.69 J	2.0 U	6.5
Perfluorohexane sulfonic acid (PFHxS)	ng/L	17	1.5 J	5.0
Perfluorohexanoic acid (PFHxA)	ng/L	2.2	0.78 J	10
Perfluorononane sulfonic acid (PFNS)	ng/L	2.0 U	2.0 U	1.8 U
Perfluorononanoic acid (PFNA)	ng/L	0.41 J	2.0 U	1.8 U
Perfluorooctane sulfonamide (FOSA)	ng/L	2.0 U	2.0 U	1.8 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	8.2	1.7 J	24 ^{abc}
Perfluorooctanoic acid (PFOA)	ng/L	3.2	0.94 J	24 ^{ab}
Perfluoropentane sulfonic acid (PFPeS)	ng/L	0.31 J	0.34 J	0.65 J
Perfluoropentanoic acid (PFPeA)	ng/L	1.4 J	0.97 J	7.0
Perfluorotetradecanoic acid (PFTeDA)	ng/L	2.0 U	2.0 U	1.8 U
Perfluorotridecanoic acid (PFTTrDA)	ng/L	2.0 U	2.0 U	1.8 U
Perfluoroundecanoic acid (PFUnA)	ng/L	2.0 U	2.0 U	1.8 U
Field Parameters				
Conductivity, field	mS/cm	0.667	1.081	1.659
Dissolved oxygen (DO), field	mg/L	1.13	2.66	0.7
Oxidation reduction potential (ORP), field	millivolts	84.9	119.3	-2.4
pH, field	s.u.	7.28	6.79	7.65
Temperature, sample	Deg C	18.7	19.7	21.3
Turbidity, field	NTU	410	4.32	2.36

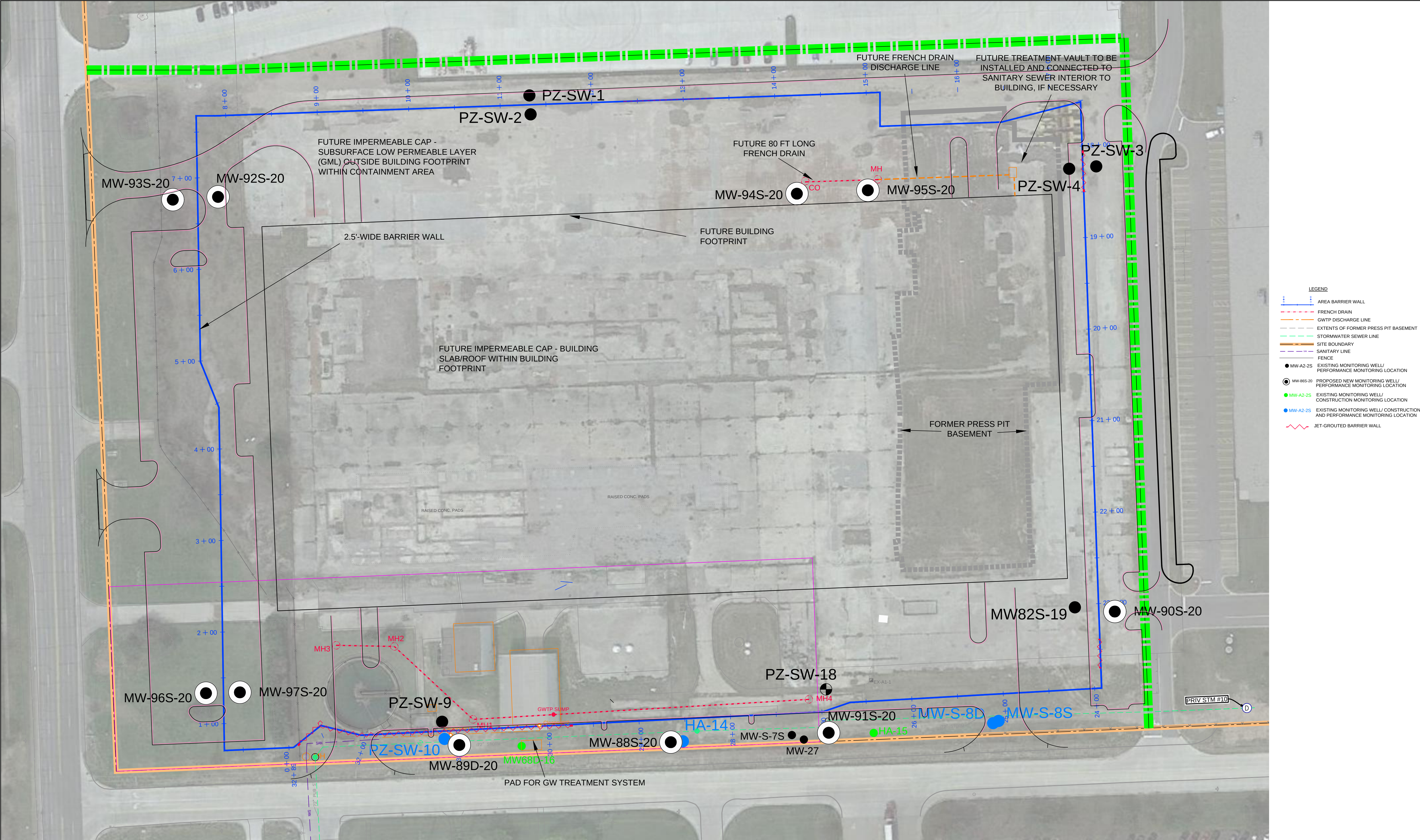


Figure 2
Eckles Road Site Construction Monitoring
Groundwater Elevations

