

November 30, 2022

Ms. Susan Bull
Eastern Region Supervisor, Oil Control Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

**RE: 2023 Groundwater Sampling & Analysis Plan (SAP)
UMD Shore Regional Health Chester River Hospital
MDE Oil Control Program Case 87-2534-KE**

Dear Ms. Bull:

Gannett Fleming (GF), on behalf of University of Maryland Shore Regional Health (SRH), submits this proposed **Sampling & Analysis Plan (SAP)** to be implemented for ongoing groundwater monitoring in 2023. The SAP was developed based on the outcome of the Maryland Department of the Environment (MDE) approved 6-month *Pilot Pumping System Shutdown* (Pilot) study which was completed from April 2022 through October 2022. Furthermore, a meeting with the MDE, representatives of Town of Chestertown (Town) including Mayor Foster, and SRH, was conducted on November 10, 2022, at which time a consensus on the results and conclusions of the Pilot study was conferred. The successful completion of the Pilot study generally determined and concluded the following:

- ✓ No reoccurrence of Light Non-Aqueous Phase Liquids (LNAPL) since system shutdown.
- ✓ No indication that the dissolved hydrocarbon plume is migrating.
- ✓ Groundwater pumping is not necessary for remediation or groundwater capture.
- ✓ Strong evidence that natural attenuation and degradation of hydrocarbons is occurring.
- ✓ No apparent risk to the Town water supply from the residual hydrocarbons at SRH.

Additionally, during the November 10, 2022, meeting with the MDE and Town, an agreement on the appropriate SAP for 2023 was identified that will continue to achieve the shared mutual goals of protecting the Town's water supply, instilling public confidence, and reducing unnecessary costs to SRH. We believe the SAP proposed herein for 2023 meets these goals.

2023 Groundwater Sampling and Analysis Plan (SAP):

Groundwater Sampling & Laboratory Analysis

- Quarterly groundwater sampling will be performed at 21 wells listed below.
- Biannual groundwater sampling of 47 monitoring wells (*inclusive of the quarterly 21 wells*) as listed below.
- Biannual well inspection of 8 monitoring wells selected for removal from the monitoring program.

All groundwater samples will be collected using low-flow methods. At each well, an electric well pump will be temporarily installed at the approximate mid-point of the saturated screened interval and a pump controller will be used to limit flow such that drawdown does not exceed 0.3-foot. Groundwater will be pumped into a flow-through cell and a calibrated YSI or Horiba (or similar) will be used to monitor temperature, specific conductivity, pH, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity at approximate 5-minute intervals. Samples will be collected only after stabilization is indicated by three consecutive measurements not exceeding the following limits: 3% change in temperature, 3% change in specific conductivity, ± 0.1 pH, ± 10 mv ORP, 10% change in DO, and 10% change in turbidity.

Table 1, below, presents the SAP details for groundwater sampling, analysis, and reporting. Colors depicted for the task descriptions in the table match the corresponding monitoring categories in **Figure 1**.

TABLE 1. Sampling and Analysis Plan (SAP) Summary

Task	Frequency	MW Locations	Duration (Events)	Analysis	Reporting
Quarterly GW Sampling	Quarterly	21 wells*	1 Year (2 events)	<ul style="list-style-type: none"> ▪ TPH-DRO (EPA 8015C, 3630)**** ▪ Naphthalene (EPA 8260D) ▪ Dissolved Oxygen (field) ▪ pH (field) ▪ ORP (field) ▪ Temperature (field) 	Quarterly Report to MDE and Town
Biannual GW Sampling	Biannual	47 wells**	1 Year (2 Events)	<ul style="list-style-type: none"> ▪ TPH-DRO (EPA 8015C, 3630)**** ▪ Full VOCs w/oxygenates (EPA 8260D) ▪ Naphthalene (EPA 8260D) ▪ Dissolved Oxygen (field) ▪ Nitrate (field) ▪ Nitrate (lab - 10% of samples) ▪ Soluble iron (field) ▪ pH (field) ▪ ORP (field) ▪ Temperature (field) 	Biannual Report to MDE and Town
Wells to be Removed from Monitoring Program	Biannual	8 wells***	1 Year (2 Events)	<ul style="list-style-type: none"> ▪ Well Inspections 	Biannual Report to MDE and Town

Notes:

*21 wells: MW-15, MW-16, MW-17, MW-18, MW-20, MW-23, MW-28, MW-29, MW-33, MW-34, MW-35, MW-43, MW-46, MW-48, MW-49, MW-50, MW-54, MW-56, S-1, S-2, and S-3

**47 wells: MW-2, MW-9, MW-10R, MW-11, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, MW-28, MW-29, MW-31R, MW-33, MW-34, MW-35, MW-37, MW-40, MW-41, MW-42, MW-43, MW-45, MW-46, MW-47, MW-48, MW-49, MW-50, MW-51, MW-52, MW-53, MW-54, MW-55, MW-56, RW-2D, RW-3B, RW-4, RW-5, RW-6, S-1, S-2, and S-3

*** 8 wells: MW-1, MW-3, MW-4, MW-5, MW-12, MW-25, MW-32, and MW-44,

****TPH-DRO: Sampling of all wells for TPH-DRO and 11 wells (MW-9, MW-13, MW-14, MW-20, MW-37, MW-41, MW-43, MW-45, MW-46, MW-47, and MW-54) for TPH-DRO using both EPA Method 8015 without Silica Gel Cleanup and method 8015 with the Silica Gel Cleanup (SGC) preparation method by EPA Method 3630.

Figure 1 – Proposed Sample and Analysis Plan Map is attached to this letter for reference.

Ongoing Trigger Events and Contingency/Action Plans

In response to the concerns discussed over time with the Town, SRH will continue with the established triggers from the approved pilot study, presented in **Table 2** below, as well as existing requirements taken from existing documents, including the MDE SACO of May 2016 and the Town Agreement (TA) of June 2016.

TABLE 2. SUMMARY OF TRIGGERS AND ACTION PLANS

#	Triggering Event/Condition	Contingency/Action Plan	Document
1.	MDE instructs SRH to restart the Pumping System. MDE has this right at any time.	SRH will restart pumping within 10 days	SACO paragraph 43
2.	Groundwater concentrations exceeding 0.47 mg/L TPH-DRO or 0.0017 mg/L Naphthalene (Trigger Levels) in any of the seven (7) Sentinel Wells: S-1, S-2, S-3, MW-18, MW-23, MW-28, MW-29.	SRH will employ aggressive measures to prevent further migration of the subject constituents. Aggressive measures could include mobilizing a system to cut off migration of dissolved phase hydrocarbons. This could include a mobile pumping system or other methods approved by MDE.	TA section 6
		The 3 years sampling period will restart	TA section 3
		SRH will restart the existing groundwater containment system.	Pilot Study Work Plan
3.	Detection of any Contaminants of Concern above Trigger Levels in an active Town production well.	SRH is obligated to indemnify and hold harmless the Town for all costs and remedial actions necessary to ensure the production and delivery of safe drinking water by the Town.	TA section 5
4.	<u>LNAPL > 0.01 ft</u> in any well south of Brown St.	Report to MDE within 2-hours. Bail/recover LNAPL. If after bailing LPH recharges, a recoverability analysis will be performed as applicable per ITRC Guidelines. If Recoverability is greater than ITRC Guidelines, submit a revised Work Plan to recover LPH. If LPH does not recharge, recoverability data will not be analyzed, and the well will be gauged & bailed again each month.	Pilot Study Work Plan
5.	<u>LNAPL > 0.05 ft</u> in any well north of Brown St.	Report to MDE within 2-hours if detected >0.05 ft for three consecutive events. Bail/recover LNAPL. If after bailing LPH recharges, a recoverability analysis will be performed as applicable per ITRC Guidelines. If Recoverability is greater than ITRC Guidelines, submit a revised Work Plan to recover LPH. If LPH is does not recharge, recoverability data will not be analyzed, and the well will be gauged & bailed again.	Pilot Study Work Plan

6.	Groundwater concentrations exceeding <u>1 mg/L TPH-DRO</u> or <u>0.017 mg/L Naphthalene</u> in “all” of the following 6 wells for 3 consecutive quarterly sampling events: MW-24, MW-16, MW-50, MW-49, MW-15, MW-17.	If Trigger exceeded, resample within 1 week. If resample exceeds trigger result, exceedance is confirmed, and action is required. If resample does not exceed on 2nd event (resulting in one sample above trigger and one below), a 3rd resample will occur within 1 week. If trigger is confirmed, submit a Site Investigation Work Plan within 30 days, which could include borings, new wells, and or other work. Restart the pumping system.	Pilot Study Work Plan
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The actions proposed in Table 2 for items 4 and 5 are consistent with current ITRC technical guidance for removal of free product to the maximum extent practicable, as is required by MDE regulations. The early warning condition proposed in item 6 above ensures that action will be taken before Trigger Levels defined in the Town Agreement are potentially exceeded at the Sentinel wells.


If no triggers occur during the groundwater program, the following milestones schedule will continue through 2023:

- April 2023 – Submit First Quarter 2023 Groundwater Monitoring Report
- July 2023 – Submit Second Quarter 2023 Groundwater Monitoring Report
- October 2023 – Submit Third Quarter 2023 Groundwater Monitoring Report
- January 2024 – Submit Fourth Quarter 2023 Groundwater Monitoring Report
- ****Annual Stakeholder Meeting: Proposed meeting with MDE and Town to be held in November 2023 to review site status and to discuss the 2024 groundwater monitoring program.***

This Work Plan and activities presented herein are intended for a 1-year period of calendar year 2023. We greatly appreciate your consideration of this request and look forward to your response. Should you have questions, please do not hesitate to contact us.

Sincerely,
GANNETT FLEMING, INC.

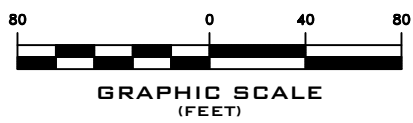
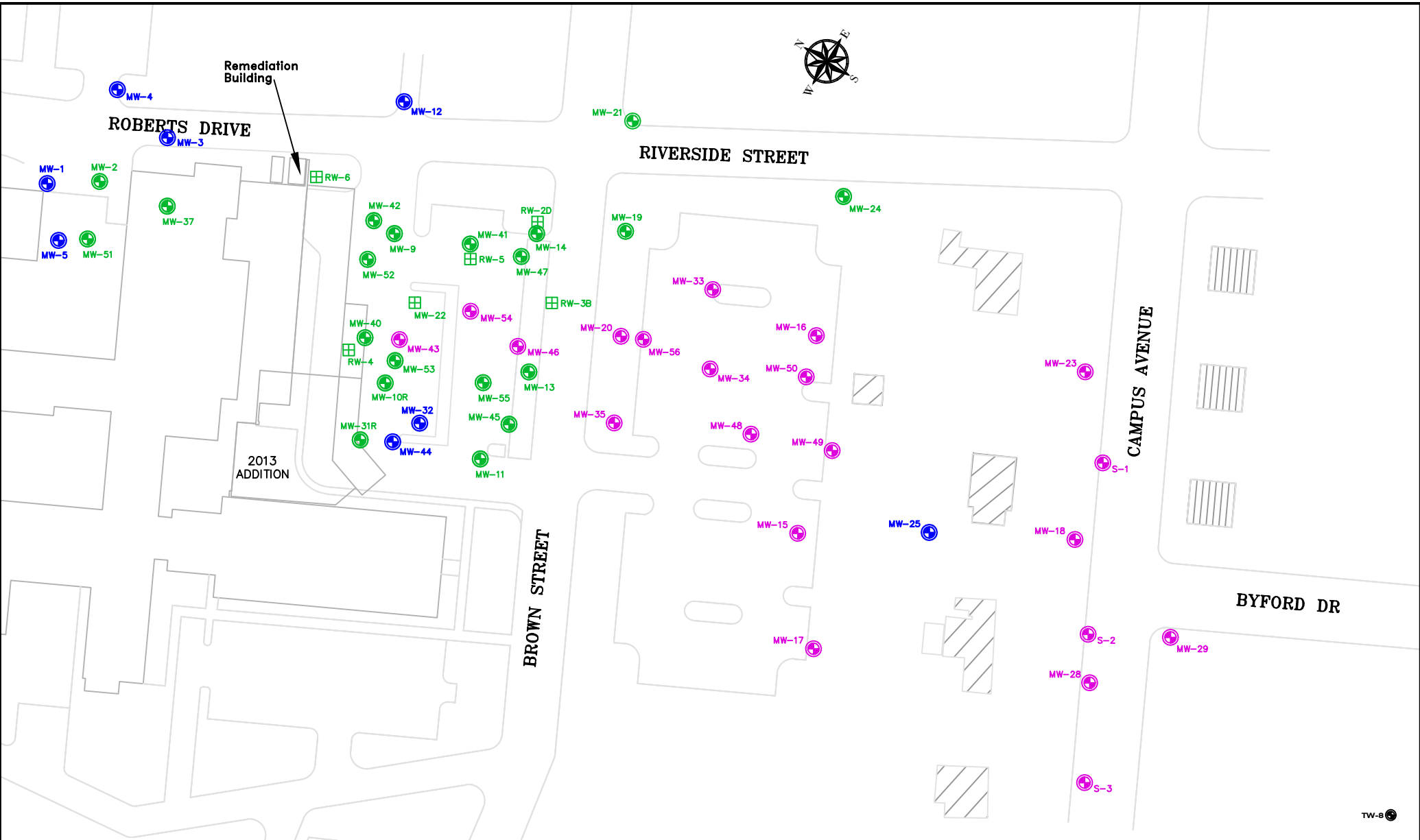

 Keith Klemm
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cc: A. Miller (MDE), C. Ralston (MDE) K. Kozel (Shore Health), M. Powell, W. Ingersoll, Mayor Foster

Attachments:

Figure 1 – Proposed Sample and Analysis Plan Map



LEGEND

- MW-40 ● MONITORING WELL
- RW-3B ■ MONITORING WELL
- MW-5 ● LOCATION PROPOSED FOR REMOVAL FROM MONITORING, BUT INCLUDED IN ROUTINE INSPECTION.
- MW-17 ● LOCATION PROPOSED FOR SAMPLING EVERY QUARTER
- MW-11 ● LOCATION PROPOSED FOR BIENNIAL SAMPLING, IN ADDITION TO THE QUARTERLY LOCATIONS

FIGURE EXCLUDES ABANDONED RECOVERY AND MONITORING WELL LOCATIONS. MONITORING WELL MW-22 IS A RECOVERY WELL.

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UMD SHORE REGIONAL HEALTH
CHESTER RIVER HOSPITAL
2023 GROUNDWATER SAMPLING &
ANALYSIS PLAN (SAP)
CHESTERTOWN, MD

FIGURE 1 – PROPOSED SAMPLE AND ANALYSIS PLAN MAP

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