Section 1. Contact and Recipient Information

Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name	First	MI	Organization/ Business Name		
Fassbender	Wayne	P	EnviroForensics, LLC		
Mailing Address			City	State	ZIP Code
P.O. Box 128			Oconomowoc	WI	53066
Phone # (include area code)	Fax # (include area code)		Email		
(262) 490-6472			wfassbender@enviroforensics.com		

The requester listed above: (select all that apply)

- ☐ Is currently the owner
- ☐ Is considering selling the Property
- ☐ Is renting or leasing the Property
- ☐ Is considering acquiring the Property
- ☐ Is a lender with a mortgagee interest in the Property
- ☒ Other. Explain the status of the Property with respect to the applicant:

  Environmental Consultant

Contact Information (to be contacted with questions about this request) ☒ Select if same as requester

Contact Last Name	First	MI	Organization/ Business Name		
Fassbender	Wayne	P	EnviroForensics, LLC		
Mailing Address			City	State	ZIP Code
P.O. Box 128			Oconomowoc	WI	53066
Phone # (include area code)	Fax # (include area code)		Email		
(262) 490-6472			wfassbender@enviroforensics.com		

☒ Attorney (if applicable)

Contact Last Name	First	MI	Organization/ Business Name		
Skwierawski	Andrew		Halling & Cayo S.C.		
Mailing Address			City	State	ZIP Code
320 E. Buffalo Street, Suite 700			Milwaukee	WI	53202
Phone # (include area code)	Fax # (include area code)		Email		
(414) 755-5039			mas@hallingcayo.com		

☒ Property Owner (if different from requester)

Contact Last Name	First	MI	Organization/ Business Name		
Gunderson	Gregory		Gunderson Cleaners (former)		
Mailing Address			City	State	ZIP Code
41 Main Street			Menasha	WI	54952
Phone # (include area code)	Fax # (include area code)		Email		
(414) 791-1736			greg.gunderson@gundersongroup.com		

Section 2. Property Information

Property Name	FID No. (if known)
Gunderson Cleaners (former)	471074120
BRRTS No. (if known)	Parcel Identification Number
02-71-467001	

Street Address	City	State	ZIP Code
891 S. Green Bay Road	Neenah	WI	54956

County	Municipality where the Property is located	Property is composed of:	Property Size Acres
Winnebago	(●) City ( ) Town ( ) Village of	(●) Single tax parcel ( ) Multiple tax parcels	

1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

( ) No (●) Yes

Date requested by: 09/18/2023

Reason: Need to sample Sub-slab vapor the first event within non-heating months, so no later than October.

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

(●) No. **Include the fee that is required for your request in Section 3, 4 or 5.**

( ) Yes. **Do not include a separate fee.** This request will be billed separately through the VPLE Program.

Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:
Section 3. Technical Assistance or Post-Closure Modifications;
Section 4. Liability Clarification; or Section 5. Specialized Agreement.

Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: **[Numbers in brackets are for WI DNR Use]**

- [ ] No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - Include a fee of $350. Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- [x] Review of Site Investigation Work Plan - NR 716.09, [135] - **Include a fee of $700.**
- [ ] Review of Site Investigation Report - NR 716.15, [137] - **Include a fee of $1050.**
- [ ] Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - **Include a fee of $1050.**
- [ ] Review of a Remedial Action Options Report - NR 722.13, [143] - **Include a fee of $1050.**
- [ ] Review of a Remedial Action Design Report - NR 724.09, [148] - **Include a fee of $1050.**
- [ ] Review of a Remedial Action Documentation Report - NR 724.15, [152] - **Include a fee of $350**
- [ ] Review of a Long-term Monitoring Plan - NR 724.17, [25] - **Include a fee of $425.**
- [ ] Review of an Operation and Maintenance Plan - NR 724.13, [192] - **Include a fee of $425.**

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- [ ] Schedule a Technical Assistance Meeting - **Include a fee of $700.**
- [ ] Hazardous Waste Determination - **Include a fee of $700.**
- [ ] Other Technical Assistance - **Include a fee of $700.** Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- [ ] Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. **Include a fee of $1050, and:**
  - [ ] Include a fee of $300 for sites with residual soil contamination; and
  - [ ] Include a fee of $350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

  Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

Section 4. Request for Liability Clarification

Select the type of liability clarification requested. Use the available space given or attach information, explanations, or specific questions that you need answered in DNR's reply. Complete Sections 6 and 7 of this form. **[Numbers in brackets are for DNR Use]**

Section 6. Other Information Submitted

Identify all materials that are included with this request.

Send both a paper copy of the signed form and all reports and supporting materials, and an electronic copy of the form and all reports, including Environmental Site Assessment Reports, and supporting materials on a compact disk.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

- ☐ Phase I Environmental Site Assessment Report - Date: _____
- ☐ Phase II Environmental Site Assessment Report - Date: _____
- ☐ Legal Description of Property (required for all liability requests and specialized agreements)
- ☐ Map of the Property (required for all liability requests and specialized agreements)

Analytical results of the following sampled media: Select all that apply and include date of collection.

☐ Groundwater ☐ Soil ☐ Sediment ☐ Other medium - Describe: _____

Date of Collection: _____

- ☐ A copy of the closure letter and submittal materials
- ☐ Draft tax cancellation agreement
- ☐ Draft agreement for assignment of tax foreclosure judgment
- ☐ Other report(s) or information - Describe: _____

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

- ○ Yes - Date (if known): _____
- ○ No

Note: The Notification for Hazardous Substance Discharge Form - Non-Emergency Only (Form 4400-225) is accessible through the RR Program Submittal Portal application. Directions for using the form and the Submittal Portal application are available on the Submittal Portal web page.

Section 7. Certification by the Person who completed this form

- ☒ I am the person submitting this request (requester)
- ☐ I prepared this request for: _____
  Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

Signature: Dana D. Fawcett — Date Signed: 8/16/23

Title: Sr. Project Manager — Telephone Number (include area code): 262-490-6472

Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a DNR regional brownfields specialist with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf.

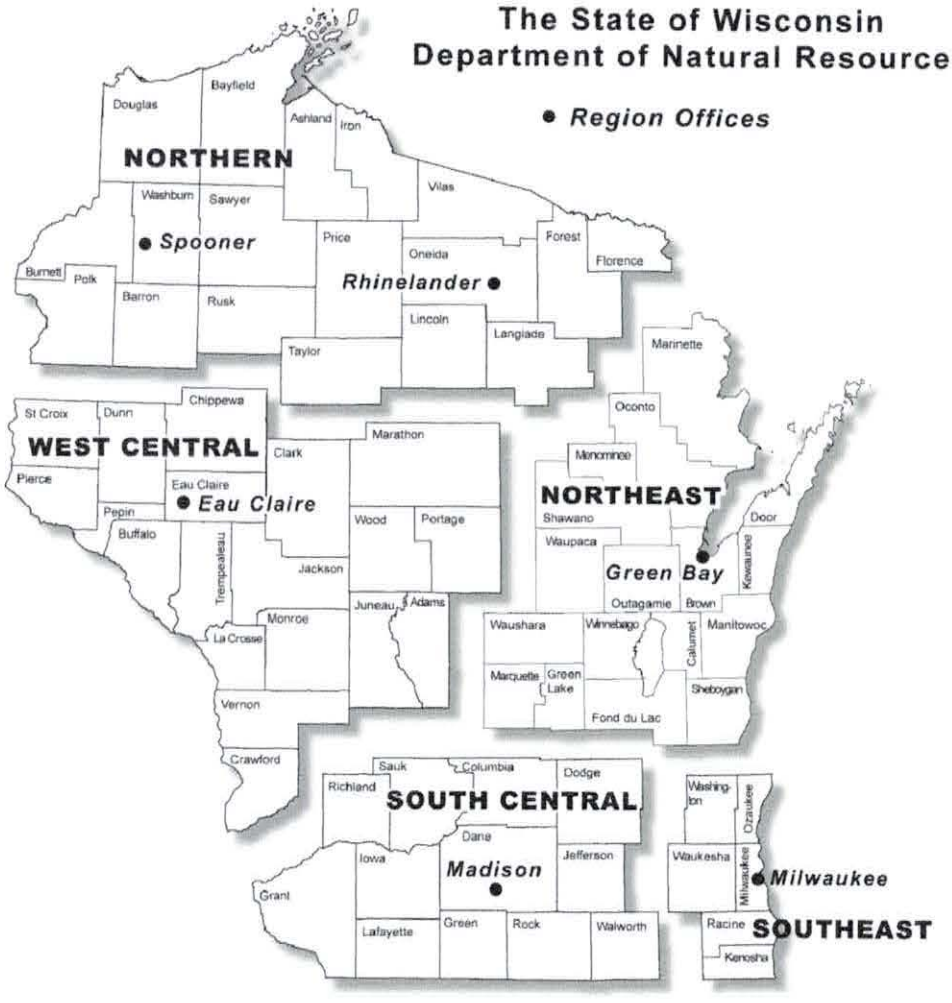
DNR NORTHERN REGION
Attn: RR Program Assistant
Department of Natural Resources
223 E Steinfest Rd Antigo, WI 54409

DNR NORTHEAST REGION
Attn: RR Program Assistant
Department of Natural Resources
2984 Shawano Avenue
Green Bay WI 54313

DNR SOUTH CENTRAL REGION
Attn: RR Program Assistant
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg WI 53711

DNR SOUTHEAST REGION
Attn: RR Program Assistant
Milwaukee DNR Office
1027 West St. Paul Ave
Milwaukee WI 53233

DNR WEST CENTRAL REGION
Attn: RR Program Assistant
Department of Natural Resources
1300 Clairemont Ave.
Eau Claire WI 54702



Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer	Comments		
Fee Enclosed? ◯ Yes ◯ No	Fee Amount $	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		

July 11, 2023

Greg Gunderson
Gunderson Cleaners, Inc.
41 Main Street
Menasha, WI 54952-3198

Re: Work Plan and Cost Estimate for Additional Site Investigations and Closure Reporting
Former Gunderson Cleaners
891 South Green Bay Road
Neenah, WI 54956
BRRTS#: 02-71-467001

Dear Mr. Gunderson:

EnviroForensics, LLC (EnviroForensics) is providing this Work Plan for additional investigation and monitoring at the former Gunderson Cleaners located at 891 South Green Bay Road, Neenah, Wisconsin (the Site). EnviroForensics previously submitted to Mr. Kevin McKnight of the Wisconsin Department of Natural Resources (WDNR) a request to proceed with case closure in their Status Report dated December 19, 2022. Since that time, Mr. McKnight is no longer the WDNR project manager and has been replaced by Ms. Josie Schultz.

In an email dated April 19, 2023, Ms. Schultz laid out additional investigative or response actions that would be required by the WDNR prior to granting closure. Follow up telephone conversations were had with Ms. Schultz and Mr. Tauren Beggs of the WDNR to discuss these requested actions and also to determine any specific requirements needed if the Voluntary Party Liability Exemption (VPLE) process is pursued. They both indicated that the requested actions would not change whether the VPLE process or the typical NR 726 path to site closure is pursued.

The following Work Plan has been prepared to address the WDNR requirements as currently understood. A WDNR technical review fee has been included in the separate cost estimate under "Project Management & Coordination" to gain WDNR approval of this Work Plan.

GENERAL SAFETY

A site-specific health and safety plan (HASP) has been prepared for work on this site as required per Occupational Safety and Health Administration (OSHA) regulations. The HASP will be modified as needed to accommodate additional new work elements. All personnel conducting fieldwork have current health and safety training as specified in OSHA, 29 CFR 1910.120. Prior

to the start of work on site, a safety meeting will be held to discuss the days work and specific health and safety items to be aware of including the use of protective equipment. All subcontractors will be required to read and understand the HASP, attend the site safety meeting, and sign the HASP at the beginning of each day of work.

SSDS DECOMMISSIONING

There is currently a sub-slab depressurization system (SSDS) operating at the Goodwill building. Sub-slab sampling was previously performed at seven (7) locations around the perimeter of the building (**Figure 1**) in June of 2021 and again in January of 2022. Since sub-slab vapor concentrations were well below the current vapor risk levels for commercial structures, the WDNR has approved decommissioning the SSDS to avoid long term obligations including continued operations testing, maintenance, and reporting that would continue in perpetuity after case closure if the SSDS continues to operate.

As part of the decommissiong process, the WDNR has requested that additional vapor ports be installed more central to the building slab and sampled for vapor to ensure there are no pockets of contaminated vapor forming in the central portion of the slab. Also, the decommissioning process prescribed in WDNR guidance document RR-800 requires that the SSDS be shut down for at least 30-days prior to sampling and that samples be collected on three (3) occasions with two (2) of the sampling events occurring during the heating months of November through March.

Field Procedures

EnviroForensics will install two (2) new vapor pin® sampling points at the approximate locations shown on **Figure 1** to satisfy WDNR demands that the central portion of the foundation slab be tested for subsurface vapors. They will consist of permanent, flush-mounted Vapor Pins® installed per the manufacturer's instructions and capped during installation until sampling is initiated. They will be labeled VP-8, and VP-9.

Vapor samples will be collected from VP-8 and VP-9 following the procedures for decommissioning sub-slab depressurization systems (SSDSs) recommended in WDNR guidance Publication RR-800: *Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin*. EnviroForensics proposes three (3) VI sampling events, two (2) of which will be conducted during the winter heating months.
Per the guidance, the existing SSDS will be shut off prior to conducting the sampling events and the events will be conducted on the following schedule:

1. The first event will be conducted in the non-heating months approximately 2-4 weeks following SSDS shut down;

2. The second event will be conducted in the heating months approximately 2-6 months following SSDS shut down. This event will likely be conducted in late November or early December; and
3. The final event will be conducted towards the end of the heating season likely in late February to early March.

If there are detections of chlorinated solvent vapor that exceed the vapor risk screening levels (VRSLs) at any time during the sampling period, then the SSDS will need to be re-started and operated until vapor concentrations are below the VRSLs at all of the select sampling ports.

To ensure that the sub-slab vapor samples are representative of subsurface conditions, water dam leak testing will be performed at each port. The integrity of the sample tubing and fittings will be verified prior to sample collection by conducting a negative pressure test.

All samples will be collected through dedicated Teflon®-lined polyethylene tubing connected to the sub-slab vapor sampling port. A graduated syringe will be utilized to purge ambient air from the tubing prior to initiating sample collection. Vapor beneath the concrete slab will then be drawn into a 1-liter vacuum canister fitted with a laboratory supplied regulator that limits the flow rate to approximately 200 milliliters per minute (mL/min). Samples will be identified by project number, address, and the previously established port ID (e.g., 200016-891-VP-1). Following the completion of sampling activities, the canisters will be submitted to an environmental laboratory for analysis of select CVOCs related to dry cleaning solvent according to U.S. EPA Method TO-15. The analytical results of the sub-slab vapor samples will be compared to VRSLs established by WDNR.

GROUNDWATER SAMPLING

The WDNR has requested that additional rounds of groundwater samples be collected from Sump B as identified on attached **Figure 2**. They would like enough rounds of samples to show a stable or reducing concentration trend. It is recommend that we collect two more quarterly rounds from Sump B. In addition, they have requested that previously sampled groundwater monitoring wells MW-105, MW-116, PZ-104, and PZ-119 shown on **Figure 2** be sampled again for per-/poly-fluorinated alkyl substances (PFAS).

Field Procedures

Water table elevation measurements will be collected from all water table wells during the monitoring events to confirm the direction of groundwater flow. Well caps will be removed at least 15 minutes before collecting water level measurements to allow groundwater in the monitoring well to equilibrate with the atmospheric pressure. The depth to water in each well will be measured to the nearest 0.01 of a foot using an electronic sounding device and recorded on sampling forms before sample collection activities.

Purging and sampling will use standard low flow (minimal drawdown) groundwater sampling procedures. During sampling, a multi-parameter water quality meter will measure temperature, pH, oxidation-reduction potential (ORP), specific conductance, and dissolved oxygen to verify stabilization before groundwater sample collection. Field personnel will record the data collected during the sampling activities on a field sampling form. If low-flow purging is not appropriate at a given well due to limited recharge, the well will be pumped or bailed dry and allowed to recharge for a minimum of four (4) hours before sample collection.

The groundwater samples collected from Sump B will be transferred directly into laboratory-provided containers containing a hydrochloric acid preservative and placed into a cooler with ice. The samples will be submitted under appropriate chain-of-custody procedures to a state-certified laboratory for analysis of volatile organic compounds (VOCs) according to U.S. EPA SW Methods 8260. For quality assurance/quality control (QA/QC) purposes, a duplicate and equipment blank will be collected during each sampling event.

The wells to be sampled for PFAS will be done in accordance with the protocol outlined in EnviroForensics' standard operating procedures for PFAS sampling (**Attachment 1**). These groundwater samples will be submitted for laboratory analysis of the 36 compounds identified in the WDNR *Wisconsin Laboratory Accreditation Program PFAS Certification Offerings – 5.1.19* and includes: 13 carboxylic acids; 12 sulfonic acids; 7 sulfonamides, sulfomidoacetic acids, and sulfonamidoethanols; and 4 replacement chemicals.

EnviroForensics plans on discharging the purge water generated to the sanitary sewer under permit from the City of Neenah.

POTENTIAL VAPOR SAMPLING AT ALDI FOODS

The WDNR has asked that we assess the need for further vapor sampling at the Aldi Food store located south of the Goodwill building. The current guidance indicates that any buildings within 100 feet of a soil source or groundwater plume be evaluated for vapor intrusion. The WDNR is considering raising that distance to 150 feet where the entire area is paved in new revisions to PUB RR-800. We will evaluate current distances from current site impacts to the Aldi building and will take into account other potential mitigating factors such as relative vapor concentrations detected to date beneath the Goodwill building and the existence or lack of potential vapor migration conduits such as utility lines.

If our initial assessment is inconclusive in ruling out a vapor risk to the Aldi Foods building, then additional soil gas sampling outside the building or sub-slab sampling inside the building may be required by the WDNR and the cost to perform this additional work will be presented in the form of a change order to this cost estimate.

SANITARY SEWER DETERMINATIONS

All reporting figures will be updated to include the new vapor sampling points. In addition, the WDNR has asked that we better determine the locations of utilities entering the Goodwill and Aldi Foods properties. Of particular interest are the deeper utilities including water and sanitary sewer lines that may intersect site contamination. Utility lines may act as preferential migration pathways for goundwater and vapor impacts which could result in impacts to off-site properties. EnviroForensics will contact the local agencies having jurisdiction of these lines to obtain accurate locational information and transfer that information to our reporting figures.

Depending on how the sanitary mains and laterals are located relative to the contamination, the WDNR may require vapor sampling to determine if they are a possible conduit for migration of chlorinated solvent vapors.

The procedures and cost to implement utility corridor investigations have not been included in this Work Plan because the need for such investigations has not yet been determined. If additional work is required, then we will present that in the form of a change order to this cost estimate.

REPORTING

Following each VI and groundwater sampling event, EnviroForensics will prepare a brief letter for the property owner in accordance with WDNR regulations. The letters will include a description of the sampling procedures, a figure depicting the sample locations, and a summary table comparing results to WDNR regulatory standards. A copy of these results reports will be sent to the WDNR through their electronic submittal portal.

A final summary report will be prepared to document all field procedures and observations along with laboratory reports, tables, and figures having the investigative results. If the investigations and decommissioning procedures are complete, then a case closure request can be submitted.

PROJECT COORDINATION AND MANAGEMENT

Project management tasks will include budget management and tracking; management of project execution, personnel and scheduling; and meetings and conference calls with regulators and other stakeholders. Project management costs included in this Work Scope assume a work duration of 12 months.

For project tracking purposes, EnviroForensics will establish the following project sub-phases to coordinate tasks and will refer to those sub-phases on all billing materials:

- Sub-phase 04b – Sanitary Sewer Determination & Reporting Figure Updates

- Sub-phase 04c – Aldi Vapor Assessment
- Sub-phase 04d – SSDS Decommissioning & Groundwater Sampling
- Sub-phase 04e – Reporting
- Sub-phase 04f – Project Coordination and Management

SCHEDULE

Upon notice to proceed

EnviroForensics will first review Oshkosh municipal information regarding the outlay of sewer lines. If additional sanitary sewer sampling is evident, then a change order will be immediately issued to cover this work. This will be done first to allow scheduling of multiple tasks and minimize multiple site mobilizations. During this same period of time, EnviroForensics will evaluate the need for additional vapor sampling at the Aldi Foods building and submit our assessment to the WDNR for review. This work will need to be completed by late July or early August to allow scheduling of the non-heating month vapor sampling event.

August-September, 2023

The non-heating month sub-slab vapor sampling event for decommissioning of the SSDS will occur in August or September of 2023. In addition, the first groundwater sampling event will be performed along with any additional sanitary sewer sampling or vapor sampling to rule out a vapor intrusion issue at the Aldi Foods building that is required. A brief results report will be issued.

November-December, 2023

The first heating month sub-slab vapor sampling event for decommissioning of the SSDS will be completed along with the second sampling of Sump B. If sanitary sewer sampling or vapor intrusion sampling at the Aldi Foods building has been warranted, then the second sampling events will occur during this mobilization. A brief results report will be issued.

February-March, 2024

The final heating month sub-slab vapor sampling event for decommissioning of the SSDS will be completed along with the final vapor intrusion sampling events within the sanitary sewer system and/or Aldi Foods building if sampling at those locations were deemed necessary.

April-June, 2024

If no additional investigative work is deemed necessary, EnviroForensics will complete the closure request documentation which was previously budgeted.

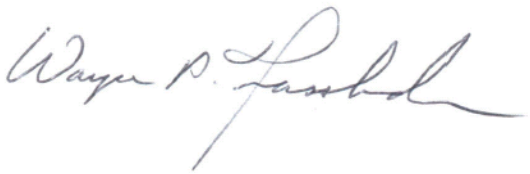
If additional work or continued operation of the SSDS is identified, then EnviroForensics will notify you.

COST ESTIMATE

All services provided in support of this proposal will be billed on a time-and-materials basis. The cost estimate to complete this scope of work is provided as a separate document. Costs are summarized and itemized by sub-phase in that document.

We appreciate the opportunity to work with you on this project. If you have any questions about this work scope, please do not hesitate to contact us at (262) 290-4001.

Sincerely,
EnviroForensics, LLC

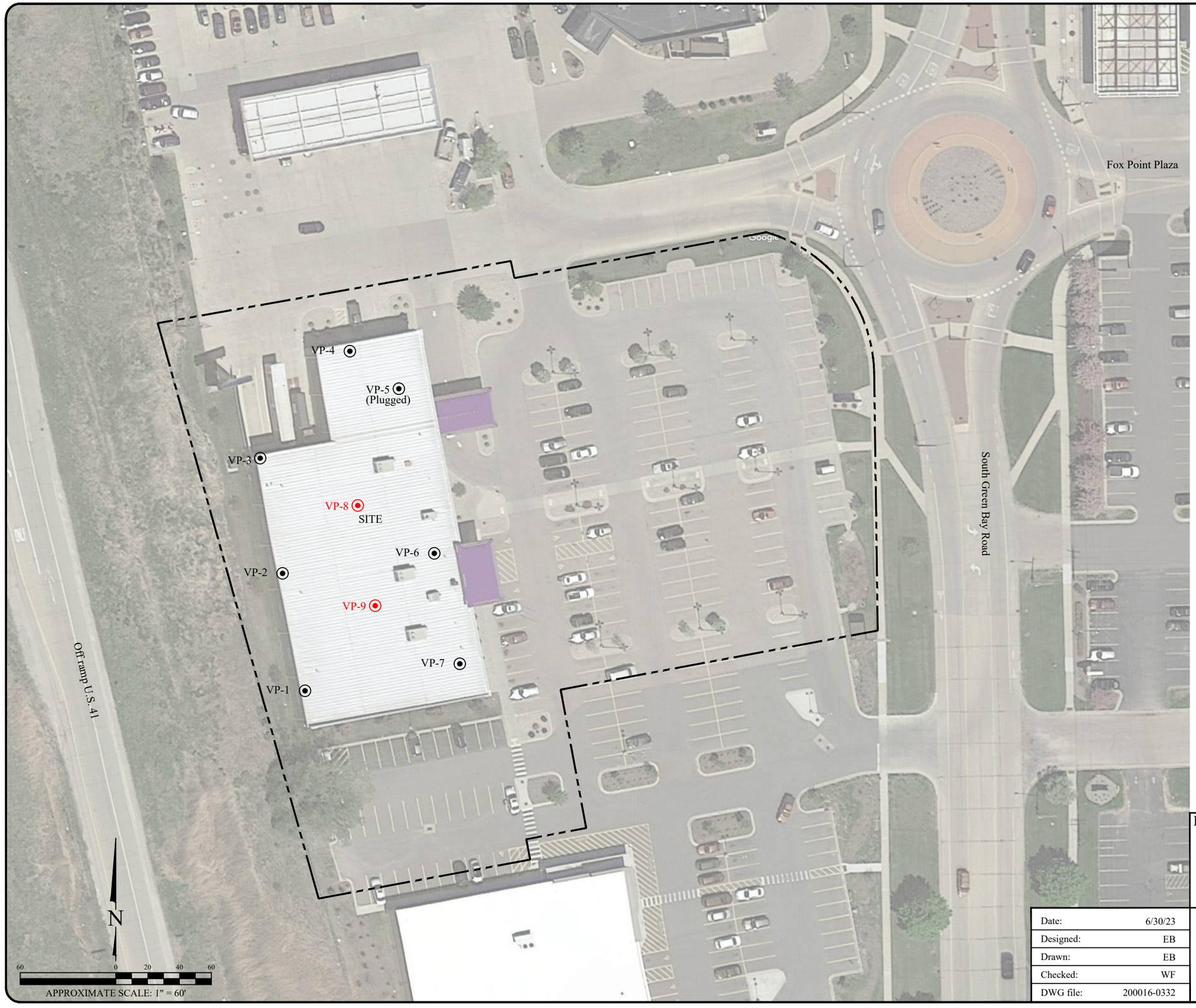


Wayne Fassbender, PG
Senior Project Manager
wfassbender@enviroforensics.com

Copy: Andrew Skwierawski, Halling & Cayo
Josie Schultz, WDNR

Attachments:

Figure 1: Vapor Pin Locations
Figure 2: PFAS Sample Locations
Attachment 1: EnviroForensics' standard operating procedures for PFAS sampling



Legend

- Property boundary
- VP-1 — Existing sub-slab vapor sample port
- VP-8 — Proposed sub-slab vapor sample port

PROPOSED ADDITIONAL SUB-SLAB VAPOR SAMPLE LOCATIONS

Gunderson Cleaners
891 South Green Bay Road
Neenah, Wisconsin

Date:	6/30/23
Designed:	EB
Drawn:	EB
Checked:	WF
DWG file:	200016-0332

ENVIRO forensics
825 North Capitol Avenue • Indianapolis, IN 46204
EnviroForensics.com

Figure
1
Project
200016

Legend

- Property boundary
- MW-1 — Monitoring Well
- Sump A — Sump
- MW-105 — Proposed PFAS Sampling Locations

PROPOSED PFAS SAMPLING LOCATIONS

Gunderson Cleaners
891 South Green Bay Road
Neenah, Wisconsin

Date:	6/29/22
Designed:	EB
Drawn:	EB
Checked:	BK
DWG file:	200016-0190

ENVIRO forensics
825 North Capitol Avenue • Indianapolis, IN 46204
EnviroForensics.com

Figure 2

Project 200016

STANDARD OPERATING PROCEDURE

Sampling Protocol for Per-and Polyfluoroalkyl Substances (PFAS)

INTRODUCTION

State regulatory agencies are currently developing sampling guidance, soil and groundwater standards, and other procedures aimed at the regulation of per- and polyfluoroalkyl substances (PFAS). Along with the developing regulatory procedures, there exist several sampling guidance resources from various agencies such as the State of Michigan, the U.S. Department of Defense, the U.S. Environmental Protection Agency, the Interstate Technology & Regulatory Council, and a few analytical laboratories such as Pace Analytical and Test America. This Standard Operating Procedure (SOP) was based on the procedures and guidance developed to date by these agencies. Since regulations and standards regarding PFAS are evolving, it is anticipated that this SOP will require periodic modifications.

When sampling for PFAS, this SOP should be used as a supplement to modify existing EnviroForensics SOP's related to standard groundwater and soil sampling procedures.

Although similar to standard sampling methods for other chemical compounds, special precautions are necessary when sampling for PFAS due to the laboratory detection limits that are in the parts per trillion range, and the proliferation of PFAS in common consumer products. This greatly raises the potential for these compounds to be inadvertently introduced to the samples, resulting in false-positive detections.

The sampling precautions and protocol for PFAS are rigorous and there are many potential opportunities for mistakes in the field that can result in cross-contamination, or the inadvertent introduction of PFAS into the sample media. **It is required that any field investigations for PFAS be conducted by a two (2) person team**. One (1) person is assigned the actual sample collection protocol and the other person is assigned to maintaining the integrity of the sample throughout the sampling process.

PRE-SAMPLING CONSIDERATIONS

As mentioned, PFAS have been detected in many everyday products including cosmetics, soaps, sun-screen, insect repellent, and many products having water repellents and/or stain-resistant coatings to include carpeting, car upholstery, some Tyvek suits, water proof leather boots, garments, and rain-wear. Several agencies have prepared a list of acceptable materials that have

been tested free of PFAS; however, there is a long list of items that have not been tested. This SOP provides some acceptable materials that can be safely used before and during sampling for PFAS, along with comments regarding materials that should not be used and various recommendations to improve sample integrity.

A limited number of readily available and recognizable products are presented below instead of listing all options. For example, there are numerous sun-screen and insect repellent products that have been determined to be PFAS-free (and the list will likely grow over time); however, only a few readily available and recognizable products are listed or recommended here to reduce the number of product decisions that project staff may need to make. If any other product is proposed for use, but is not identified in this SOP as PFAS-free, then that product or substance will need to be analyzed or otherwise determined to be PFAS-free before it can be used.

Personal Hygiene and Care Products

Many personal care products may contain PFAS. These products include soaps, shampoos, cosmetics, deodorants, and dental products including floss. By following this SOP it is not likely that these types of products will come into direct contact with a sample. However, it is **highly recommended that the use of personal care products be curtailed the day of sampling** until more information is available for personal care products that do not contain PFAS.

Personal Protective Equipment

Many common types of protective equipment including clothes, jackets, boots, gloves, Tyvek products, sunscreen, and insect repellents contain PFAS. For common clothing, jackets, boots, and gloves, the PFAS occurs in water repellent and stain repellent treatments that have been applied to the clothing and outer wear. The use of fabric softeners during laundering may also impart PFAS to clothing. Rain suits made of breathable, yet water repellent, materials typically have PFAS in them. Items made of rubber or PVC do not contain PFAS.

Items that may be worn and are known to be free of PFAS include:

- Powderless nitrile gloves;
- Clothing made of natural and synthetic fibers (preferably cotton) and that have been **washed at least six (6) times and without using fabric softeners or dryer sheets**;
- Polyvinyl chloride (PVC) or wax-coated fabrics, including rain gear;
- Any boots or over-boots made of polyurethane or PVC;
- Neoprene;
- Un-coated Tyvek® coveralls;

- Sunscreen: Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30; or Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50; and
- Insect repellent: Off Deep Woods.

Items that **may not** be worn due to the potential for containing PFAS:

- Coated Tyvek® materials as they do contain PFAS;
- Leather or other steel-toed work boots unless polyurethane or PVC over-boots are used;
- Clothing treated with stain or water repellents;
- Clothing and outerwear that has been dry cleaned; and
- Any rain gear having Gore-Tex™ or other water-proof, or water-repellent fabrics or coatings.

Field Sampling Equipment

Carefully select sampling equipment that directly contacts the sample to ensure it is free from PFAS. Submersible pumps, down-hole instruments, and tubing used for groundwater sampling could have external or internal parts that are not PFAS-free. Check with the manufacturer to evaluate whether there are PFAS-containing components in the equipment. If unsure collect an equipment blank and have it analyzed for PFAS.

Some materials that are known to be PFAS-free include:

- Metals (metal components used for groundwater sampling are typically either stainless steel or brass);
- Nylon;
- PVC (bailers and pump parts);
- High-density polyethylene (HDPE);
- Polypropylene and polyurethane (bailer rope and tubing);
- Silicone (tubing); and
- Acetate (drill core sleeves).

Materials that may contain PFAS and **are not** to be used include:

- Low-density polyethylene (LDPE) tubing. LDPE does not inherently contain PFAS, but may have acquired it through materials used in the manufacturing process. LDPE Zip-loc® sample bags can be used if they do not contact the sample media directly;
- Aluminum foil;

- Teflon-lined tubing or equipment having Teflon components;
- Any product or equipment having any "fluoro" prefix;
- "Rite in the Rain" or other all-weather field books; and
- Sharpie markers, post-it notes, or other adhesive paper products.

In addition, **do not** transport field equipment in direct contact with vehicle carpet or seats. These materials typically contain PFAS in stain and water repellent applications. If equipment must be set on seats or carpet, then transport it in a closed container.

Sample Collection Recommendations:

1. If the depth to water is shallow, use disposable PVC bailers with polypropylene or polyurethane rope.
2. Collect an equipment blank from or through any sampling equipment before its use in the field, unless all equipment materials are inherently PFAS-free, or the manufacturer can guarantee that all components are PFAS-free.
3. Determine if the measuring tape on the water level meter contains PFAS, see #2 above.
4. If using a peristaltic pump to collect shallow water table samples, use only new, unused, tubing that is inherently PFAS-free at each sample location (HDPE, nylon, polyurethane, silicone).
5. If using any other submersible pump in deeper water table conditions, see #2 above.
6. If using any other down-hole data collection probe, see #2 above.
7. For longer-term monitoring of confirmed PFAS in groundwater, consider using dedicated and PFAS-free equipment such as dedicated pumps. Passive Diffusion Bags may be used if equipped with HDPE hydrasleeves and the de-ionized water is PFAS-free.
8. If setting temporary wells, collecting soil samples, or using any other drilling method, ensure that the core sleeves are either acetate, PVC, or HDPE (see #2 above).
9. Use only stainless steel tools or wooden disposable tongue depressors to collect soil sub-samples from drill cores.
10. Use only aluminum or Masonite clipboards with loose paper (non-water resistant) to record field notes.
11. Use only ball-point pens to record field data, prepare sample labels, etc.

Decontamination

It is extremely important that any **water** used for decontamination of equipment or hand washing before, between, and after sampling be free of PFAS. Commercially available distilled water sources should be analyzed for PFAS before its use in the field and should come in an HDPE container. If using municipal water, check with the municipality to determine if the source is

PFAS-free. If that cannot be readily determined, then sample the water for PFAS before its use.

All rental equipment and in-house equipment previously used at other sites needs to be decontaminated before its use. Use only Alconox®, Liquinox®, or Citranox® to decontaminate equipment or wash hands, and use only PVC or HDPE brushes for scrubbing equipment.

Decontaminate equipment before collecting samples, between samples, and at the end of the day. Triple-rinse equipment after cleaning, and change nitrile gloves after decontaminating equipment between sample locations.

FIELD SAMPLING PROCEDURES

Sample Handling

Sample handling procedures are implemented to ensure that sample integrity is maintained throughout the sample collection process. Therefore, the procedures for collecting PFAS samples are not unlike typical sample handling procedures already employed by EnviroForensics personnel. However, due to the pervasiveness of PFAS in the environment, low laboratory detection limits, and possibility of cross-sample contamination, the sample handling procedures for PFAS are more rigorous. EnviroForensics uses a clean hands/dirty hands approach during sample handling activities. One person handles all of the sampling equipment and the other person handles only the sample containers. Specific sample handling procedures with respect to PFAS include:

1. Label sample containers and zip-lock bags in the office before visiting the Site, or in a staging area, and keep the containers in a PFAS-free cooler for use on site. Wash hands and don new powderless nitrile gloves before sample collection.
2. The person designated "dirty hands" handles the sampling equipment only. The person designated "clean hands" holds the sample container and seals the container lid after collecting the sample.
3. **Do not** touch anything other than decontaminated field sampling equipment or sample containers after donning clean nitrile gloves. If you do by accident, change gloves before proceeding further.
4. **Do not** touch the sample or let the outside of the sampling equipment (tubing, bailer, etc.) touch the sample container during sample collection.
5. **Do not** set the sample container on the ground or other surfaces while collecting the sample. That is why there are two people involved.

6. Hands must be washed and new powderless nitrile gloves donned after any decontamination procedure, or (if using all disposable materials) before collecting another groundwater or soil sample;
7. Double bag individual soil or groundwater samples in zip-loc bags and immediately place samples on ice in the cooler.

Additional Considerations

1. Wash hands and change gloves frequently during a long decontamination procedure.
2. Set up a staging area away from the sample collection area for logging field notes, labeling samples containers before sampling, and for taking breaks.
3. **Do not bring any fast food to the site or go off site for lunch.** Fast food wrappers typically contain PFAS. Instead, prepare a lunch and bring it in a plain paper bag to consume in the staging area.
4. Wash hands thoroughly and don clean nitrile gloves following lunch and other breaks.

Laboratory

Many states are currently developing PFAS regulatory standards and laboratory certification programs. There are many compounds of concern contained in the overall PFAS family of chemicals. If State standards have not yet been developed, check with the State regulatory agency to determine the particular compounds to analyze for. Some analytical laboratories have been certified by various agencies such as: State regulatory agencies; Department of Defense; Department of Energy; National Environmental Laboratory Accreditation Program; and International Organization for Standardization. That does not mean that they are set up to analyze for all PFAS chemicals of concern to a particular State agency. Check with the laboratory after determining the State requirements.

Do not use glass sampling containers, as glass tends to adsorb PFAS. Instead, use HDPE or polypropylene containers. Container caps should be of the same material with no Teflon™ seal. Confirm that coolers used to store and ship laboratory samples are PFAS-free. A qualified laboratory will provide the appropriate media for these protocols.

For groundwater samples, do not filter or use a chemical preservative. For samples of municipal drinking water (also possibly used for equipment decontamination) the analytical methods call for preservation with Trizma® to buffer and remove chlorine. Check with the laboratory regarding how many sample containers are needed per sample and appropriate preservatives. Place samples separately in double zip-loc® bags and place immediately on ice. Maintain temperature of the samples below 50° F (10° C). Use regular ice. **Do not use "blue ice" or**

chemical ice packs.

Seal Chain-of-Custody forms and other forms in a zip-loc® bag and tape to the inside lid of the cooler. Tape the cooler closed with a custody seal and ship to the analytical laboratory. Hold time is 14 days to the laboratory with extraction within 28 days.

The current U.S. Environmental Protection Agency (USEPA) developed, and validated analytical methods for PFAS are USEPA Method 533, and USEPA Method 537.1. USEPA Method 533 is focused on the detection of short-chained PFAS (4-12 carbon chain lengths), while Method 537.1 is more focused on detecting longer chain PFAS. Using both methods, up to 29 PFAS chemicals can be detected. These methods were developed for drinking water, but would also apply to groundwater. Soil samples are currently being analyzed for PFAS using a modified Method 537M. New sampling methods are evolving, so these methods may change in the future. Check with State agencies and the analytical laboratories to determine if the above stated methods are still valid or if other methods have been developed and approved by the USEPA and State.

ADDITIONAL FIELD QUALITY CONTROL (BLANKS)

Several different blanks will need to be collected during and possibly before field sampling operations. As previously mentioned, equipment blanks should be collected and analyzed before site work if any materials to be used in field sampling cannot be determined to be PFAS-free. There are additional blanks that will need to be collected during the actual sample collection process to ensure that quality control has been maintained and samples have not been contaminated by outside sources.

Equipment Blanks

Equipment blanks are collected to determine the adequacy of the decontamination process. Equipment blanks are not needed if using dedicated or disposable sampling equipment that has been determined to be PFAS-free.

- Collect an equipment blank by passing PFAS-free water through/over field sampling equipment before use; and
- Collect an additional equipment blank for every five (5) samples collected.

Have the analytical laboratory hold the equipment blanks for possible analysis. Some of the equipment blanks may be analyzed if one or more samples contain PFAS detections.

Field Reagent Blanks

Field reagent blanks (FRBs) are collected to determine if PFAS have entered the samples through the ambient environment, the sampling process in general, and the analytical laboratory sample handling processes. The analytical laboratory will supply a vial of PFAS-free water and an empty sample container for collecting the FRB. The analytical laboratory should be consulted regarding the number of FRBs that should be collected per sampling event.

The FRB will be opened during the collection of one (1) site sample and handled in the same way as that of the site sample. The laboratory provided PFAS-free water will be poured into the provided clean sample vial to mimic field sample collection procedures. As with equipment blanks, reserve the FRBs for possible laboratory analysis if PFAS is detected in any given sample.

Field Duplicates

Collect duplicate samples to measure both field and laboratory precision. The State regulatory agency should be contacted to determine the number of duplicate samples to collect. The State may require more duplicate samples than would be typical for other types of contaminants. For example, the Wisconsin Department of Natural Resources typically requires that one (1) duplicate sample be collected for every 10 groundwater samples that are collected. However, this is guidance (refer to *Groundwater Sampling Desk Reference*, PUBL-DG-037, September 1996) and they may require more when sampling for PFAS.

Trip Blanks

Typically, trip blanks are utilized to determine cross-contamination during shipment of samples and the possible introduction of contaminants in the laboratory environment due to volatile organic compounds. However, the analytical laboratory should be consulted regarding the need for a trip blank during PFAS sampling.

If requested by the laboratory, the laboratory will prepare the trip blanks using PFAS-free water and will ship them with the cooler. If required, include one (1) trip blank in each sample cooler. Do not remove the trip blank from the cooler during sampling, or transport to and from the site. The laboratory will decide whether to run the trip blank if one (1) or more site samples contain PFAS.

REFERENCES

California State Water Quality Control Board, Division of Water Quality, 2019, *Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines*, 9 pp.

Interstate Technology Regulatory Council, 2018, *Site Characterization Considerations, Sampling Precautions, and Laboratory Analytical Methods for Per- and Polyfluoroalkyl Substances (PFAS)*, 9 pp.

Michigan Department of Environmental Quality, 2018, *General PFAS Sampling Guidance*, 24 pp.

Pace Analytical Webpage, *PFAS Field Sampling Guide*: https://www.pacelabs.com/assets/2020-01-14-pfas-field-sampling-guide.pdf.

United States Department of Defense Webpage, *Bottle Selection and Other Sampling Considerations When Sampling for Per- and Poly-Fluoroalkyl Substances (PFAS)*: https://www.denix.osd.mil/edqw/home/what-s-new/unassigned/edqw-pfas-sampling-factsheet-rev-1-2-july-2017/.

United States Environmental Protection Agency Webpage, *EPA Drinking Water Laboratory Method 537 Q&A*: https://www.epa.gov/pfas/epa-drinking-water-laboratory-method-537-qa.