

**DES Waste Management Division
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**Work Plan for Interim Groundwater Monitoring
Preliminary Groundwater Management Zone
Perimeter Well Sampling
Saint-Gobain Performance Plastics
701 Daniel Webster Highway
Merrimack, New Hampshire 03054
NHDES Site No.: 199712055
Project Number: 36430**

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WORK PLAN FOR INTERIM GROUNDWATER MONITORING - PRELIMINARY GROUNDWATER MANAGEMENT ZONE PERIMETER WELL SAMPLING *SAINT-GOBAIN PERFORMANCE PLASTICS*

MERRIMACK, NEW HAMPSHIRE

Submitted to:

New Hampshire Department of Environmental Services

Hazardous Waste Remediation Bureau
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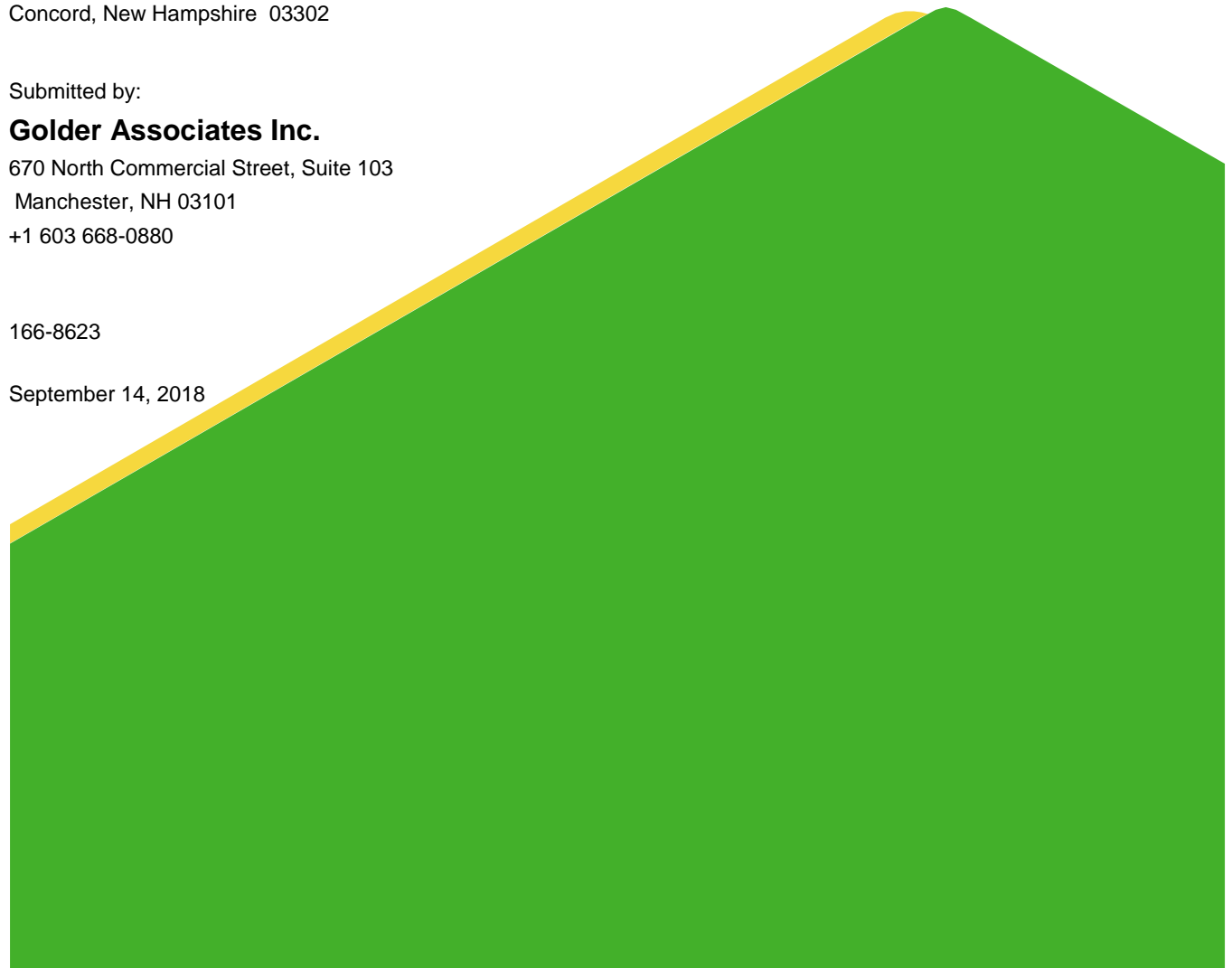


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1.0 INTRODUCTION

On behalf of Saint-Gobain Performance Plastics (SGPP), Golder Associates Inc. (Golder) is submitting this work plan to the New Hampshire Department of Environmental Services (NHDES) for interim groundwater monitoring of residential wells located around the perimeter of the preliminary Groundwater Management Zone (pre-GMZ) in Bedford, Merrimack, Londonderry, and Litchfield New Hampshire. This work plan is submitted in response to the NHDES' July 31, 2018 request (NHDES, 2018c).

1.1 NHDES Request for Work Plan

NHDES comments dated July 31, 2018 on the 2017 Annual Groundwater Monitoring Summary Report (NHDES, 2018c), included the following request:

"To date, Saint-Gobain has connected over 400 properties to public water in areas with PFAS-impacted groundwater. As part of the March 2017 Consent Decree, an additional 300 properties will also be provided with public water or point of entry treatment systems. Connection of existing well users inside the pre-GMZ to public water will change local groundwater withdrawal rates. Groundwater flow (and PFAS migration) in the vicinity of the pre-GMZ boundary has the potential to be altered by such changes in groundwater use. As such, the interim water quality monitoring program should be expanded to include additional water supply wells located at the perimeter of those areas being connected to public water and those areas that have already been connected. The purpose of the additional sampling is to ensure groundwater outside the pre-GMZ boundary used for drinking water continues to meet [ambient groundwater quality standards] (AGQS) as defined in Env-Or 600. Portions of this monitoring program can overlap with the well-resampling underway at properties in Bedford and Merrimack. Please provide a work plan for expansion of the supply well sampling program within 45 days."

The pre-GMZ boundary is identified in Exhibit C of the March 2018 Consent Decree between the NHDES and SGPP and is illustrated on Figure 1.

There are known PFAS sources other than the SGPP facility within and near the pre-GMZ. This work plan specifies that sampling of wells located around the perimeter of the pre-GMZ boundary as requested by NHDES. Analytical results for samples collected from these wells may reflect impacts from sources other than the SGPP Merrimack facility.

1.2 NHDES Guidance on Residential Well Sampling

In May 2017, NHDES issued the following guidelines for wells with detections of perfluorooctanoic acid (PFOA) and/or perfluorooctane sulfonic acid (PFOS) above laboratory reporting limits (NHDES, 2017):

- Detections of less than 50% of AGQS (i.e., 35 ng/l): waiving future sampling requirements if two consecutive rounds of sampling fail to detect these PFAS above 35 ng/l.
- Detections \geq 50% AGQS (i.e., 35 ng/l): Additional monitoring will likely be required to establish a trend, the frequency and duration of which will be based on site-specific conditions. However, between two and four rounds of monitoring will likely be needed.
 - If increasing concentrations are observed, an evaluation of the site characterization, remedy, and future monitoring frequency will be necessary.

- If steady or decreasing concentrations are observed, additional sampling on a less frequent basis until concentrations decrease to less than 50% of AGQS.
- Additional guidance for detections $\geq 50\%$ AGQS (i.e., 35 ng/l) in water supply wells: More frequent monitoring is recommended to establish trends.
 - $\geq 70\%$ AGQS (i.e., 49 ng/l): Sample monthly.
 - $\geq 50\%$ to $\geq 70\%$ AGQS (i.e., 35 to 49 ng/l): Sample in 3 to 6 [months].

Golder has considered these guidelines in selecting the sample locations and frequencies specified below.

2.0 ASSESSMENT OBJECTIVES AND SCOPE OF WORK

This section provides the assessment objectives, methodology for selecting wells, and proposed activities.

2.1 Objectives

The objective of this work plan is to provide for routine monitoring of wells located around the perimeter of the pre-GMZ as requested by NHDES to evaluate whether groundwater outside the pre-GMZ boundary potentially used for drinking water continues to meet AGQS as defined in Env-Or 603.03. This objective was used to develop the scope of the activities described below. When a Groundwater Management Permit (GMP) is established for the site, the interim monitoring covered by this work plan will be replaced by a monitoring specified in the GMP.

2.2 Identification of Wells and Sampling Frequency

Table 1 lists the wells selected for routine monitoring under this work plan and includes PFOA analytical results as provided by NHDES in an excel spreadsheet dated May 2018 (NHDES, 2018b). Well locations are illustrated on Figure 1. If a well listed on Table 1 is not available for routine monitoring, SGPP will propose an alternative to NHDES for approval.

All but two of the wells selected for routine monitoring have PFOA+PFOS concentrations below the 35 ng/L, equivalent to parts per trillion (ppt) threshold established for monitoring in the NHDES guidance (NHDES, 2017, see Section 1.2). The remaining two wells have PFOA+PFOS concentrations below the 49 ppt threshold established for monitoring in the NHDES guidance. SGPP will sample the pre-GMZ perimeter wells semi-annually for one year (two rounds). In consideration of NHDES guidance (which recommends discontinuation of monitoring if PFOA+PFOS is detected at a concentration below 35 ppt in two consecutive monitoring events), if concentrations are confirmed to be below 35 ppt after the initial two rounds of sampling, the subsequent sampling frequency will be modified to bi-annual (once every two years).

SGPP will re-evaluate monitoring frequencies after each sampling event and inform property owners and NHDES of any changes in monitoring frequency in data transmittal cover letters. Changes in monitoring frequency will also be summarized in the semi-annual reports (see Section 2.6 below).

In addition to the routine monitoring specified in this work plan, SGPP is also conducting the following monitoring:

- Sampling of 10 residential wells in Bedford and Merrimack in accordance with the Residential Well Sampling Work Plan and NHDES comments on that work plan (Golder, 2017 and NHDES, 2018a).
- Sampling of influent from Point of Entry Treatment Systems (CT Male, 2018).

As appropriate, SGPP will consider the data generated by these sampling efforts in addition to data generated under this work plan to evaluate whether groundwater outside the pre-GMZ boundary will continue to meet AGQS as defined in Env-Or-603.03.

2.3 Sampling Methodology and Field Documentation

SGPP will collect samples following the standard operating procedures (SOPs) included in Appendices A through C. Golder will record field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity), and field observations (including but not limited to color, odor, clarity, foam, and sheen) for each sample.

2.4 Analytical Parameters

SGPP will submit samples to a qualified laboratory under chain-of-custody protocols for analysis of PFAS and non-PFAS compounds as listed in Table 2. SGPP may discontinue analysis of non-PFAS parameters or field parameters besides temperature, at any time. SGPP may add additional parameters if monitoring results indicate that localized PFAS sources may be present. Addition of parameters will be communicated to NHDES for approval.

2.5 Quality Assurance/Quality Control

Quality assurance/quality control samples will be collected in accordance with the sampling procedure included as Appendix C. Field blanks, trip blanks and duplicates will be analyzed once for every 20 primary samples. Field blanks and trip blanks will be collected at each sample location and submitted on hold pending review of preliminary analytical results.

2.6 Reporting

Unvalidated analytical results will be reported to the property owner(s) within 45 days of the sampling date. NHDES Waste Management Division and town health officers will be copied on transmittals of analytical results to the property owner(s).

If any of the analyzed parameters are detected at a concentration above an AGQS in a sample collected from a water supply well that is being used as a drinking water source, SGPP will:

- Provide notification to homeowners in accordance with the procedures identified during access agreement negotiations and verbal notification to NHDES within 24 hours of receipt of analytical data.
- Notify the property owner(s), NHDES, and town health officers in writing within 5 business days after receiving the results.

For the duration of the sampling under this work plan, SGPP will provide a semi-annual status report to NHDES in July and February of each year summarizing the available sampling results and providing recommendations for future well sampling locations, frequencies, and parameters. The first semi-annual status report is tentatively scheduled for February 15, 2019 (assuming NHDES approval of this Work Plan by October 14, 2018) and would cover the period from October 14, 2018 to December 31, 2018.

3.0 NEXT STEPS AND SCHEDULE

Following work plan approval from NHDES, SGPP will complete the following activities:

- Initiate contact with and provide an access agreement to property owners within 30 days of work plan approval
- Conduct first sampling of wells within 60 days of access agreement acceptance by the property owner(s)

4.0 CLOSING

The undersigned are the principal authors of this Report. Should you have any questions regarding this document, please contact Ross Bennett at (603) 668-0880.

Golder Associates Inc.



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Senior Engineer



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RWB/APTM/drb

5.0 REFERENCES

Consent Decree, State of New Hampshire, Dept. of Environmental Services v. Saint-Gobain Performance Plastics Corporation. March 20, 2018.

CT Male, 2018. Point-of-Entry Treatment Systems Work Plan. August 2018.

Golder, 2017. Work Plan for Residential Well Sampling. December 22, 2017

NHDES, 2017. Frequently Asked Questions (FAQs) for Sampling and Analysis of PFAS at WMD Sites. May 17, 2017.

NHDES, 2018a. Comments on Work Plan for Residential Well Sampling. April 17, 2018.

NHDES, 2018b. Excel Spreadsheet titled "20180524 DB SGPP.xlsx" transmitted May 24, 2018.

NHDES, 2018c. Letter Re: 2017 Annual Groundwater Monitoring Summary Report. July 31, 2018

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TABLES

Table 1: Pre-GMZ Perimeter Monitoring Sampling Locations
Saint-Gobain Performance Plastics
Merrimack, New Hampshire

TOWN	NHDES Station ID*	Pre-GMZ-ID	Station Name	DATE	ACTIVITYID	ST-ABR	WELL DEPT H	PFOA	PFOS	PFOA+ PFOS
BEDFORD	0197020001	36 Camp (Allen) Rd	BATHROOM BLDG OUTSIDE SPIGOT	5/9/2017	1705105-01	BR	(blank)	34	<4	34
BEDFORD	NHDES_M_4926	11 Sunset Ln	KITCHEN SINK	4/12/2017	8941934	OVV	(blank)	40	<2	40
BEDFORD	NHDES_M_4988	17 Veronica Dr	STORAGE TANK	10/18/2017	9277059	BR	805	12	<0.7	12
BEDFORD		17 Veronica Dr	STORAGE TANK	10/18/2017	9277060	BR	805	13	<0.8	13
LITCHFIELD	NHDES_M_2955	91 Hillcrest Rd	OUTSIDE SPIGOT	10/4/2016	K1612028-001	BR	530	2.9	<4.5	2.9
LITCHFIELD	NHDES_M_4740	19 Colonial Dr	BATHROOM MAIN FLOOR	10/3/2016	K1611854-003	BR	340	14	<4.3	14
LITCHFIELD	NHDES_M_735	265 Charles Bancroft Hwy	OUTSIDE SPIGOT	9/19/2016	K1611210-001	BR	605	<1.5	<3.8	ND
LONDONDERRY	NHDES_M_2715	189 Litchfield Rd	STORAGE TANK	4/18/2016	K1604044-001	BR	(blank)	3.1	<4.6	3.1
LONDONDERRY	NHDES_P_DW_128	3 Sandy Brook Ln	3 SANDY BROOK LN	4/22/2016	K1604185-004	BR	90	2	<4.6	2
MERRIMACK	NHDES_M_2978	40 Joppa Rd	KITCHEN SINK	10/11/2016	K1612398-005	BR	(blank)	8.4	<4.6	8.4
MERRIMACK	NHDES_M_5505	52 Pearson Rd	OUTSIDE SPIGOT	6/8/2016	1606136-01	BR	220	20	<4	20
MERRIMACK		52 Pearson Rd	OUTSIDE SPIGOT	6/8/2016	1606136-01B	BR	220	23	<4	23
MERRIMACK	NHDES_M_8278	10 Wildcat Falls Rd	STORAGE TANK	12/20/2017	9384168	BR	(blank)	40	4	44
MERRIMACK	NHDES_M_8279	10 Wildcat Falls Rd	KITCHEN SINK	12/20/2017	9384169	UNK	(blank)	41	4	45

Notes:

Well information and PFOA data based on spreadsheet titled "20170524 DB to SGPP.xlsx" provided by NHDES

*Station IDs were assigned by NHDES; "P" indicates "PFOA" and "M" indicates "MTBE"

PFOA = perfluorooctanoic acid

ng/L = nanograms per liter

Prepared by: RWB

Checked by: LDA

Reviewed by: APTM

Table 2: Residential Well Sampling - Analytical Parameters
Saint-Gobain Performance Plastics
Merrimack, New Hampshire

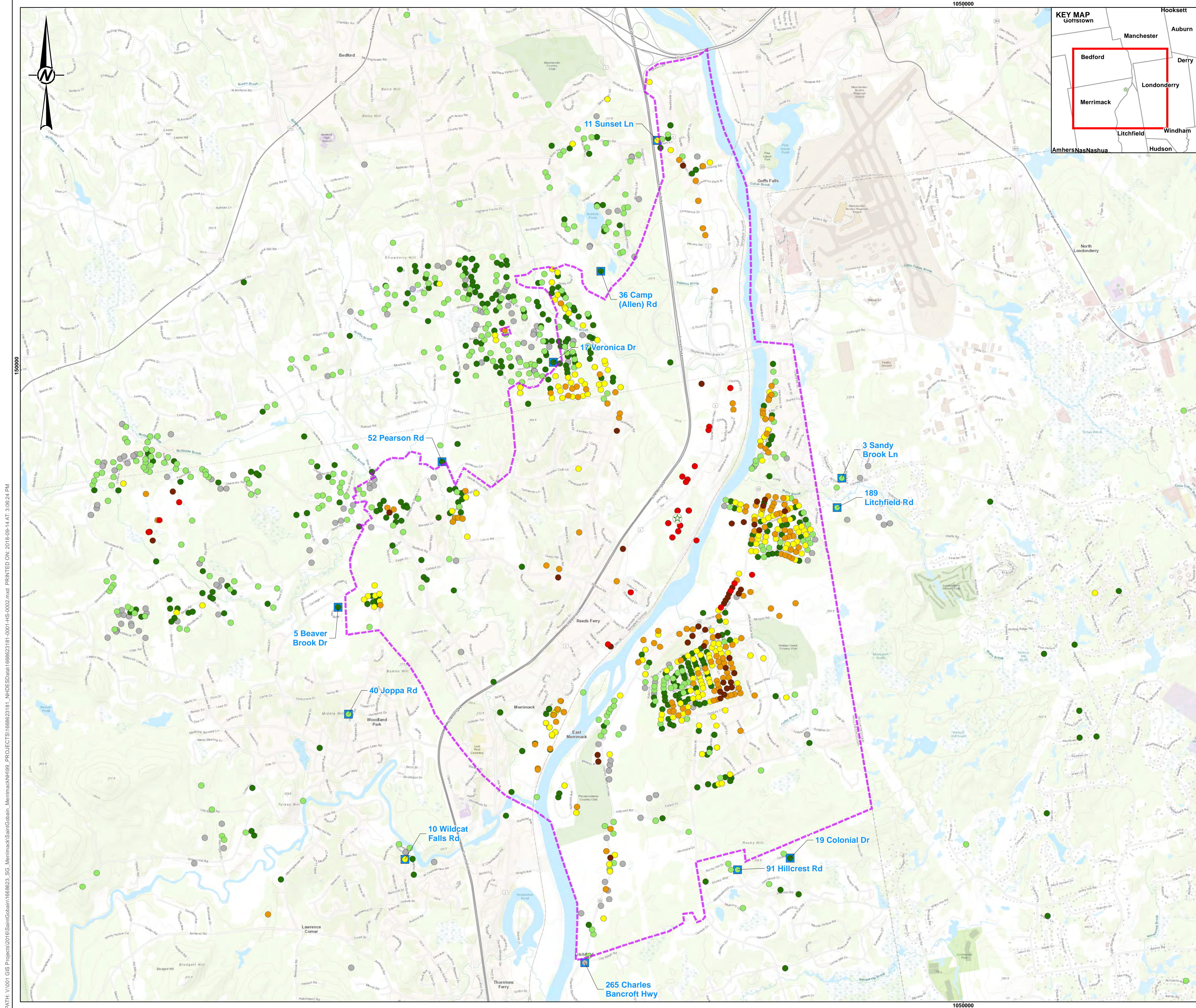
Method	Units	Anticipated Method Detection Limit	Bottle Requirements	Preservative	Hold Time
Parameter					
EPA 300.0					
Chloride	mg/L	1	40 mL glass vial	none	28 days
Nitrate Nitrogen	mg/L	0.25	40 mL glass vial	none	48 hours
Nitrite Nitrogen	mg/L	0.25	40 mL glass vial	none	48 hours
Sulfate	mg/L	1.5	40 mL glass vial	none	28 days
EPA 350.1					
Ammonia Nitrogen	mg/L	0.05	500 mL round glass	sulfuric acid	28 days
EPA 365.1					
Total Phosphorus as P (water)	mg/L	0.05	500 mL round glass	sulfuric acid	28 days
EPA 537 modified					
NEtFOSAA	ng/L	0.4	250 mL wide mouth plastic	none	28 days
NMeFOSAA	ng/L	0.4	250 mL wide mouth plastic	none	28 days
Perfluorobutanesulfonate	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluorobutanoic acid	ng/L	2	250 mL wide mouth plastic	none	28 days
Perfluorodecanoic acid	ng/L	0.4	250 mL wide mouth plastic	none	28 days
Perfluorododecanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluoroheptanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluorohexanesulfonate	ng/L	0.4	250 mL wide mouth plastic	none	28 days
Perfluorohexanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluorononanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluoro-octanesulfonate	ng/L	0.7	250 mL wide mouth plastic	none	28 days
Perfluorooctanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluoropentanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluorotetradecanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluorotridecanoic acid	ng/L	0.3	250 mL wide mouth plastic	none	28 days
Perfluoroundecanoic acid	ng/L	0.4	250 mL wide mouth plastic	none	28 days
SM 2320B					
Bicarbonate Alkalinity	mg/L	1.7	250 mL wide mouth plastic	none	14 days
Total Alkalinity to pH 4.5	mg/L	1.7	250 mL wide mouth plastic	none	14 days
SM 2540D					
Total Suspended Solids	mg/L	1	1L round plastic	none	7 days
SM 4500-SO3 B					
Sulfite	mg/L	1.5	250 mL round amber	EDTA	immediate
SM 7500-Rn B					
Radon	pCi/L	100	2 x 40 ml glass vials	None	4 days
SW-846 6010C					
Calcium	mg/L	0.06	250 mL wide mouth plastic	nitric acid	6 months
Iron	mg/L	0.0805	250 mL wide mouth plastic	nitric acid	6 months
Magnesium	mg/L	0.0374	250 mL wide mouth plastic	nitric acid	6 months
Manganese	mg/L	0.0016	250 mL wide mouth plastic	nitric acid	6 months
Potassium	mg/L	0.179	250 mL wide mouth plastic	nitric acid	6 months
Sodium	mg/L	0.321	250 mL wide mouth plastic	nitric acid	6 months
EPA 200.8					
Arsenic	mg/L	0.001	250 mL wide mouth plastic	nitric acid	6 months

Notes:

mg/L = milligrams per liter
ng/L = nanograms per liter
mL = milliliters
L = liters

Prepared by: BPC
Checked by: TGB
Reviewed by: RWB

FIGURES



LEGEND

- Saint Gobain Performance Plastics Building
- Proposed residential wells for interim monitoring of the perimeter of the (pre-GMZ)
- NHDAS Pre-GMZ Boundary

PFOA Concentrations

- ND
- <10
- 10-<35
- 35-<70
- 70-<150
- 150-<400
- >400

NOTE(S)

- PFOA DATASET UPDATED MAY 24, 2018.
- MOST RECENT DATA FOR EACH LOCATION IS SHOWN.

REFERENCE(S)

SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

SAINT GOBAIN PERFORMANCE PLASTICS

PROJECT
SAINT-GOBAIN PERFORMANCE PLASTICS
701 DANIEL WEBSTER HIGHWAY
MERRIMACK, NH

TITLE
PRE-GMZ PERIMETER SAMPLING LOCATIONS

CONSULTANT	YYYY-MM-DD	9/14/2018
DESIGNED	RWB	
PREPARED	SHL	
REVIEWED	RWB	
APPROVED	APTM	

PROJECT NO.	CONTROL	REV.	FIGURE
168623181	-	4	1

APPENDIX A
SOP-1: GENERAL FIELD METHODS FOR PFAS
SAMPLING PROGRAMS

APPENDIX A

GENERAL FIELD METHODS FOR PFAS SAMPLING PROGRAMS

1.0 GENERAL APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures that shall be used during implementation of this perfluorinated compound (PFAS) sampling program.

Due to the extremely low method detection limits associated with PFAS analysis (i.e., nanograms per liter [ng/l]) and the many potential sources of trace levels of PFASs, field personnel shall employ the greatest caution by strictly following the protocols described herein. Frequent replacement of nitrile gloves and decontamination of non-dedicated sampling equipment in accordance with the appropriate procedures will reduce the potential for false detections of PFASs.

This SOP includes the following:

- Considerations regarding food packaging and food consumption during PFAS sampling programs
- Field gear and clothing restrictions
- Personal hygiene requirements
- Sample area access restrictions
- Field equipment decontamination

Implementation of a field program subject to the provisions of the PFAS sampling requirements described herein shall not conflict with or supersede standard health and safety procedures outlined in the site-specific Health and Safety Plan (HASP).

2.0 RESPONSIBILITIES

The Field Team Leader and field personnel have the shared responsibility to oversee and ensure that the PFAS sampling program is performed in accordance with the program-specific protocols described in this SOP while adhering to the site-specific HASP. The Field Team Leader shall ensure that on-site personnel, including subcontractors and third parties that may have direct access to the sampling area, understand and comply with this SOP. Field personnel shall be notified of these requirements a minimum of three days prior to the start of field work in order to have the time to appropriately comply with many of the food and clothing requirements prior to arriving at the site.

3.0 GENERAL FIELD METHODS

3.1 Food Consumption

Components of some food packages have been treated to resist wetting. Historically, this was achieved through the use of PFASs. Accordingly, field personnel shall avoid the use of paper bags and other paper packaging to transport food to the site, including pre-wrapped foods and snacks (e.g., chocolate bars, energy bars, granola bars, potato chips, etc.). Field personnel shall not bring any fast food to the site that uses any form of paper wrapping including such sandwich wrappers or paper drinking cups. If possible, field personnel shall use hard plastic or stainless-steel food containers. Field personnel shall not use aluminum foil, wax paper, or coated textiles to transport food to the site.

The Teflon® coating on some frying pans contains fluorinated compounds and as such represents a potential source of PFASs. Field personnel shall not transport to or consume food at the site that has been prepared using a Teflon® coated cooking utensil.

Field personnel shall not consume food or beverages in the immediate vicinity of the sample location. Prior to consuming food or beverages, field personnel shall remove their nitrile gloves and move to a location a minimum distance of 35 feet away from the sample location, preferably in the downwind direction. When finished eating or drinking, field personnel shall wash their hands (in accordance with the

APPENDIX A

GENERAL FIELD METHODS FOR PFAS SAMPLING PROGRAMS

personal hygiene restrictions in Section 3.3), put their coveralls back on and put on a new pair of nitrile gloves prior to returning to the work area.

3.2 Field Gear and Clothing Restrictions

Because treatments to provide water resistant, water proof, or stain-resistant clothing include the use of PFASs, field personnel shall not wear any water resistant, water proof, stain-resistant treated clothing or Tyvek clothing during the field program. Permissible outer field clothing for PFAS sampling programs includes clothing made from natural fibers, preferably cotton, and rain gear made of polyethylene, vinyl or PVC. Clothing made of synthetic fibers shall be avoided (i.e., reflective vests); however, during cold-weather field events, it shall be allowable to wear synthetic under-layers, provided that they be completely covered by clothing made of natural fibers.

Field clothing shall be laundered with a minimal amount of detergent and no fabric softener or scented products shall be used. Once field clothing has been washed appropriately, field clothing shall be washed a second time on a rinse-only cycle, using only water, prior to drying. Anti-static dryer sheets shall not be used when drying field clothing. Field clothing shall preferably be old cotton clothing that has been laundered many times, as new clothing may contain PFAS related treatments. Clothing containing Gore-Tex™ shall not be worn during the sampling program, as Gore-Tex™ clothing contains a PFAS membrane.

Because rental field vehicle seats may have been treated with PFAS-containing products for stain resistance, the seats of rented field vehicles shall be covered with a well laundered cotton sheet or blanket for the duration of the field program in order to avoid direct contact between field personnel clothing and vehicle seat fabric. Covering of personal field vehicle seats with sheets is only required if the fabric has been treated/washed recently, or if the vehicle owner is uncertain about the history of the vehicle. Measures taken to mitigate field personnel contact with field vehicle seat fabric shall not in any way interfere with the functionality or impede the use of vehicle safety belts.

Waterproof field books shall not be used; field notes shall be recorded on loose paper using aluminum clip boards. Plastic clip boards, self-sticking notes, binders or spiral hard cover notebooks shall not be used. Field notes shall be recorded in pen or pencil. Markers shall not be used.

Most safety footwear is constructed of leather and synthetic materials that have been treated to provide some degree of waterproofing and/or increased durability. Therefore, footwear materials represent a potential source of trace PFASs. Nitrile gloves shall be worn when contacting footwear. The nitrile gloves worn while contacting footwear shall be removed and new nitrile gloves shall be put on prior to re-entering the sampling area.

Disposable nitrile gloves shall be worn at all times. A new pair of nitrile gloves shall be donned prior to the following activities at each sample location:

- Contact with laboratory-supplied sample containers or PFAS-free water containers
- Decontamination of sampling equipment
- Insertion of anything into the well (e.g., HDPE tubing, HydraSleeve, bailer, etc.)
- Insertion of silicon tubing into the peristaltic pump
- Completion of monitoring well purging
- Groundwater and soil sample collection
- Handling of QA/QC samples including field blanks and equipment blanks
- After the handling of any non-dedicated sampling equipment or contact with non-decontaminated surfaces

APPENDIX A

GENERAL FIELD METHODS FOR PFAS SAMPLING PROGRAMS

3.3 Personal Hygiene

Field personnel shall not use shampoo, conditioner, body gel, cosmetic cream, or hand cream as part of their personal showering routine on the day of a sampling event, as these products may contain surfactants and represent a potential source of PFASs. Field personnel shall follow their normal hygiene routine the night before a sampling event and then rinse with water only the morning before a sampling event. The use of bar soap is acceptable; however, bar soap including moisturizers shall be avoided.

Field personnel shall not use moisturizers, cosmetics, or dental floss (unless they are made with natural ingredients) for the duration of the field program, either on-site or off-site, as these products may contain trace PFASs.

Field personnel shall use sunscreen and insect repellent as necessary to provide adequate personal protection and maintain adherence to the site-specific HASP. The field team leader will keep in stock a specific sunscreen (Equate Sport Lotion SPF 50) and insect repellent (DeepWoods Off for mosquitoes, or Sawyer Premium Insect Repellent for ticks) for use by field personnel. Extra volume of these products will be stored for potential laboratory testing if abnormal PFAS detections occur in samples. Field personnel may choose to use other sunscreens and insect repellents; however, extra volume must be purchased and stored for potential laboratory testing if abnormal PFAS detections occur in samples. Field personnel shall document the use of sunscreen and insect repellent in field notes including the specific products used by each field personnel.

3.4 Sample Area Access

Visitors, including contractors or site personnel, who are not following these general PFAS sampling program protocols shall not be allowed to approach within 35 feet of the sample area until PFAS sample collection activities are complete and the PFAS sample container has been enclosed in a Ziploc® storage bag and placed in the sample cooler.

3.5 Sample Containers and Handling

Sample containers shall not be handled without first donning a new, clean pair of nitrile gloves. Samples shall only be collected in high density polyethylene (HDPE) or polypropylene containers provided by the laboratory for specific PFAS use (no Teflon liner). Glass containers shall not be used due to the potential for loss of PFAS through sorption. Sample container labels shall be completed after collection of the sample using a non-gel pen or a pencil. The sample shall be collected first and the lid to the sample container shall be re-sealed before the sample container label is completed.

3.6 Sample Storage and Shipment

Analytical samples shall be stored on ice, maintained at approximately 4 degrees Celsius (°C) and transported by overnight courier to ELLE under proper chain of custody protocols. Field personnel shall only use new, fresh ice. Reusable chemical or gel ice packs shall not be used as these may contain PFAS. Tracking numbers for all shipments shall be provided once the sample coolers have been shipped to ensure their timely delivery.

Samples shall be packed consistent with ELLE's packing requirements (typically included on a form mailed with the bottles/chains of custody). Typically, this includes the following:

Field personnel shall double check that bottles are appropriately labeled with location names, sample dates and times, and analyte(s), and match with chain of custody. Sample bottles from the same location should be bagged together (with the exception of PFAS bottles, which will be bagged separately), and the outside of the bag shall be labeled with the sample location.

APPENDIX A

GENERAL FIELD METHODS FOR PFAS SAMPLING PROGRAMS

Glass bottles/vials shall be wrapped in bubble wrap, or placed in foam packing cubes, prior to being bagged.

PFAS samples shall be shipped in PFAS-specific coolers.

Coolers will be lined with a larger plastic bag, with 5+ lbs of ice in a ziplock bag, followed by samples in ziplock bags and an additional 5+ lbs of ice in a ziplock bag. The large plastic bag shall then be zip-tied shut. Chain of custody should be photographed, and placed in a ziplock bag on top of the large plastic bag before sealing cooler. *REMEMBER: The temperature blank bottle must be inside of the large plastic bag on top of the ice.* Ensure that the coolers are dry prior to packing so that no stray water is likely to leak from the cooler while in transit.

Coolers containing samples must be taped shut and a lab-supplied custody seal must be signed, dated, and affixed across the edge of the lid of the cooler. *REMEMBER: Even unused coolers which don't contain samples must be taped shut when being shipped back to the lab.* If the cooler contains samples with short hold times, affix the appropriate lab-supplied sticker indicating short hold times on the lid of the cooler. The coolers should be labeled on the packing tape with "1 of X," "2 of X," etc. so the lab will know if a cooler is missing.

Samples shall be shipped overnight, with Saturday delivery. Lab-supplied shipping labels should specify this. Retain shipping receipts from FedEx with tracking numbers (to confirm delivery).

The FedEx at the Manchester Airport (Londonderry) is open until 8:15PM, but to make sure coolers make it onto the last plane, ***delivery to FedEx should be no later than 7:00PM.***

Designate a field team member or someone in the office to confirm FedEx delivery to the lab the following day – delivery is typically by 10:00AM (but may not show up in the system until 11:00AM)

APPENDIX B

SOP-2: PFAS PROGRAM SAMPLING PROTOCOLS

APPENDIX B

PFAS PROGRAM SAMPLING PROTOCOLS

1.0 GENERAL APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures that shall be followed during sample collection for analysis of perfluoroalkyl substances (PFAS).

This SOP includes the following:

- Sample Container Considerations
- Sample Collection
- Sample Shipping Requirements

2.0 RESPONSIBILITIES

The Field Team Leader and field personnel have the shared responsibility to oversee and ensure that the monitoring well purge and PFAS groundwater sampling program is performed in accordance with the program-specific protocols described in this SOP. The Field Team Leader shall ensure that field personnel understand and comply with this SOP.

3.0 SAMPLING PROCEDURES

3.1 Sample Containers

Drinking water samples shall be collected in HDPE sample containers provided by the laboratory specifically for use in the collection samples for analysis of PFAS (i.e., HDPE without a Teflon® liner). Glass containers shall not be used due to the potential for loss of PFAS through adsorption.

Sample container lids shall remain on the sample container until immediately prior to sample collection and lids shall be resealed immediately following sample collection. Field personnel shall hold the sample container lid in their hand until the lid is replaced on the sample container. Field personnel shall not rinse sample container bottles during groundwater sample collection. Sample container labels shall be completed using a pen or a pencil after the lid has been re-secured on the sample container. Field personnel shall not use markers to complete sample container labels.

3.2 Sample Collection

Field personnel shall wash their hands and put on a new pair of nitrile gloves prior to sample collection. Once the nitrile gloves are put on, field personnel shall not handle papers, pens, clothes, etc. prior to the collection of groundwater samples. If field personnel need to take notes or handle anything other than the sample container prior to collecting the sample, the old nitrile gloves with which contact was made shall be removed and new nitrile gloves put on.

Field personnel shall hold the sample container in such a manner that the sample container does not come in direct contact with the sampling equipment. The sampling container shall be filled completely. If field personnel observe suspended solids in the collected sample, a new sample shall be collected, if possible. If it is not possible to collect a sample with minimal suspended solids (i.e., no evidence of solids settling at the bottom of the sampling container), field personnel shall contact the project manager and, if the sample is submitted for analysis, indicate the presence of suspended solids as a note on the chain-of-custody.

Samples shall be placed directly into the laboratory-supplied HDPE containers. Once the sample container lid has been resealed, groundwater sample containers are to be placed into individual new Ziploc® (or equivalent) storage bags. Following sample collection, sample containers enclosed within their Ziploc® (or equivalent) storage bags shall be placed on ice in the laboratory-provided sample cooler. Field personnel shall minimize sample exposure to sunlight during sample handling and storage.

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PFAS PROGRAM SAMPLING PROTOCOLS

All sampling materials shall be treated as single use and disposed of following completion of sampling at each location.

3.3 Sample Shipping

Sample containers shall be stored on ice and maintained at approximately 4 degrees Celsius (°C) and transported by overnight courier to the laboratory. Field personnel shall only use new, fresh ice. Reusable chemical or gel ice packs shall not be used as these may contain PFAS. Tracking numbers for all shipments shall be provided once the sample coolers have been shipped to ensure their timely delivery.

APPENDIX C

SOP-3: PFAS PROGRAM RESIDENTIAL/PRIVATE WELL SAMPLING PROTOCOL

APPENDIX C

PFAS RESIDENTIAL/PRIVATE WELL SAMPLING PROTOCOL

1.0 GENERAL APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to describe the methods to be followed when collecting samples from private water supply wells for laboratory analyses from locations in the vicinity of the Saint-Gobain Performance Plastics manufacturing facility in Merrimack, New Hampshire.

2.0 EQUIPMENT AND MATERIALS

2.1 Equipment

The list below identifies the equipment required to complete this task.

- Clean hand tools
- Clean container for field measurements
- Graduated container and stop watch and/or flowmeter to determine purge rate and volume
- Clean 5-gallon buckets for purge water (if sampling outdoor or basement tap)
- YSI
- Turbidity Meter
- First-aid kit
- Fire extinguisher
- Metal clipboard for field observations

2.2 Materials

The list below identifies the materials required to complete this task.

- Laboratory-supplied, pre-preserved sample containers and trip blanks
- Chain-of-Custody
- Cooler with ice
- Field sampling form
- Personal protective equipment (PPE)

3.0 PROCEDURES

3.1 Preliminary Activities

Observe well head if exposed. Note on the sampling form any defects observed in the well head and/or potential contaminant sources located near well head.

Determine and note on the sampling form the volume of the holding/pressure tank(s).

Trace the cold water system and look for in-house treatment devices, such as water softeners, pH adjusters, point-of-entry treatment (POET) systems, radon systems, carbon systems, or ultra violet systems. Note in-house treatment devices on the sampling form. The sample must be collected prior to any type of water treatment system or the system must be bypassed.

Samples should be collected as close to the well head as possible.

Samples should be collected from an outdoor tap, if possible, but may be collected from an indoor tap (kitchen sink, bathroom sink, tap at the holding/pressure tank, etc.) if necessary.

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PFAS RESIDENTIAL/PRIVATE WELL SAMPLING PROTOCOL

Note the location of sample collection on the field form. Note any nearby potential contamination sources (PFAS-containing materials, cleaners, solvents, gas cans, paint cans, dry cleaning [if indoors], etc.) on the field form. Consider a different sampling location if the sample port is not clean (i.e., contains grease, lead soldering, or other possible contaminants) or if there are potential contamination sources nearby.

Always wear new personal protection gloves (e.g., nitrile) at each location when collecting samples.

3.2 Sampling

Begin purging the cold water tap using an empty container of known volume and stopwatch or a flowmeter to determine the sampling port flow rate. Note the time purging began and the estimated flow rate on the field form.

Pre-label the laboratory supplied, certified pre-cleaned containers using indelible ink (Sharpie).

After purging a minimum of 10 minutes and removing a minimum of 110% the volume of the pressure tank, measure the temperature of the water using a YSI every 2 to 3 minutes and record it, as well as the appearance of the water, on the field form. A sample may be collected once the temperature stabilizes (3 consecutive readings are ± 0.3 °C).

If purging an indoor location, purge water can be sent down the drain. If purging an outdoor location, purge water should be collected in a bucket and poured on the ground in an area away from walkways/play areas etc., such that ice or wet/slippery conditions are not created.

Once temperature stabilization has been achieved, record all field parameters (temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) on the field form and collect the sample:

Reduce the flow rate from the sampling port to achieve as laminar a flow as possible.

Collect the primary PFAS samples (and duplicate, if applicable), then collect the remaining primary and duplicate samples. Field duplicate samples will be collected at one per sampling event (monthly) or one in every twenty sampling locations, whichever is more frequent, for all analytical parameters. Open the labeled sample container and collect the sample by allowing the water to flow gently down the inside wall of the container with minimal turbulence.

Wearing nitrile gloves, fill the sample bottles nearly to the top, secure caps on the bottles, and gently agitate the bottles to allow the preservative to dissolve. Do not rinse the sample containers or allow them to overflow.

Field blanks for perfluorinated compound (PFAS) samples will be collected at each sampling location. Collect the PFAS field blank for the location by slowly pouring the provided laboratory DI water into the appropriate sample container at the same location where the primary sample is collected. Place the sample container in the cooler with ice and record the sample collection time on the field form and complete the chain-of-custody.

Place the sample containers in a cooler on ice at 4 degrees Celsius to be delivered to the laboratory within 24-hours of collection.

Record the sample collection time on the field form and complete the chain-of-custody.

Samples must be delivered to the laboratory within 24-hours of collection.

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4.0 SAMPLE NAMING

For consistency, name samples using the following conventions:

For primary field samples – use the street number, name and town (e.g., “179 Back River Road-Bedford”).

For field duplicate samples - use the primary sample name appended by “Dup” (e.g., “179 Back River Road- Bedford-DUP” for a field duplicate collected at 179 Back River Road, Bedford).

For field blank samples (Method 537.1 only) – use the primary sample name appended by “FB” (e.g., “179 Back River Road-Bedford-FB” for the field blank collected at 179 Back River Road, Bedford).

5.0 QA/QC SAMPLES

5.1 Field Duplicates

Field personnel shall collect one blind field duplicate for every 20 primary field samples collected. Field personnel shall collect field duplicates immediately after collection of the primary field samples. Field duplicates shall be collected in the laboratory-supplied sample containers and analyzed for the same analytical parameters as the primary sample. Field duplicate container lids shall remain in the hand of field personnel until replaced on the sample container. Sample container labels shall be completed as described above.

Field personnel shall collect groundwater field duplicates for analysis of PFAS using the following procedures:

- Following collection of the primary sample, change gloves and prepare to collect the field duplicate.
- Field duplicates shall be collected immediately following collection of the primary sample.
- Completely fill the laboratory-provided sample containers.
- Replace and re-seal the lid on the groundwater sample containers and then complete the sample container label as described above.

5.2 Field Blanks

Field personnel shall submit one field blank for each sampling location for analysis of PFAS only. Field blanks shall consist of PFAS-free water containerized in an HDPE sample container filled at the laboratory prior to beginning the field program. Field blank sample containers shall be opened during the collection of a sample and the laboratory-supplied PFAS-free water contained therein shall be poured directly into a laboratory-supplied HDPE sample container and then resealed. Field blank container lids shall remain in the hand of field personnel until replaced on the sample container. Sample container labels shall be completed as described above.

One field blank per every twenty samples will be submitted for analysis for PFAS compounds only, and the remaining field blank samples will be placed on hold pending preliminary review of analytical results.

5.3 Trip Blanks

Field personnel shall submit one laboratory-supplied trip blank per day of sampling for analysis of PFAS only. Trip blanks shall consist of PFAS-free water containerized in an HDPE sample container filled at the laboratory prior to the beginning of the field program. Field personnel shall place one trip blank container in the sample cooler at the beginning of the day and the trip blank shall remain in the cooler for the duration of sampling activities conducted on that day. Trip blank containers shall be submitted to the laboratory with the daily field sample shipment.

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One trip blank per every twenty samples will be submitted for analysis for PFAS compounds only, and the remaining trip blank samples will be placed on hold pending preliminary review of analytical results.

6.0 DOCUMENTATION

The field sampling form should be filled out in its entirety, including information regarding the location of sample collection, potential sources of cross contamination located near the sampling location, field measurements, any observations about the sample, and sample times. Field duplicate samples and trip blanks should be included on the chain-of-custody.



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