2026

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) SAMPLING GUIDELINES FOR AQUEOUS AND SOLID MATRICES

CALIFORNIA STATE WATER QUALITY CONTROL BOARD

DIVISION OF WATER QUALITY

SWRCB PFAS Website: https://www.waterboards.ca.gov/pfas/
DDW PFAS Website: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/PFOA_PFOS.html

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REVISION HISTORY

Prepared By	Date	Description of Change
State Water Board	March 20, 2019	Initial version
State Water Board	September 2020	Version 1.0 – Expanded pre-sampling and decontamination procedures. Added matrix-specific sampling considerations and expanded descriptions of field QC samples.
State Water Board	August 2026	Version 2.0

ABBREVIATIONS

AFFF	aqueous film-forming foam
AOF	adsorbable organic fluorine
CAS	chemical abstracts service
CEC	chemicals of emerging concern
CIC	combustion ion chromatography
DNAPL	dense nonaqueous phase liquid
DoD/DoW	Department of Defense/Department of War
EFTE	ethylene-tetrafluoro-ethylene
ELAP	Environmental Laboratory Accreditation Program
EOF	extractable organic fluorine
FEP	fluorinated ethylene propylene
HDPE	high-density polyethylene
IDW	investigation derived wastes
LC MS/MS	liquid chromatography tandem mass spectrometry
LDPE	low-density polyethylene
LNAPL	light nonaqueous phase liquid
NAPL	nonaqueous phase liquid
PCTFE	polychlorotrifluoroethylene
PFAS	per-and polyfluoroalkyl substances
PFTE	polytetrafluoroethylene
PPE	personal protective equipment
PVC	polyvinyl chloride
PVDF	polyvinylidene fluoride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
SWRCB	State Water Resources Control Board
U.S. EPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Per- and polyfluoroalkyl substances (PFAS) are a class of manufactured fluorinated organic compounds that due to their properties are extensively used to make everyday items more resistant to stains, grease, and water. These chemicals have been used in a variety of industrial, commercial, and consumer products and some of these products are present and/or used during routine sampling events. Use of these products could potentially contaminate samples during preparation of the sampling site, sample collection, decontamination of sample equipment, or shipment and storage of samples. With a relatively high probability of PFAS cross-contamination, care must be taken to design and implement effective PFAS sampling procedures. Therefore, this guidance document was developed to outline steps to take during PFAS sampling events to prevent or minimize sample contamination.

This document includes information from other guidance documents related to PFAS sampling practices. Since the science around sampling trace levels of PFAS is still evolving, the practices in this guide are conservative to minimize the possibility of cross-contamination. References to the guidance documents used to update this guide are provided for practitioners to consult. Additionally useful web resources and links are provided in **Appendix A**.

1.1 SCOPE

This document outlines sampling protocols for aqueous and solid media to ensure activities follow current best practices. The State Water Resources Control Board and Regional Water Control Boards acknowledge other recommended procedures may exist, but this guide aids samplers in meeting the Water Boards' quality objectives during PFAS sampling events. Review this guide before collecting PFAS samples for Water Boards programs or projects and strive to follow these recommendations. Updates will be made as more is learned about PFAS sources and contamination prevention during sampling. Note: This guidance is not for drinking water sampling; refer to the Division of Drinking Water's separate guidance (SWRCB 2022). It also does not apply to sampling aqueous film-forming foam (AFFF) concentrates.

2.0 PROJECT PLANNING

Some programs in the Water Boards a Quality Assurance Project Plan (QAPP) is required, and it is recommended even when not explicitly required. A QAPP is tailored to each PFAS sampling event before beginning the sampling. It should cover, at a minimum, the project's goals, an organizational chart with assigned individuals and their responsibilities, sampling design and methods, analytical method requirements, reporting protocols, and data evaluation procedures. There are specific guidelines for submitting data collected during site investigations into the State Water Resources Control Board's (SWRCB) case management system, GeoTracker (**Appendix B)**.

2.1 QUALITY ASSURANCE PROJECT PLAN (QAPP)

A QAPP is project-specific and is designed to provide the type and quality of data required to answer questions posed by the project. Additionally, the QAPP should clearly identify the PFAS-specific sampling procedures and necessary preventative measures required to prevent sample contamination from sources of PFAS, including sample equipment decontamination procedures and information on prohibited and acceptable sample containers, field clothing, personal protective equipment (PPE), personal products, food packaging, and sampling conditions.

For compliance to the Chemicals of Emerging Concern (CEC) monitoring (including PFAS) requirements in the Recycled Water Policy, the development and approval of a QAPP is required.

Additional guidelines for the preparation of a QAPP can be found at:

- Water Board's QAPP Development Resources website,
- Water Board's Recycled Water Policy QAPP Template for CEC Monitoring, and
- U.S. Environmental Protection Agency's (EPA) *Guidance for Quality Assurance Project Plans* (U.S. EPA 2025a).

In the absence of a QAPP, it is important that a thorough, site-specific sampling plan is developed prior to sampling for PFAS. Since PFAS are prevalent in everyday products, the risk for cross contamination is elevated and preventing or minimizing contamination during sampling events will require extra steps to the sampling procedure. This sampling guide should be fully reviewed and can be used as a resource when preparing a sampling plan or QAPP. This will ensure that acceptable sampling supplies and sampling equipment are used and activities on site are performed in the correct order and location. The plan should include a setup of the staging area, including a checklist of sampling supplies and personal protective equipment, as well as the procedure for

decontamination when moving in and out of the staging area. Creating a site-specific sampling plan helps avoid mistakes, supports a successful PFAS sampling event, and records all procedures for future reference if the data is ever questioned.

Sampling plans should address investigation derived wastes (IDW) handling and storage, prior to a sampling event that is expected to generate PFAS-containing IDW.

2.1.1 Sample Design Considerations

In general, representative samples are collected considering sample locations, depths, and number of samples. Different environmental media may require some other considerations during the development of the sampling plan. The sample design or plan should be discussed with the relevant environmental regulator.

Matrix	Sample Design Considerations	Relevant Sections in this Guide
Soil and Sediment	PFAS adsorption will differ based on different soil types because of the small volume of sample collected for soil and sediment. Approach the sediment sampling location from downstream and then move upstream.	Sections 6.2.1 and 6.2.2
Biosolids and Sludge	Ensure samples are homogenized and understand the solid content. Solids content indicates settling characteristics, which helps determine if a sample will separate into different fractions, risking nonrepresentative results. The choice of sampling equipment depends on the viscosity and solids content of the material.	Section 6.2.3
Drinking Water	Coordinate with the Division of Drinking Water and their local district engineers. Refer to the State Water Resources Control Board's Division of Drinking Water sampling guidance document (SRWCB 2022).	Section 6.3.1
Groundwater	The potential for seasonal changes in groundwater levels and minimizing cross-contamination during sampling should be considered. It is important to properly purge a borehole or monitoring well to ensure that a representative sample of the aquifer is collected.	Section 6.3.2

Matrix	Sample Design Considerations	Relevant Sections in this Guide
Surface Water and Stormwater	Collect samples from areas of active flow, not from pools of standing water, and collect samples downstream and then working upstream to minimize the disturbance of subsequent samples that are collected upstream. The presence of debris and scum on top of the water needs to be avoided.	Sections 6.3.3 and 6.3.4
Surface Water Foam	PFAS-containing foam often appears on surface water bodies, even if PFAS levels are low or undetectable. It is usually near release sources but can travel across the water. Collect enough foam for PFAS analysis as it condenses into an aqueous phase. Use your gloved hands to scoop up the foam from a boat (always upstream) or along the shoreline.	Section 6.3.3.1
Wastewater	The top layer of wastewater flow should not be used in the collection of a representative sample.	Section 6.3.5
Landfill Leachate	When collecting a representative sample, consider the location (leachate risers, vault, sump, aboveground storage tanks), homogeneity, landfill cell status (active or closed), and waste classification.	Section 6.3.6

The most common and commercially available analytical methods approved by US EPA for PFAS analysis are listed in the table below.

	U.S. EPA 537.1 (2020)	U.S. EPA 533 (2019)	U.S. EPA 1621 (2024a)	U.S. EPA 1633A (2024b)
Validated matrix	Drinking water	Drinking water	Non-potable water	Non-potable water, solids, biosolids, tissue
Analytical Method	LC-MS/MS	LC-MS/MS	CIC	LC-MS/MS
Number of Analytes	18	25	NA	40

CIC = Combustion ion chromatography
LC-MS.MS = Liquid chromatography tandem mass spectrometry

A list of PFAS chemical names associated these analytical methods along with Chemical Abstracts Service (CAS) Number and acronyms used in the State Water Boards GeoTracker case management tool is provided in **Table 1**.

Non-standard analytical methods are increasingly used to measure total PFAS and unknown PFAS not identified by conventional methods. Although the EPA has not approved these methods yet, they are evaluating EOF and TOP assays for future use.

- Extractable Organic Fluorine (EOF) - EOF and Adsorbable Organic Fluorine (AOF) are similar. They both use combustion ion chromatography to quantify unknown PFAS. EOF isolates organic fluorine through liquid-solid phase extraction, whereas AOF uses activated carbon adsorption. EOF is typically for solid samples but can be used for liquids; AOF is mainly for liquids. EOF's reporting limits may be lower than AOF for the same matrices and can include smaller chained PFAS and other compounds not covered in standard methods. AOF is ideal for a range of organic fluorine compounds but less effective for shorter-chained PFAS that can pass through activated carbon.

- Total Oxidizable Precursor (TOP) Assay - This analysis measures the potential for PFAS to form under oxidative conditions. Paired with conventional methods like EPA Method 1633, one sample is tested "as-is", while a second sample undergoes oxidation to convert precursors into terminal products like PFCAs. The difference between pre- and post-oxidation measurements indicates unknown precursor concentrations. However, the oxidation step may be incomplete or ultrashort-chain PFAS or other intermediates might not be detected, both leading to underestimated results.

- Non-target analysis (NTA) employs high-resolution mass spectrometry (HRMS) to detect and identify unknown compounds in a sample without needing a target list. This method reveals the full chemical composition, highlighting emerging contaminants or unknown pollutants. Few analytical laboratories can perform NTA as it requires specialized equipment, software, reference libraries, and highly skilled staff. Additionally, NTA is costly due to its labor-intensive data analysis process.

2.1.2 PFAS Fingerprinting Methods

Methods like computer models, concentration ratios, and branched and linear isomers are used to identify contamination sources in environmental media. The EPA developed successful computer models for PFAS source apportionment, including UNMIX, positive

matrix factorization, and principal component analysis-multiple linear regression (USGS 2024). EPA refers to fingerprinting as forensic analysis.

U.S. EPA offers guidance on forensic analysis tools and methods for PFAS (U.S. EPA 2025b). The bulletin helps project managers and assessors review data for source apportionment and PFAS fate and transport. Understanding PFAS at a site requires multiple lines of evidence, which inform sampling strategies and conceptual site models. Key topics include PFAS sources, biochemical impacts on precursor transformation, and analytical methods like targeted analysis, NTA, TOP assay, and total organic fluorine tests (e.g. AOF, EOF). Forensic evaluations use gathered data to build conceptual site model (CSM) and consider factors such as isomer distribution, PFAS ratio calculations, and trend maps or charts.

2.2 PRESENCE OF HIGHLY CONCENTRATED SUBSTANCES

2.2.1 NONAQUEOUS PHASE LIQUID (NAPL)

If co-contaminant and phases such as nonaqueous phase liquid (NAPL), either dense or light nonaqueous phase liquid (LNAPL and DNAPL) is suspected, their presence should be evaluated (e.g., membrane interface probe). Since PFAS partitioning into and sorption onto NAPLs is likely, NAPL sampling as a source of PFAS should be considered. For the NAPL measurement, Total petroleum hydrocarbons, U.S. EPA Method 8015D is recommended to be used.

2.2.2 AQUEOUS FILM-FORMING FOAM (AFFF)

Aqueous film-forming foam is a class of firefighting foam that is used to extinguish flammable liquid fires, Class B fires. AFFF materials include legacy PFOS AFFF and legacy and modern fluorotelomer AFFF. If AFFF and AFFF-impacted groundwater is suspected, their presence should be evaluated. PFAS are not typically found as a separate phase in the environment (e.g., solid, LNAPL, or DNAPL). Instead, they are usually found as dissolved solutes in groundwater systems. However, at sites where PFAS mixtures are present as separate phases (e.g., at fire-training facilities where petroleum hydrocarbon LNAPL was released along with AFFF foams), PFAS interactions with co-contaminants (e.g., NAPL) within the subsurface have been reported and can impact migration in groundwater. The laboratory performing the analysis of any NAPL must be consulted to develop the sampling strategy.

2.2.3 SURFACE WATER FOAM

The Michigan Department of Environment, Great Lakes and Energy (MEGLE) has been a leader in the sample collection for AFFF foam. As a result, the guidance on sampling

of suspected AFFF foam in this document is based on their sampling guidance document (MEGLE 2019a). Surface water foam volume, density, and PFAS concentration may vary by location, composition, foaming mechanism, and age of the foam. Guidance is provided for sampling foam on surface water in Section 6.3.3.1 of this document. Once the foam enters the waterway, stormwater significantly influences PFAS migration due to its high mobility in water. Refer to Section 6.3.4 for stormwater sampling guidance.

3.0 PRE-SAMPLING CONSIDERATIONS

Because of widespread use of PFAS in the manufacturing and production of sample collection materials and field supplies, sampling methods require additional considerations when selecting sampling materials. Plastic bags, sample containers, waterproof pens and paper, personal protective equipment, clothing, field gear, food packaging, and personal care products can possibly be sources of cross contamination. This guidance document has divided commonly used sampling materials and field supplies into three categories:

- ***Acceptable materials***: These materials are not known to be sources of PFAS cross contamination and can be used during all sampling stages and in the immediate sampling environment.

- ***Staging area-only materials***: These materials may contain PFAS and should not come into direct contact with the sample but can be used in the staging area. However, these materials should be used away from sample container and equipment. Care should be taken to thoroughly wash hands and use new gloves after handling any of these materials.

- ***Prohibited materials***: These materials are known to contain PFAS that may present a threat to the integrity of the sample and should not be used during any stage of the sampling event.

3.1 SAMPLING EQUIPMENT

Sampling equipment for PFAS must be made from PFAS-free materials like high-density polyethylene (HDPE), polypropylene, silicone, stainless steel, nylon, PVC, acetate, and cotton. Equipment with PFAS coatings or fluoropolymer parts that contact samples or the environment are prohibited. These include but are not limited to:

- Polytetrafluoroethylene (PTFE), including the trademark Teflon® and Hostaflon®, which can be in ball check-valves on certain bailers, lining of some hoses and tubing, wiring, certain kinds of gears, lubricants, seals, and some objects that require the sliding action of parts.

- Polyvinylidene fluoride (PVDF), including the trademark Kynar®, which can be in tubing, films/coatings on aluminum, galvanized or aluminized steel, wire insulators, and lithium-ion batteries.

- Polychlorotrifluoroethylene (PCTFE), including the trademark Neoflon®, which can be in many valves, seals, gaskets, and food packaging.

- Ethylene-tetrafluoro-ethylene (ETFE), including the trademark Tefzel®, which can be in many wire and cable insulation and covers, films for roofing and siding, liners in pipes, and some cable tie wraps.

- Fluorinated ethylene propylene (FEP), including the trademarks Teflon® FEP and Hostaflon® FEP, and may also include Neoflon®, which can be in wire and cable insulation and covers, pipe linings, and some labware.

Equipment that includes PFAS-coated components, such as Teflon, can be used if these parts are internal and do not come into contact with the sample or the external environment. Avoid using sampling equipment with low-density polyethylene (LDPE) parts if those parts will directly touch the sample. LDPE is acceptable only when an equipment blank has verified it is PFAS-free. Although LDPE's raw materials do not contain PFAS, contamination can occur during manufacturing.

Sampling equipment used for grab sampling, including cable ties, extension rods, and couplings, should be made of materials that are known to be PFAS-free. Recommended materials for this sampling equipment include:

- Cable ties made of natural rubber or nylon or uncoated metal springs.
- Extension rods made of materials that are known to be PFAS-free.
- Stainless-steel couplings

Automatic sampling has an increased potential for cross contamination because the tubing, valves, strainers, suction lines, distribution nozzles, and other parts may be made from PFAS. Automatic sampling should only be used if a representative sample cannot otherwise be collected. If automatic sampling is used, then parts made from preferable materials including HDPE, polypropylene, silicone, stainless steel, nylon, PVC, and acetate should be used when possible. It is recommended that parts on the sampler be screened prior to sampling by reviewing the safety data sheets (if available) and collecting an equipment blank to verify that the parts are PFAS-free.

Regardless of the sampling set-up or equipment selected, an equipment or rinsate blank must be taken to verify that the equipment is not contaminating the sample. Refer to Section 7 for more details about field quality control samples.

3.2 SAMPLE CONTAINERS

All sample containers used for PFAS sampling should come from the laboratory that is Environmental Laboratory Accreditation Program (ELAP) accredited to perform the

PFAS analysis. Sample containers are method dependent (e.g., U.S. EPA Method 1633A), and method requirements should be followed. Generally, high-density polyethylene (HDPE) or polypropylene sample bottles with Teflon®-free caps are recommended. Sample containers made from LDPE should not be used as PFAS are used in the manufacturing process of these containers. LDPE can be found in many sample containers including bottles and plastic bags. PFAS can adhere onto glass containers, and therefore should not be used for water, leachate, or other aqueous samples. Refer to Section 5.4 for a listing of sample containers for common PFAS analytical methods.

3.3 PERSONAL PROTECTIVE EQUIPMENT AND FIELD CLOTHING

PFAS are used to coat clothing and PPE to repel water, oil, and dirt. Avoid new or waterproof clothing to prevent cross-contamination; if necessary, wash field clothing without fabric softener. Note any PFAS-containing PPE used for safety in field notes and reports and collect rinsate blanks before sampling if concerned about contamination (see Section 7 for details).

Certain standard PPE items like hard hats, safety glasses, and uncoated Tyvek® products may not have been evaluated for PFAS. Screen these items with an equipment blank before use. For unknown PPE, collecting an equipment blank is also recommended.

During surface water sampling, personnel might need PFAS-free booties or waders over other footwear to avoid contamination from treated boots.

For reference purposes, **Table 2** lists examples of clothing and personal protective equipment that should and should not be used during PFAS sampling events.

3.4 PERSONAL CARE PRODUCTS

Many personal care products, including cosmetics, moisturizers, lotions, fragrances, shampoo and laundry detergents may contain PFAS or may become contaminated with PFAS from the containers they are supplied in. For this reason, the use of such products should be avoided or minimized on the day of sampling, and 24 hours prior to sampling. The words “natural” and/or “organic” in a product name or used to describe the product does not mean that the product is PFAS-free. More information on personal care products can be found in the Environmental Working Group’s Skin Deep Guidance. Note that this is not a comprehensive listing of personal care products. Listing or omission of any product does not imply endorsement or disapproval of the product.

Also, there is no guarantee that products will always remain PFAS-free or maintain their status as possibly containing PFAS.

3.5 SUN AND BIOLOGICAL PROTECTION

Biological hazards (UV from sun, mosquitos, ticks, etc.) may be encountered during sampling, so the elimination of specific clothing materials, sunscreens and insect repellants that are known to contain PFAS may not be possible because it could pose a health and safety hazard to field staff. Therefore, any deviation from this guidance document, including those necessary to ensure the health and safety of field staff, should be recorded in the field records and discussed in the report.

Sunscreens may be needed if field staff are subject to prolonged sun exposure. Sunscreens may have been manufactured using PFAS and could potentially be a source of cross contamination. Similarly, protection against insects may require the use of insect repellant, which also may have been manufactured with PFAS. Therefore, it is important to be aware of the sunscreen or insect repellant selected for use during a PFAS sampling events. The words “natural” and/or “organic” in a product name or used to describe the product does not mean that the product is PFAS-free. Mineral-based sunscreens (e.g., zinc oxides) could be PFAS-free. More information on sunscreens and insect repellants can be found in Michigan DEQ’s General PFAS Sampling Guidance (MEGLE 2024) and PFAS Central, a non-profit website, that lists PFAS-free products . These information sources do not provide a comprehensive list of sunscreens or insect repellants so other products not listed may meet the requirements for use. Listing or omission of any product does not imply endorsement or disapproval of the product and there is no guarantee that these products will always remain PFAS-free.

If sunscreens or insect repellants are used during a PFAS sampling event, then the product should be applied in the staging area. Hands should be washed, and new gloves donned following application.

3.6 FOOD PACKAGING

PFAS are known to be prevalent in food packaging, including paper plates, aluminum foil, paper towels, pre-wrapped food or snacks, food containers, bags, and wraps. Although long-chain PFAS have been banned for use in the manufacturing of contact food materials in the United States, short-chain PFAS have not been banned. Therefore, these products could be source of PFAS cross contamination. If food or beverages are to be consumed during the sampling event, then a dedicated eating area should be included in the sampling site plan (see Section 5.1 below).

4.0 DECONTAMINATION

Sampling equipment must be cleaned and decontaminated prior and after each use. Conventional procedures for cleaning and decontaminating sampling equipment can be used but must include a triple rinsing with PFAS-free water and adhere to the following decontamination guidance:

- Use of laboratory supplied or certified PFAS-free deionized water is preferred for cleaning and decontamination.
- Commercially available deionized water (or PFAS-free reagent water) may be used for decontamination if the water is verified to be PFAS-free.
- Municipal drinking water may be used for cleaning or decontamination if the water is known to be PFAS-free.
- Alconox®, or Liquinox® can be used for drilling and re-usable equipment decontamination. Do not use Decon 90®.
- If general safety requirements are met, reagent grade methanol or isopropanol could be used for decontamination during soil sampling.
- Sampling equipment can be scrubbed using a polyethylene or polyvinyl chloride (PVC) brush to remove particulates.
- Sampling equipment may be steam cleaned, or hot pressure washed (Liquinox® and high pressure hot water) as an alternative to brushing.
- A representative sample of water used for decontamination must be included in sampling plan. Disposable plasticware should not be decontaminated and reused.

An equipment or rinsate blank must be collected to ensure that the equipment is not contaminating the sample, irrespective of the decontamination procedures. For further details on field quality control samples, please refer to Section 7.

5.0 SAMPLING PROCEDURES

Conventional sampling procedures can be used to collect samples for PFAS analysis. However, there are PFAS-specific considerations and preventative measures that must be followed to prevent contamination of samples. It is recommended that supplies used for PFAS sampling that will come in direct contact with PFAS samples; including sample containers, pumps/tubing/collection equipment, and deionized water be stored separately from other sampling supplies. These items should also be handled minimally, to reduce the risk of cross contamination from other field equipment. Hands must be washed and cleaned. Powderless nitrile gloves must be worn on hands before collecting samples, handling sample containers, or handling sampling equipment.

5.1 SITE SET-UP

The sampling site should be evaluated prior to sampling to identify potential contamination risks and to select dedicated eating, staging, and sampling areas.

- ***Eating Area***: The eating area is physically separated from the sampling and staging areas, and the only place where food and drink should be stored and consumed. Food packaging must not be in the sampling and staging areas during sampling due to the potential for PFAS cross-contamination.

- ***Staging Area***: The staging area is where equipment is set-up and personal protective equipment is put on and taken off. PFAS-free over-boots and PPE should be put on in the staging area prior to sampling activities

- ***Sampling Area***: Sampling areas are the areas of the field where samples are collected. When staff requires a break to eat or drink, they should move to the staging area before removing gloves, coveralls, and any other appropriate PPE. Staff should move to the designated eating area for food and beverage consumption. Staff should wash their hands and put on a fresh pair of powderless nitrile gloves and appropriate PPE at the staging area, before returning to the sampling area.

Before sampling begins, a sampling sequence should be established. To prevent cross-contamination, sampling should start in areas suspected to be least contaminated and continue to areas suspected to be most contaminated. If there is no existing sampling data from the area, potential PFAS sources and transport paths should be reviewed to help inform the best sampling sequence.

If multiple samples are collected in an area where PFAS has been documented, sampling should begin in areas that are known to be upgradient from the suspected source, followed by those that are furthest downgradient. Downgradient locations

should be progressively sampled from the furthest downgradient to the closest suspected pfas source.

5.2 SAMPLE HANDLING AND COLLECTION

Sample collection procedures should include standard best practices for environmental sampling to prevent contamination and ensure a representative sample is collected. In addition, the following protocols should be followed when collecting PFAS samples:

- The sample container must be kept sealed and only opened during sample collection. The sampling container cap or lid should never be placed on the ground or on any other surface unless it is PFAS-free.
- Keep tubing and other materials out of sample bottles when collecting the sample. Ensure no dust or fibers enter the sample bottle.
- Collect samples upstream of your body to avoid contamination from clothing or personal care products.
- If sample filtration is necessary, it should be performed by the laboratory. The laboratory may also perform other methods, such as centrifuging, to reduce the need for filtration. Field filtration is not advised due to risks of contamination and sorption of PFAS onto the inside of the sample container.
- If there are plans to collect surface water foam, always collect the other matrices first (surface water) before collecting any foam samples.
- Samples should be double bagged using resealable bags.

5.2.1 U.S. EPA METHOD 1699, CLEAN/DIRTY HANDLING METHOD

The recommended methodology to collect surface water samples and groundwater samples is a “Clean Hands/Dirty Hands” procedure in accordance with US EPA Method 1669 (U.S. EPA 1996). This technique would lower the possibility of accidental and cross-contamination of samples.

Sample collection should use two or more person sampling teams, as described in U.S. EPA Method 1669. One member of the two-person sampling team is designated as "Dirty Hands," and the second member of the team is designated as "Clean Hands." Dirty Hands is responsible for the preparation of the sampling equipment (but does not handle the sample container itself), operation of any sampling equipment (such as pumps), and for all other activities that do not involve direct contact with the sample

(e.g., writing notes, cleaning up). Clean Hands will handle all operations involving contact with the sample bottles and transfer of the samples from the sample collection device to the sample bottles. The procedure for the collection of duplicate or replicate samples must follow the same method used for the collection of the original sample.

5.3 SAMPLE LABELING AND FIELD DOCUMENTATION

Additional considerations should be taken when labelling samples and documenting field activities to prevent contamination including the following:

- Regular/thick size markers (Sharpie® or otherwise) should be avoided as they may contain PFAS.
- Fine and Ultra-Fine point Sharpie® markers are acceptable to label the empty sample bottle while in the staging area provided the lid is on the sample bottle and new gloves are donned following sample bottle labeling.
- Ballpoint pens may be used when labeling sample containers. Preprinted labels from the laboratory may also be used but sample specific information must be completed in the field at the time of sampling.
- Do not use sticky notes (e.g. Post-it Notes®), plastic clipboards, or waterproof paper and notebooks in the sampling area.
- Rite in the Rain® notebooks are acceptable to use in the staging area provided gloves are changed after note taking.

5.4 SAMPLE HOLDING TIMES, PRESERVATION, STORAGE, AND SHIPMENT

Samples must be chilled during storage and shipment. Refer to **Table 3** that lists commonly used analytical methods for PFAS and their holding times, preservation and storage requirements. The information included in this list was obtained from ITRC's PFAS Guidance document (Section 11- Analytical Methods) (ITRC 2026).

Chemical or blue ice should not be used for storage or shipment of PFAS samples. When preparing samples for transportation or shipment, the samples and ice should be double bagged using bags made of materials that do not present a PFAS contamination risk, such as HDPE, if possible. LDPE bags may be used for bagging samples if special precautions are taken. LDPE bags should be kept separate from other sampling

supplies in the staging area and should not come into direct contact with the sample media. Gloves should be changed after handling LDPE bags.

6.0 MATRIX-SPECIFIC SAMPLING CONSIDERATIONS

The following sections provide general guidelines to follow for matrix-specific sampling. The matrices included in this guide are not all inclusive but are those matrices currently being included per State Water Board's Investigative Orders (order).

6.1 GENERAL GUIDELINES

Although PFAS sampling guidance is provided in this document, field staff should refer to the project-specific QAPP, project-specific sampling plan and/or applicable analytical method for sample testing, collection, preservation, holding times, and storage requirements. If sampling is occurring under an order, refer to the order in addition to this document for additional requirements or guidance on sampling. The laboratory performing the PFAS analysis should be consulted before sampling to develop the sampling strategy. Additionally refer to the QAPP, sampling plan or other regulatory document on the location where the samples should be collected.

When performing other analytical tests supporting non-PFAS characterization of the sample, the non-PFAS analyses must be collected in separate containers from the PFAS sample.

6.2 SOLID MATRICES

6.2.1 SOIL

High-density polyethylene (HDPE) or polypropylene sample bottles with Teflon®-free caps are the preferred sampling containers for PFAS sampling. Bags used to store soil samples should be verified to be PFAS-free prior to using them for storage.

Sampling equipment used to collect soil samples for PFAS analysis must be made from acceptable materials. If collecting core samples, liners for core samplers should be made of acetate or other materials known to be PFAS-free.

6.2.2 SEDIMENT

Sediment PFAS sampling should mirror soil sampling procedures. Use stainless steel core, grab, or composite devices, and consider HDPE sleeves in the core barrel. Ensure all equipment contacting samples is suitable for PFAS testing. Collect samples upstream of personnel to avoid contamination from PPE. Verify sediment sample bags are PFAS-free before use.

6.2.3 BIOSOLIDS AND SLUDGE

Biosolids (and sewage sludge) typically consist of both liquid and solid components. Therefore, it is generally recommended to collect samples with the highest possible solids content. When determining the optimal method for obtaining a representative biosolids sample (composite or single grab), consult the laboratory performing the analysis prior to sampling. Additionally, the number of samples required to form a representative composite sample will vary depending on the project and should be established through discussions with both the regulator and the laboratory.

Samples should be collected after the treatment processes and before disposal (i.e., before leaving the facility). If liquids are present, a representative whole sample aliquot that includes both liquid and solid fractions should be obtained. However, samples with minimal liquid content are preferred.

A stream from a mechanical or treatment process where biosolids and sludge are expected to be well mixed is more likely to represent the composition of the stream. In such cases, a single grab sample may sufficiently reflect the composition of the biosolid stream at the sampling point. Conversely, when biosolids have undergone dewatering and have been stored in locations such as drying beds, storage tanks, or compost piles, a composite sample may be more representative. If a composite sample is to be collected, consider asking the laboratory to prepare the composite prior to analysis.

When sampling biosolids, make sure to collect and document the information below, along with any other details needed per the project QAPP, laboratory, or project work plan.

- An estimate of the moisture content of each sample, reported as a percentage by weight of solids for a given volume of sample.
- The sample location (if compositing is used, a representative single location should be reported).
- A description of the sample location, biosolids classification, and the specific step within the treatment plant’s material processing sequence from which the sample was taken.

6.3 AQUEOUS MATRICES

6.3.1 DRINKING WATER

Guidance for sampling drinking water supply wells for PFAS is provided by the State Water Board's Division of Drinking Water. A copy can be accessed here: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas.html.

6.3.2 GROUNDWATER

The "Clean Hands/Dirty Hands" procedure (U.S. EPA 1996) is a recommended method for collecting groundwater samples.

Prior to purging, the water level in the well and the total depth of the well should be measured to determine the volume of water in the well. However, the sampler should have records of the well construction, such as depth and screen interval to compare with the most recent reading of well depth.

Record the well purging method and field parameters (i.e. temperature, electrical conductivity, pH, and turbidity).

Note: Probing the well bottom with a depth meter during low flow purge can disturb solids, increasing turbidity and affecting water quality stabilization. It's best to measure the total well depth after sampling.

- ***Monitoring Wells*** - Low-flow purge methods are recommended. For more information on groundwater sampling procedures, including suggestions for low-flow sampling methods, refer to U.S. EPA's Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells (U.S. EPA 2017).

  If low-flow sampling is not possible, then a submersible pump (dedicated or non-dedicated), Hydrasleeves or bailer can be used to sample the well. Ensure any purging components (pumps, bailers) or tubing are PFAS free. If it is uncertain whether the pump and/or tubing components are PFAS free, an equipment blank is recommended to determine the potential PFAS contribution by the equipment in contact with the sample. Nylon or cotton are recommended materials for the line attached to bailers for sample collection.

Purging should continue until the selected indicator parameters have stabilized. For suggested stabilization criteria, please refer to **Table 4**.

6.3.3 SURFACE WATER

The recommended method for collecting surface water samples is the "Clean Hands/Dirty Hands" procedure (U.S. EPA 1996).

Unless required by project objectives, avoid taking samples from the top layer or surface scum of the water body. PFAS may accumulate at the surface, leading to biased results not representative of the bulk water.

Other considerations when sampling surface water are:

- For samples collected via container immersion, the sample bottles should be held above the water surface and inverted (positioning the container opening downwards into the water). Then, once fully submerged, invert the sample bottle upright to collect the sample. If foam is present on the water surface, it should be cleared away, so it does not contact the container and is not included in the sample.
- When container immersion is not feasible due to insufficient water depth, collecting surface water using a peristaltic pump with HDPE/silicon tubing is preferred. The tubing volume should be purged before taking the sample, and IDW should not be disposed of in the area where the sample is taken. Pumping of sediment and other particulates into the sample container should be avoided.
- Personnel who must enter the water body to collect a sample should enter and stand downstream of the sample collection point.
- The sample location in the water column should be described and noted in the field logbook or other field form.
- If the surface water location is to be sampled repeatedly, collect each sample from the same location.
- If the surface of the water is frozen, then the ice may be broken or drilled through to access the water beneath. Be sure to allow time for any disturbed sediments or other particulates to settle before collecting samples, again avoiding collecting sediments or surface water. Reschedule sampling if liquid water is not present.
- Collecting surface water PFAS samples during wet and dry periods is preferred to assess seasonal fluctuations.

6.3.3.1 SURFACE WATER FOAM

The following sampling considerations for surface water foam was obtained from the MEGLE's Surface Water PFAS Sampling Guidance**Error! Bookmark not defined.**.

- Surface water foam can vary vastly in density. Samplers should collect enough surface water foam so that there is sufficient volume for PFAS analysis since the foam condenses over time into an aqueous phase of approximately 20 to 50 milliliters (mL) of the liquid phase of the surface water foam sample; however, verify this quantity with the laboratory. Overall, the collection of foam in 2 large gallon-size Ziploc® bags, 6 quart-size Ziploc® bags, or 8 250 mL HDPE bottles has been found to produce enough volume of condensed foam needed for analysis.

- Since boats may be made of various parts that may contain PFAS (especially protective water repellent coating), surface water foam samples collected on rivers should always be collected on the upstream side of the boat.

- Use a polyethylene plastic bag (e.g., Ziploc®) for the initial foam sample collection. If Ziploc® bags are not used, you must do an equipment blank.

- During the initial surface water foam sample collection, labeling should be done on the Ziploc® bags used to collect and condense the surface water foam. Preprinted labels, or blank labels from the laboratory, may also be used.

- After foam has condensed into a liquid, use HDPE or polypropylene sample bottles with Teflon-free caps provided by the laboratory. There are direct scooping methods that should be used when collecting the foam.

    - **Hand Collection – Surface** - Put on a fresh pair of nitrile gloves and gently skim the foam into the appropriate container. HDPE bottles are recommended. Caution should be taken to avoid inclusion of the surface microlayer (which is approximately the top 50 micrometers of the water) and the surface water, both of which would affect the results if included.

    - **Hand Collection – Shoreline** - For surface water foam that has blown inland on the shoreline, put on a fresh pair of nitrile gloves and use your hands or use a piece of rigid, PFAS-free plastic sheet, and gently scoop the foam into the appropriate container. HDPE bottles are recommended. Caution should be taken to avoid inclusion of the underlying sediment, which would affect the results.

- **Hand Collection** – Other Foam (such as aqueous film-forming foam) - For other foams that occur without surface water present, put on a fresh pair of nitrile gloves and use your hands or use a piece of rigid, PFAS-free plastic sheet, and gently scoop the foam into the appropriate containers. HDPE bottles are recommended. Make sure that no dirt, plant materials, or other debris get collected along with the sample.

6.3.4 Storm Water

The sampling of stormwater is similar to sampling surface water, including the use of the "Clean Hands/Dirty Hands" procedure (U.S. EPA 1996).

Other considerations to be aware of when sampling stormwater are:

- Stormwater sampling should be started from the manhole farthest downstream and work upstream. This mitigates the impact of subsequent samples if anything on the bottom is disturbed and migrates downstream.

- Stormwater samples should only be collected from active flow. Stormwater will not be collected from pools or standing water.

- Collect surface/storm water samples directly into laboratory-supplied bottles; wide-mouth bottles may be preferable to narrow mouth bottles for ease of surface/storm water collection.

6.3.5 Wastewater

Because PFAS are expected to accumulate in the air/water interface and therefore bias the analytical results, avoid sample collection from the surface. If depth of the flow allows, gently collect the sample at mid-depth or at one foot below the surface, facing the upstream direction. Properly flush the sample port line before collecting sample. Grab samples are recommended to be collected during peak flow. If possible, collect 24-hr composite samples to obtain representative samples from each stream.

6.3.6 Landfill Leachate

The most frequent leachate samples are collected from underground tanks, vaults or sumps, or leachate riser. If sample is collected from a leachate storage tank, properly flush the sample port line before collecting sample. The leachate in storage tanks could be stratified if not mixed, and sediments (organic and inorganic) could settle at the bottom of the tanks. Typically, fresh leachate samples could be collected from tank inlet or riser pipes.

We recommend to consult *Leachate PFAS Sampling Guidance* published by MEGLE (2020) for more details.

6.3.7 Passive Samplers for Surface Water and Groundwater

Passive samplers are utilized to measure PFAS concentrations in water matrices over extended periods. The advantages of employing passive samplers include acquiring time-weighted average concentrations and the ability to concentrate large volumes of water, which results in lower detection limits. Passive samplers can be used to assess time-integrated PFAS levels in stormwater and can be easily deployed prior to rainfall. However, there are limitations associated with passive samplers, such as weather impacts on results, potential variable uptake rates, and limited validated methods to ensure consistency across data sets.

7.0 FIELD QUALITY CONTROL SAMPLES

Due to the prevalence of PFAS in a wide range of materials, there may be a greater likelihood for cross-contamination during sampling, transport, and storage of samples. As such, it is recommended to collect field quality control samples to evaluate whether or not cross-contamination has occurred. The type and frequency of quality control samples should be identified in the project-specific QAPP. Additionally, analytical methods for PFAS analysis may provide instructions on the frequency and type of quality control samples required per sampling event.

7.1 FIELD DUPLICATE – RECOMMENDED

Field duplicates are replicate samples collected in the field and submitted to the laboratory as two distinct samples. Field duplicates are used to verify the precision of field and laboratory activities. The Field Duplicate (FD) is a sample collected from a sample location at the same time and under identical circumstances as the field sample and treated the same throughout field and laboratory procedures. To avoid bias during laboratory testing, the FD should be labeled with a unique sample ID that does not indicate which sample it duplicates.

7.2 FIELD BLANK - REQUIRED

A Field Blank (FB) is collected to verify that the sampling environment does not introduce PFAS and cross-contaminate samples during the sampling event. For the analysis of aqueous matrices, the field blank is collected by pouring PFAS-free reagent water that is stored in an acceptable sample container for PFAS sampling into an empty, clean sample container at the sampling site. The sample containers and supplies to process a field blank should be prepared and provided by the laboratory prior to the sampling event. The field blank is treated the same throughout field and laboratory procedures.

7.3 RINSATE/EQUIPMENT BLANK - REQUIRED

Equipment blank samples are collected by passing laboratory-verified PFAS-free water over or through decontaminated field sampling equipment before the collection of field samples to assess the adequacy of the decontamination process and/or to evaluate potential contamination from the equipment used during sampling.

7.4 TRIP BLANK – NOT REQUIRED

Trip blanks are a bottle of PFAS-free water that is prepared in the laboratory, travels from the laboratory to the site, and then gets transported back to the laboratory without having been exposed to any sampling procedures. The trip blank sample is used to

assess cross-contamination introduced from the laboratory and during shipping procedures.

7.5 BLIND SAMPLES/BLIND REPLICATES – NOT REQUIRED

Duplicate (or triplicate) results serve to estimate the error associated with sub-sampling, splitting procedures, and laboratory analyses, and provide an assessment of precision. Such samples should be submitted to the laboratory as blind samples, which are obtained by collecting at the same time and location as the primary sample. In certain sampling programs, it is advisable to send a portion of these duplicate or triplicate samples to a secondary laboratory to validate the results from the primary laboratory. Furthermore, field duplicates should be designated as "blind duplicates" to promote objective laboratory analysis. Each blind duplicate should be assigned a unique sample identifier that does not indicate its relationship to the corresponding primary sample.

7.6 TAP/SOURCE WATER - RECOMMENDED

Tap or source water may be utilized on-site during equipment decontamination between sampling points. A sample of the tap or source water should be collected if there is no recent analytical data confirming that this water is free of PFAS.

8.0 REFERENCES

ASTM International 2024. "*ASTM D8421-24 Standard Test Method for Determination of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Matrices by Co-solvation followed by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)*".

County of San Diego Environmental Health and Quality 2004. "Site Assessment and Mitigation Manual" (https://www.sandiegocounty.gov/content/dam/sdc/deh/water/docs/sam_manual1.pdf)

Department of Energy 2023. "PFAS Environmental Sampling Guidance" (https://www.energy.gov/pfas/articles/environmental-sampling-guidance-0)

Interstate Regulatory Technology Council (ITRC) 2026. "PFAS Technical and Regulatory Guidance Document (Web-based Guidance)". (https://pfas-1.itrcweb.org/)

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U.S. Environmental Protection Agency (EPA) 1996. "*Method 1669 Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels*". July. (https://www.epa.gov/sites/default/files/2015-10/documents/method_1669_1996.pdf).

U.S. EPA 2017. "*Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells*". September 17. (https://www.epa.gov/sites/default/files/2017-10/documents/eqasop-gw4.pdf)

U.S. EPA 2019. "*Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry*" December. (https://www.epa.gov/sites/default/files/2019-12/documents/method-533-815b19020.pdf).

U.S. EPA 2020. "*Method 537.1 Determination of Selected Per- and Polyflourinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)*". Rev 2. March. (file:///C:/Users/wlinck/Downloads/METHOD%20537_1_REV2_FINAL%20(4).PDF).

U.S. EPA 2024a. "*Method 1621: Determination of Adsorbable Organic Fluorine (AOF) in Aqueous Matrices by Combustion Ion Chromatography (CIC)".* EPA 821-R-24-002. January. (https://www.epa.gov/system/files/documents/2024-01/method-1621-for-web-posting.pdf).

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U.S. EPA. 2025b. "*EPA Superfund Program – RPM Bulletin 2025-02 Environmental Forensic Tools for Understanding PFAS Fate and Transport*". June (https://www.epa.gov/system/files/documents/2025-06/rpm-bulletin-pfas-environmental-indicators-4-14-2025_508-compliant.pdf).

United States Geological Survey (USGS) 2006, "National Field Manual for the Collection of Water-Quality Data, Chapter A4 Collection of Water Samples". September. (https://pubs.usgs.gov/twri/twri9a4/twri9a4_Chap4_v2.pdf).

USGS 2024, "Guide to Per- and Polyfluoroalkyl Substances (PFAS) Sampling within Natural Resource Damage Assessment and Restoration". Open-File Report 2024–1001. 2024. (https://www.usgs.gov/publications/guide-and-polyfluoroalkyl-substances-pfas-sampling-within-natural-resource-damage).

TABLES

TABLE 1. PFAS CHEMICAL NAMES, ACRONYMS, CAS NUMBERS, AND ANALYTICAL METHODS

Chemical Name/ Abbreviation	Geotracker PARLABEL	Chemical Abstracts Service (CAS) No.	EPA Method 537.1	EPA Method 533	EPA Method 1633A
Perfluorobutanoic acid	PFBA	375-22-4		Yes	Yes
Perfluoropentanoiic acid	PFPeA	2706-90-3		Yes	Yes
Perfluorohexanoic acid	PFHxA	307-24-4	Yes	Yes	Yes
Perfluoroheptanoic acid	PFHpA	375-85-9	Yes	Yes	Yes
Perfluorooctanoic acid	PFOA	335-67-1	Yes	Yes	Yes
Perfluorononanoic acid	PFNA	375-95-1	Yes	Yes	Yes
Perfluorodecanoic acid	PFDA	335-76-2	Yes	Yes	Yes
Perfluoroundecanoic acid	PFUnDA	2058-94-8	Yes	Yes	Yes
Perfluorododecanoic acid	PFDoDA	307-55-1	Yes	Yes	Yes
Perfluorotridecanoic acid	PFTrDA	72629-94-8	Yes		Yes
Perfluorotetradecanoic acid	PFTeDA	376-06-7	Yes		Yes
Perfluorohexadecanoic acid	PFHxDA	67905-19-5			
Perfluorooctadecanoic acid	PFODA	16517-11-6			
Perfluorobutane sulfonic acid	PFBS	375-73-5	Yes	Yes	Yes
Perfluoropentane sulfonoic acid	PFPeS	2706-91-4		Yes	Yes
Perfluorohexane sulfonic acid	PFHxS	355-46-4	Yes	Yes	Yes
Perfluoroheptane sulfonic acid	PFHpS	375-92-8		Yes	Yes
Perfluorooctane sulfonic acid	PFOS	1763-23-1	Yes	Yes	Yes
Perfluorononane sulfonic acid	PFNS	474511-07-4			Yes
Perfluorodecane sulfonic acid	PFDS	335-77-3			Yes
Perfluorododecanesulfonic acid	PFDoS	79780- 39-5			Yes
Perfluorooctanesulfonamide	PFOSA	754-91-6			Yes

Chemical Name/ Abbreviation	Geotracker PARLABEL	Chemical Abstracts Service (CAS) No.	EPA Method 537.1	EPA Method 533	EPA Method 1633A
N-Ethyl perfluorooctane sulfonamide ethanol	ETFOSE	1691-99-2*			Yes
N-Methyl perfluorooctane sulfonamide ethanol	MEFOSE	24448-09-7			Yes
N-Ethyl perfluorooctane sulfonamide	ETFOSA	4151-50-2			Yes
N-Methyl perfluorooctane sulfonamide	MEFOSA	31506-32-8			Yes
N-Methyl perfluorooctane sulfonamidoacetic acid	NMEFOSAA	2355-31-9	Yes		Yes
N-Ethyl perfluorooctane sulfonamidoacetic acid	NETFOSAA	2991-50-6	Yes		Yes
4:2 Fluorotelomer sulfonic acid	4:2FTS	757124-72-4		Yes	Yes
6:2 Fluorotelomer sulfonic acid	6:2FTS	27619-97-2		Yes	Yes
8:2 Fluorotelomer sulfonic acid	8:2FTS	39108-34-4		Yes	Yes
10:2 Fluorotelomer sulfonic acid	10:2FTS	120226-60-0			
2H,2H,3H,3H-Perfluorohexanoic acid	3:3FTCA	356-02-5			Yes
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3			Yes
2H,2H,3H,3H-Perfluorodecanoic acid	7:3FTCA	812-70-4			Yes
Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	13252-13-6	Yes	Yes	Yes
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	Yes	Yes	Yes
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9ClPF3ONS	756426-58-1	Yes	Yes	Yes

Chemical Name/ Abbreviation	Geotracker PARLABEL	Chemical Abstracts Service (CAS) No.	EPA Method 537.1	EPA Method 533	EPA Method 1633A
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11ClPF3OUdS	763051-92-9	Yes	Yes	Yes
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6		Yes	Yes
Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7		Yes	Yes
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1		Yes	Yes
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5		Yes	Yes

TABLE 2. EXAMPLES OF PERMITTED AND NOT PERMITTED CLOTHING AND PPE DURING PFAS SAMPLING

Acceptable materials	Staging area materials	Prohibited materials
• Synthetic or 100% cotton clothing that has been well-laundered (without use of fabric softener) • Waterproof clothing made with polyurethane, PVC, wax-coated fabrics, rubber, or neoprene • Boots made of polyurethane and/or PVC • Powderless nitrile gloves • Polyethylene and Vinyl clothing	• Non PFAS-free boots (e.g. steel-toed) • First-aid adhesive wrappers Note: Hands should be washed and clean new gloves donned after handling these products.	• Water/stain/dirt-resistant treated clothes (including but not limited to Gore-Tex™, Scotchgard™, and RUCO®) • New unwashed clothing • Clothes recently washed with fabric softeners • Clothes chemically treated for insect resistance and ultraviolet protection • Coated Tyvek® • Latex gloves

TABLE 3. PFAS ANALYTICAL METHODS HOLDING TIMES AND PRESERVATION REQUIREMENTS

Media	US EPA Method	Sample Container Requirements	Holding Time, Preservation, and Storage Requirements	Analytical Instrument
Drinking water	533 (25 analytes)	Polypropylene bottle fitted with a polypropylene screw cap, 100 - 250 mL, one per sample	1 g/L ammonium acetate added to bottles prior to sampling. Samples received at laboratory within 48 hours of collection must be received below 10°C. Samples received beyond 2 days of collection must be received with ice remaining in the cooler. Samples must be stored in the laboratory at or below 6°C until extraction but must not be frozen. Samples must be extracted within 28 days of collection. Sample extracts are generally stored at room temperature and must be analyzed within 28 days after extraction.	LC/MS/MS
Drinking water	537.1 (18 analytes)	Polypropylene bottle fitted with a polypropylene screw cap, 250 mL, one per sample	5 g/L Trizma (R) added to bottles prior to sampling. Chill samples to below 10°C during the first 48 hours after collection and during shipment. Upon receipt by the laboratory, sample temperature must be at or below 10°C. Samples must be stored in the laboratory at or below 6°C until extraction but must not be frozen. Samples must be extracted within 14 days of collection. Sample extracts must be stored at room temperature and must be analyzed within 28 days after extraction.	LC/MS/MS
Surface water, groundwater, wastewater, soil, sediment, biosolids,	1633A (40 analytes)	**Aqueous**: HDPE bottle with linerless HDPE or polypropylene caps. Two 500 mL aliquots	**All matrices**: Samples and sample extracts must be stored protected from light after collection through analysis. Maintain samples at 0 to 6°C from time of collection until received by the laboratory. Store sample extracts between 0 to 6°C for up to 90 days	LC/MS/MS

Media	US EPA Method	Sample Container Requirements	Holding Time, Preservation, and Storage Requirements	Analytical Instrument
tissue, and landfill leachate (tissue not mentioned)		for sample preparation and a smaller sample container for % solid determination and screening purposes for all but landfill leachates. For landfill leachates, three 100 mL aliquots; two for sample preparation and one for % solid determination and screening purposes.	before analysis; however either sulfonate concentrations may be elevated after 28 days. **Aqueous**: Samples must be received at the lab within 48 hours of collection. Samples may be extracted up to 90 days from collection if stored at ≤ -20°C at the lab. When stored at 0 - 6°C, samples may be extracted up to 28 days from collection; however, issues are noted for some perfluorooctane sulfonamide ethanols and perfluorooctane sulfonamidoacetic acids after 7 days. Samples may need to be extracted as soon as possible if NFDHA is an important analyte. **Solids**: Samples may be extracted up to 90 days from collection if stored at ≤ -20°C or 0 - 6°C with the caveat that samples may need to be extracted as soon as possible if NFDHA is an important analyte. Storage ≤ -20°C is recommended for biosolids samples if samples are stored for more than a few days due to the production of gases due to microbiological activity when stored at 0 - 6°C.	
Water and Wastewater	1621 (an aggregate concentration)	Collect samples in HDPE or polypropylene containers following	Samples and sample extracts must be stored protected from light after collection through analysis. Maintain samples at 0 to 6°C from time of collection until received by the laboratory. Samples must be	CIC

Media	US EPA Method	Sample Container Requirements	Holding Time, Preservation, and Storage Requirements	Analytical Instrument
		conventional sampling practices. All sample containers must have linerless HDPE or polypropylene caps.	received by the laboratory within 48 hours of collection. Samples may be extracted up to 90 days from collection if stored at 0 to 6°C.	
Non-drinking water	ASTM D8421-24 (44 analytes)	Collect 5 mL 6 0.5 mL samples, duplicates/ triplicates, matrix spikes and field blanks in graduated 15 mL polypropylene tubes.	Samples must be stored at a temperature between 0 °C and 6 °C until analysis. Samples should be stored refrigerated between 0 °C and 6 °C from the time of collection until analysis. Analyze the sample within 28 days of collection.	LC/MS/MS

TABLE 4. SUGGESTED WELL PURGE STABILIZATION CRITERIA FOR WATER-QUALITY-INDICATOR PARAMETERS

Parameter	Stabilization Criteria	Reference
Temperature	± 3% of reading (minimum of ± 0.2 °C	County of San Diego Environmental Health and Quality, 2004
pH	+/- 0.1	Puls and Barcelona, 1996; USGS 2006
Specific electrical conductance (SEC)	+/- 3%	Puls and Barcelona, 1996
Turbidity	Desirable, 5 NTU	U.S. EPA, 2017

APPENDICES

APPENDIX A – USEFUL WEB RESOURCES

The web resources listed below offer additional information on PFAS sampling. Do not use these resources in place of the required practices in this guidance, project-specific QAPPs, or analytical methods for PFAS analysis.

U.S. EPA

- U.S. EPA Analytical Methods Development and Sampling Research
- U.S. EPA Collection of Analytical Test Methods
- U.S. EPA Monitoring Unregulated Contaminants in Drinking Water Program
- U.S. EPA PFAS Program

Department of Energy PFAS Environmental Sampling Guidance

Department of Defense and Other Military Branches

- DoD/DoW PFAS Program
- National Guard
  - PFAS Program
- U.S. Air Force and Space Force
  - PFAS Program
- U.S. Army
  - U.S. Army Environmental Command PFAS Program
- U.S. Navy and Marine Corps
  - Assistant Secretary of the Navy – PFAS Program
  - Naval Facilities Engineering Systems Command (NAVFAC) PFAS Reading Room
  - U.S. Navy Southwest – PFAS Sampling Program

State and Other Guidance Documents

- Interstate Technology and Regulatory Council (ITRC) PFAS Technical and Regulatory Guidance Documents
- State of Michigan Department of Environment PFAS sampling guides
- State Water Resources Control Board PFAS Website
- State Water Resources Control Board - Division of Drinking Water PFAS Website

Personal Care Products

- PFAS Central – PFAS Free Products
- Environmental Working Group's Skin Deep Guidance

APPENDIX B – ENTERING DATA IN GEOTRACKER

For some PFAS sampling projects, the geographic locations of sample sites must be recorded in the field in the form of latitudes/longitudes and then uploaded into GeoTracker. These points can be non-surveyed field points, meaning that a licensed surveyor is not necessary to measure these points; a handheld GPS device or obtaining the coordinates using a readily available mapping program on the internet is sufficient. Step-by-step instructions for creating and uploading non-surveyed field points can be found in the document "How Do I Upload? Electronic Submittal of Information (ESI) Guide" under the "Getting Started" section. Templates and data formatting requirements can be found on the Electronic Submittal of Information (ESI) for GeoTracker home page (https://www.waterboards.ca.gov/ust/electronic_submittal/index.html).

When uploading the PFAS data into GeoTracker, the PARLABELs numbers for each unique PFAS is needed. The GeoTracker PARLABELs numbers are listed at the end of this guide but can also be found on the State Water Resources Control Board's Per- and Polyfluoroalkyl Substances (PFAS) webpage in the information and resources for Non-Drinking Water.