DRAFT-FINAL
PHASE I — PERFLUOROALKYL SUBSTANCES GROUNDWATER INVESTIGATION

FORMER NAVAL AIR STATION DALLAS
DALLAS, TEXAS

Revision Number: 0

Prepared for:

Department of the Navy
Naval Facilities Engineering Command Southeast
Building 135 North, P.O. Box 30
Jacksonville, Florida 32212-0030

March 2017

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NAVFAC
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NAVFAC SOUTHEAST

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Naval Facilities Engineering Command Southeast
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Jacksonville, Florida 32212-0300

Prepared by:

RESOLUTION CONSULTANTS

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

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STATE OF TEXAS
THOMAS WIBERG
GEOLOGY
1619
LICENSED
PROFESSIONAL GEOSCIENTIST

March 2017

Tom Wiberg 2 March 2017

Tom Wiberg, P.G./Date
Task Order Manager
Resolution Consultants

Emily J Brickman 2 March 2017

Emily Brickman, P.G./Date
Project Geologist
Resolution Consultants

List of Abbreviations and Acronyms

AFFF	Aqueous film forming foam
bgs	below ground surface
COC	Chemical of Concern
DoD	Department of Defense
FFTA	Firefighter Training Area
FSS	Fire Suppression System
ft	feet
ft msl	feet above mean sea level
GWBU	Groundwater bearing unit
GWPS	Groundwater Protection Standard
HA	health advisory
HDPE	high-density polyethylene
µg/L	micrograms per Liter (parts per billion – ppb)
mg/L	milligrams per Liter (parts per million – ppm)
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
PCL	Protective Concentration Level
PFAS	Polyfluorinated Alkyl substances
PFC	Perfluorinated Compound
PFBS	Perfluorobutanesulfonic Acid
PFHPA	Perfluoroheptanoic Acid
PFHXA	Perfluorohexanoic Acid
PFHXS	Perfluorohexanesulfonic Acid
PFNA	Perfluorononanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFPA	Perfluoropentanoic Acid
PSQ	principal study question
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SWMU	Solid Waste Management Unit
TCEQ	Texas Commission on Environmental Quality
TOC	top of casing
TRRP	Texas Risk Reduction Program
U.S. EPA	United States Environmental Protection Agency

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1.0 INTRODUCTION

Resolution Consultants has prepared this Groundwater Investigation Memorandum summarizing the actions taken and results of the Phase I November-December 2016 perfluoroalkyl substances (PFAS) groundwater investigation conducted at the Former Naval Air Station (NAS) Dallas, Dallas, Texas. From approximately 1940 until 1984, the areas associated with Solid Waste Management Units (SWMU) 6P through 14P operated as a Fire Fighting Training Area (FFTA). Additionally, an aqueous film forming foam (AFFF) fire suppression system (FSS) was present in Buildings 605, 607, 608, and 609, north of SWMU 17 (Buildings 1423 and 1429). Historical documentation indicates that PFAS-containing AFFF was stored, used, released, and/or spilled at the facility. Groundwater sampling of temporary and existing monitoring wells was conducted to evaluate the presence or absence of PFAS in the shallow groundwater bearing unit (GWBU).

This document was prepared by Resolution Consultants for the United States Department of the Navy (Navy) and the Naval Facilities Engineering Command Southeast. Resolution Consultants has conducted this work under Naval Facilities Engineering Command, Comprehensive Long-Term Environmental Action Navy Contract No. N62470-11-D-8013, Contract Task Order JM37. Work was performed in accordance with the October 2016 *Tier II Sampling and Analysis Plan Addendum #2 Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas* (Resolution Consultants 2016a) and in compliance with applicable Navy, United States Environmental Protection Agency (U.S. EPA) Region 6, and Texas Commission on Environmental Quality (TCEQ) requirements, regulations, guidance, and technical standards, as appropriate.

1.1 Site Location and History

The Former NAS Dallas, consisting of approximately 837 acres, is located 10 miles southwest of downtown Dallas, Texas. The property is bordered to the east by the United States Army and privately owned property; to the south by Mountain Creek Lake; to the west by the Naval Weapons Industrial Reserve Plant Dallas; and to the north by Jefferson Boulevard and the City of Grand Prairie. Figure 1 is a site location map, and a SWMU location map is presented in Figure 2.

Aviation operations were first conducted at the Former NAS Dallas when Hensley Field opened in 1932 on property leased from the City of Dallas. The Army Corps maintained Hensley Field until 1940, when in 1941 the field was commissioned as a Naval Air Reserve Base. The Navy took command in 1946 and continued to expand activities into the 1990s. In 1993, Former NAS Dallas was identified for closure under Base Realignment and Closure. Numerous environmental investigations have been conducted at the site to identify and remedy potential environmental concerns related to historical operations at the base.

Firefighting training was conducted in the southwest portion of the Former NAS Dallas (Figure 2) from the 1940s through the 1980s (Naval Energy and Environmental Support Activity [NEESA], 1985). Additionally, during the mid-1970s, a fire suppression system was installed in the northeast section of the site (Figure 2), west of SWMU 21 and north of SWMU 17/Building 1423 (Tetra Tech NUS, 2001); the system was in operation until site closure. These areas were the subject of the Phase I PFAS Groundwater Investigation. A detail description of historical firefighting training operations at the FFTAs and the AFFF Fire Suppression System (FSS) area is included in the Sampling and Analysis Plan (SAP) (Resolution Consultants 2016).

1.2 Geology and Hydrogeology

The geology of the Former NAS Dallas has been well documented in past reports and consists of Holocene and Pleistocene alluvial terrace deposits overlaying the Cretaceous Eagle Ford Shale (Tetra Tech NUS 2001, Tetra Tech NUS 2004, Tetra Tech NUS 2000, Naval Energy and Environmental Support Activity 1985, Tetra Tech NUS 2000). Surface soils and near surface deposits consist both of fill material and alluvial clays and silty clays with thin, discontinuous sandy or gravelly clay lenses. The thickness of the alluvial deposits ranges from less than two feet in the southern portion of the site (near the FFTA) to greater than 65 feet in thickness in the northern portion of the site (near the AFFF FSS).

As described in the *Resource Conservation and Recovery Act (RCRA) Facility Investigation Report for Category E,* the Eagle Ford Shale, a blue-gray, fissile, Upper Cretaceous-age marine shale, directly underlies the alluvial deposits. The contact between the underlying Eagle Ford Shale and the alluvium has been observed to be both sharp with occasional thin gravel layers and transitional — including a weathered shale zone transitioning to a more competent shale with depth. The thickness of the Eagle Ford Shale in the Site area ranges from approximately 80 to 217 feet (ft) (Tetra Tech NUS 2001).

In descending order, the hydrogeologic units present at the Site are the shallow alluvial aquifer, the Eagle Ford Shale confining unit, the Woodbine aquifer, the Washita and Fredericksburg confining units, the Paluxy aquifer, the Glen Rose confining unit, and the Twin Mountains aquifer. The uppermost aquifer is the Woodbine, but because this unit is separated by the Eagle Ford confining unit, it is not discussed in this report. The Eagle Ford Shale serves as an aquitard to the downward migration of groundwater into underlying deposits of the Woodbine Formation, a regional minor aquifer (Tetra Tech NUS 2001).

Groundwater occurs at approximate depths of 3 to 20 ft below ground surface across the Site within the shallow alluvial deposits. This unit comprises the shallow GWBU Zones of saturation have been observed within discontinuous sandy and gravelly clay layers of the alluvium and at the contact of the alluvium with the underlying shale; however, in areas of more significant thickness of alluvial deposits, unconfined saturation has been observed to be discontinuous and perched on top of less permeable units.

Historical potentiometric surface maps provide information of site-wide groundwater flow regimes, providing indication that groundwater generally mimics land surface topography, flowing from higher areas toward topographically lower areas. Potentiometric maps indicate a groundwater divide located near the intersection of taxiway D and taxiway T separating the groundwater flow of the AFFF FSS from the FFTA[1]. Groundwater flows from the northwest corner of the facility radially to the southwest/south/southeast toward surface water bodies, in addition to flowing toward the east and northeast. Groundwater flows toward surface water bodies and likely discharges to these features. Groundwater flowing to the east and northeast, in the area of the AFFF FSS, is generally orientated to a small surface water drainage which exits the facility on the eastern property boundary approximately 50 ft north of Building 702. Historical data for the FFTA indicates the presence of a

[1] See potentiometric surface maps presented in the 2001 RCRA FI for Category E.

groundwater mound which induces radial flow towards surface water bodies to the north (Cottonwood Bay), west (diversion channel), and east (Mountain Creek Lake).

1.2.1 Groundwater Resource Classification

As documented in the 2002 Affected Property Assessment Report, the majority of the Site is located within a Class 2 groundwater resource area [2]; however, the western portion of the Site, which includes the FFTA, is a Class 3 groundwater resource area.

1.3 Land Use and Receptor Exposure

Groundwater is the environmental medium of concern due to the high solubility of PFAS and its affinity for aqueous transport; therefore, the focus for this investigation was the shallow GWBU near the FFTAs and the AFFF FSS. As documented in the *Affected Property Assessment Report* (Tetra Tech NUS, October 2002) and also in the facility's RCRA Permit and Groundwater Compliance Plan (TCEQ 2004), the current land use is industrial but the projected future land has been determined to be residential. Land use in the immediate vicinity of Former NAS Dallas includes industrial, commercial/retail, and residential. Evaluation of the soil, sediment, surface water, air, and ecological exposure pathways were not included as part of this investigation.

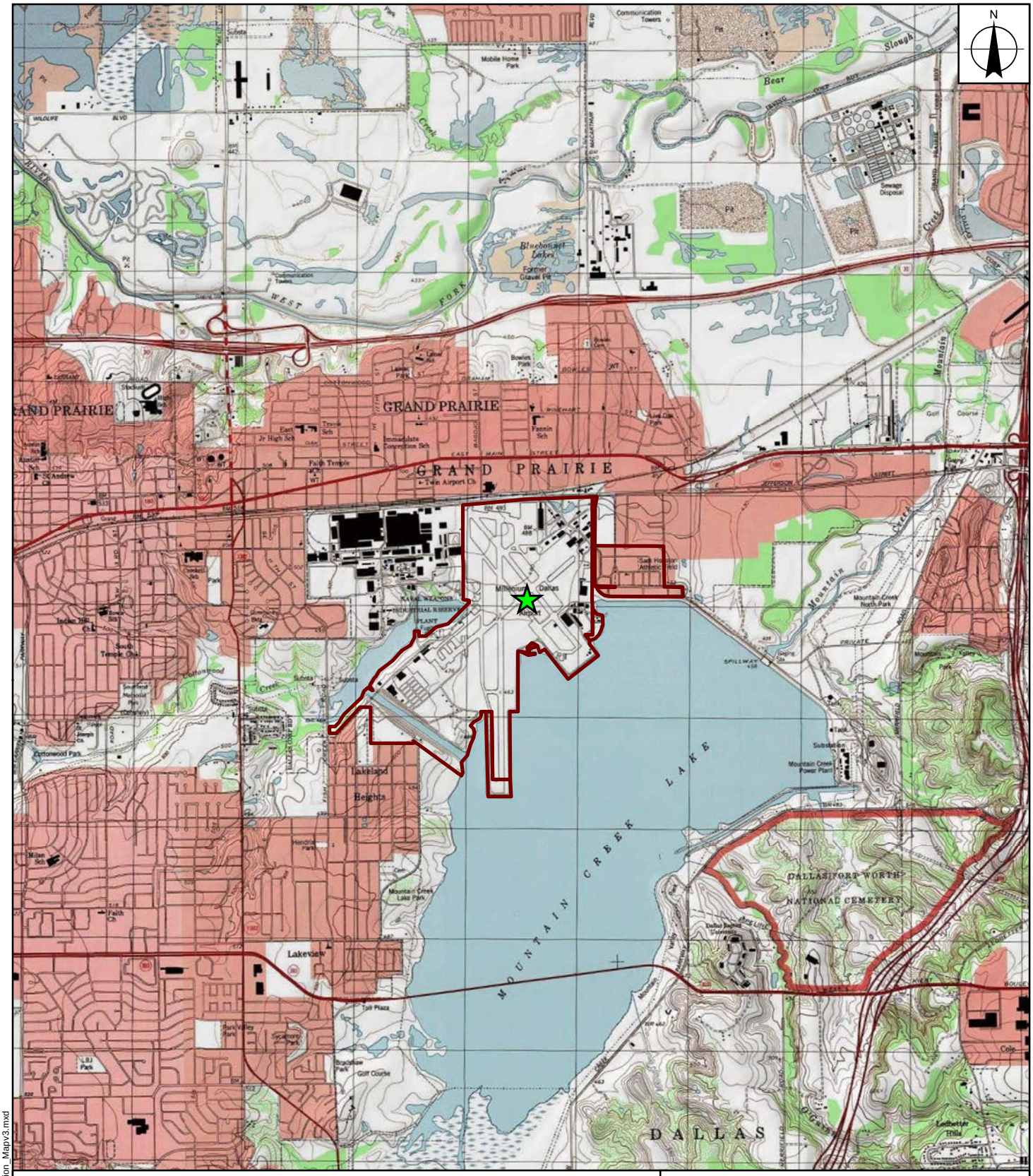
1.4 PFAS Background

PFAS are man-made synthetic chemicals that do not occur naturally in the environment. In general, PFAS have strong carbon-fluorine bonds, and their high molecular weight and solubility creates stable compounds resistant to environmental degradation processes, such as biodegradation, photolysis, and hydrolysis.

PFAS are components of AFFF and are known to be persistent and bioaccumulative compounds (U.S. EPA 2016a, 2016c, 2016d). Use of AFFF to combat fires has been shown to release PFAS to the environment (Seow, 2013) which increases the potential impact to surface and groundwater resources in close proximity to areas where these foams have been used. The Navy began distributing PFAS-containing AFFF to the military in 1966. AFFF was likely used at the FFTA onsite and was also used in the fire suppression deluge system in Building Group 26. PFAS were identified as a potential concern by the U.S. EPA through comments on previously submitted reports

[2] A Class 2 groundwater resource includes any GWBU which is a production zone for an existing well within one-half mile of the affected property or is capable of producing water with less than 10,000 mg/L TDS at a sustainable rate greater than 150 gpd (§350.52 (2)A-B) but less than that of a Class 1 groundwater resource (5,000 gallons per day).

for the Former NAS Dallas; therefore, the Navy implemented this PFAS groundwater investigation in order to evaluate the presence or absence of PFAS in groundwater.



Legend

- Site Location
- Site Boundary

0 4,000 8,000 Feet

FIGURE 1
SITE LOCATION MAP
PFAS GROUNDWATER INVESTIGATION SAP
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

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FIGURE 2
SWMU LOCATION MAP
PFAS GROUNDWATER INVESTIGATION SAP
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER: JM78

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

2.0 GOALS, OBJECTIVES, AND DECISION RULES

The objective of this investigation was to collect data to determine the presence or absence of PFAS in the shallow GWBU associated with potential AFFF source areas, specifically associated with the former FFTAs and AFFF fire suppression system. The principal study questions (PSQs) developed to define decision statements and to ultimately resolve the problem are as follows:

- PSQ1a: Are PFAS, specifically the perfluorinated compounds (PFCs) perfluorooctane sulfonate (PFOS) and/or perfluorooctanoic acid (PFOA), present in shallow GWBU near the FFTAs and the AFFF FSS at concentrations above an analytical method's limit of detection?

  — If PFOS and PFOA are present, do they occur at concentrations above the established U.S. EPA Health Advisory (HA) values?

- PSQ1b: Is perfluorobutanesulfonic acid (PFBS) present in the shallow GWBU near the FFTAs and the AFFF fire suppression system at concentrations above an analytical method's limit of detection?

  — If PFBS is present, dose it occur at concentrations above the U.S. EPA Tapwater Regional Screening Level (RSL)?

- PSQ1c: Are any of the other 13 select PFCs identified in Texas Risk Reduction Program (TRRP) present in the shallow GWBU near the FFTAs and the AFFF FSS?

- PSQ2a: If PFOS, PFOA, or PFBS are present in the shallow GWBU above the U.S. EPA values, then is additional delineation, documentation, and/or action required to evaluate potential risk to drinking water sources?

As described in the SAP, data required to resolve the problems included

- **Chemical Data:** Groundwater analysis for 16 PFAS identified in the TRRP Protective Concentration Levels (PCLs) tables, collected from both permanent monitoring wells (12 existing monitoring wells used as part of the Former NAS Dallas long-term monitoring program and three historical wells discovered in the FFTA) and temporary monitoring points (two installed near the former FFTAs and five installed near the AFFF FSS).

- **Field Measurements:** Field parameters (temperature, dissolved oxygen, pH, specific conductance, oxidation-reduction potential, and turbidity) collected to determine when low-flow groundwater purge stabilization was complete.

- **Sample Location Data:** Horizontal coordinates collected from temporary well installations via a handheld global positioning system.

- **Groundwater Level Measurements:** Water level measurements (via water level meter) from existing monitoring wells collected prior to sampling and combined with historical vertical survey data to interpret groundwater flow conditions and to a provide potentiometric surface (i.e., elevation) map for the AFFF FSS area.

3.0 GROUNDWATER PROTECTION STANDARDS

As indicated in the SAP, the U.S. EPA HAs (May 2016) were identified as screening levels for PFOS and PFOA. U.S. EPA also recommends that when PFOS and PFOA occur at the same time and location in a drinking water source, the sum of their concentrations should be compared to the HA (PFOA + PFOS) of 0.070 micrograms per liter (µg/L) (U.S. EPA, May 2016a).[3] Table 1 includes screening levels established in the SAP.

The screening level for PFBS has been identified as the U.S. EPA Tapwater RSL of 380 µg/L (May 2016), reflecting a target cancer risk of 1E-06 and a target hazard quotient of 1 (reflecting three chemicals utilized for decision making purposes versus the multiple chemicals [10] suggested by use of a hazard quotient of 0.1). The toxicity value used in screening level calculations for PFBS is a Tier 2 value which has undergone peer review.

The remaining 13 PFCs included as part of the analysis utilized the TRRP Tier 1 $^{GW}GW_{Ing}$ PCLs for a residential land use scenario (TCEQ, March 2016). It should be noted that the use of the TRRP PCLs for the 16 PFAS is inconsistent with *Department of Defense (DoD) Instruction 4715.18* and recommendations presented in the U.S. EPA Office of Solid Waste and Emergency Response Memorandum (Directive 9285.7-86, dated June 19, 2013) regarding identification of Tier 3 toxicity values. In addition, although the TRRP PFAS toxicity values undergo public review and internal review, this does not meet the U.S. EPA's criteria for peer review.[4] The Navy has agreed to analyze groundwater samples for the 16 PFAS for which PCLs have been established; however, TRRP PCLs for PFAS are not based on Tier 1, 2, or 3 toxicity values and, therefore, should not be considered binding values in a RCRA investigation.

Decisions for PFAS at this site for PFOA and PFOS have been based upon the U.S. EPA combined HA (PFOA + PFOS) of 0.070 µg/L. Decisions related to the occurrence of PFBS in site groundwater are based upon U.S. EPA Tapwater RSL of 380 µg/L.

3 U.S. EPA recommends that the lifetime HA for PFOA/PFOS apply to both short-term (i.e., weeks to months) scenarios during pregnancy and lactation, as well as to lifetime-exposure scenarios.
4 U.S. EPA identifies peer review as "one of several critical elements in selecting or giving preference to one toxicity value over another" in OSWER 9285.7-86 (U.S. EPA, 2013). Per the document *TCEQ Guidelines to Develop Toxicity Factors* (TCEQ 2015, RG-442), peer review is not conducted on the state-derived toxicity values.

Table 1
PFAS and Groundwater Protection Standards

Analyte Perfluoroalkyl Substances via U.S. EPA Method 537 modified (1)	CAS No.	Screening Level Source (2, 3)	Screening Levels (µg/L)	Health Advisory (U.S. EPA 2016) (µg/L)	Regional Screening Level (U.S. EPA May 2016) (µg/L)	TRRP $^{GW}GW_{Class\ 1\ Class2}$ PCLs(µg/L)	TRRP $^{GW}GW_{Class\ 3}$ PCLs(µg/L)
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	U.S. EPA Tapwater RSL	380	—	380	34	3400
Perfluorobutanoic Acid (PFBA)	375-22-4	Residential $^{GW}GW_{Ing}$	71	—	—	71	7100
Perfluorodecanesulfonic Acid (PFDCS)	335-77-3	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29
Perfluorodecanoic Acid (PFDA)	335-76-2	Residential $^{GW}GW_{Ing}$	0.37	—	—	0.37	37
Perfluorododecanoic Acid (PFDOA)	307-55-1	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29
Perfluoroheptanoic Acid (PFHPA)	375-85-9	Residential $^{GW}GW_{Ing}$	0.56	—	—	0.56	56
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	Residential $^{GW}GW_{Ing}$	0.093	—	—	0.093	9.3
Perfluorohexanoic Acid (PFHXA)	307-24-4	Residential $^{GW}GW_{Ing}$	0.093	—	—	0.093	9.3
Perfluorononanoic Acid (PFNA)	375-95-1	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29
Perfluorooctane Sulfonamide (PFOSA)	754-91-6	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	U.S. EPA HA	0.070 (4)	0.07	—	0.56	56
Perfluorooctanoic Acid (PFOA)	335-67-1	U.S. EPA HA	0.070 (4)	0.07	—	0.29	29
Perfluoropentanoic Acid (PFPA)	2706-90-3	Residential $^{GW}GW_{Ing}$	0.093	—	—	0.093	9.3
Perfluorotetradecanoic Acid (PFTEDA)	376-06-7	U.S. EPA Tapwater RSL	0.29	—	—	0.29	29
Perfluorotridecanoic Acid (PFTRA)	72629-94-8	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29
Perfluoroundecanoic Acid (PFUNA)	2058-94-8	Residential $^{GW}GW_{Ing}$	0.29	—	—	0.29	29

Notes:

(1) United States Environmental Protection Agency (U.S. EPA) Method 537 is a drinking water method modified for environmental groundwater samples and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5, (DoD, 2013) quality control guidelines.

(2) U.S. EPA has not completed peer review on the 13 perfluoroalkyl substances (PFAS) with action level sources derived using Texas Risk Reduction Program (TRRP) Protective Concentration Levels (PCLs), thus creating uncertainty in using PCLs as screening criteria; therefore, the Navy will only use them qualitatively. The Navy has agreed to sample these other 13 PFAS to help provide an abundance of information to decision-makers but notes that site management decisions will be made based on analytical results for compounds that have Tier 2 or Tier 3 toxicity values (perfluorooctane sulfonate [PFOS]/perfluorooctanoic acid [PFOA]/ perfluorobutanesulfonic acid [PFBS]). For additional discussion, please see Worksheet #11 of the SAP.

(3) Residential PCLs were established in the SAP for the 13 PFAS identified as having TRRP PCLs because if perfluorinated compounds are detected, then the Texas Commission on Environmental Quality requires that the boundary between industrial and residential concentrations be known to establish the Land Use Control boundary. U.S. EPA Health Advisory (HA) values are being used as the Screening Level for PFOS and PFOA; the respective Residential $^{GW}GW_{Ing}$ PCL values are 0.56 and 0.29 µg/L. The U.S. EPA Tapwater Regional Screening Level (RSL) value is the Screening Level for PFBS, reflecting a target cancer risk of 1E-06 and a target hazard quotient of 1 (reflecting three chemicals utilized for decision making purposes verses the multiple chemicals [10] suggested by use of a hazard quotient of 0.1); the respective Residential $^{GW}GW_{Ing}$ PCL value is 34 µg/L.

U.S. EPA recommended that when PFOS and PFOA occur at the same time and location in a drinking water source, the sum of their concentrations should be compared to the HA (PFOA + PFOS) of 0.070 µg/L (U.S. EPA, May 2016a).

CAS No. = Chemical Abstract Services number
µg/L = Micrograms per liter
U.S. EPA HA = United States Environmental Protection Agency, 2016. *Health Advisories for PFOA and PFOS*.
Residential $^{GW}GW_{Ing}$ = Texas Risk Reduction Program March 2016 Tier 1 Protective Concentration Level (PCL) for Residential Class 1 or 2 groundwater (ingestion)
U.S. EPA Tapwater RSL = United States Environmental Protection Agency Tapwater Regional Screening Level, May 2016.

4.0 GROUNDWATER MONITORING WELLS

The groundwater investigation sampling design and rationale are based on the approved SAP (Resolution Consultants 2016a) and includes existing monitoring wells and temporary well installations. Table 2 provides monitoring well construction information for both temporary well installations and existing wells included in the Phase I PFAS Groundwater Investigation.

The sampling design was developed to optimize resources and generate data to satisfy the data quality objectives. As outlined in the SAP, FFTA groundwater assessments were to include the installation and sampling of seven temporary monitoring wells and the sampling of one existing monitoring (308A51MW) at SWMU 6P. Attempts were made to install temporary monitoring wells at the seven proposed locations; however, only two temporary well borings produced sufficient saturation to warrant installation of a temporary well and collection of a groundwater sample. During field activities, two additional monitoring wells were observed near SWMU 6P. These wells have been identified as monitoring wells 30807MW and 30809MW, which were thought to have been abandoned. Both of these wells were sampled as part of this PFAS groundwater investigation.

Groundwater investigations for the AFFF FSS area included sampling of twelve existing monitoring wells from SWMU 17/Building 1429, SWMU 17/Building 1423, SWMU 21, SWMU 85, and SWMU 108. Five temporary wells were installed in the AFFF FSS area to supplement the existing well network and focus investigations in potential source areas for PFAS. Temporary well location FSS1TMW was not installed due to the lack of observed saturation during drilling and lack of accumulation of groundwater in the open borehole after 24-hours; therefore, no groundwater sample was collected from this location.

Table 2
Monitoring Well Construction Information

Well ID	Easting	Northing	Installation Date	Well Diameter (inches)	Total Boring Depth (feet bgs)	Screen Length (feet)	Screened Interval (feet bgs)		PFAS Groundwater Investigation Rationale
Former FFTA Sample Locations									
FFTA1TMW	2437279.654	965831.359	12/7/2016	—	28	dry - no well set			downgradient of Site 1, SWMU 9P
FFTA2TMW	2436745.29	6953310.595	12/7/2016	1	16	5	9	14	downgradient of Site 1, SWMU 7P/8P
FFTA3TMW	2436180.61	6952841.447	12/7/2016	—	28	dry - no well set			downgradient of Site 1, SWMU 10P/11P/12/13P
FFTA4TMW	2437007.668	6952948.133	12/7/2016	1	12	5	6	11	source area of Site 1, SWMU 7P
FFTA5TMW	2437325.82	6951015.195	12/5/2016	1	11	5	6	11	downgradient of Site 2, SWMU 14P
FFTA6TMW	2437492.14	6950892.185	12/8/2016	1	20	10	7.4	17.4	downgradient of Site 3, SWMU 14P/6P
FFTA7TMW	2437684.355	6951186.252	12/8/2016	—	12	dry - no well set			downgradient of Site 3, SWMU 6P
30807MW	2438004.75	6950563.5	9/25/1996	2	no data	no data			identified in the field
30809MW	2438256.003	6951099.00332	10/2/1996	2	no data	no data			identified in the field
308A51MW	2437484.32	6951068.44	—	2	15	10	5	15	source area of Site 3, SWMU 6P
AFFF Fire Suppression System Sample Locations									
FSS1TMW	2440473.67	6956627.914	12/6/2016	—	45	dry - no well set			South & downgradient of Building 608
FSS2TMW	2440497.094	6956702.44	12/7/2016	1	14	5	8	13	east & downgradient of Building 608
FSS3TMW	2440456.543	6956806.25	12/5/2016	1	20	5	14	19	north & side gradient of Building 608
FSS4TMW	2440585.814	6957048.881	12/5/2016	1	25	5	18	23	east & downgradient of Building 609
FSS5TMW	2440583.949	6957305.059	12/5/2016	1	20	10	7.5	17.5	east & downgradient of Building 605
FSS6TMW	2441906.692	965736.588	12/6/2016	1	21	10	11	21	downgradient of storm sewer discharge
SWMU 18 Plume									
606D150MW	2441883.29	6957594.81	5/15/2006	2	22.7	10	12.7	22.7	downgradient of sanitary sewer
SWMU 108 Plume									
40001MW	2441520.04	6955087.8	7/10/1995	2	19.5	10	9	19.5	side gradient of Building 608
40003MW	2441740.9	6954899.79	6/29/1995	2	25	10	15	25	side gradient of Building 608
SWMU 17/Building 1423 Plume									
61301MW	2441053.14	6956634.92	11/10/1995	2	24	10	14	24	side gradient to downgradient of Building 608
613D39MW	2440720.99	6956579.76	4/3/1998	2	20	10	10	20	side gradient to downgradient of Building 608, adjacent to storm sewer
613D41MW	2440836.92	6956613.81	4/7/1998	2	16.7	10	6.7	16.7	side gradient to downgradient of Building 608, adjacent to storm sewer
SWMU 17/Building 1429 Plume									
603D71MW	2440486.099	6956535.891	4/4/1998	2	9.2	5	4.2	9.2	upgradient to side gradient of Building 608
61201MW	2440340.709	6956371.044	10/15/1995	2	24	10	14	24	upgradient of Building 608
SWMU 21 Plume									
608D132MW	2441164.676	6956849.388	3/29/2005	2	19.7	10	9.7	19.7	side gradient to downgradient of Building 608
608D161MW	2441240.756	6957106.313	6/17/2011	2	27.5	10	17.5	27.5	downgradient of Building 608
608D33MW	2441051.882	6956957.134	4/2/1998	2	19.6	10	9.6	19.6	downgradient of Building 608, adjacent and down gradient of storm sewer
SWMU 79/136 Central Plume									
508F51MW	2441926.533	6956047.468	9/15/2004	2	21.3	10	11.3	21.3	side gradient of Building 608

Notes:

TOC	=T	Top of Casing
bgs	=	below ground surface
SWMU	=	Solid Waste Management Unit
Background	=	Background Well
—	=	Not applicable or no data.

5.0 FIELD INVESTIGATION

This section discusses field activities conducted during the Phase I November-December 2016 PFAS groundwater investigation event including special precautions taken, monitoring well redevelopment, groundwater sampling, and analysis.

Work described in this Groundwater Investigation Memorandum was conducted in accordance with the approved SAP (Resolution Consultants 2016). Field activities adhered to Resolution Consultants general safety and health program requirements and the approved *Accident Prevention Plan*, which includes the Resolution Consultants *Site Safety and Health Plan* (Resolution Consultants October 2015).

Sampling activities were recorded in field logbooks or groundwater sampling records; a copy of these records is in Appendix B of this report.

5.1 Special Precautions

Special precautions were taken to minimize cross-contamination during sample collection. These measures included restrictions for materials, clothing, and supplies; hand washing; elimination of Teflon and low density polyethylene materials in the sampling process; and use of high-density polyethylene (HDPE) materials such as HDPE ground protection sheeting and HDPE spray bottles used with stainless steel buckets in the decontamination process. In addition, field personnel used well laundered work uniforms and 100% natural sunblock and insect repellant.

Teflon materials, such as Teflon O-rings associated with flush-threaded joints used in typical temporary well construction, were eliminated from well installation materials. Compatibly-threaded Teflon-free joints were used instead.

5.2 Decontamination

Groundwater sampling activities were conducted in accordance with Resolution Consultants decontamination procedures and additional decontamination procedures outlined in the approved SAP. HDPE and silicon tubing utilized during sampling was decontaminated prior to placement in the well to minimize cross-contamination associated with plastic wrapping and packaging. Both lab grade and store bought deionized water were used for the rinse cycle. Tubing ends were placed within the stainless steel bucket containing a mixture of deionized water and Liquinox detergent. The pump was turned on and circulated wash water for 2 to 3 minutes to clean the interior of the tubes. The exterior of the tubing was also rinsed. A second bucket of deionized water was used for the rinse cycle. Lab supplied water was utilized for a final rinse and wash. Decontamination fluid was

then properly containerized, and new decontamination mixtures were utilized for each decontamination process thereafter.

Temporary well installation activities were conducted in accordance with Resolution Consultants additional decontamination procedures outlined in the approved SAP. Decontamination of temporary monitoring well construction material included high-power, hot-water pressure washing of well construction supplies, a secondary rinse with store bought deionized water and Liquinox, and a final rinse with laboratory grade deionized water.

5.3 Monitoring Well Development

Existing monitoring wells listed in the SAP did not require redevelopment prior to being sampled because dedicated sampling equipment had been removed at least 30 days prior to PFAS groundwater sample collection. Temporary monitoring wells were developed after installation following SAP specific guidelines and SOPs. Groundwater recharge was minimal at temporary well FSS6TMW; therefore, only limited development of this well was possible.

Only the newly identified monitoring wells 30807MW and 30809MW required additional redevelopment to eliminate the potential for cross-contamination from PFAS from previous sampling equipment. All sampling equipment was removed from the monitoring wells and was containerized for disposal. Down-hole tubing for peristaltic equipment was decontaminated prior to use and well development was carried out in accordance with Resolution Consultants SOPs. Development water was containerized in 55-gallon drums and managed as investigation derived waste. Monitoring wells were allowed to recover for 24 hours prior to initiating purging and sampling techniques. Appendix B contains well development field records.

5.4 Groundwater Sampling Approach

Resolution Consultants collected groundwater level measurements and sampled groundwater from the specified monitoring wells. Groundwater samples were collected on 29 November-8 December 2016. Field sampling forms are provided in Appendix B. Low-flow sampling techniques were utilized in accordance with U.S. EPA guidelines and Resolution Consultants SOPs. Groundwater recharge was limited at temporary well FSS6TMW; therefore, a grab groundwater sample was collected from this location at the completion of development using a peristaltic pump.

Where groundwater recharge was sufficient, each well was sampled using a Pegasus Alexis peristaltic pump and decontaminated HDPE and silicone tubing. Water level readings were collected using a Solinst Model 101 water level meter, which had limited contact with the water surface in order to

avoid cross contamination. Field parameter readings were collected at 3- to 5-minute intervals while purging wells. Field parameters, including specific conductance, pH, temperature, dissolved oxygen, and oxidation-reduction potential were measured during purging using an YSI-556 Series multi-parameter water quality meter fitted with a flow through cell. Turbidity was measured with a Hach 2100 turbidity meter. Table 3 summarizes the results of field-measured parameters.

Upon stabilization of field parameters, groundwater samples were collected in laboratory-provided sample containers consisting of two-125 milliliter HDPE containers. Quality control samples included MS/MSDs, field blanks, equipment rinsate blanks of groundwater sampling equipment, temperature blanks, and field duplicates. Samples were placed on ice, packaged, and shipped to the off-site laboratory. Sample shipments to the designated laboratory contained appropriate chain-of-custody forms.

Table 3
Groundwater Field Parameter Measurements, November - December 2016

Well ID	Date Sampled	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	pH (su)	Turbidity (NTU)	Field Observations	
								Color	Odor
Former Firefighting Training Area Sample Locations									
FFTA2TMW	12/8/2016	14.0	0.740	1.1	-25.7	7.5	62	silty/murky	none
FFTA4TMW	12/8/2016	14.1	0.734	7.4	74	7.6	10	silty/murky	none
30807MW	12/7/2016	19.5	3.290	0.9	-30.9	6.9	2	clear	strong sulfur odor
30809MW	12/7/2016	16.2	4.892	2.7	220	6.8	2	clear	none
308A51MW	12/7/2016	17.7	3.455	1.9	182.7	6.8	1	clear	none
AFFF Fire Suppression System Sample Locations									
FSS2TMW	12/8/2016	17.7	0.846	1.7	-256.1	7.2	20	murky/cloudy	none
FSS3TMW	12/7/2016	21.5	0.105	1.2	-241	7.0	4	clear	none
FSS4TMW	12/6/2016	20.9	1.007	0.8	-201	6.1	5	clear	none
FSS5TMW	12/6/2016	23.9	1.039	1.9	-268.3	6.9	17	clear	none
FSS6TMW	12/8/2016	9.1	8.731	6.9	26.8	7.3	47	silty/murky	none
606D150MW	11/28/2016	23.3	4.349	0.5	48.3	6.7	1	clear	none
40001MW	11/28/2016	21.8	9.395	0.7	70.4	6.7	2	clear	none
40003MW	11/28/2016	22.8	8.516	0.8	177	6.7	3	clear	none
61301MW	11/28/2016	25.3	1.572	5.2	168.1	7.4	1	clear	none
613D39MW	11/28/2016	24.4	1.327	1.4	154.5	6.8	4	clear	none
613D41MW	11/28/2016	25.6	1.060	1.7	145.4	6.9	1	clear	none
603D71MW	11/28/2016	23.7	2.485	3.6	186.7	7.0	1	clear	none
61201MW	11/28/2016	25.5	0.377	0.3	128	7.4	5	clear	none
608D132MW	11/28/2016	21.6	1.924	2.7	91	6.8	1	clear	none
608D161MW	11/29/2016	24.7	2.058	0.6	110	6.9	1	clear	none
608D33MW	11/28/2016	22.9	0.760	2.9	45	10.6	3	clear	none
508F51MW	11/28/2016	25.3	8.664	0.6	24.3	6.7	3	clear	none

Notes:

°C	=	Degrees Celsius
mS/cm	=	milli-siemens per centimeter
mg/L	=	milligrams per liter
mV	=	millivolts
su	=	standard units
NTU	=	nephelometric turbidity units

5.5 Investigation-Derived Waste

Investigation-derived waste generated from the field activities included three 55-gallon drums of decontamination water and groundwater purged from wells during development, and one 55-gallon drum of soil cuttings from the temporary well installations. The drums were properly labeled and staged prior to pick up. Stericycle Environmental Solutions picked up the drums on 5 January 2017. Final disposal documentation is presented in Appendix C.

6.0 DATA EVALUATION

This section presents the results of the November-December 2016 PFAS groundwater investigation sampling event.

6.1 Groundwater Elevation Data

Static water levels were measured on 28-29 November 2016, from investigation-specific monitoring wells prior to groundwater sampling activities. Additional water level measurements were collected from existing monitoring wells to provide general site-wide groundwater flow data. Depths to water were measured to the nearest 0.01 foot from the top of casing, and are tabulated in Table 4.

Static water level measurements were converted to elevations in feet and contoured to construct the potentiometric surface map for the AFFF FSS area. Only those data points having top of casing elevations were used to contour the potentiometric surface. Top of casing elevation data was not identified for the three monitoring wells in the FFTA, and data were not used to evaluate groundwater flow. No potentiometric surface map was constructed for the FFTA due to the limited water elevation data set. Instead, historical potentiometric surface maps from past reports were referenced to provide groundwater flow directions.

As shown on Figure 3, and consistent with historical observations made in the AFFF FSS area, groundwater flow is from the northwest corner of the facility toward upgradient monitoring wells 61201MW and 600D84MW. The potentiometric surface has a radial component to the southwest/south/southeast toward surface water bodies, in addition to flowing to the northeast and east towards monitoring wells 608D33MW and 608D144MW. Northeast and east groundwater flow in the area of the AFFF FSS is generally oriented to a small surface water drainage which exits the facility on the eastern property boundary south of FSS6TMW and approximately 50 ft north of Building 702.

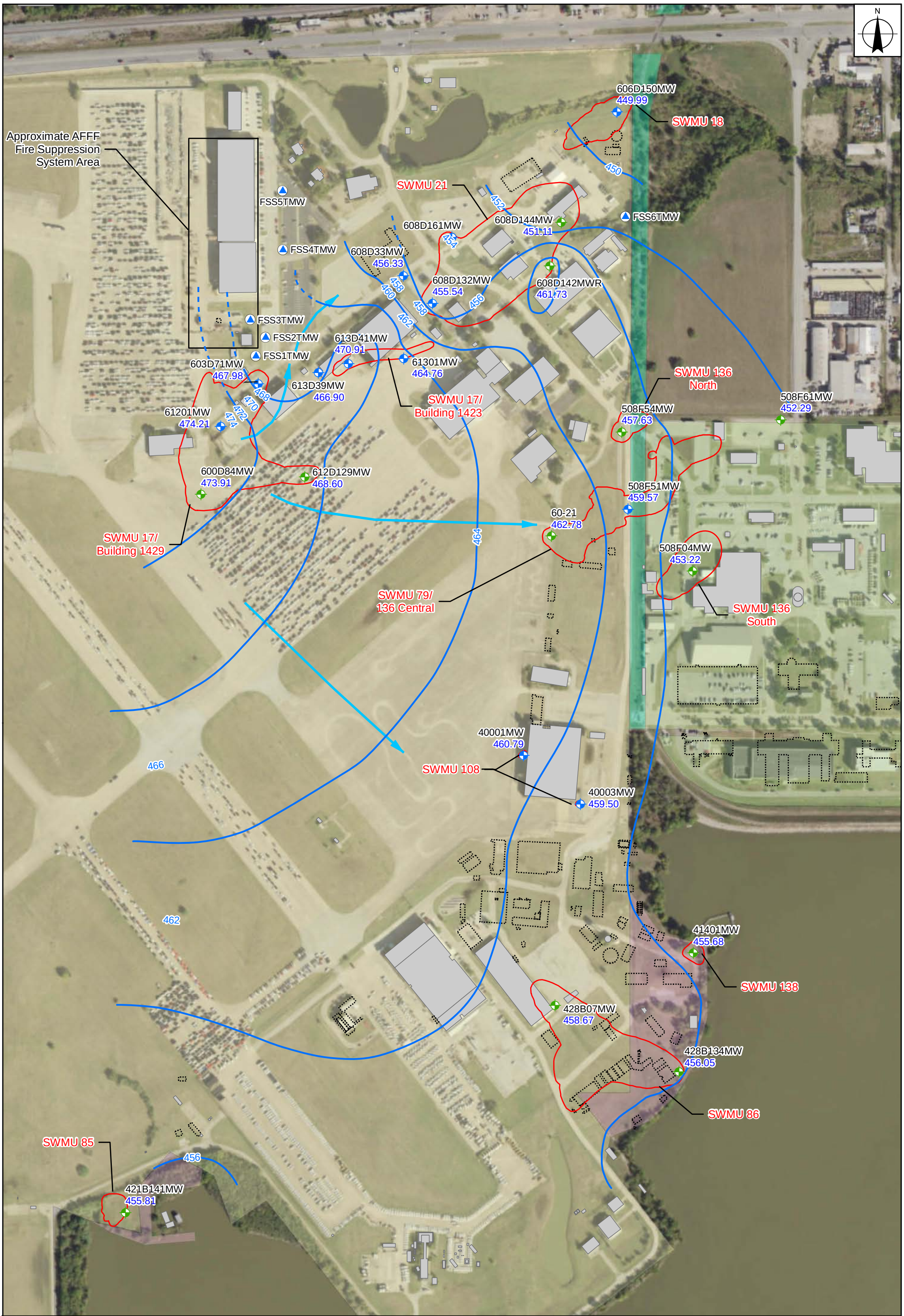
As previously mentioned in Section 1.2 of this report, historical data for the FFTA indicates the presence of a groundwater mound which induces radial flow towards surface water bodies to the north (Cottonwood Bay), west (diversion channel), and east (Mountain Creek Lake).

Table 4
Groundwater Measurements and Elevations

Well ID	TOC Elevation (ft msl)	November 2016	
		Depth to Water From TOC (ft)	Groundwater Elevation (ft msl)
Former Firefighting Training Area Sample Locations			
FFTA2TMW	—	5.84	—
FFTA4TMW	—	9.7	—
30807MW	—	6.85	—
30809MW	—	13.31	—
308A51MW	—	13.68	—
AFFF Fire Suppression System Sample Locations			
FSS2TMW	—	5.2	—
FSS3TMW	—	13.99	—
FSS4TMW	—	13.21	—
FSS5TMW	—	16.81	—
FSS6TMW	—	20.53	—
606D150MW	459.52	9.53	449.99
40001MW	465.84	5.05	460.79
40003MW	465.8	6.3	459.5
61301MW	474.18	9.42	464.76
613D39MW	475.74	8.84	466.9
613D41MW	475.92	5.01	470.91
600D84MW	476.99	3.08	473.91
603D71MW	473.42	5.44	467.98
61201MW	478.03	3.82	474.21
612D129MW	475.84	7.24	468.6
608D132MW	466.07	10.53	455.54
608D33MW	463.82	7.49	456.33
608D142MWR	465.1	3.37	461.73
608D144MW	456.91	5.8	451.11
508F51MW	466.55	6.98	459.57
508F61MW	457.44	5.15	452.29
60-21	472.42	9.64	462.78
508F54MW	464.73	7.1	457.63
508F04MW	464.54	11.32	453.22
421B141MW	463.7	7.89	455.81
428B07MW	464.39	5.72	458.67
428B134MW	461.39	5.34	456.05
41401MW	460.11	4.43	455.68

Notes:

TOC = Top of casing
Ft = Feet
ft msl = Feet above mean sea level
bgs = below ground surface



Temporary Well Locations
Monitoring Well
Monitoring Well - Water Level Only
Groundwater Flow Direction
Potentiometric Surface Contour (Dashed Where Inferred)
Gross PCLE Zone Outline
Demolished Building

Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

0 350 700 Feet

FIGURE 3
POTENTIOMETRIC SURFACE MAP
FORMER FIRE SUPPRESSION SYSTEM AREA
NOVEMBER 2016

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER: JM78

X:\Navy\NAS_Dallas\SWMU_PotMap_2.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

6.2 Laboratory Analysis and Validation

Groundwater samples were analyzed for the target list of 16 PFAS outlined in Table 1 following a modified U.S. EPA Method 537/OP 058.1, MS 014.1. U.S EPA Method 537 is a drinking water method modified for environmental groundwater samples and *DoD Quality Systems Manual for Environmental Laboratories*, Version 5, (DoD 2013) quality control guidelines. Laboratory analysis was performed by TestAmerica Laboratories, Inc. of West Sacramento, California, which is a DoD Environmental Laboratory Accreditation Program and State of Texas accredited laboratory.

Laboratory data were reported and reviewed in accordance with the TCEQ guidance document Review and Reporting of chemical of concern (COC) Concentration Data under TRRP, RG-366/TRRP-13 (TCEQ 2010). Based on a review of the data quality documentation provided by the laboratory, the overall quality of the data relative to the COCs was acceptable and met method-specific requirements. Exceptions found in the data quality are noted in the data usability summary provided in Appendix D. Analytical data for groundwater samples are also included in Appendix D. Table 5 summarizes the Phase I Groundwater Investigation PFAS analytical results.

Table 5
Groundwater Analytical Results, Phase I PFAS Groundwater Investigation, Former NAS Dallas, Dallas, Texas.

Sample Location	Sample ID	Sample Date	Analyte	PERFLUOROBUTANESULFONIC ID (PFBS)	PERFLUOROBUTANOIC ID (PFBA)	PERFLUORODECANESULFONIC ID (PFDCS)	PERFLUORODECANOIC ID (PFDA)	PERFLUORODODECANOIC ID (PFDOA)	PERFLUOROHEPTANOIC ID (PFHPA)	PERFLUOROHEXANESULFONIC ID (PFHXS)	PERFLUOROHEXANOIC ID (PFHXA)	PERFLUORONONANOIC ID (PFNA)	PERFLUOROOCTANE SULFONAMIDE (PFOSA)	PERFLUOROOCTANE SULFONIC ID (PFOS)	PERFLUOROOCTANOIC ID (PFOA)	PFOS + PFOA	PERFLUOROPENTANOIC ID (PFPA)	PERFLUOROTETRADECANOIC ID (PFTEDA)	PERFLUOROTRIDECANOIC ID (PFTRA)	PERFLUOROUNDECANOIC ID (PFUNA)
			CAS No.	375-73-5	375-22-4	335-77-3	335-76-2	307-55-1	375-85-9	355-46-4	307-24-4	375-95-1	754-91-6	1763-23-1	335-67-1	—	2706-90-3	376-06-7	72629-94-8	2058-94-8
			Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
30807MW	SWMU1-01-1216	12/07/2016	FFTA	0.00092 J	0.02	0.0012 U	0.00043 U	0.00058 U	0.00079 U	0.0034	0.0057	0.00064 U	0.00063 UR	0.0013 U	0.0028	0.003	0.0039	0.0011 J	0.00054 U	0.00074 U
30809MW	SWMU1-02-1216	12/07/2016	FFTA	0.01	0.016	0.0064	0.00072 J	0.00052 U	0.00081 J	0.033	0.012	0.00058 U	0.018 JL	1.2	0.0047	1.205	0.0049	0.00044 J	0.00049 U	0.00067 U
308A51MW	308A51MW-LF-1216	12/07/2016	FFTA	4.3	5.3	0.0011 U	0.0027	0.00054 U	4.3	17	11	0.13	0.0021 JL	11	2.6	13.6	9.1	0.00047 J	0.00051 U	0.00069 U
FFTA2TMW	FFTA2TMW-1216	12/08/2016	FFTA	0.26	0.31	0.0013 U	0.017	0.0006 U	0.74 J	0.018 U	0.016 U	0.029	0.088 JL	0.026 U	0.015 U	U	1 J	0.00041 U	0.00057 U	0.00077 U
FFTA4TMW	FFTA4TMW-1216	12/08/2016	FFTA	2	0.43	0.0012 U	0.00042 U	0.00056 U	1.2	15	7.6	0.0055	0.00061 UR	0.068	23	23.07	1.4	0.00038 U	0.00053 U	0.00072 U
FFTA4TMW	FFTA4TMW-1216-D	12/08/2016	FFTA	2.1	0.44	0.0012 U	0.00042 U	0.00056 U	1.2	15	8.1	0.005	0.00061 UR	0.064	23	23.06	1.4	0.00038 U	0.00053 U	0.00072 U
40001MW	40001MW-LF-1216	12/01/2016	FSS	0.00087 UJ	0.00043 U	0.0011 U	0.00041 U	0.00055 U	0.00076 U	0.00091 J	0.00074 U	0.00062 U	0.0006 U	0.0017 J	0.00071 U	0.002	0.00093 U	0.00038 U	0.00052 U	0.00071 U
40003MW	40003MW-LF-1216	12/01/2016	FSS	0.0016 J	0.01	0.0012 U	0.00043 U	0.00057 U	0.0017 J	0.00085 U	0.0048	0.00064 U	0.00062 UJL	0.0017 J	0.0047	0.006	0.01	0.00039 U	0.00054 U	0.00073 U
508F51MW	508F51MW-LF-1116	11/29/2016	FSS	0.021 JL	0.034 JL	0.0011 UJL	0.00068 JL	0.00052 UJL	0.01 JL	0.06 JL	0.058 JL	0.00058 UJL	0.00057 U	0.036 JL	0.034 JL	0.07	0.039 JL	0.00036 UJL	0.00049 UJL	0.00067 UJL
608D132MW	608D132MW-LF-1116	11/30/2016	FSS	1.5	0.52 JH	0.0011 U	0.00042 U	0.00055 U	0.32	3.7 JH	2.1 JH	0.00064 J	0.0006 UJL	1.4 JH	0.55 JH	1.95	0.76 JH	0.00038 U	0.00052 U	0.00071 U
603D71MW	603D71MW-LF-1216	12/01/2016	FSS	2.2	0.97 JH	0.0011 U	0.0011 J	0.00054 U	0.63 JH	8.1 JH	3.3 JH	0.027	0.00076 JL	13 JH	1.3 JH	14.3	1.9 JH	0.00037 U	0.00051 U	0.00069 U
606D150MW	606D150MW-LF-1116	11/29/2016	FSS	0.055	0.043	0.0011 U	0.00041 U	0.00055 U	0.022	0.19	0.1	0.0018 J	0.0006 UJL	0.052	0.058	0.11	0.054	0.00037 U	0.00052 U	0.0007 U
608D161MW	608D161MW-LF-1116	11/29/2016	FSS	3.4	1.1	0.0011 U	0.0039	0.00053 U	0.88	18	4.9	0.054 JL	0.002 J	52 J	1.8	53.8	1.8	0.00037 U	0.0005 U	0.00068 U
61301MW	61301MW-LF-1116	11/30/2016	FSS	0.014	0.17	0.0011 U	0.0016 J	0.00055 U	0.11	0.071	0.15	0.008	0.0006 UR	0.061	0.1	0.161	0.18	0.00038 U	0.00052 U	0.0007 U
608D33MW	608D33MW-LF-1116	11/30/2016	FSS	0.73	0.29	0.0039	0.0022 J	0.00056 U	0.21	5.4	0.94 JH	0.017	0.043 JL	21	0.38	21.38	0.47 JH	0.00038 U	0.00053 U	0.00072 U
613D39MW	613D39MW-LF-1116	11/30/2016	FSS	0.0062	0.0028	0.0011 U	0.0004 U	0.00053 U	0.00072 U	0.022	0.00071 U	0.00059 U	0.00057 UJL	0.026	0.0013 J	0.027	0.00089 U	0.00036 U	0.0005 U	0.00067 U
61201MW	61201MW-LF-1216	12/01/2016	FSS	0.0051	0.009	0.0011 U	0.00062 J	0.00053 U	0.003	0.012	0.0068	0.0025	0.00058 UJL	0.073	0.022	0.095	0.0058	0.00036 U	0.0005 U	0.00068 U
613D41MW	613D41MW-LF-1116	11/30/2016	FSS	0.0053	0.012	0.0011 U	0.00063 J	0.00055 U	0.0036	0.032	0.0074	0.00092 J	0.0006 UJL	0.07	0.035	0.105	0.0063	0.00038 U	0.00052 U	0.0007 U
FSS2TMW	FSS2TMW-1216	12/08/2016	FSS	26	18	0.24 U	0.046	0.00058 U	6.4	240	50	0.61	0.76	680	23	703	21	0.0004 U	0.00054 U	0.0049
FSS3TMW	FSS3TMW-1216	12/07/2016	FSS	19	8.6	0.22 U	0.067	0.00052 U	4	61	38	0.19 JL	0.63	300	13	313	12	0.00036 U	0.00049 U	0.0021 J
FSS4TMW	FSS4TMW-1216	12/06/2016	FSS	7.2	5	0.11	0.026	0.00052 U	6.1	59 JH	28	0.18 JL	0.012	1200	47	1247	12	0.00036 U	0.00049 U	0.00066 U
FSS5TMW	FSS5TMW-1216	12/06/2016	FSS	0.22	0.22	0.0011 U	0.0026	0.00051 U	0.17	0.63	0.53	0.01	0.00056 UR	0.95	0.2	1.15	0.3	0.00035 U	0.00048 U	0.00065 U
FSS6TMW	FSS6TMW-1216	12/08/2016	FSS	4.3	2.1	0.0012 U	0.0014 J	0.0006 U	4.4	29	10	0.13	0.0057 JL	6.5	4.1	10.6	5.5	0.00041 U	0.00056 U	0.00076 U
Number of Detects				22	22	3	15	0	20	21	20	17	10	21	21	22	21	3	0	2
Number analysis				23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Minimum Detect				0.0051	0.0028	0.0039	0.0026	0.0000	0.0030	0.0034	0.0048	0.0025	0.0120	0.0260	0.0028	0.0017	0.0039	0.0000	0.0000	0.0049
Maximum Detect				26	18	0.11	0.067	0	6.4	240	50	0.61	0.76	1200	47	1247	21	0	0	0.0049
U.S. EPA Health Advisory (HA), March 2016				—	—	—	—	—	—	—	—	—	—	0.07	0.07	0.07	—	—	—	—
U.S. EPA Regional Screening level, hazard quotient=1, May 2016				380	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$^{GW}GW_{ING}$ PCL Class 1/Class 2				34	71	0.29	0.37	0.29	0.56	0.093	0.093	0.29	0.29	0.56	0.29	---	0.093	0.29	0.29	0.29
FFT Area $^{GW}GW_{Class\ 3}$ PCLs				3400	7100	29	37	29	56	9.3	9.3	29	29	56	29		9.3	29	29	29

Notes:

CAS No.	=	Chemical Abstract Service Number
µg/L	=	Micrograms per liter
FFTA	=	Firefighting training area
U	=	Undetected; the value represents the method detection limit
R	=	Value was rejected because a quality control parameter was grossly exceeded.
J	=	Estimated concentration
JL	=	Estimated concentration, potentially biased low
JH	=	Estimated concentration, potentially biased high
Bold	=	detected value
	=	Value exceeds the $^{GW}GW_{ING}$ Protective Concentration Level or the Value exceeds both the Health Advisory and $^{GW}GW_{ING}$ Protective Concentration Level
FSS	=	Fire suppression system
HA	=	U.S. EPA Health Advisory, March 2016
$^{GW}GW_{ING}$ PCL	=	Texas Risk Reduction Program - Tier 1 Groundwater Ingestion (Class 2) Protective Concentration Level for Residential Land Use Scenario, March 2016

6.3 Groundwater Analytical Summary

Detections for PFAS in groundwater samples were compared to the analytical method's limit of detection to evaluate presence or absence. PFAS were detected in samples collected from all 22 groundwater sample locations, and 14 of the 16 PFAS were detected in groundwater samples, including:

Perfluorobutanesulfonic Acid (PFBS)	**Perfluorononanoic Acid (PFNA)**
Perfluorobutyric Acid (PFBA)	**Perfluorooctane Sulfonamide (PFOSA)**
Perfluorodecanesulfonic Acid (PFDCS)	**Perfluorooctane Sulfonic Acid (PFOS)**
Perfluorodecanoic Acid (PFDA)	**Perfluorooctanoic Acid (PFOA)**
Perfluoroheptanoic Acid (PFHPA)	**Perfluoropentanoic Acid (PFPA)**
Perfluorohexanesulfonic Acid (PFHXS)	Perfluorotetradecanoic (PFTEDA)
Perfluorohexanoic Acid (PFHXA)	Perfluoroundecanoic (PFUNA)

Note:
Bold = detected above groundwater protection standard

The most frequent detections for PFAS occurred in source area shallow GWBU groundwater monitoring wells. Specifically, AFFF FSS area source area monitoring wells FSS2TMW, FSS3TMW, FSS4TMW, FSS5TMW, upgradient monitoring well 61201MW, sidegradient monitoring well 61301MW, and downgradient monitoring well FSS6TMW had detections of 10 to 13 PFAS with the highest number of PFAS detected in monitoring well FSS2TMW (13) (Figure 4). Some intermediate and downgradient monitoring wells (613D41MW, 608D33MW, 608D161MW, and 606D150MW) also had frequent detections for PFAS (9). Frequent detections for PFAS in FFTA source area monitoring wells 308A51MW (located in SWMU 6P) and FFTA4TMW (located in SWMU 7P) had detections of 11 and 10 PFAS, respectively (Figure 5).

Of the PFAS detected, eight were detected at concentrations exceeding either the U.S. EPA 2016 HA or TRRP Tier 1 $^{GW}GW_{Ing}$ PCLs, herein referenced as the groundwater protection standard (GWPS), and include PFOS, PFOA, PFHPA, PFHXS; PFHXA; PFNA; PFOSA; and PFPA. Figure 4 and Figure 5 show the distribution and COCs in groundwater based on results from the 2016 groundwater sampling event for the FSS area and the FFTA, respectively

The following summarizes analytical findings in relation to PSQs.

PSQ1a:

- Detections of PFOS occurred at concentrations above the established U.S. EPA HA value of 0.07 µg/L in 12 of 22 samples.

- Detections of PFOA occurred at concentrations above the established U.S. EPA HA value of 0.07 µg/L in 12 of 22 samples.
- Detections for the combined PFOS + PFOA occurred at concentrations above the established U.S. EPA Combined HA value of 0.07 µg/L in 16 of 22 samples.

PSQ1B:

- PFBS is present in the shallow GWBU near the FFTAs and the AFFF FSS at concentrations above an analytical method's limit of detection.
- PFBS concentrations did not exceed the U.S. EPA Tapwater RSL.

PSQ1:

- Twelve of the other 13 select PFAS identified in TRRP are present in the shallow GWBU. Other PFAS detections include: Perfluorobutanesulfonic (PFBS), Perfluorobutanoic (PFBA), Perfluorodecanesulfonic (PFDCS), Perfluorodecanoic (PFDA), Perfluoroheptanoic (PFHPA), Perfluorohexanesulfonic (PFHXS), Perfluorohexanoic (PFHXA), Perfluorononanoic (PFNA), Perfluorooctane Sulfonamide (PFOSA), Perfluoropentanoic (PFPA), Perfluorotetradecanoic (PFTEDA), and Perfluoroundecanoic (PFUNA).
- PFHPA, PFHXS, PFHXA, PFNA, PFOSA, and PFPA concentrations exceeded GWPS.

PSQ2a:

- PFOS, PFOA, or PFBS are present in the shallow GWBU at concentrations exceeding the U.S. EPA values and require additional delineation, documentation, and action to evaluate potential risk to drinking water sources.

6.4 Nature and Extent of Chemicals of Concern in Groundwater

The following summary of nature and extent of COCs in groundwater focuses on PFOS and PFOA. Figure 4 and Figure 5 show detected concentrations of PFAS in groundwater compared to GWPS for the AFFF FSS area and the FFTA, respectively. Figures 6 through Figure 8 show the nature and extent for PFOS and PFOA in the AFFF FSS area. Figures 9 through Figure 11 show the nature and extent of PFOS and PFOA for the FFTA. The remainder of detected PFAS occurring at concentrations above laboratory detection limits are not discussed in further detail because detections for PFOS and PFOA

are generally representative of other exceedances. The nature and extent of other detected PFAS are represented in Figures 12 through Figure 19.

Perfluorooctane Sulfonic Acid

PFOS was detected in 20 of the 22 groundwater samples, with concentrations ranging from 0.0017 µg/L to 1,200 µg/L; 12 samples had concentrations exceed the U.S. EPA HA of 0.07 µg/L. In the AFFF FSS area, PFOS concentrations exceeding the GWPS were highest in the temporary wells located adjacent and downgradient of the suppression system. The sample from temporary well FSS4TMW had the maximum observed detection for PFOS of 1,200 µg/L, a concentration representative of AFFF product. In the FTTA, two shallow groundwater monitoring wells 3089MW and 308A51MW had concentrations of PFOS exceeded the HA of 0.07 µg/L. The nature and extent of PFOS is shown in Figure 6 (AFFF FSS area) and Figure 9 (FFTA).

The aerial extent of GWPS exceedances within the shallow GWBU is estimated, as there are currently no data to bound PFOS concentrations downgradient, sidegradient, and upgradient of both plumes. No attempts were made to estimate the distribution of these groundwater plumes.

Perfluorooctanoic Acid

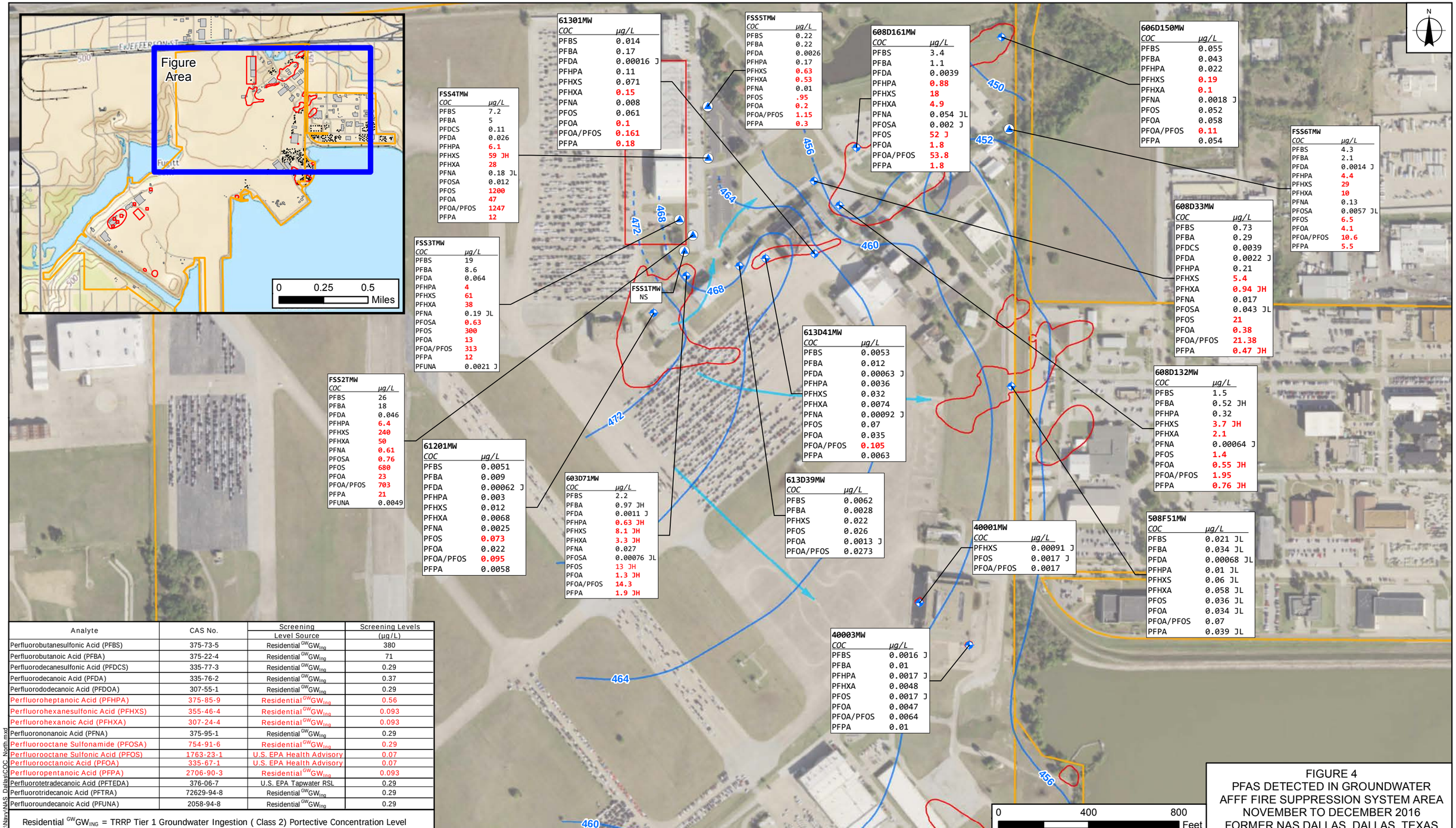
PFOA was detected in 20 of the 22 groundwater samples, with concentrations ranging from 0.0012 µg/L to 47 µg/L; 12 samples had concentrations exceed the U.S. EPA HA of 0.07 µg/L. In the FSS area, PFOA concentrations were highest in the temporary wells located adjacent and downgradient of the FSS buildings. In the FTTA, PFOA concentrations in existing well 308A51MW and temporary well FFTA4TMW exceeded the HA of 0.07 µg/L. The nature and extent of PFOA is shown in Figure 7 (AFFF FSS area) and Figure 10 (FFTA).

The aerial extent of exceedances of the GWPS within the shallow GWBU estimated, as there are currently no data to bound PFOA concentrations downgradient, sidegradient, and upgradient of both plumes. No attempts were made to estimate the distribution of these groundwater plumes.

The nature and extent for PFOS + PFOA is shown in Figure 8 (AFFF FSS area) and Figure 11 (FFTA).

Perfluorobutanesulfonic Acid

PFBS was detected in 21 of the 22 groundwater samples, with concentrations ranging from 0.00092 J µg/L to 26 µg/L. PFBS does not have a designated HA level; however, the U.S. EPA RSL for PFBS is 380 µg/L. PFBS did not exceed GWPS in any samples.



Analyte	CAS No.	Screening Level Source	Screening Levels (µg/L)
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	Residential $^{GW}GW_{ING}$	380
Perfluorobutanoic Acid (PFBA)	375-22-4	Residential $^{GW}GW_{ING}$	71
Perfluorodecanesulfonic Acid (PFDCS)	335-77-3	Residential $^{GW}GW_{ING}$	0.29
Perfluorodecanoic Acid (PFDA)	335-76-2	Residential $^{GW}GW_{ING}$	0.37
Perfluorododecanoic Acid (PFDOA)	307-55-1	Residential $^{GW}GW_{ING}$	0.29
Perfluoroheptanoic Acid (PFHPA)	375-85-9	Residential $^{GW}GW_{ING}$	0.56
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	Residential $^{GW}GW_{ING}$	0.093
Perfluorohexanoic Acid (PFHXA)	307-24-4	Residential $^{GW}GW_{ING}$	0.093
Perfluorononanoic Acid (PFNA)	375-95-1	Residential $^{GW}GW_{ING}$	0.29
Perfluorooctane Sulfonamide (PFOSA)	754-91-6	Residential $^{GW}GW_{ING}$	0.29
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	U.S. EPA Health Advisory	0.07
Perfluorooctanoic Acid (PFOA)	335-67-1	U.S. EPA Health Advisory	0.07
Perfluoropentanoic Acid (PFPA)	2706-90-3	Residential $^{GW}GW_{ING}$	0.093
Perfluorotetradecanoic Acid (PFTEDA)	376-06-7	U.S. EPA Tapwater RSL	0.29
Perfluorotridecanoic Acid (PFTRA)	72629-94-8	Residential $^{GW}GW_{ING}$	0.29
Perfluoroundecanoic Acid (PFUNA)	2058-94-8	Residential $^{GW}GW_{ING}$	0.29

Residential $^{GW}GW_{ING}$ = TRRP Tier 1 Groundwater Ingestion (Class 2) Portective Concentration Level

- Groundwater Monitoring Well
- Temporary Groundwater Monitoring Well
- Historical PCLE Zone Outline
- Groundwater Flow Direction (Nov. 2016)
- Potentiometric Surface Contour, Dashed Where Inferred (Nov. 2016)
- Installation Boundary

Notes:
- NS = Not Sampled (Dry)
- **RED** = Concentration Exceeds Screening Level
- PFOA/PFOS = PFOA + PFOS Combined HA
- J = Estimated Concentration
- JH = Estimated Concentration, Potentially Biased High
- JL = Estimated Concentration, Potentially Biased Low
- COC = Chemical Of Concern
- µg/L = micrograms per liter

FIGURE 4
PFAS DETECTED IN GROUNDWATER
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

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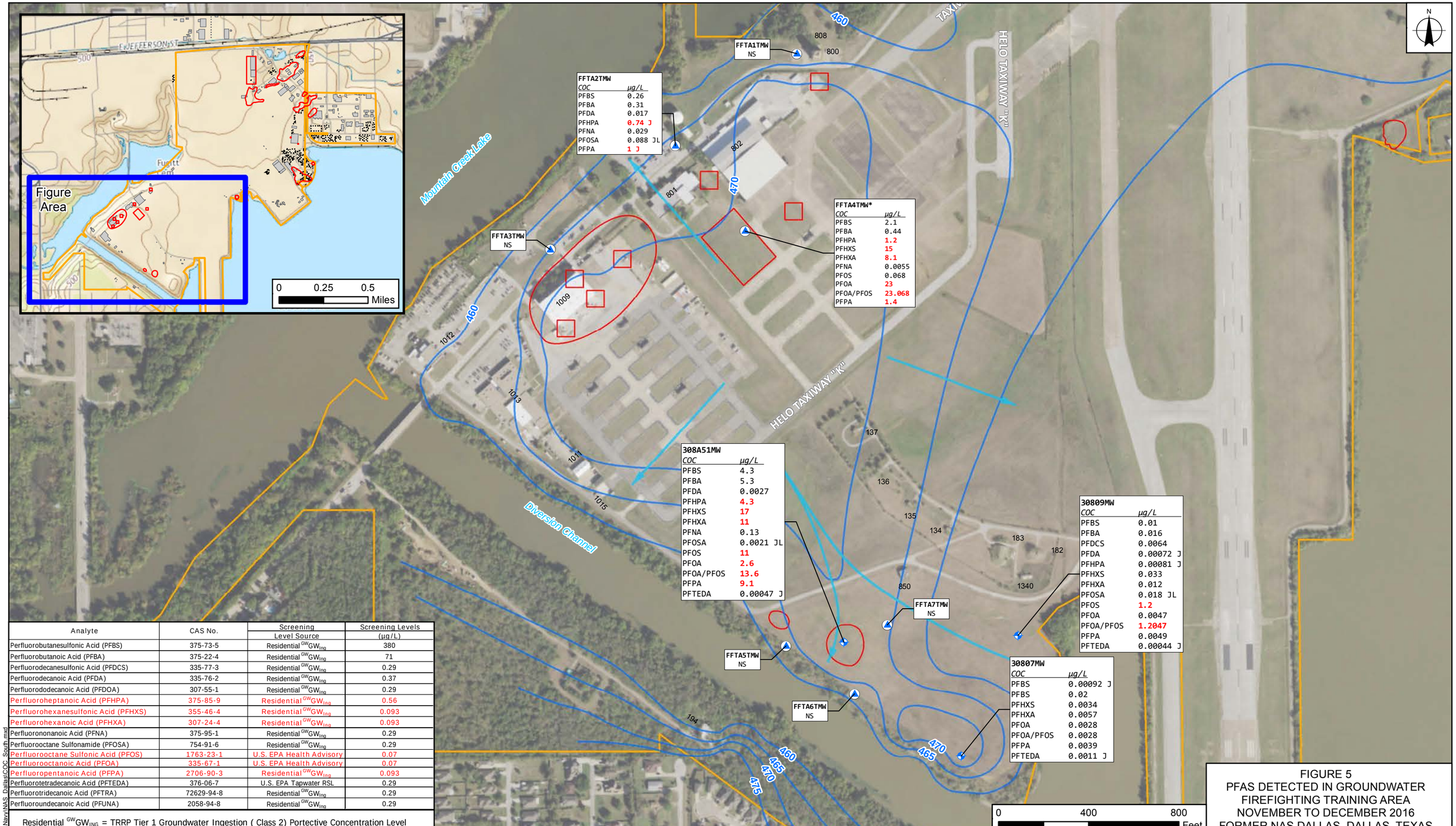

Analyte	CAS No.	Screening Level Source	Screening Levels (µg/L)
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	Residential $^{GW}GW_{ING}$	380
Perfluorobutanoic Acid (PFBA)	375-22-4	Residential $^{GW}GW_{ING}$	71
Perfluorodecanesulfonic Acid (PFDCS)	335-77-3	Residential $^{GW}GW_{ING}$	0.29
Perfluorodecanoic Acid (PFDA)	335-76-2	Residential $^{GW}GW_{ING}$	0.37
Perfluorododecanoic Acid (PFDOA)	307-55-1	Residential $^{GW}GW_{ING}$	0.29
Perfluoroheptanoic Acid (PFHPA)	375-85-9	Residential $^{GW}GW_{ING}$	0.56
Perfluorohexanesulfonic Acid (PFHXS)	355-46-4	Residential $^{GW}GW_{ING}$	0.093
Perfluorohexanoic Acid (PFHXA)	307-24-4	Residential $^{GW}GW_{ING}$	0.093
Perfluorononanoic Acid (PFNA)	375-95-1	Residential $^{GW}GW_{ING}$	0.29
Perfluorooctane Sulfonamide (PFOSA)	754-91-6	Residential $^{GW}GW_{ING}$	0.29
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1	U.S. EPA Health Advisory	0.07
Perfluorooctanoic Acid (PFOA)	335-67-1	U.S. EPA Health Advisory	0.07
Perfluoropentanoic Acid (PFPA)	2706-90-3	Residential $^{GW}GW_{ING}$	0.093
Perfluorotetradecanoic Acid (PFTEDA)	376-06-7	U.S. EPA Tapwater RSL	0.29
Perfluorotridecanoic Acid (PFTRA)	72629-94-8	Residential $^{GW}GW_{ING}$	0.29
Perfluoroundecanoic Acid (PFUNA)	2058-94-8	Residential $^{GW}GW_{ING}$	0.29

Residential $^{GW}GW_{ING}$ = TRRP Tier 1 Groundwater Ingestion (Class 2) Portective Concentration Level

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Groundwater Monitoring Well

Temporary Groundwater Monitoring Well

Historical PCLE Zone Outline

Past Groundwater Flow Direction**

Past Potentiometric Surface Contour**

Installation Boundary

Notes:

- NS = Not Sampled (Dry)
- * = Duplicate Sample
- ** = Drawn from Tetra Tech NUS, Inc. RCRA Facility Investigation Reports — Naval Air Station Dallas Category E, Figure 2-14, Potentiometric Groundwater Contour Map April 15, 1997.
- COC = Chemical Of Concern
- **RED** = Concentration Exceeds Screening Level
- PFOA/PFOS = PFOA + PFOS Combined HA
- J = Estimated Concentration
- JL = Estimated Concentration, Potentially Biased Low
- µg/L = micrograms per liter

FIGURE 5
PFAS DETECTED IN GROUNDWATER
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
FORMER NAS DALLAS, DALLAS, TEXAS

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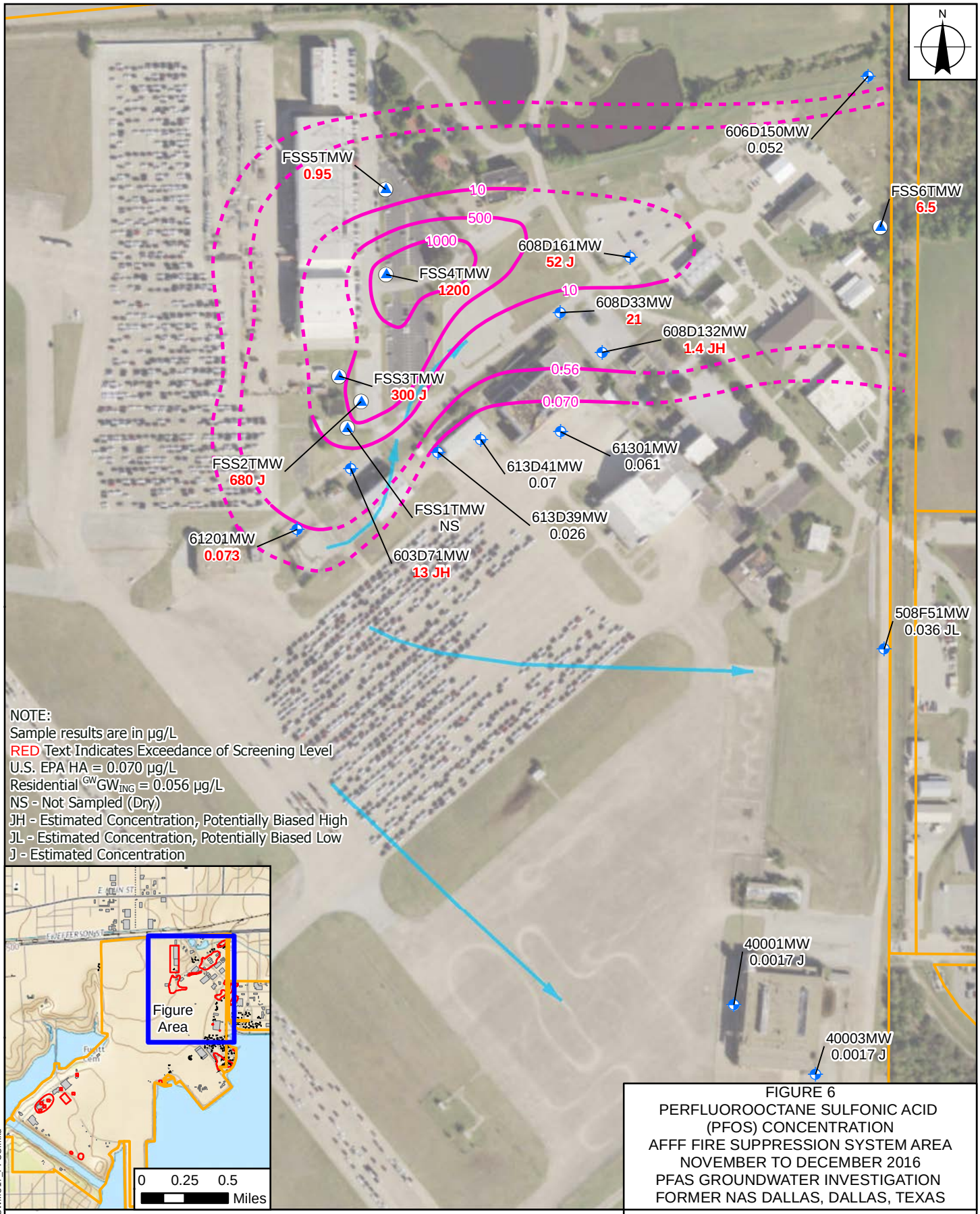

FIGURE 6
PERFLUOROOCTANE SULFONIC ACID (PFOS) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

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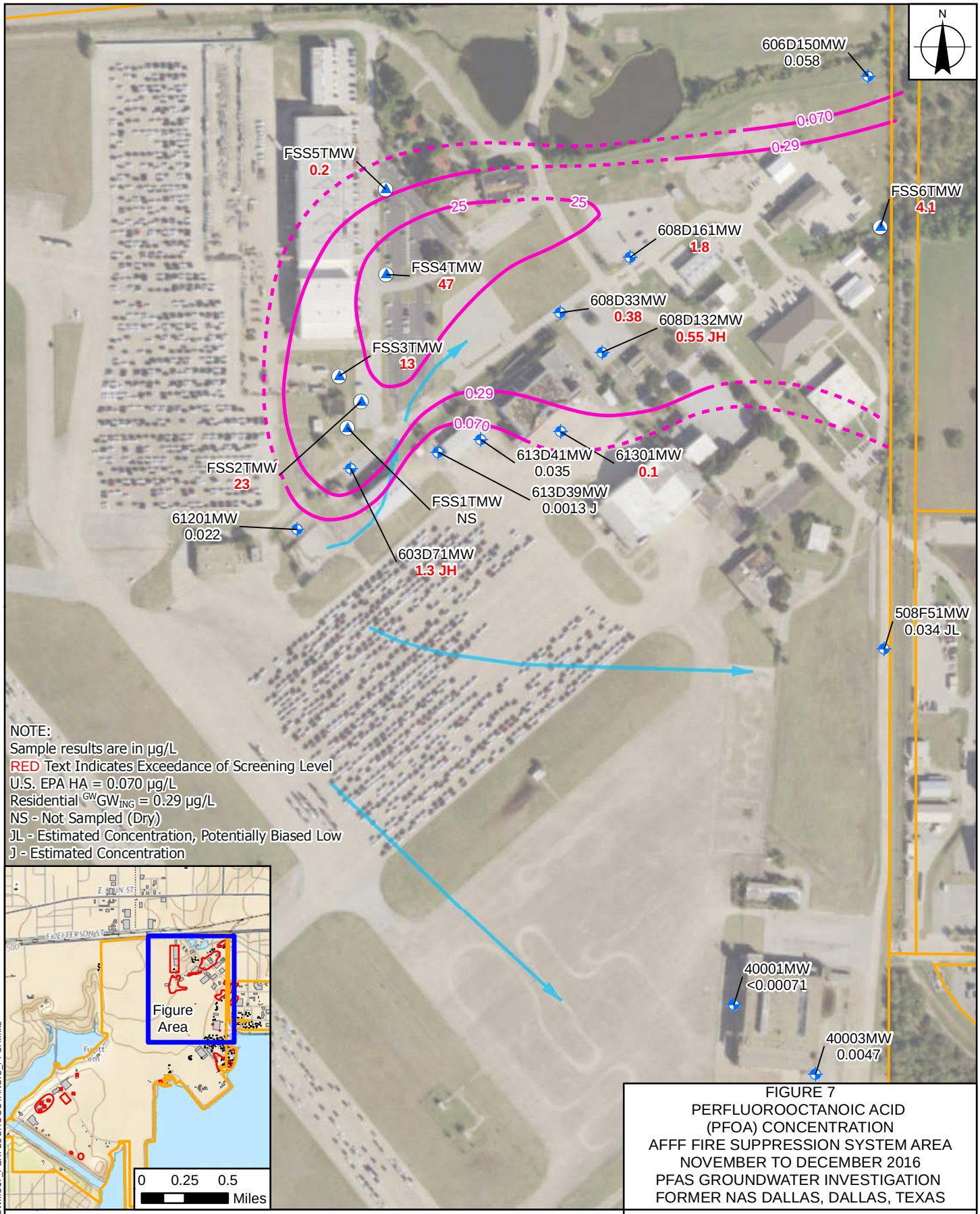

FIGURE 7
PERFLUOROOCTANOIC ACID
(PFOA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

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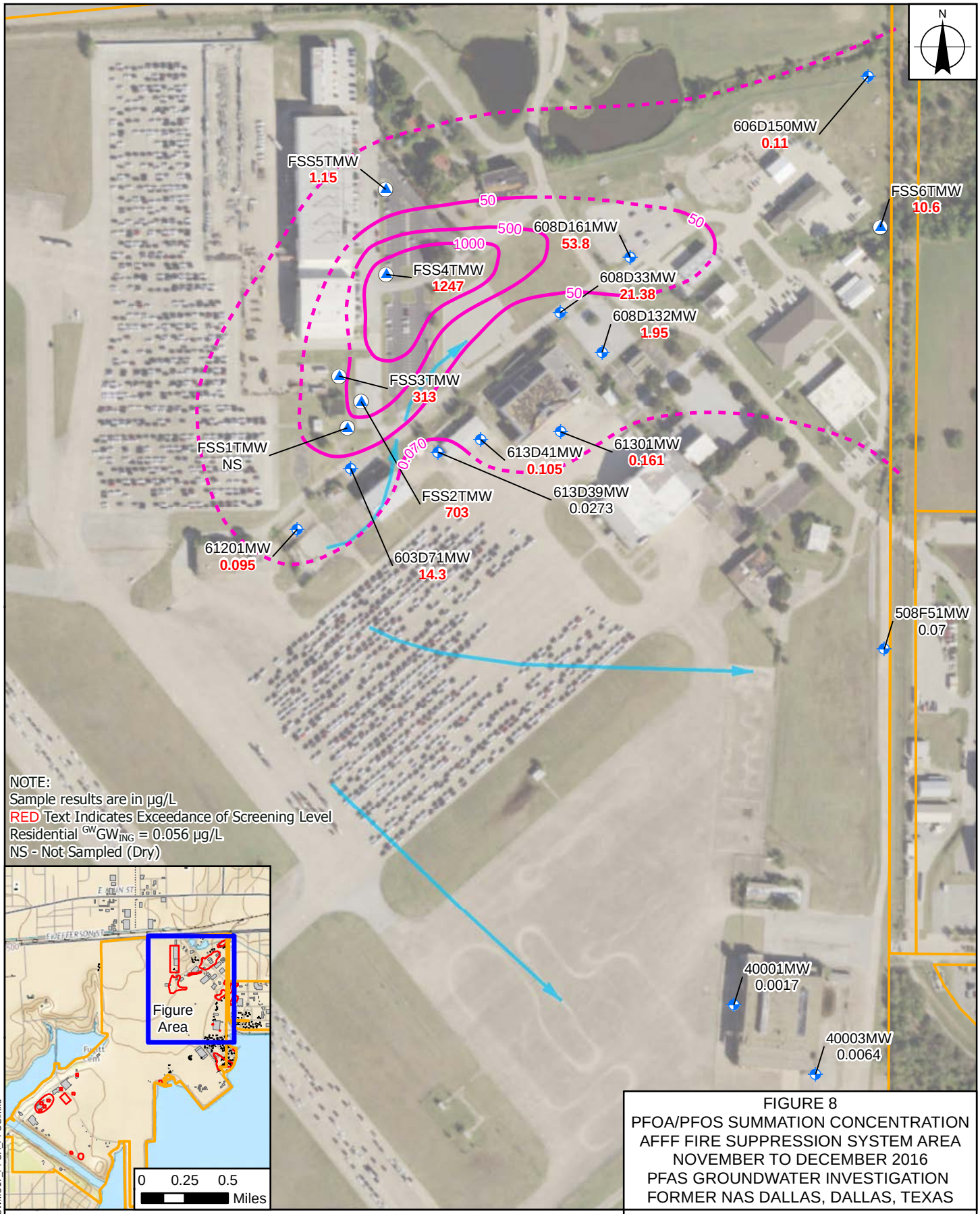

FIGURE 8
PFOA/PFOS SUMMATION CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

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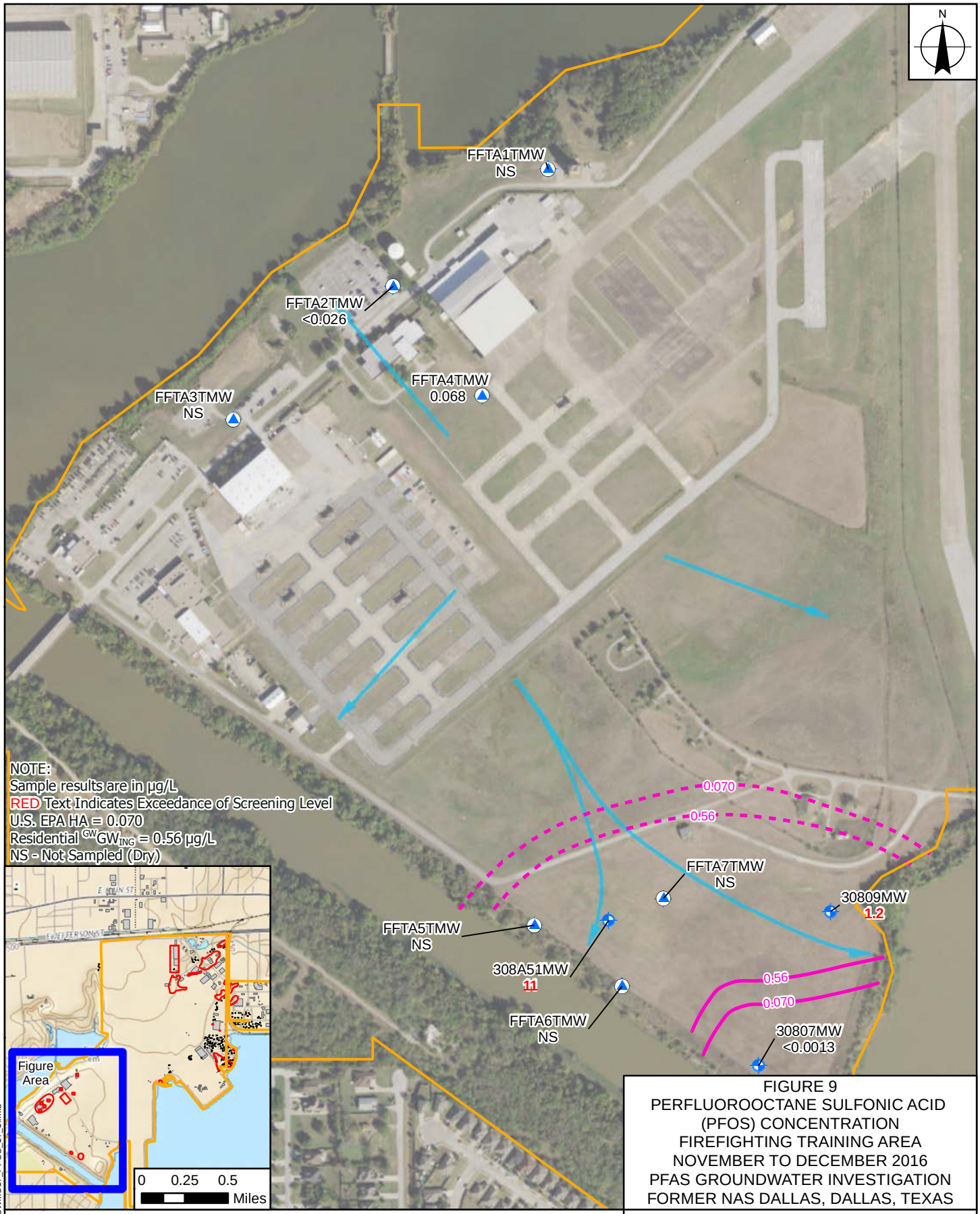

FIGURE 9
PERFLUOROOCTANE SULFONIC ACID (PFOS) CONCENTRATION
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

Groundwater Monitoring Well
Temporary Groundwater Monitoring Well
Installation Boundary
Isoconcentration Contour, Dashed Where Inferred
Groundwater Flow Direction
0 225 450 Feet

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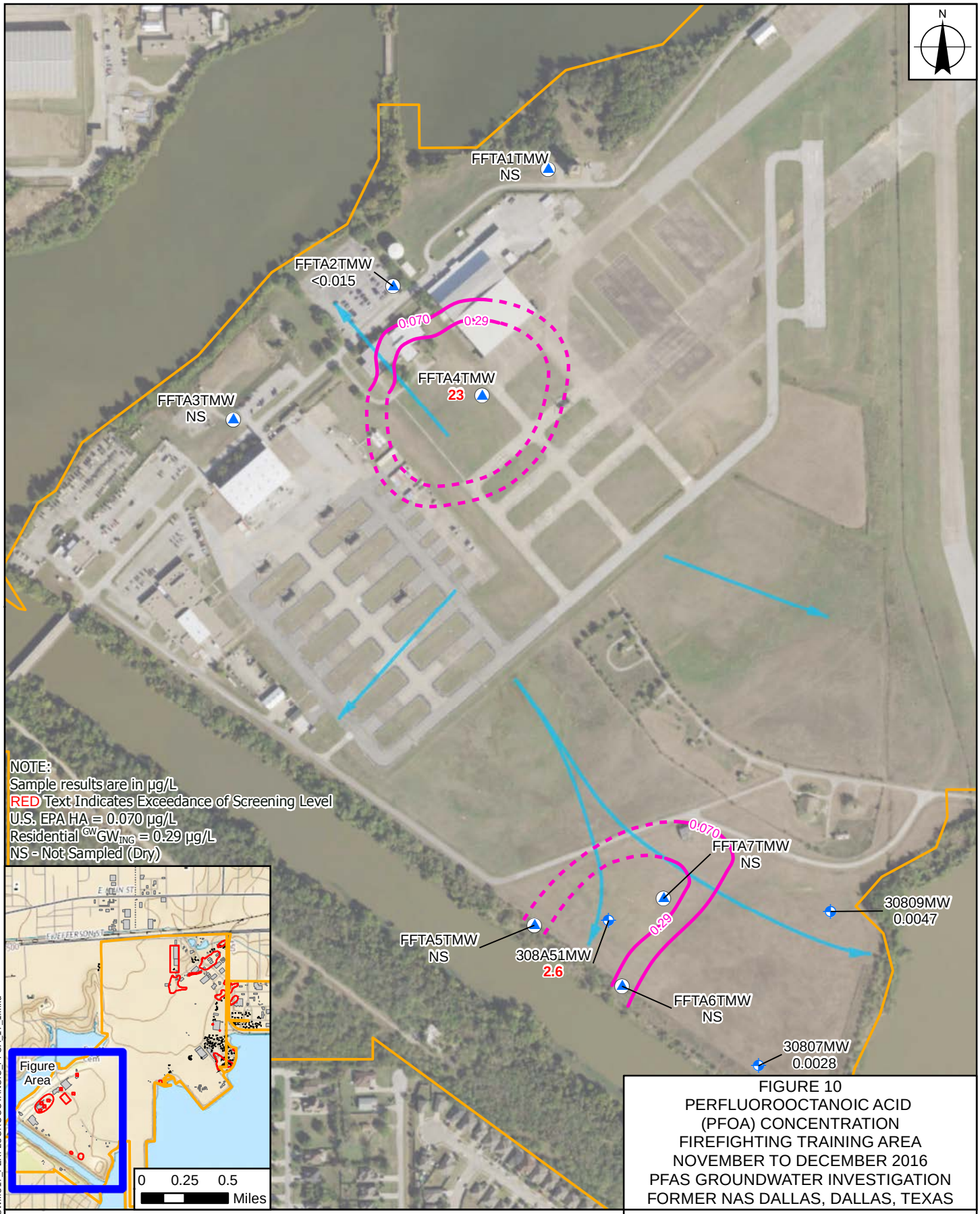

FIGURE 10
PERFLUOROOCTANOIC ACID
(PFOA) CONCENTRATION
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

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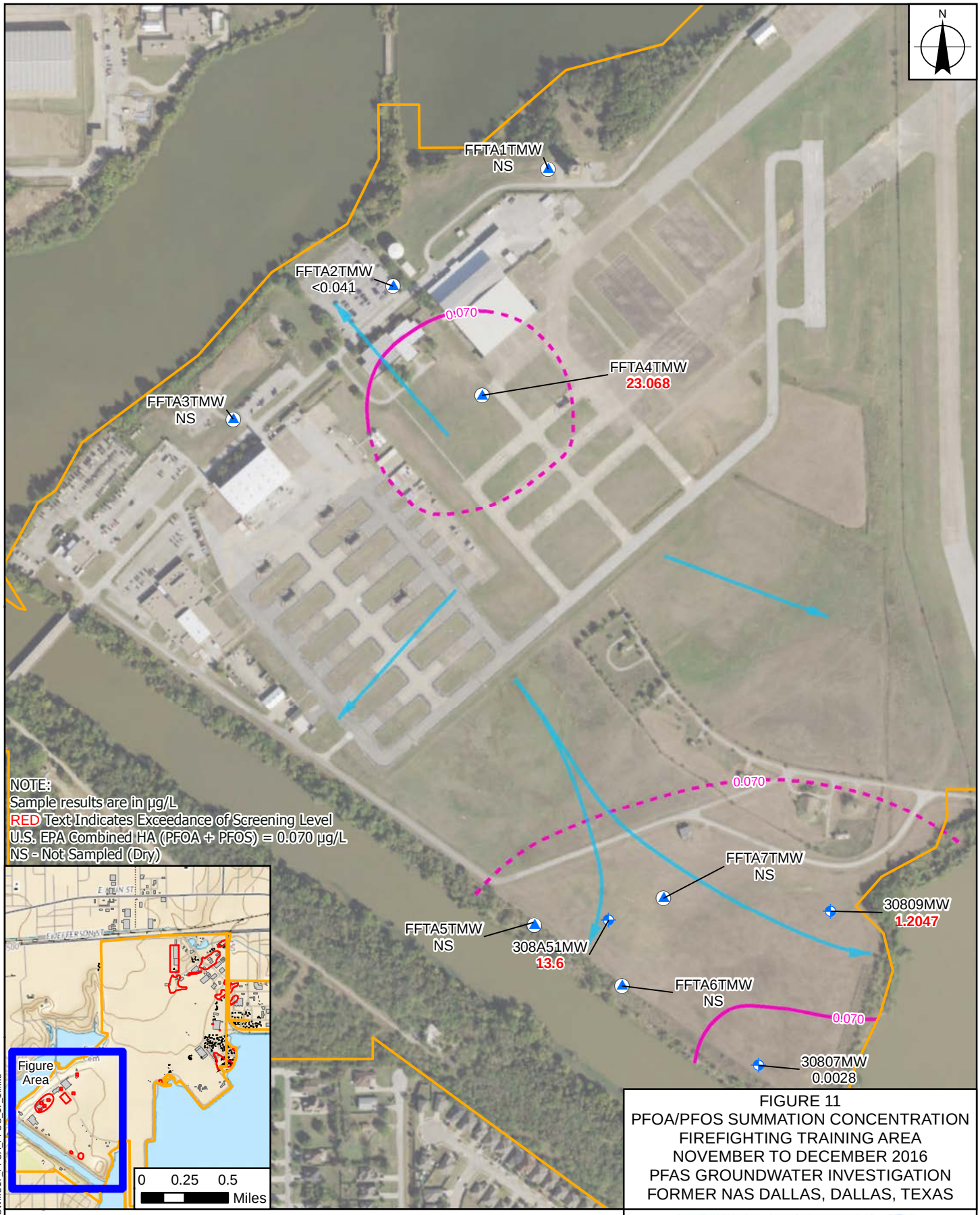

FIGURE 11
PFOA/PFOS SUMMATION CONCENTRATION
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

Groundwater Monitoring Well
Temporary Groundwater Monitoring Well
Installation Boundary
Isoconcentration Contour, Dashed Where Inferred
Groundwater Flow Direction
0 225 450
Feet

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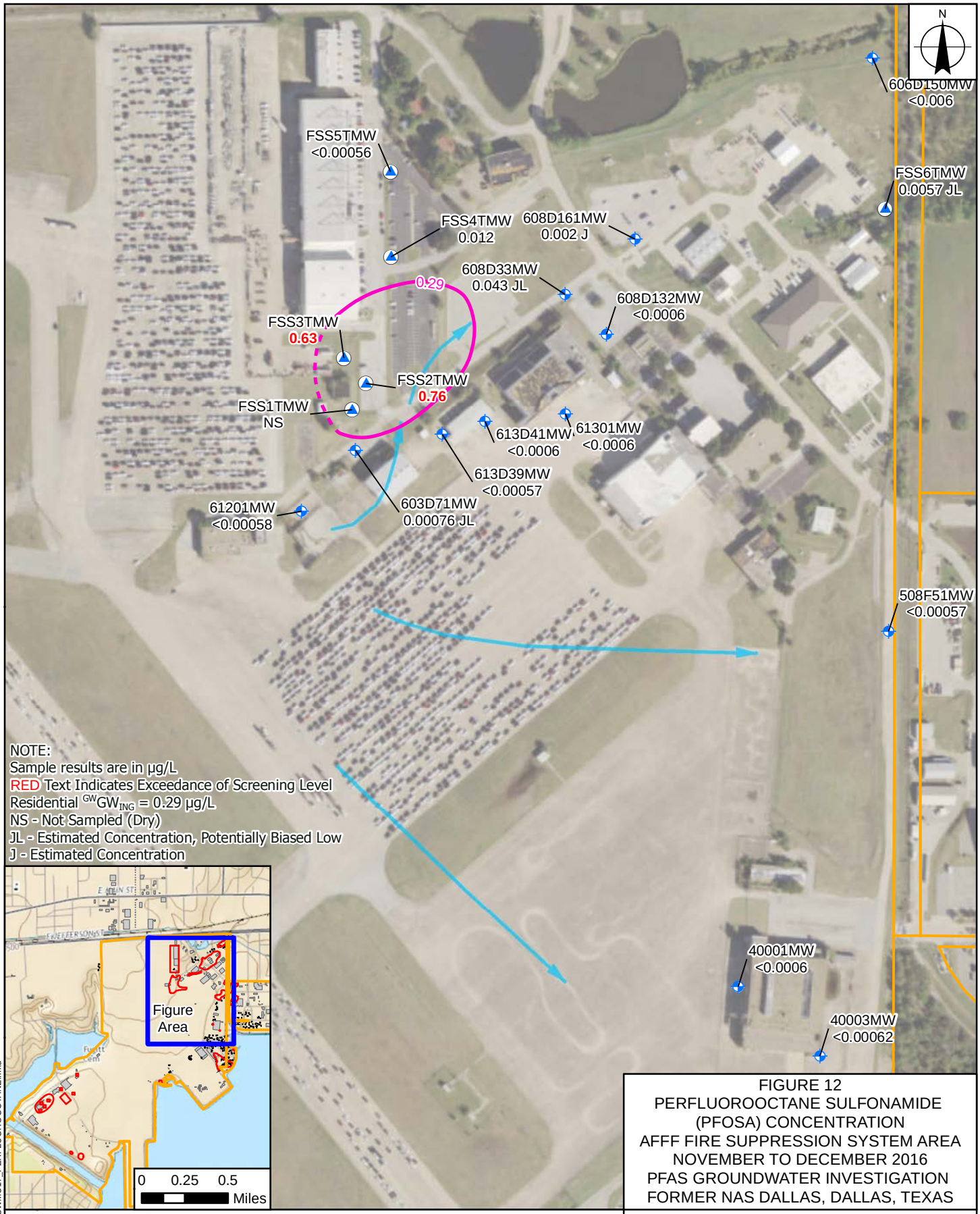

FIGURE 12
PERFLUOROOCTANE SULFONAMIDE (PFOSA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

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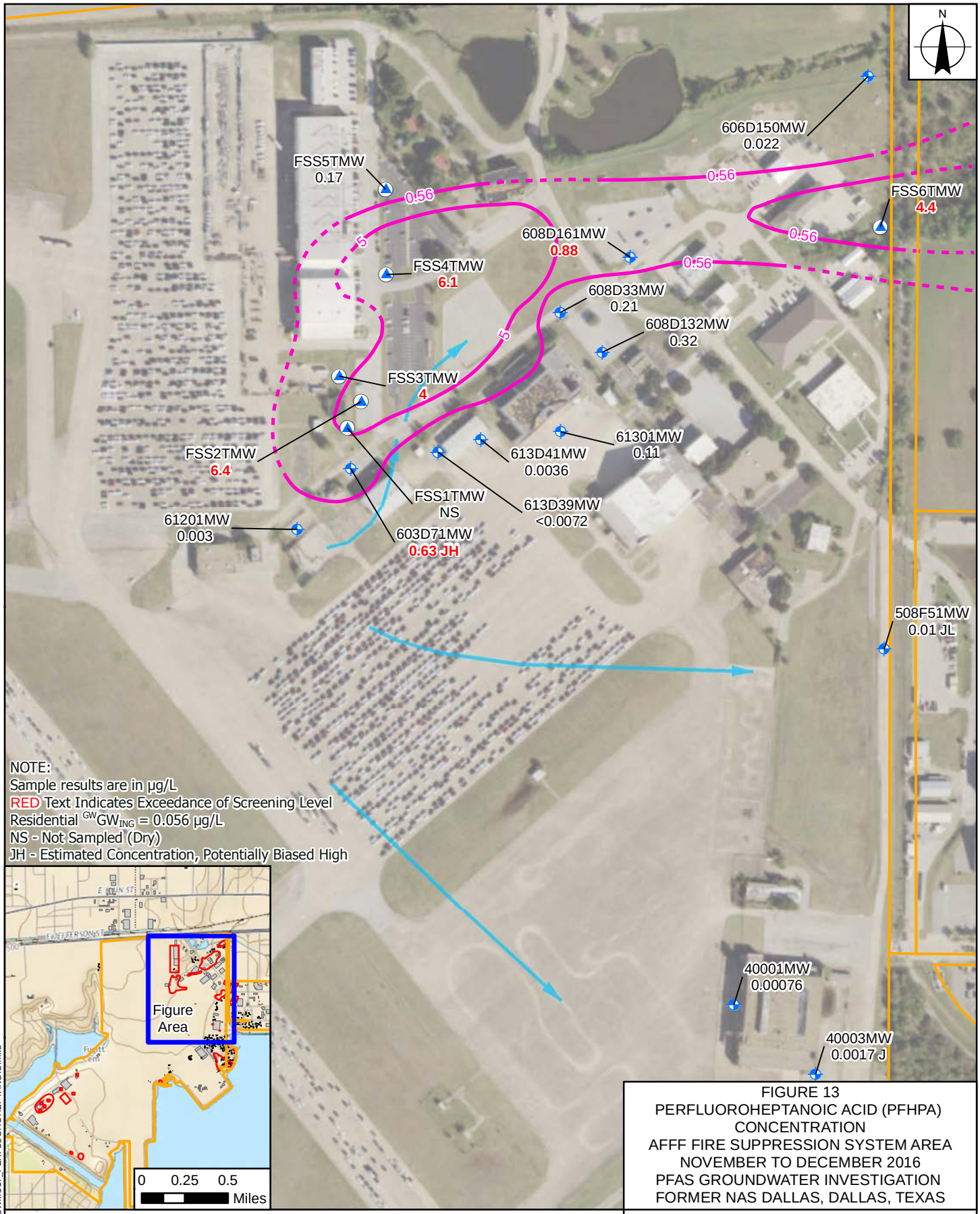

FIGURE 13
PERFLUOROHEPTANOIC ACID (PFHPA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

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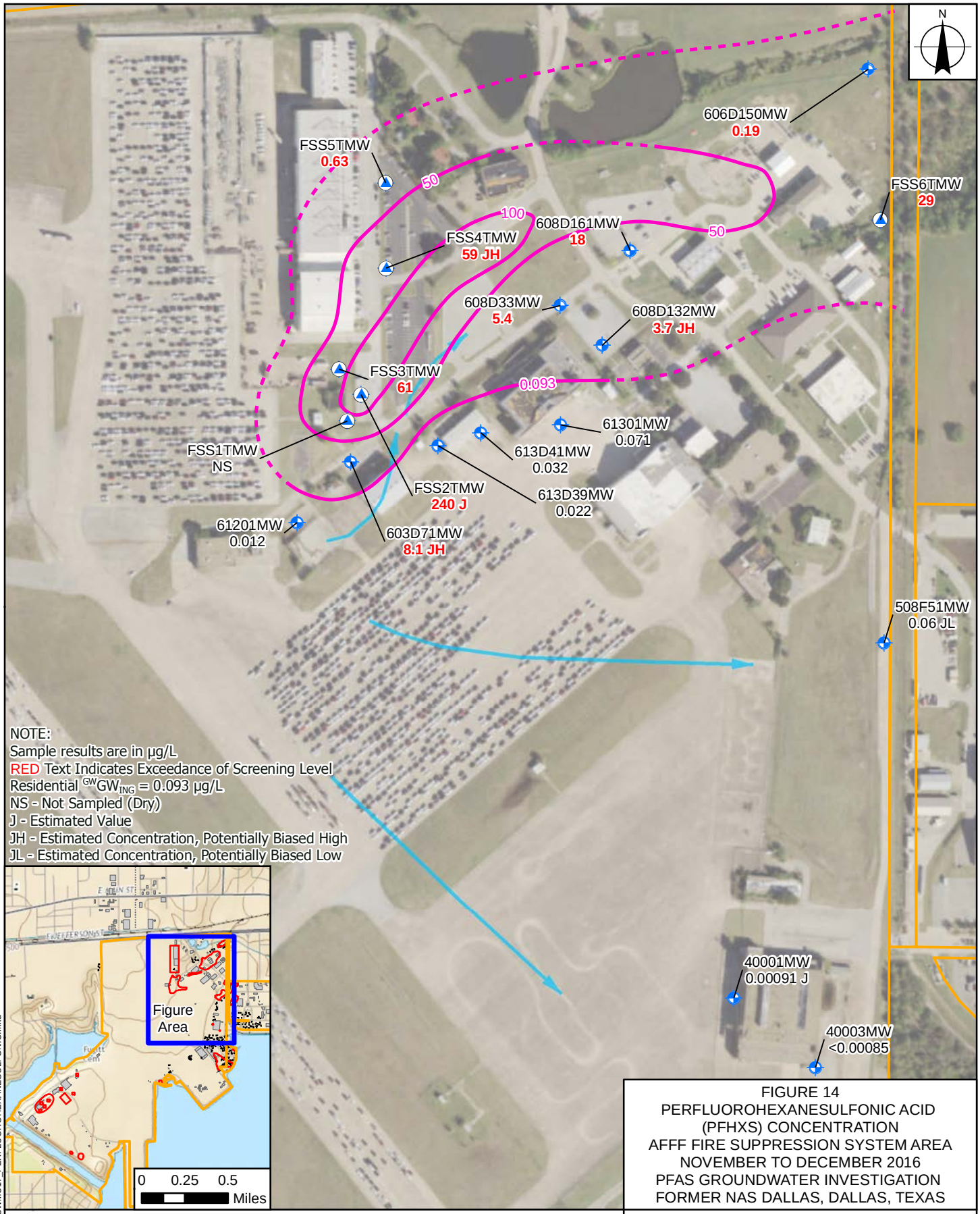

FIGURE 14
PERFLUOROHEXANESULFONIC ACID
(PFHXS) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
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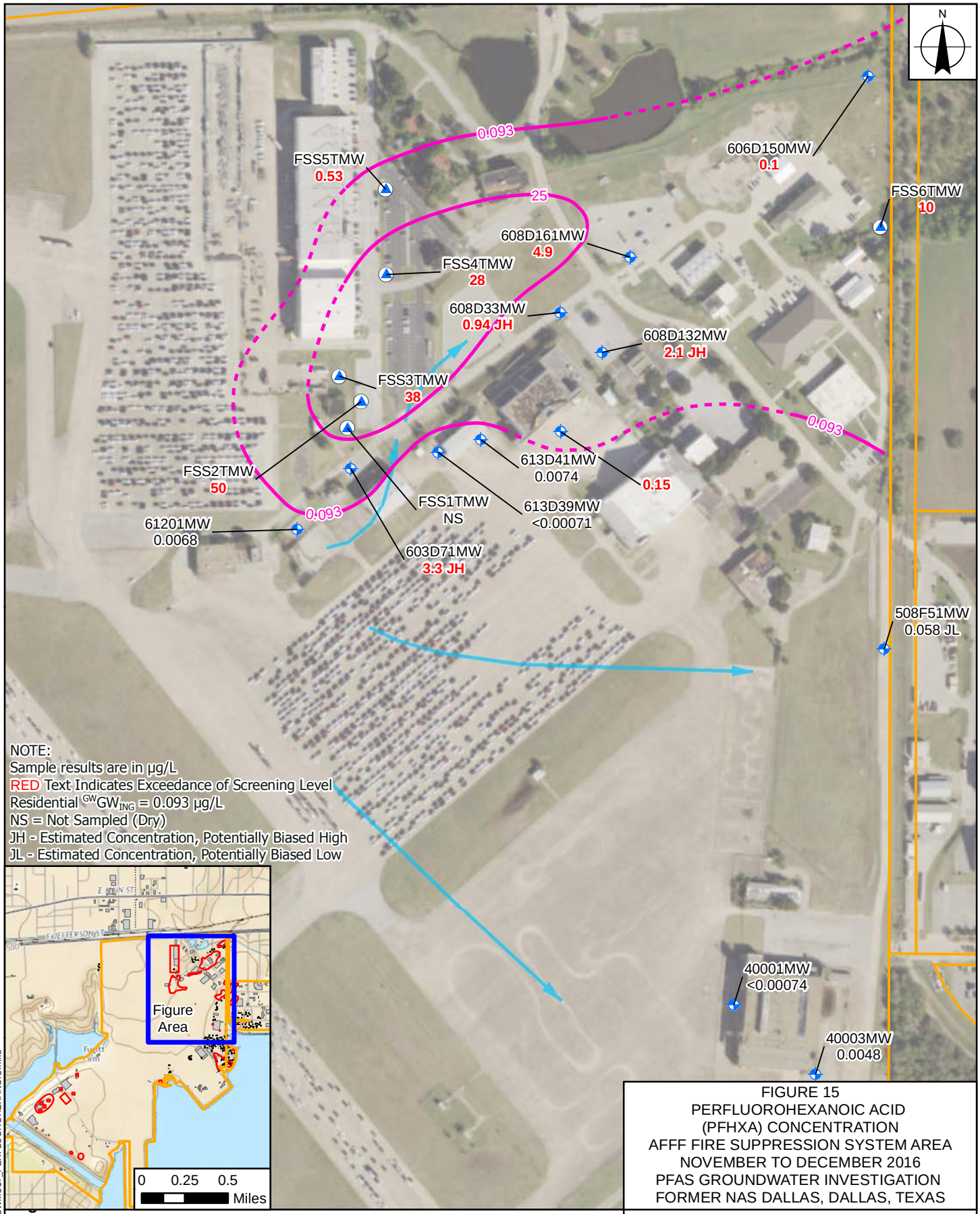

FIGURE 15
PERFLUOROHEXANOIC ACID
(PFHXA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, USGS The National Map: National Boundaries Dataset, National Elevation

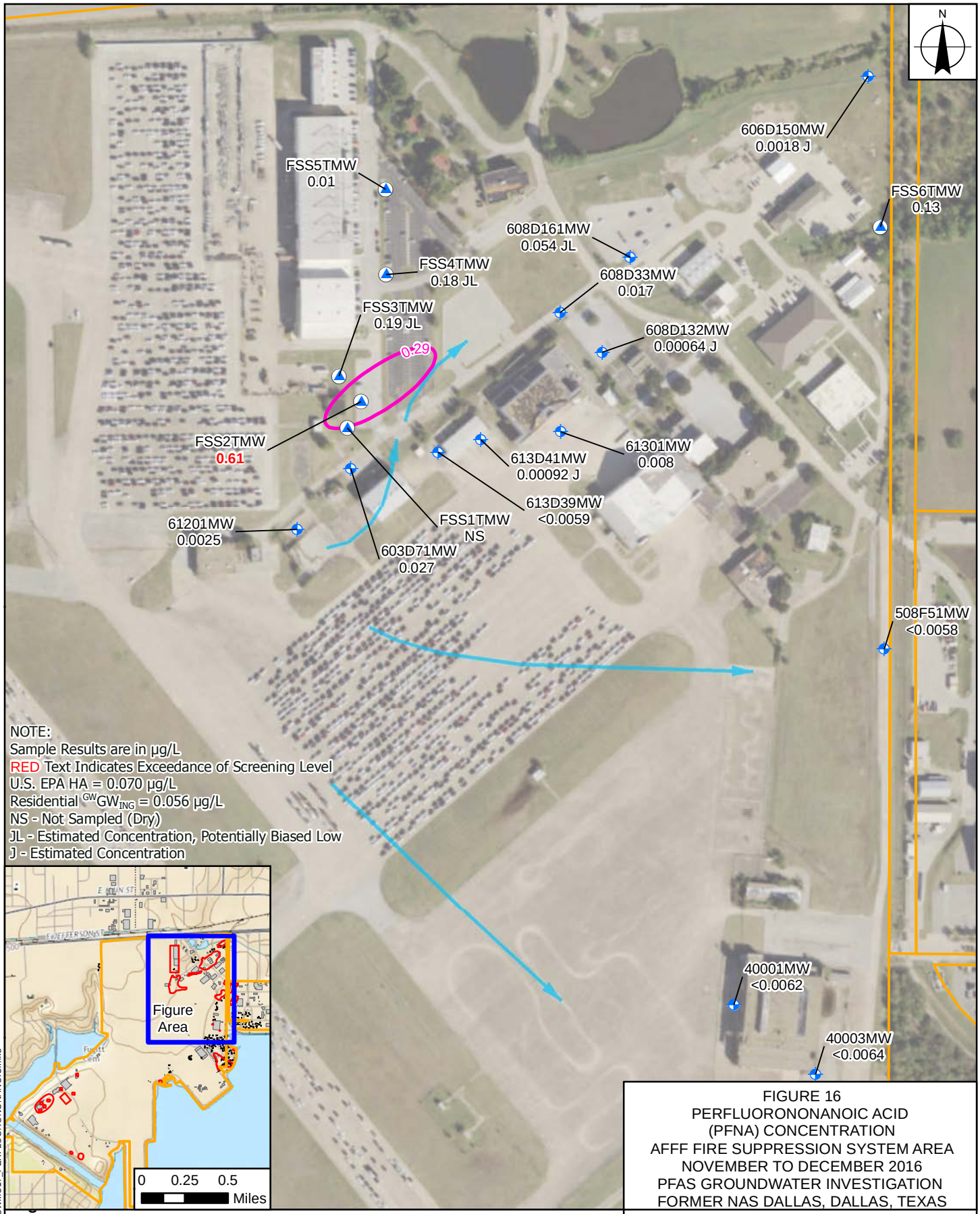

FIGURE 16
PERFLUORONONANOIC ACID
(PFNA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

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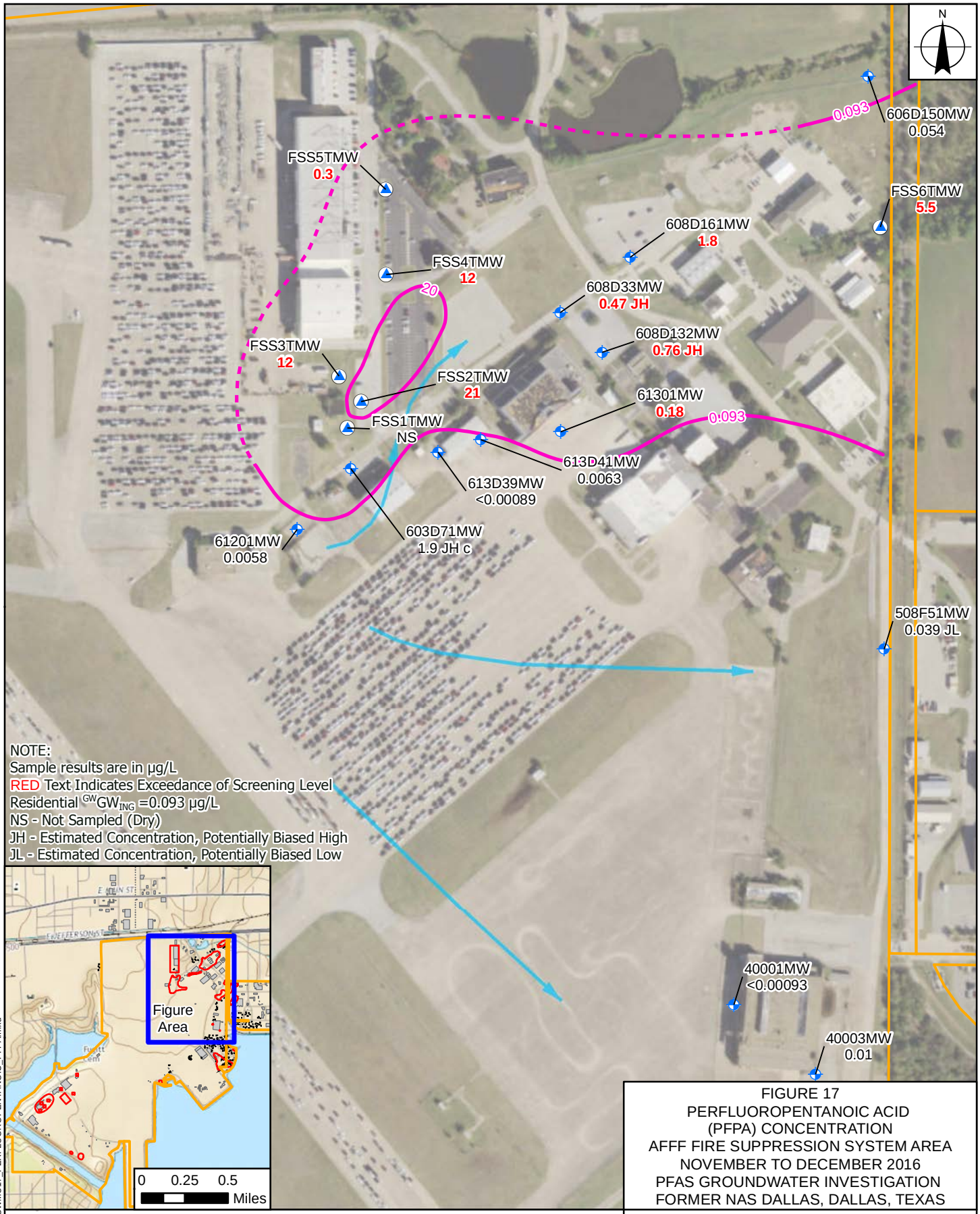

FIGURE 17
PERFLUOROPENTANOIC ACID
(PFPA) CONCENTRATION
AFFF FIRE SUPPRESSION SYSTEM AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

X:\Navy\NAS_Dallas\SWMU17_PERFLUOROPENTANOIC_PFPA.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, USGS The National Map: National Boundaries Dataset, National Elevation

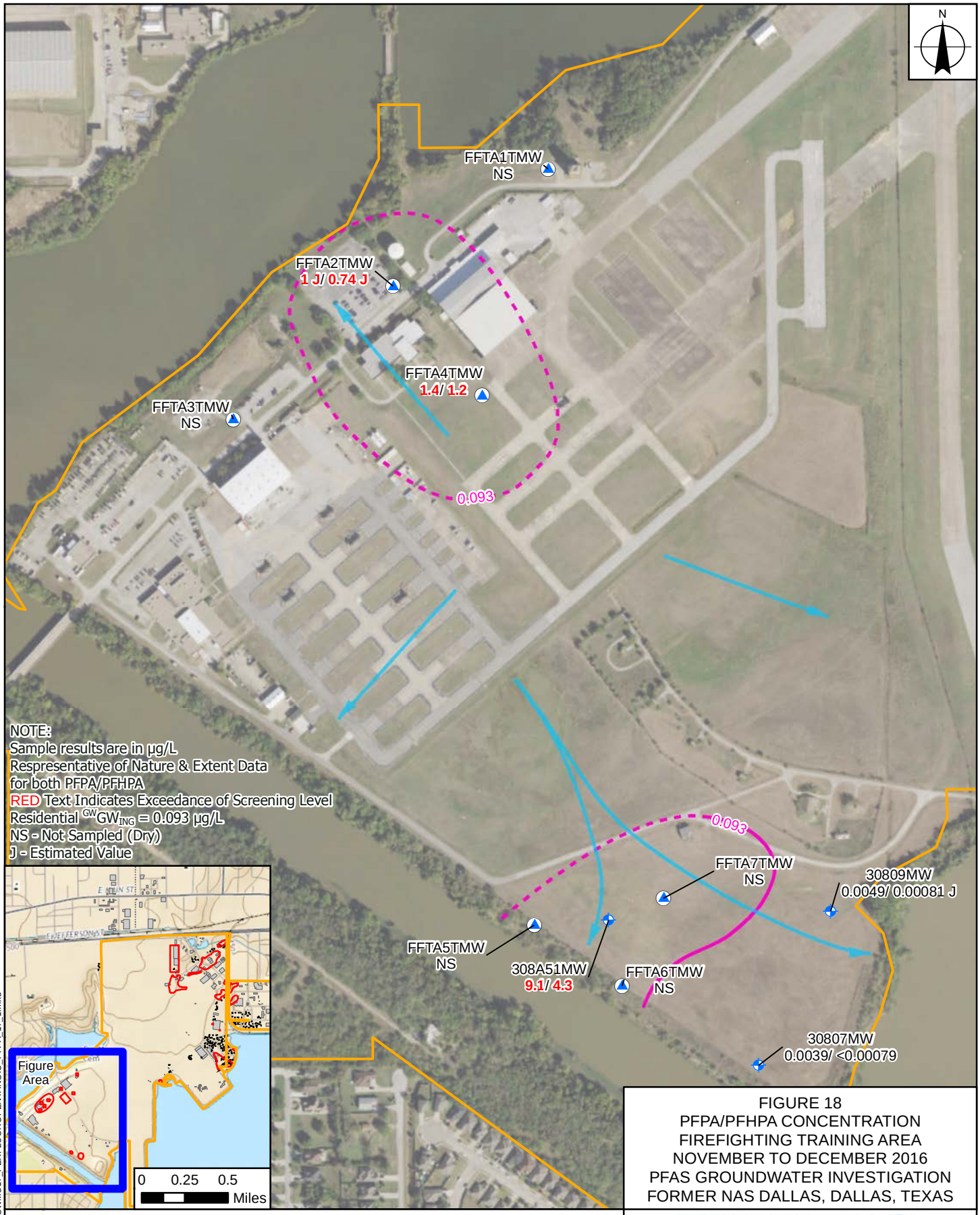

FIGURE 18
PFPA/PFHPA CONCENTRATION
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

Groundwater Monitoring Well
Temporary Groundwater Monitoring Well
Installation Boundary
Isoconcentration Contour, Dashed Where Inferred
Groundwater Flow Direction
0 225 450
Feet

NAVFAC
Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

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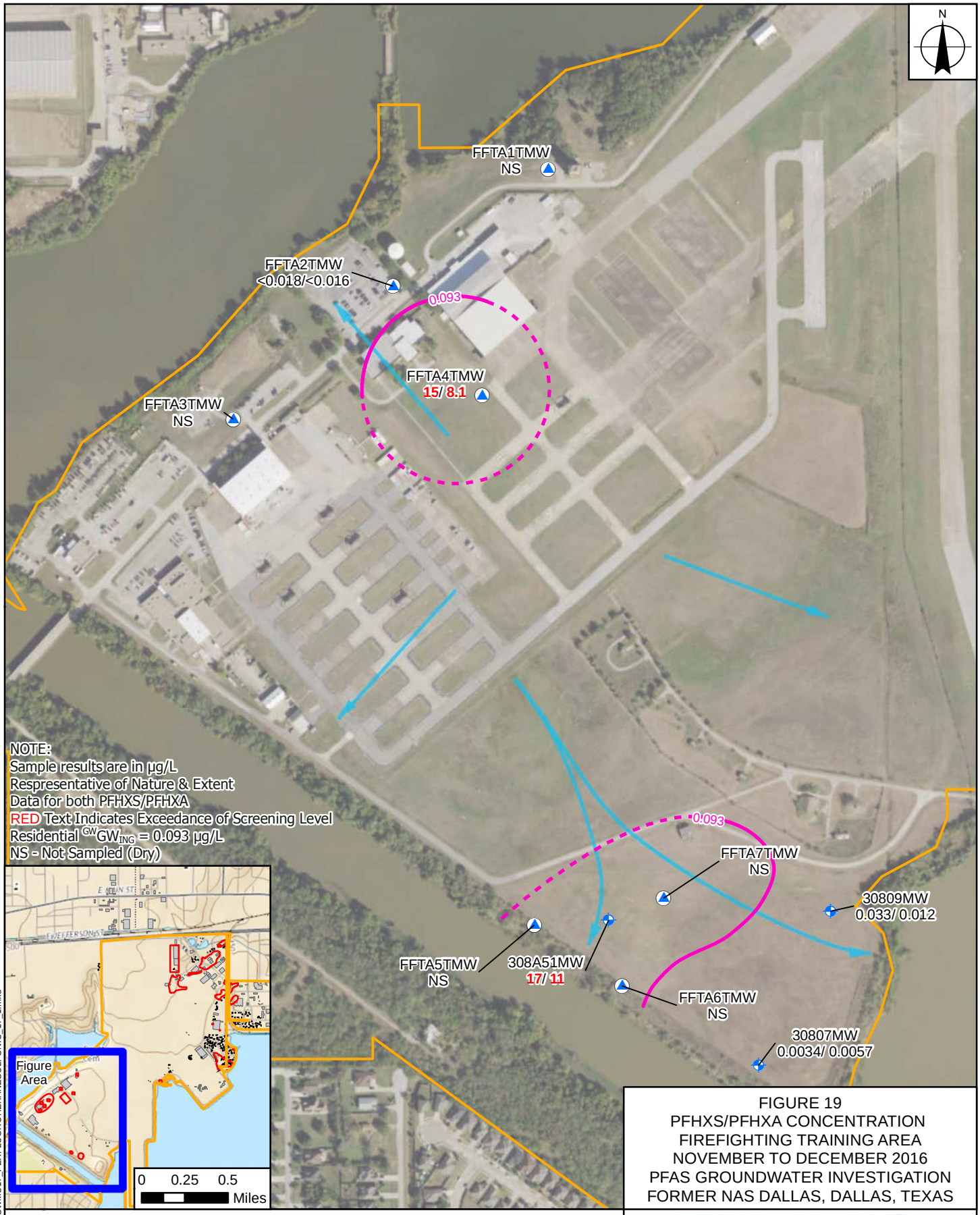

FIGURE 19
PFHXS/PFHXA CONCENTRATION
FIREFIGHTING TRAINING AREA
NOVEMBER TO DECEMBER 2016
PFAS GROUNDWATER INVESTIGATION
FORMER NAS DALLAS, DALLAS, TEXAS

Groundwater Monitoring Well
Temporary Groundwater Monitoring Well
Installation Boundary
Isoconcentration Contour, Dashed Where Inferred
Groundwater Flow Direction

0 225 450
Feet

NAVFAC
Naval Facilities Engineering Command

REQUESTED BY: E. BRICKMAN	DATE: 2/21/2017
DRAWN BY: M. SENNE	TASK ORDER NUMBER. JM78

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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data;

7.0 CONCLUSIONS

This PFAS Groundwater Investigation Memorandum for the Former NAS Dallas summarizes the laboratory and field results for the investigative effort completed in November and December 2016.

The following conclusions can be made based on the Phase I 2016 PFAS investigation:

- The direction of groundwater flow in the AFFF FSS area is to the east and northeast orientated to a surface water drainage feature.

- The direction of groundwater flow in the FFTA is radially towards surface water bodies.

- Detections for PFAS in groundwater samples were compared to the analytical method's limit of detection to evaluate presence or absence. PFAS were detected in samples collected from all 22 groundwater sample locations, and 14 of the 16 PFAS included in analysis were detected in groundwater samples.

- Eight PFAS were detected at concentrations exceeding either the U.S. EPA 2016 HA or the TRRP Tier 1 $^{GW}GW_{Ing}$ PCLs and include PFOS, PFOA, PFHPA, PFHXS; PFHXA; PFNA; PFOSA; and PFPA.

- PFOS and PFOA were most frequently detected COCs in groundwater. Currently detected concentrations of PFOS in the shallow GWBU are indicative of AFFF product.

- AFFF FSS area source area monitoring wells, upgradient monitoring wells, sidegradient monitoring wells, and downgradient monitoring wells had detections of PFAS, with the highest number of PFAS detected in temporary monitoring well FSS2TMW. Results indicate PFAS groundwater plumes have migrated horizontally from the suppression system area and extended east and northeast. The aerial extent of groundwater contamination within the AFFF FSS area in the shallow GWBU has not been defined as the current groundwater monitoring data and existing well network does not fully delineate the pathways along which contaminated groundwater migrates. Specifically, PFAS nature and extent data gaps are present upgradient, sidegradient, and downgradient of the observed detections. No attempts were made to estimate the distribution of groundwater plumes or to estimate potential discharge of groundwater to surface water.

- Two of the four FFTA samples had frequent detections of PFAS and results indicate that groundwater plumes have migrated towards surface water bodies. The aerial extent of PFAS in groundwater within the FFTA has not been defined upgradient, sidegradient, or downgradient of the current PFAS data set. No attempts were made to estimate the distribution of groundwater plumes or to estimate potential discharge of groundwater to surface water.

- November - December 2016 Phase I PFAS groundwater investigation data indicate PFOS and PFOA have been released to shallow groundwater, occur at concentrations above the U.S. EPA 2016 HA values, and require additional delineation in order to define the nature and extent of contamination.

8.0 REFERENCES

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Appendix A
Boring Logs, Abandonment Records, Well Reports

RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA1TMW

Start Date/Time: 12/07/2016 - 1000
End Date/Time: 12/07/2016 - 1100
Total Depth: 28 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Monitoring Well Construction
0					ML	Silt, orange to tan, stiff, dry to moist, with some roots.	
-1							
-2						Semi-consolidated, dry at 2 ft.	
-3							
-4	100%				SP	Sand, tan, fine to very fine, dry, loose.	
-5							
-6							
-7						Some subangular fine sandstone gravel at 7.5 ft.	
-8	100%						
-9						Abundant rounded fine sandstone gravel, dry at 8.5 ft.	
-10					CL	Clay with silt, light brown, medium stiff to stiff, dry, fat to lean.	
-11						No silt with some black organics at 11 ft.	
-12	100%						
-13							
-14							
-15							
-16	70%				CL	Sandy seam, fine to medium sand, dry, 2.5 inches at 15.5 ft.	
-17						Clay with silt, light brown, medium stiff to stiff, dry, fat to lean.	
-18							
-19							
-20	100%						
-21							
-22							
-23							
-24	100%						
-25						Rounded fine sanstone gravel	
-26							
-27							
-28							

Notes: No saturation identified, hole remained open for ~24 hours to be evaluated for presence of groundwater.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA2TMW

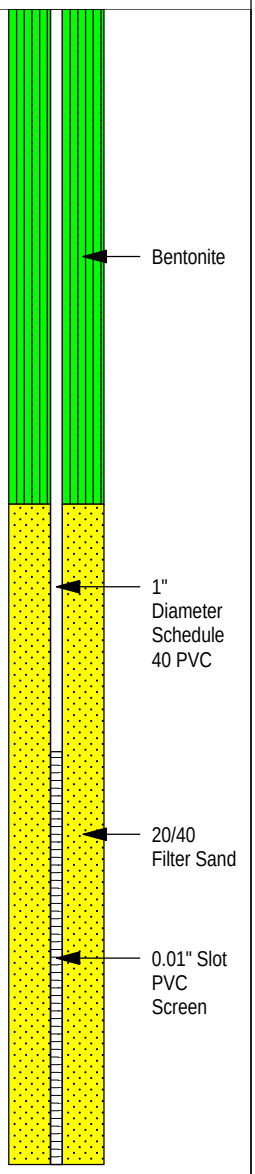
Start Date/Time: 12/07/2016 - 1120
End Date/Time: 12/07/2016 - 1200
Total Depth: 16 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with sand and silt, orange, medium stiff, moist, some organics, some gravel and cobbles, medium to fine sand, fat to lean.
-4	100%					
-5						Abundant rounded fine to coarse sand, gravel, wet at 5.5 ft.
-7						Gravel, moist at 7-7.2 ft.
-8	80%					
-9					SC	Clayey sand, tan, soft, saturated, fine to medium sand, fat clay.
					CH	Fat clay with some sand, gray, soft, wet, fine sand.
-12	100%					
-13						Saturated sandy clay seam at 13-13.5 ft.

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA3TMW

Start Date/Time: 12/07/2016 - 1230
End Date/Time: 12/07/2016 - 1310
Total Depth: 28 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Monitoring Well Construction
0					CL	Clay with sand, silt, gravel, orange to tan, medium stiff, dry, medium sand, coarse angular to rounded gravel, lean clay.	
-4	90%						
-6						Soft to medium stiff, moist at 6 ft.	
-8	100%				SP	Sand seam, wet, loose, some clay.	
					CH	Fat clay, tan to orange, medium stiff, moist.	
-11						Sand seam, 1-2 inches at 11 ft.	
-12	100%						
-16	100%						
-20	100%						
-21						Sandy clay, moist, medium stiff at 21 ft.	
-24	100%						
-26						Organics and gravel, dry	
-28							

Notes: Limited saturation. Hole left open for ~24 hours with no documented water. Hole was abandoned.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA4TMW

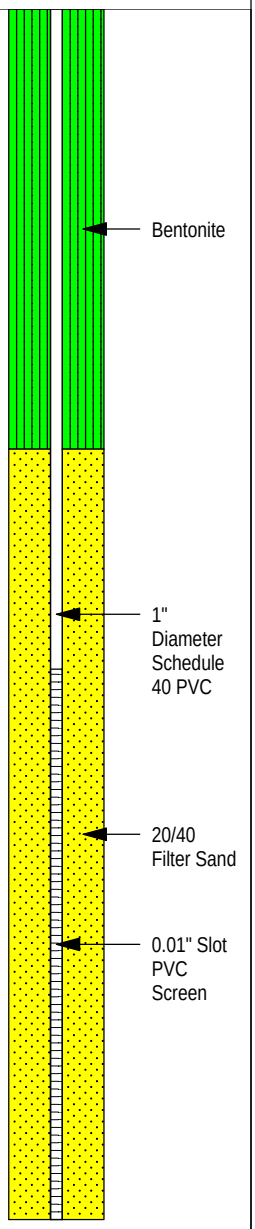
Start Date/Time: 12/07/2016 - 1400
End Date/Time: 12/07/2016 - 1445
Total Depth: 12 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with silt sand and gravel, orange, medium stiff, dry to moist, medium sand, angular sandstone.
	100%					Abundant gravel, fine at 3 ft.
						Abundant sand and clay, moist at 5 ft.
-7	80%				CH	Clay, tan, fat, medium stiff, dry to moist, with some sand.
-9					GC	Gravel with clay, angular fine to coarse, wet to saturated.
-10					CH	Fat clay, brown to orange, stiff, dry.
-12						

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA5TMW

Start Date/Time: 12/07/2016 - 1446
End Date/Time: 12/07/2016 - 1515
Total Depth: 11 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Monitoring Well Construction
0					CL	Clay with silt to clayey silt, tan to gray, medium stiff, friable, dry.	Bentonite
						Angular to sub-rounded sandstone gravel, coarse to fine at 3 ft.	
-4	75%				CL	Angular to sub-rounded sandstone gravel, finely bedded, gray.	1" Diameter Schedule 40 PVC
-7					Shale	Weathered shale, gray with some orange mottles (10%), moist.	20/40 Filter Sand
-8	100%						0.01" Slot PVC Screen
-11							

Notes: DPT refusal at 11 ft. bgs

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA6TMW

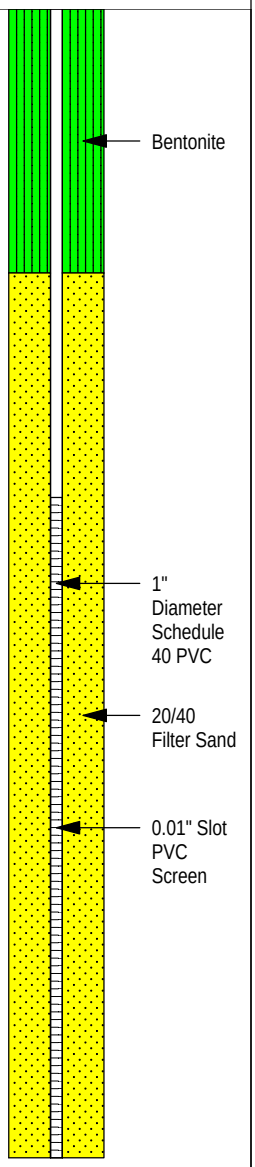
Start Date/Time: 12/08/2016 - 0815
End Date/Time: 12/08/2016 - 0900
Total Depth: 20 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with silt to silt with clay, with some sand and gravel, tan to gray, medium stiff, dry, medium sand, bedded/fissile.
-4	100%					Abundant angular to sub-rounded gravel, tan at 3.5 ft.
-5						Gray with 10% orange mottles at 5.5 ft.
-7						Some rounded sand with gravel at 7 ft.
-8	100%					
-9					Shale	Weathered shale, gray with 25% orange mottles, dry, fissile/friable.
-11	100%					
-14	100%					
-18					Shale	Shale observed on DPT point at bottom of hole.
-19	0%					

Monitoring Well Construction



Notes: DPT refusal at 20 ft.
Dry, no groundwater sample collected.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FFTA7TMW

Start Date/Time: 12/08/2016 - 1240
End Date/Time: 12/08/2016 - 1330
Total Depth: 12 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Monitoring Well Construction
0 – -4	100%				CL	Clay with silt, tan to gray with 10% to 15%, orange mottles, medium stiff, dry.	
-4 – -8	100%				Shale	Weathered shale, gray with 10% orange mottles, dry, consolidated.	
-8 – -12					Shale	Shale, dark gray, consolidated, dry, hard - DPT refusal.	

Notes: No saturation observed, no well set. Hole left open to evaluate for water on 12/09/2016.
Dry, no groundwater sample collected.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS1TMW

Start Date/Time: 12/06/2016 - 1055
End Date/Time: 12/06/2016 - 1125
Total Depth: 45 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Monitoring Well Construction
0	100%				CL	Clay with silt and gravel, brown, medium stiff, dry to moist, angular to course to fine gravel (limestone and sandstone gravel) lean clay.	
					CL	Silty clay to clayey silt, brownish orange, medium stiff dry, 0.5" bedding planes at same medium sand, fat to lean clay, some rocks.	
	100%				CL	Silty clay to clayey silt, brownish orange, medium stiff clay, 0.5" bedding planes at same medium sand, fat to lean clay, some rocks.	
	10%				CL	Clay with sand, tan to orange, medium stiff, dry, medium sand, lean to fat clay. At 9.1 ft - 20% to 25% rounded, fine gravel, moist	
	100%				CH	Fat clay, gray to orange, medium stiff, moist. At 19 ft - with 15% rounded fine gravel and concretions.	
	100%						
	100%						
	80%						
	50%						
	60%						
	70%						
45							

Notes: Dry - no well set
No saturation identified, hole remained open for ~24 hours to be evaluated for presence of groundwater.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

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Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS2TMW

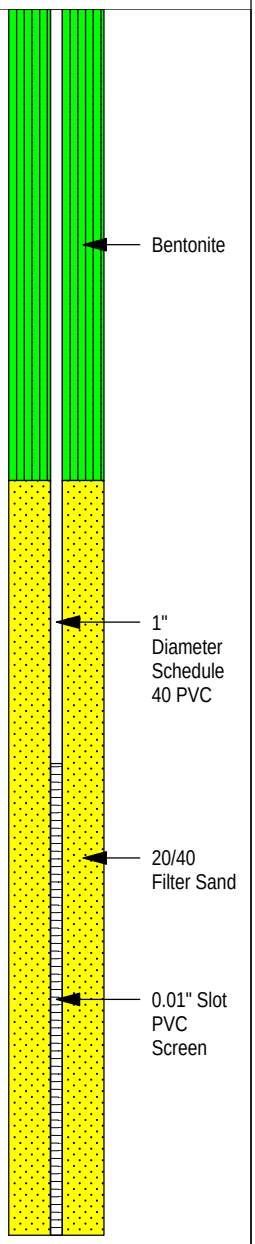
Start Date/Time: 12/07/2016 - 0750
End Date/Time: 12/07/2016 - 0815
Total Depth: 14 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with silt, brown, medium stiff, moist, with organics and roots, some cobble, angular and chalky gravel, fat to lean clay.
-1					SC	Clayey sand with gravel, reddish-brown to brown, loose to medium coarse, moist, medium sand, fat clay, rounded sandstone cobbles.
-2					CL	Silty clay, brown with 15% tan and orange mottles, medium stiff, moist, fat to lean.
-3					CL	Increasing silt content with depth.
-4	10%				SC	Clay with sand to clayey sand, tan with 10% orange mottles, medium dense to medium stiff, moist.
-5						Medium sand, soft, moist to wet at 8 ft.
-6						Fine rounded sandstone pebbles at 8.5 ft.
-7						Saturated at 9 ft.
-8					CH	Fat clay with some silt, gray with 10% orange mottles, medium stiff, moist.
-9	100%					
-10						
-11						
-12						
-13						
-14						

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS3TMW

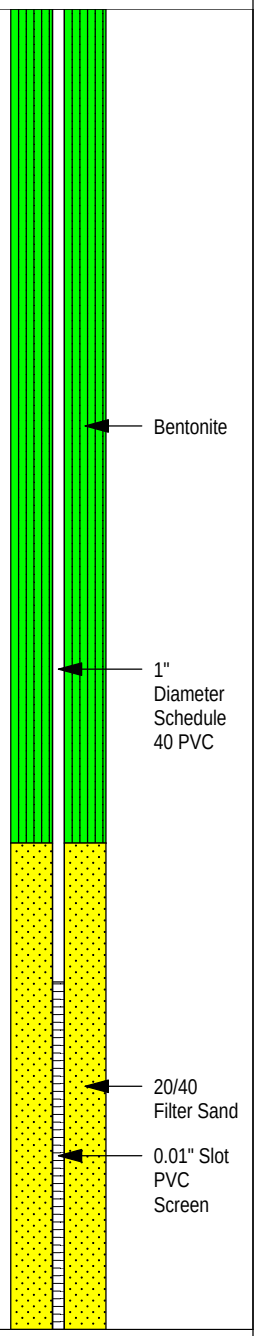
Start Date/Time: 12/05/2016 - 1250
End Date/Time: 12/05/2016 - 1320
Total Depth: 19 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Laura Foss

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with silt, dark brown with organics and roots, rounded gravel, reddish-brown mottling, very soft.
-4					CL	Clay with silt, dark brown, chalky gravel, very stiff, dry.
-5	80%					
-7					CL	Clay, silty dark brown and brown mottles, breaking on 1/2" bedding planes, stiff.
-10	100%				CL	Clay with silt, orange-brown, slightly sandy with some gravel, calcium nodules.
-13					CL	Clay matrix with rounded gravel, ironstone, calcareous material, orange brown, fat to lean, stiff.
-15	100%					Increasing in clay content with depth.
-16						Saturated at 16 ft.
-19					CL	Clay, orange to brown, lean, stiff.

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS4TMW

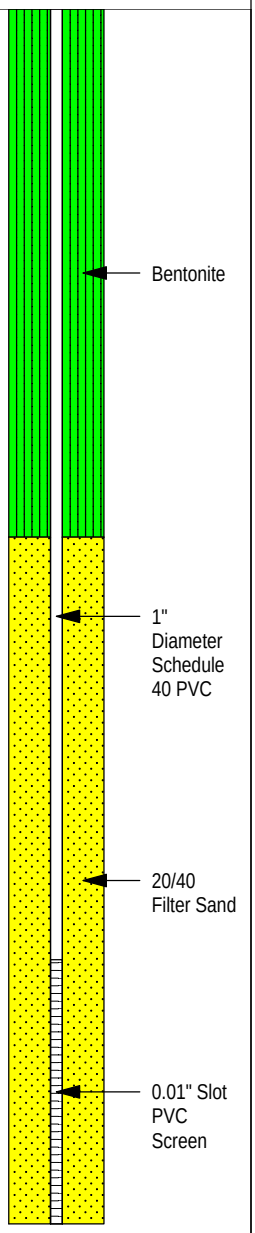
Start Date/Time: 12/05/2016 - 1048
End Date/Time: 12/05/2016 - 1200
Total Depth: 25 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0					CL	Clay with some silt and gravel, dark brown with 10% black mottling, stiff, dry, lean clay, angular to rounded chalky limestone gravel to pebbles.
-3					GC	Chalky limestone gravel with some clay and white gravel.
					CL	Silty clay to clayey silt, brown to dark brown, stiff, dry.
-4						Increasing gravel content at 4.5 ft.
-5	90%					
-6						Orange mottling at 5.5 ft.
-7						Increasing fat clay content at 7.5 ft.
-8						
-9						
-10	100%					
-11					CH	Fat clay, olive gray, medium stiff, moist, minor silt content and calcite nodules.
-12						
-13						
-14						
-15	100%					
-16						
-17						
-18						
-19						
-20	100%					
-21						
-22						
-23					SC	Sandy clay, orange, medium dense, moist to wet, fine/medium sand, fat clay.
					CH	Fat clay, orange to gray, stiff, moist.
-24						
-25						

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS5TMW

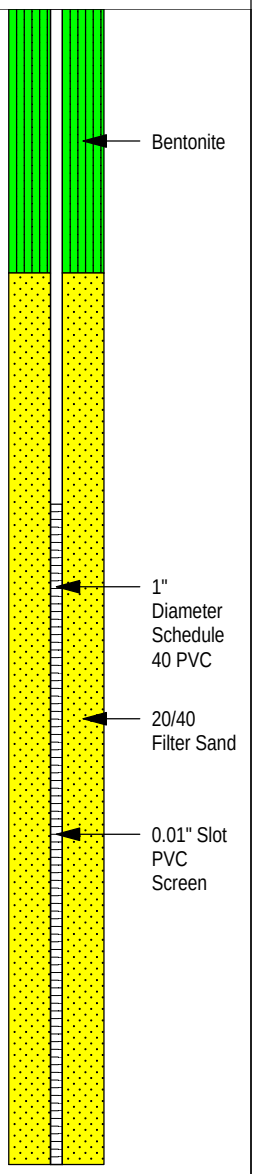
Start Date/Time: 12/05/2016 - 0845
End Date/Time: 12/05/2016 - 1040
Total Depth: 20 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0–1					CL	Clay to clay with some silt, brown with 5 to 10% black and tan mottling, medium stiff, lean to fat, moist, some organics and roots.
1–2					GC	Limestone, chalk gravel with clay, tan to white, sandstone, angular to rounded.
2–6	80%				CL	Silty clay to clayey silt, brown with some iron staining on bedding planes, medium stiff, dry, 1/2" bedding planes.
6–8					ML	Silt with some clay and gravel, orangish-brown, medium stiff to stiff, dry, white chalk to limestone, angular gravel with depth.
8–9					GM	Limestone gravel, white, medium consolidated, dry, some silt and clay, brown.
9–10					ML	Silt with clay, sand and gravel, orangish-brown, stiff, dry.
10–11	100%				CL	Silt with clay, sand and gravel, orangish-brown, stiff, dry.
11–13					SC	Clay with sand, tan to orange, medium stiff, dry to moist, medium sand.
13–20	100%				SC	Clayey sand to sandy clay, tan to orange, soft to medium dense, moist to wet, medium to fine sand. Wet/saturated at 13 ft.

Monitoring Well Construction



Notes:

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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RESOLUTION CONSULTANTS

4545 Fuller Drive Suite 342
Irving, TX 75038

Soil Boring Log and Monitoring Well Log

Location ID: FSS6TMW

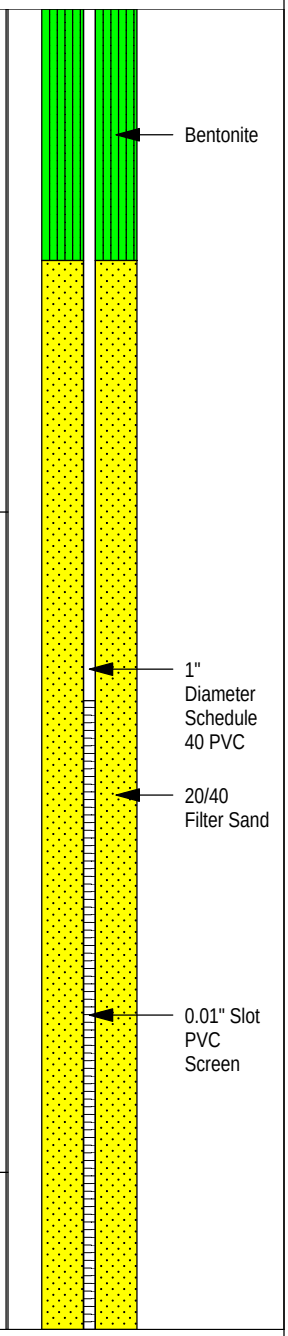
Start Date/Time: 12/06/2016 - 0835
End Date/Time: 12/06/2016 - 1030
Total Depth: 21 ft.

Client: NAS Dallas
Project #: 0888812796
Purpose: Temporary Monitoring Well
Project: PFAS Investigation
Location: Grand Prairie, TX

Sample Method: PVC Sleeves 5 ft X 1.75 ft
Drill Equipment: Geoprobe 6600
Drilling Company: StrataCore, Inc.
Geologist: Emily Brickman

Depth (ft.)	% Recovery	Miscellaneous	OVA Reading (ppm)	Symbol	USCS	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))
0 – -8	100%				CH	Fat clay, dark brown with 10 to 15% orange and tan mottling, medium stiff, moist, rounded sandstone gravel (fine to coarse), some organics. Transitions to fat clay, light gray, soft to medium stiff, moist, increasing silt content.
-8 – -16	100% 100% 70%				CL	Clay with silt, light gray with 15% orange mottles, stiff to hard, dry. Clay, orange, lean to fat. Interbedded and laminated, 15% to 20% orange mottles. White crystaline precipitate along bedding planes and fractures.
-16 – -21	100%				Shale	Weathered shale, gray, consolidated, significant precipitate along horizontal and vertical fractures and beds.

Monitoring Well Construction



Notes: DPT refusal at 21 ft.

Water Level
Laboratory Sample Interval
TOC - Top of Casing
ft. - feet

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Appendix B
Field Investigation Documentation and Groundwater Sampling Forms

Daily Log

Site Location: NAS Dallas - PFAS GW investigation	Date: 11/28/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Showers in the morning, 68 to 71°, cloudy to sunny in the afternoon
89% humidity, wind SSW 12 mph, pressure 29.5 mm Hg, visibility 7 miles
0700 E.J. Brickman (EJB) arrives on site & prepairs for the day
0745 L. Flowers @ heathus.com - Health consultants on site with utility locate services. EJB emails maps for a second time.
0750 L. Flowers off site to utility locate.
0754 A.O. Gonzales on site (EnSafe AOG)
• gas line east of bldg near fence 469-271-5414 - L. Flowers - gas
0810 Dave Hagenmyer of GPRs is on site.
0820 Begin marking FSS locations with GPR & gas (Health consultants)
Atmos Energy
FSS1 - OK FSS5 - OK
FSS2 - OK FSS4 - OK
FSS3 - OK
0855 Head south to the FFTA. Access to the FFTA is not from the city of Dallas Property. From Jefferson, south on 14th st. Left on Garrett St., left on Lakecrest. (follow the signs for RSAF Peace Prairie Detachment) Tx National guard
0940 Bullard - Phillip - Security guard on duty at the base - will notify Captain Eric Maldonado of our return to the base with GPRs crew.
1000 Strata core on site with two 55-gal drums. Drop them off at staging area.
1005 Strata core off site.
Head to FFTA w/ David.
1022 Arrive at gate. Enter with GPR & travel to Site 2/Site 3
1049 Collect a water level & TD at 308A51MW.
DTW 13.68 from TOC (above grade) TD 17.48 (from TOC)
Identify two wells in FFTA area, one south of EJB to south-east of 308A51MW & the other more to the east
both flush mount w/ 3 x 3 pads
Latitude Longitude
#1 - 32.7264 -96.9734 (south-east) → 30808MW
#2 - 32.7269 -96.9723 (east of 308A51MW) → 30807MW
1114 FFTA2 - potz obstruction (trash or tree root)
1150 David H. of GPR is finish with locates. One location, FSS6 TMW will be completed on Thursday at 1300
1200 Mark location of second identified well & send location to Tom
1215 Back on site to meet Laura K. Foss (LKF). Off site for lunch.
1250 Back on site at staging area.
1320 EJB off site, Alex & Laura collect water levels
1340 EJB calls Cindi A. to request gates be unlocked

Daily Log

Site Location: NAS Dallas - PFAS GW investigation	Date: 11/30/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Partly cloudy to sunny, 47 to 60°, 0% chance of rain, 45% humidity, wind NW at 9 mph, 30 in Hg pressure, 10 mile visibility

0720 E.J. Brickman arrives on site. Prep for day
Samples collected on 11/29/16 include 606D152MW
608D161MW, 508F51MW, EBGW112916

0730 Laura Foss arrives on site & Alex on site

0800 EJB finds security - Sharon. Securitas - white Ford
Monique - 214-837-3200 - They have locked the gate
EJB calls Cindi A. with city of Dallas & leave a message

0852 Back on site with ice. Conduct safety mtg. & plan for day
L. Flowers back on site to locate last location (gas) - Health Consultants

0907 EJB calls Paul Hook to enter the TX Air National Guard

0910 EJB & L. Flowers back on site in TX ANG locating FSS6TMW
Gas line runs adjacent & parallel to the fence. Marked location is not within this area

0925 L. Flowers off site. EJB escorts Laura to TX ANG bathroom

0934 Rich Mayer EPA on-site continue gw sampling
Darell Harrison EPA

1110 Finish sampling 608D53

1210 Dorothy with Security stops by while we are at 61301MW

1250 EPA off site. Finish ~~103~~ EJB 61301MW sampling.

1330 EJB enters FFTA to investigate monitoring wells
30802MW? 6.85 from TOC (WL) 24.28 from TOC (TD) SWMW1-01
30807MW? 13.31 " 29.10 " SWMW1-02
Head back to SWMUS where we continue to gw sample.
Collect 613D39MW, 613D41MW. Collect ~~all~~ EJB & Field Blank at 613D39MW.

1545 Dump purge water & lable drums. Pack up supplies.

1605 All off site for day.

Daily Log

Site Location: NAS Dallas - PFAS GW investigation	Date: 12/1/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Sunny. 41 to 64°, 0% chance of rain, humidity 66%, wind SSE at 3 mph, 0% chance of precipitation, pressure 30.1 in Hg, visibility 10 mi
0730 EJB & AOG on site. prep for day
0800 Calibration check 4511556 / #12C101846 - Laura on site
pH 7 Lot #1060677 Ex. 6/30/2018
pH 7 pre - Temp. 8.37, D 7.05 post Temp 8.43 - 6.99
pH 10 Lot #602083 Ex 01/30/2018
pH 10 Temp. 8.52°, 9.95 post 8.53° 10.00
0814 DO - Store bought DI - DO% saturated pure 752.4 mm Hg
0819 Temp. 13.58°, 82.0 DO%, 8.40 mg/L
0820 14.44 98.0 DO% 10.00 mg/L
Conductivity 4.49 mS/cm³.
Temp. 8.16°, 4.506 post 8.19°, 4.491 mS/cm³
0830 Conduct safety mtg. & SWAP. Collect buckets & head to 4003MW
0840 Set up at 4003 - SWMU 108
0910 Tom Wiberg arrives on site.
Move to 4000 MW
1030 TCEQ Drew Townsend & Dorothy Lewis of TCEQ Environmental Investigator Waste Section.
1130 Finish sampling at 4000 MW. Investigate BH. 1430 & identify Foam & Fire distribution system & tanks
1145 Tom Wiberg off site. Move to 61201 MW. Gate open when we (EJB/AOG) get peristaltic pump
1255 TCEQ off site.
David Haganmyer of GPR on site. to conduct last geophysical clearing of FSS16TMW. Sgt. Paul provides access to area.
1350 GPR cleared location & is off site.
1430 EJB calls Colonel James B. Hardy & gets the OK to access historical wells at SWMU 1 / SWMU 6
1505 EJB off site.

DOROTHY LEWIS

Environmental Investigator
Waste Section

Region 4 ■ DFW Region

Texas Commission on Environmental Quality
2309 Gravel Drive, Fort Worth, TX 76118
Direct 817/588-5824 ■ Office 817/588-5800
Fax 817/588-5706
dorothy.lewis@tceq.texas.gov

printed on recycled paper

Daily Log

Site Location: NAS Dallas - PFAS GW investigation	Date: 12/5/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Cloudy, 46 to 51°C, 30% chance of rain with showers more likely after 1300, humidity 84%, Wind NNE at 5 mph Pressure 29.9 in Hg

0715 EJB is on site. Strata Core Services, LLC (drilling co) is on site at the front gate (SCS)
Driller - Margarito Estrada Helper - Gary Davis
Mobilize to the parking lot to await arrival of additional field team members

0745 EJB gives safety talk to SCS. Mobilize to within the gated area to drop the decon supplies
Drilling Supplies
- RG104 Strata Core - US DOT 1842199 - F550 XL Super Duty Flatbed with drill rig - TX CPD 3224
- M-Mi-T-M 3500 PSI 158932 - TX Trailer 603 211J 10/17
  - Honda GX 630 generator
  - Sunstate Equipment Co. 1-888-456-4560
  - 2 - 200 gallon tanks - filled at the SCS office
- Geoprobe 6600

0833 Decon 5' rods & 5' Sampler for geoprobe use.
Mobilize to FSS5TMW

0845 Set up & begin pushing at FSS5TMW.

0930 Conduct decon of PVC piping ~20 ft. First utilizing hot-power washer. Collect photo documentation.
Perform second rinse with Store bought Great Value Distilled Water & Liquinox. Laura Foss on site.
Perform a third rinse with lab certified DI.

1015 Travel back to FSS5TMW to push remaining 5 ft log soils & set well
Sch 40 PVC
- Premier Silica sand CAS 14808-60-7 - 50 lbs bags 20/40
- Pipe plug - Hallworth 3/8" 877-379-7412 NSF

1048 Begin pushing at FSS4TMW
Push to 25 ft bgs & only incounter a small seam of sand at 22.4 - 22.9 ft bgs

1210 Decon drill-pipe & Alex begins purging

1251 Begin pushing at FSS3TMW Push to 26 ft bgs
Decon PVC (20 ft). Set well with 5 ft Screen 14-19 ft bgs

1405 Pack up. Weather changes. Starts to rain & increases in intensity.
Decon rods & rig. Laura off site.

1430 Dump soil & gw. Lock gates

1440 Alex off site. Emily off site too.

EJB

Daily Log	
Site Location: NAS Dallas - PFAS GW investigation	Date: 12/6/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Overcast, 50 to 56°, partly cloudy with chance of showers ~9 to 12 ~10%, 97% humidity, Wind NNE at 9 mph, 29.9 in Hg pressure, 4 mile visibility

0710 EJB & Strata Core Services on site

0720 Alex on site. ACG & EJB discuss plan for the day
Alex to develope FSS3TMW then sample FSS5TMW & FSS1TMW. Laura to decon & develope new installations
EJB to log.

0740 L. Figs on site. EJB gives safety & job description mtg. SWAP
Drop Augers & pallet at staging area

0800 City of Dallas opens gate. Access decon area
Decon PVC

0825 EJB calls St. Paul of the TRANG to enter gate.
Set up at FSS6TMW. Hand Auger
Hit a solid destruction at 3 ft bgs

0925 EJB calls paul to get access for Laura w/PVC & tubing for FSS6TMW

0927 Alex calls & gate was left open & not closed properly

0928 Alex needs Water level meter. EJB looks for Laura - but at truck to deliver water level meter

1030 Exit ANG to decon DPT rig, Sampler, & rods
Also, provide stage #1 decon of PVC riser with steam cleaner - Remove Teflon "O" Rings from PVC
PVC - Environmental Manufacturing Inc. Manhattan, KS
P40100SDCA 1" X 5' SCH 40 PVC
0.010 Slot Screen 20 PCS box
PVC - Environmental Manufacturing Inc.
P40100SCCCA 1" X 5' SCH 40 PVC Riser
20 PCS Box
Liners Environmental Services P/N: LNRMC48
clear PVC Tubing - 45.5 LX 1.75 OD X 0.040 Wall
PVC, Rigid - clear
Length: 45.500 +/- 0.125 - QTY-66

1050 Mobilize to FSS1TMW

1230 Drill to 27 ft bgs. out of drill stem. SCS calls office to deliver more - Break for lunch
Alex collects GW Equipment Blank
Also collect Equipment blank off of decomed Temp Well casing to be used at FSS1TMW

1325 SCS on site with additional rod

1330 SCS off site. Laura off site to ship samples. Continue drilling
Pushing rods in at an angle - may cause pressure on rods

1525 Pull FSS5TMW - remove PVC & Screen Plug hole with 1/2 bag

1530 Pull FSS4TMW "

1600 SCS off site.

1615 EJB, ACG, LF all off site.

EJB

Daily Log	
Site Location: NAS Dallas - PFAS GW investigation	Date: 12/7/2016
Project Number: 0888812796.FI.FS	EJB

Partly cloudy to sunny, 40 to 55°C, 10% chance of rain, wind SW at 0 to 5 mph, pressure 30.1 inHg

0710 EJB & Stratacore on site.

0725 L.Foss & AOG on site.

EPA Richard Mayer calls & informes that he & others will be on site in the afternoon.

0730 EJB & others conduct safety mtg. Alex to gw sample. Laura to check FSS6TMW for water / develop.

0755 Hand auger & begin pushing at FSS2TMW.

Set FSS2TMW

0830 Test FSS1TMW for Water. No water identified within the 40 ft bore hole. Back fill hole with bentonite chips

0850 EJB & SCS pack up to mobilize to the southern FF7A

0910 Drop power washer & decon supplies near FF7A5TMW

0915 Decon drill rod, sampler, hand auger, & additional well supplies

0950 Mobilize to FF7A1TMW

1007 Arrive on site. Continue drilling - No saturation observed at FF7A1 - move on

1110 Move to FF7A2MW.

Set well. Decon & move to FF7A3TMW

1330 EPA on site. Mob to FF7A4TMW

1400 Anderson & Maldonado request to be notified.

1446 Set up at FF7A5TMW to drill

1520 EPA off site. SCS decons drill stem. EJB/AOG pack up

1545 SCS off site.

1600 EJB AOG off site. Drop soil & purge water a staging area for IDW. Laura to pack & ship samples

1620 All off site for day.

Daily Log

Site Location: NAS Dallas - PFAS GW investigation	Date: 12/8/2016
Project Number: 0888812796.FI.FS	E.J. Brickman

Cloudy to sunny, 35 to 39°C, 0% chance of precipitation, 67% humidity
Wind Northeast 10 to 20 mph, 30.6 inHg, Visibility 10 miles.
0715 EJB, LF & Stratacore enter Singapore air base. Meet at the decontamination staging area located near FFTA5-TMW
Conduct safety mtg.
0850 Decon PVC & collect Well Casing (WC) EB's = A
off of separate piece of PVC.
0810 Collect an equipment blank off of the outside of the DPT sampler
with lab DI. Located at FFTA6. EBDPT-120816-A
Begin hand augering at FFTA6 TMW
0920 Set well, Decon Collect second WC EB = B
0930 Collect second EB off of the deconed DPT sampler. EBDPT-120816-B
Alex informs me that the open hole at FFTA1
& the two open holes at FFTA3 are all dry. In addition
FFTA5TMW is also dry.
0940 Set up at FFTA7 TMW to drill.
1051 Drill FSS6-TMW & backfill with bentonite
1105 Move staged decon water to IDW staging area
FSS3 picked.
1130 Plug FFTA1, FFTA3.
1145 No water in FFTA6 - P&A
1155 P&A FFTA5.
1215 EJB & SCS leave FFTA & Travel to FSS2-TMW. Laura
was finished sampling & FSS2 can be P&A'ed.
1230 EJB at IDW staging area to dispose of IDW
SCS off site.
EJB stage IDW - 6 drums on site - labled & on pallets
~~1- GW Purge & Decon - full~~ Empty
2- GW Purge & Decon - full
3- GW Purge & Decon - full
4- GW Purge & Decon - 3/4 to full
5- Soil - full
6- Empty

* photo documentation collected.

1345 EJB off site. AOG & LF continue to sample
Wes Ward to use 1 of the empty drums
Alex to ask drillers to bring back one of the drums

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 11/28/2016 – 11/29/16

13:10 Decon equip for water level. To start gauging wells.
13:20 Note to ED re: gates are all locked. Call to CA
Proceed to gauge available wells.
14:40 Gates unlocked. Proceed to wells.
1520 'Copters on runway near SWMU 85: Drove thru grass (field)
to access B141. Gate locked at 1530 Proceed to SWMU 138
Gate locked.
0800 11/29/2016 cool, clear, calm. Gauge & Sample
Brett Hamby Alex Gonzales Laura Foss
Begin gauging SWMU 18 & 21. Marked temp well FSSG
0850 Gauging complete. Regroup to calibrate equipment & set up for
sampling. SWMU 18 150MW + 161MW
1000 Enter gates at TANG. Stop at restroom – all wash hands.
Proceed to 606D150MW. Set up for sampling. Decon all, new tubing
[Note: 61201MW MS/MSD] per map on Addendum 2.
1130 Collect two 250 mL plastic containers 606D150MW - LF-1116
1200 set up on 608D161MW Decon all, new tubing
1240 Collected 2 - 250 mL containers 608D161MW - LF-1116
Clean up. Break for lunch.
1345 Return to site. Set up and prep for sample
Proceed to 603D71 MW Gates locked. Proceed to 508F51MW.
1410 Set up to sample. Cones out, blinkers on Decon all, new tubing
1505 Collected 2 - 250 mL containers 508F51MW - LF-1116 + 4 - 250 mL
1515 for MS/MSD. Collected 2 - 250 mL EBGW112916
Brett Hamby depart site. Purgewater dumped in SS-G drum.
1535 meet at parking lot to pack for FedEX
Call to TW re: locked gates: CA. Gate to 86/138 unlocked,
not near. Locked at 1550.

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 11/30/16 Wednesday

0730 LF arrive to meet EB at site. AG
Begin calibration, SWAP, and set up. Cool, Clear, breezy
0840 Begin sampling at 608D132MW
0840 Collected 2 - 250 mL 608D132MW - LF - 1116 Proceed to
1100 D33. Collected 2-250 mL 608D33MW-LF-1116
Clean up and break for lunch Proceed to 61301
1200 Begin sampling Parameters stabilized Collect samples at
1245 2-250 mL containers 61301 MW - LF - 1116 Move to
D41. Parameters very stable, quickly. Collect samples at
1355 2-250 mL 613D41MW-LF-1116 Proceed to D39
1520 Samples collected 2-250 mL 613D39MW - LF - 1116 (Field Blank)
1550 Depart to pack, ship - FedEx, Osler
Note: EPA reps present off/on throughout aft. Observing and discussing work. They will return for TW installation
Note: All tubing used during sampling was new and de-connected per SAP (x3). Tubing remains.

LF

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/1/16 Thurs.

0800 LF arrive to meet EB + AG
Calibrate equipt, set-up, SWAP
0930 Move to 40003MW for sampling. Set up. TW arrive
0955 Fluctuations in DO: samples collected 2-250mL containers
40001MW-LF-1216. Clean up and Proceed to 40001MW
1020 EB + TW depart to chk adj bldgs. LF + AG to decon, set up
1030 Begin low-flow set up for readings (1045) Note: plastic Sheeting: decon
1055 TCEQ arrive, discuss procedures.
1125 Samples collected 2-250 mL 40001MW-LF-1216
1130 TW + EB return to 40001MW to meet TCEQ
Clean up + deCon equipt Note: Call to A-H re new standards for turbidity meter (Hach); expired 10/16 - will get new tmro. (Blake)
1145 TW depart site. TCEQ + LF Proceed to 6120MW
1150 Begin sampling set up
1245 TCEQ depart. EB depart to meet GPRS technician.
1255 Samples collected 2-250 mL 6120MW-LF-1216
1310 Begin decon for 603D71MW
1350 EB return
1410 Samples collected 603D71MW-LF-1216 2-250 mL
1425 EB: (2 well volumes per well) 3 wells to develop 12/2/18 per Col. Hardy
SWMU 1: SWMU1-01, SWMU1-02

	TD	dtw		TD	dtw	
-01			-02	29.10	13.31	11/30/16
11/30/16	24.23	6.55				-01, -02: @ 1330

top concrete material
1440 Equipment blanks run off WL probe 2-250 mL (lab grade DI)
EB, LF, AG depart bldg area, close/lock gate, meet at p Lot
1450 Field blank taken w/ lab DI 2-250 mL
1455 EB depart site.
1510 LF + AG depart to pack Ship

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/2/16

0800 LF + AG meet at p Lot. Condense equipt to truck

0820 SWAP and review: Well development. Cool, breezy, overcast

0840 check in at guard shack and proceed to SWMU1

Set up on SWMU1-02 for well development dtw = 13.44'

De Con tubing and purge well

0945 Helicopter ~~maneuvers~~ maneuvers bt us and A51MW. Call to EB

Per Col. Hardy LF + AG are not hindering maneuvers nor is

there any safety violations. Maneuvers should end shortly and will

be at an end for the day. Proceed w/ development 5G removal

1000 Helicopters depart. Well development continues.

1050 Two well volumes purged. Checking recovery + clean up.

1110 [-> dtw = 19.08'] Proceed to SWMU1-01 Decon, begin purge

1158 Helicopters return, land at pad 6G removal dtw = 6.91 -01

1255 Complete purging. Proceed to 308A51mw

Screen clogged w/ organic material, cleared. Pumped 4 well vol

1350 Depart for p-Lot. Clean up ~~and~~ dump purgewater.

1425 PDB deployed 152 mw (old one removed)

1435 PDB deployed 149 mw

1440 Gates locked. Equipt loaded

1445 AG + LF Depart site

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/2/16

Well Development SWMW1-02 TD = 29.10 Tubing to BOH

Time	Flow Rate	Pumped Quantity	Depth dtw	Remarks/Notes
initial	one well vol = ~2.6 G	x2 = 5.3G	~~13.44~~ 13.44	water col = 15.66
0920	200 mL/min			clear rotten egg smell
0923			13.66	
0926			13.94	
0929			14.01	
0932			14.19	
0935			14.37	
0938			14.51	
0941			14.66	
0944			14.85	
0947			15.02	
0950			15.19	
1000 ~~0953~~			15.93	
1010 ~~0956~~			16.56	
1020 0959			17.22	
1030 ~~0102~~			17.55	
1040			18.50	
1050			~~18.~~	
1100				
@ 10:50	Squallow Removal	19.00		
1055			18.90	
1100			18.85	
1105			18.83	

3.135/1G 2:30 500 2.5 m/500

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/2/14

Well Development TD = 24.28 SWMW1-01 Tubing to BOH

Time	Flow Rate	Pump Quantity	dtw Depth	Recharge/Notes
initial	one well vol = ~2.9 G x2 = 5.9 G		4.91	water col = 17.37
1119	250 mL/min		7.22	strong sulfur
1122			7.42	egg odor
1125			7.61	Clear
1128			7.82	
1131			8.03	
1134			8.24	
1137			8.42	
1140			8.56	
1143			8.80	
1146			8.98	
1149			9.12	
1159			9.78	
1209			10.52	
1219			11.20	
1229			11.92	
1239			12.51	
1249			13.11	
1259				
	1255 6 G removed		13.49	

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/2/14

Well Development TD = 17.43 308A SMW tubing to BOH

Time	Flow Rate	Pumped Quantity	Depth	Recharge/Notes
initial	one well vol = 0.43	x 2 = ~1.3 G	13.73	water ~~[illegible]~~ =
1308	250 ml/m			started pumping @
1312		murky	13.99	1305, no pull.
1316		organic material	14.11	Bottom of tubing
1320			14.25	~~clock~~ clogged w/
1325	occ'l org. material - clearing		14.44	organic material
1330		slightly murky	14.59	black, strong
1335			14.93	rotten egg odor
1340		~~2 G removed~~ 4	15.39	clog, clear
1343		3 G removed	15.59	clog, clear
1344			15.56	surged the
1345			13.54	tubing
1346			13.52	scraping the
1347			13.51	screen
1348			13.51	
1349			13.51	

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/5/16 - 12/6/16

0930 LF arrive at site. Meet EB & AG in deCon process. Drillers SCI.
FSS5TMW ~~on~~ in process, set. TD = 20' water @ ~15'
1025 Drillers depart to deCon. Set up on FSS4 TMW → 25' push
cored @ 20' reopen, screen 18-23' set in @ ~22'
DeCon Set up on FSS3 TMW TD = set in @
Rainstorm approaching. Clean up and load
1430 Crew (all) departs site
0730 Cold, drizzling, windy 12/6/2016
Complete 3 more wells
EB, AG, LF, SCI → SWAP and review day. EB + SCI →
Move to set up on FSS6 TMW inside ANG gates.
0900 De Conned casing and join at ANG. FSS6 TMW complete
1100 TD = 21' 5' screen. Dry. Cleared soil cuttings.
Move to deCon casing
1330 LF depart to pack samples (AG), ship — FedEx
1245 Equipment blank off WL probe 2-250 mL EBGW120616
1310 Equipment blank off 1" riser 2-250 mL EBWC120616
1350 LF return to Site. Crew working on FSS1 TMW

~~FSS5 TMW~~ FSS4 TMW 12/6 1220
~~FSS6 TMW~~ FSS5 TMW 12/6 1100

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Laura Foss | Date: 12/7/2016 Wed.

0720 arrive at site. meet AG, EB, SCI cold, partly cloudy
continue w/ TW install, develop, sample.
0730 SWAP & Review TANG
0745 Move to FSS6TMW. Collect 2 250 mL samples prior to develop
per EB. Cut casing TD = 21.5. Apparent recharge. Purged
0930 dry. Clean up and record.
1000 depart TANG. Proceed to FFTA1TMW, meet AG, EB, SCI
51 18 14 set to sample AS1, -01, 02
01 25 7
02 29 13
depart site for RR. Return to site
1140 SWMU1-01 dtw = 12.88' 308AS1mw dtw = 15.37
TD ~ 25 TD ≈ 18
wat col ~ 12' wet col ~ 2.5
AG samples SWMU1-02. Proceed to AS1
1255 Set up on AS1 to sample. All tubing new, deconned
Parameters stable. Low vol in well - very low flow. Collected
1340 2 250 mL 308AS1MW-LF-1216 AG arrive / leave. Proceed to
1355 SWMU1-01, new tubing - deconned. Parameters stable
1445 Collected 2-250 mL SWMU1-01-1216
Clean up and meet EB, AG, SCI at FFTA5TMW, being
1530 installed. Depart site to pack and ship samples.

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/8/16 Thurs.

0715 Arrive at Site meet EB, SCI cold, windy, clearing. AG
0730 SWAP + Review Set up to Sample & Conn tubing, equipment
0810 Calibrate. Auto Cal lot 12326 Exp 8/5/17 Note <25°C
SpC 3.136 pH (4.0) 3.67 - 4.0
20 8535 7/17 22.3
100 8536 7/17 104
800 8537 7/17 844
10 8534 7/17
0830 Proceed to TANG to chk FSS6TMW. Chk in w/ Sgt PI
0840 Set up on well. Recharge → dtw = 7.17' Begin Sampling
0930 Parameters stable. 2-250 mL collected FSS6TMW-1216
Depart site → low fuel warning on vehicle (cold weather?)
1040 Meet AG at FSS2TMW to sample per EB.
1115 AG & EB depart for FFTA area. ORP fluctuating - high
1135 Parameters stabilized, collected 2-25mL FSS2TMW-1216
1150 Dumped PW Proceed to FFTA Set up on 2TMW
GW murky, but parameters stable. Collect 2-250 mL
1240 containers + 4 (MS/MSD) FFTA2TMW-1216 Finish and
proceed to meet AG to sample 4TMW ~~Samples~~ LF collected
1320 Attempt to check in w/ base personnel re: 4TMW. OKd
1410 and proceed. Collected sample 2-250 mL + DUP
FFTA4TMW-1216. AG depart to clean up cuttings and
purgewater. LF depart to pack, ship
Note: all IDW staged on pallets at collection point.

LF

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/5/16

7:00 AM Drove To Argus-Hazco to get New WL & Turb Calibration Solution
#5 9:00 arrive on site met with emily. We decoured the Doc for well. Then I started to decon tubing for developing well-5 @ 10:00. I finished @ 10:20 decoming tubing, Drove to 5 well @ 10:45 started to purge well #5. I purged the well until 11:30 the water was Dark brownish color with no order. I purged out 2.5 gallons of water, It Cleared up around 1.5 gallons. The well recovered very well about a tenth every 30 seconds. Done/complete at 11:45
#4 of well Mobilized to 4 location/well I started to pump well at 12:35 the wl was @ 14.62 I pumped the well Dry at 13:05 the water was Real clay like color in the beginning then it Cleared up at the end. the Turbidity was Hi. around 600 or so. Done at 13:15 with well. The well Recovered very well, Pumped 2 gallons out of well. Picked up all equit
#3 and mobilized to #3. They Dilled the well at 3. Due to the Rain we stopped at 3. We picked up and cleaned all the area & equit put away trash.

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/6/16

6:00 Drove to site arrived @ 7:14. I Met with Emily and Dissuced the scope/plan of work today. Waited on Other Team Member to arrive. 7:47 we did the safty meeting and dissuced the hazards.
8:00 we started to load/unload equit into field Vehicles, then went to clean all equit and Calibrate.
8:30 I drove over to # 3 well to start Developing the well @ 8:40 I started purging well. finished Purging @ 9:15 I Checked Recover on well it was fine at 1 tenth per/30 sec, on Recovery. I Cleaned up and deconed and Mobilized to Sample well # 5. I started to purge well for Sampling @ 10:00 I Collected all the Reading for the well that are Needed and then Collected my Sample, 2 poly bottles 250 ML each @ 11:00. I then cleaned up area and deconed the equit and Mobilized to # 4 well @ 11:30 started to purge well for Sampling. I collected the Parameters for the well. Then Sampled at 12:20. Cleaned and clean the equit and went to dump purge water. Came back to help Laura & Emily at staging location. We took equit Blank Sample from Strata Core and our equit. Then packed the Samples in a cooled laura went to drop them off at fedex, around 13:30 she came back @ 15:05. We are still here at #[illegible] well. we drilled to 42 feet. We finished here at 15:45. I then Drove to the office to get buckets for south area.

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/7/16

600 left the house Drove to site. I Arrived on site @ 7:16 we then Had our safty meeting, went over scope of work for today. I then Calibrated all the equip and then went to #3 well. started to purge #3 @ 8:15 Made sure all the parameters were up to par. then collected Samples @ 8:55 was finished cleaning up @ 9:10 and then went to dump purge water @ IDW location, Came back and started to Develop #2 @ 9:20 Purged 4.5 gallons. the went to the south area to Develop wells. I started to Sample SNMU1-02 well Collected all the parameter and then collected the sample @ 12:00. Then decone, Stripped well SNMU1-02) then went to develop FSSTA2 location. I polled out 7 gallon of water from well. we then met with EPA of #TA4 location. After Developing that well went to field to Develop the other wells (#4TA4) well 3 gallons of water from Developing, then went to field. No water in the well.

Daily Log - NAS Dallas - PFAs Groundwater Investigation

Project Number: 0888812796.FI.FS | Date: 12/9/16

6:00 Drove to the office. Unloaded the equit and tools from the pick up and put in the equit Room. Then went to Met with Brett about McGregor. Then Met with Emily about Nas Dallas. I then gathered all the equit and went to get GPS points from site and all the temp wells. and some of the old existing wells. I got all the wells P&A with Marisito around 12:30 ish. then went to get empty Drum loaded on his pick-up for him to take back to their shop. I then locked all the gates and Drove back to office to copy paper work and get paperwork from Brett for Mcgregor.

AG

Coordinates GPS

GPS 12/9/16 NAS DALLAS

well-ID	longitude	latitude	sats
FSS2TMW	32°44'34.846N	96°57'53.183w	6
FSS3TMW	32°44'35.879N	96°57'53.640w	7
FSS5TMW	32°44'40.796N	96°57'52.063w	7
FSS4TMW	32°44'38.261N	96°57'52.085w	6
FSS6TMW	32°44'39.933N	96°57'36.588w	6
FSS1TMW	32°44'34.112N	96°57'53.470w	6
FFTA6TMW	32°43'37.790N	96°58'29.352w	7
FFTA5TMW	32°43'39.031N	96°58'31.278w	7
SWMW1-01	32°43'34.721N	96°58'24.226w	7
SWMW1-02	32°43'36.648N	96°58'20.362w	7
308A51MW	32°43'39.572N	96°58'29.449w	5
FFTA1MW	32°44'05.793N	96°58'31.359w	6
FFTA2TMW	32°44'01.826N	96°58'37.684w	7
FFTA3TMW	32°43'57.265N	96°58'44.374w	6
FFTA7TMW	32°43'40.672N	96°58'27.052w	7
FFTA4TMW	32°43'58.202N	96°58'34.674	7

NAS Dallas Nov-Dec 2016 PFAs Groundwater Investigation

Date:

Project ID: 0888812796 FI FS

RC Staff:

Equipment: 100' water level indicator NOTE: Avoid contact of tape with water column.

Weather Conditions:

		Date	Time	DTW
	SWMU 108			
Sampled 1	40001MW	11/23	1507	5.05
Sampled 1	40003MW	11/28	1512	6.30
	SWMU 138			
Additional	41401MW	11/28	1535	4.43
	SWMU 17/Building 1423			
Sampled 1	61301MW	11/23	1503	9.42
Sampled 1	613D39MW	11/28	1455	8.84
Sampled 1	613D41MW	11/28	1500	5.01
	SWMU 17/Building 1429			
Additional	600D84MW	11/28	1448	3.08
Sampled 1	603D71MW	11/28	1440	5.44
Sampled 1	61201MW	11/28	1443	3.82
Additional	612D129MW	11/28	1450	7.24
	SWMU 18			
Sampled 1	606D150MW	11/29	0825	9.53
	SWMU 21			
Sampled 1	608D132MW	11/28	1330	10.53
Additional	608D142MWR	11/29	0882	9.94
Additional	608D144MW	11/29	0348	3.37
Sampled 1	608D161MW	11/29	0810	5.80
Sampled 1	608D33MW	11/28	1332	7.49
	SWMU 79/136 Central			
Sampled 1	508F51MW	11/28	1325	6.98
Additional	~~508F50MW~~ 508F61MW	11/28	1335	5.15
Additional	60-21	11/28	1505	9.64
	~~**SWMU 79/136 North**~~			
Additional	508F54MW	11/23	1355	7.10
	~~**SWMU 79/136 South**~~			
Additional	508F04MW	11/28	1345	11.32
	~~**SWMU 85**~~			
Additional	421B141MW	11/28	1520	7.89
	~~**SWMU 86**~~			
Additional	428B07MW	11/28	1320	5.72
Additional	428B134MW	11/28	1348	5.34
	SWMU 6P			
1	308A51MW	11/28/2016	1049	12.68

Note on 308A51MW only: TD and conditions

17.48 TD

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 088881279 6 FIFS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS1TMW

Start Date/Time: 12/6/2016 @ 1055

End Date/Time: 12/6/2016

Page 1 of 2

Total Depth: 45

Sampling Method: PVC Sleeves 5' x 1.75"

Drilling Equipment: DPT6600, 2.25 dia

Drilling Co.: SCI

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
1	0-4	100%		Hand Auger & Push	0-25	CL	0	Clay with silt & gravel, brown, med. stiff dry to moist. Angular to subrounded coarse to fine gravel (limestone & sandstone gravel) lean clay	
	0-5						1		
							2		
					25.5	CL/ML	3	Silty clay to clayey silt, brown/orange, med. stiff, dry, 0.5" bedding planes @ some med. sand, fat to lean, some roots	
							4		
2	5-10	100%			5.75	~~SC~~	5	SAA	
							6		
							7		
					7.5-15	CL	8	Clay with sand, tan to orange med. stiff, dry, med sand, lean to fat @ 9.1 ft bgs with 20 to 25% rounded, fine gravel, moist	
							9		
3	10-15	10%					10	No Recovery. Broken drill rod blocked the intake of sample tube.	
							11		
							12		
							13		
							14		
4	15-20	100%			15-45	CH	15	Fat clay, gray ~~to~~ to orange, med. stiff, moist	
							16		
							17		
							18		
							19	@19 ft. with 15% rounded fine gravel & concretions	
							20		

Notes: Dry. No Well set.

Well Constuction		Top	Base
Material:	Casing:	No Well	
Diameter:	Screen:		
Wellhead:	Grount:		
Ballards:	Bent/Seal:		
Pad:	Sand Pack:		

Sample ID	Time	Interval	Analyses
1)			
2)			
3)			
4)			
5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FI FS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

3.

Location ID: FSS1 TMW

Page 2 of 2

Start Date/Time: 12/6/2016

End Date/Time: 12/6/2016

Total Depth: 45

Sampling Method: PVC Sleeve 5' x 1.75"

Drilling Equipment: DPT 6600, 2.25 dia

Drilling Co.: ~~SCI~~ Strata Core

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
5	20-23	100%				CH	20	SAA same SIH	
							21		
							22		
6	23-27	80%				CH	23	SAA	Angle of drill rig is causing torque on rods & the hole is crooked.
							24		
EJB ~~7~~	~~15-22~~						25		
							26		
7	27-30	50%				CH	27	SAA	
							28		
							29		
8	30-33	50%				CH	30	SAA	
							1		
							2		
9	33-36	60%					3	SAA	
							4		
							5		
10	36-40	70%				CH	6	SAA	
							7		
							8		
							9	push to 45 - No water observed on top & soil was a dark orange hard clay.	
							40		

45 BGBH

3 4 4 4 4 4 4 4 4
5 5

Notes: No well set on 12/6/16. Hole left open over night to evaluate for water in the morning.

EJB

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS2 TMW

Start Date/Time: 12/7/16 @ 0750

End Date/Time: 12/7/16 @ 0815

Page 1 of 1

Total Depth: 14

Sampling Method: 5' x 1.75" PVC liners

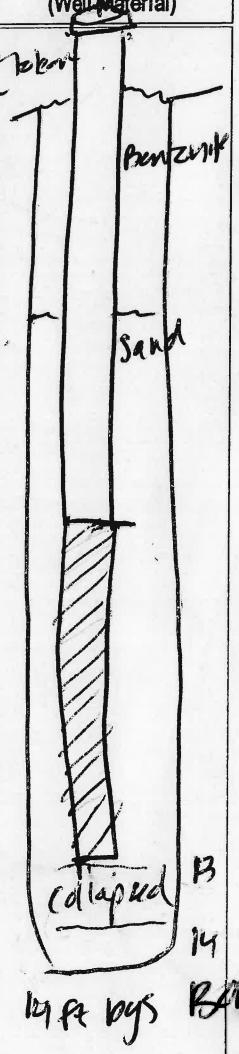
Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: ~~SCI~~ Strata Core

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
1	0-4	100%		0-1		CL/CH	0	Clay with silt, brown, med. stiff, moist, with organics & roots, some cobble, angular limestone/cavity gravel, fat to lean
				1-2.5		SC	1, 2	Clayey sand with gravel, reddish-brown to tan, loose to med. dense, moist, med. sand, fat clay, rounded sandstone cobbles
				2.5-4		CH/ML/CL	3	Silty clay, brown with 15% tan & orange mottles, med. stiff, moist, fat to lean
2	4-9	100		4-7			4, 5, 6	SAA, increasing silt content with depth
				7-10.5		SC/CL	7, 8, 9, 10	Clay with sand to clayey sand, tan w/ 10% orange mottles, med. dense to med. stiff, moist, med. sand @ 8 soft, moist, wet, fat @ 8.5 with fine rounded sandstone pebbles @ 9 to 9.5 SC, saturated
3	9-14							
				10.5-14		CH	11, 12, 13, 14	Fat clay with some silt, gray with 10% orange mottles, med stiff, moist
							15, 16, 17, 18, 19	BOB H

Generic Notes (Sample Interval) (Well Material)



Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material: Sch 40 PVC	Casing:	~~0~~ +1	~~12~~ +1 13	1)			
Diameter: 1"	Screen:	8	13	2)			
Wellhead: —	Grount:	—	—	3)			
Ballards: —	Bent/Seal:	0	5	4)			
Pad: —	Sand Pack:	5	13	5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FI FS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS 3

Start Date/Time: 12/5/16 1250

Page 1 **of** 1

End Date/Time:

Total Depth: 19' ~~25'~~

Sampling Method: AA

Drilling Equipment: Geoprobe

Drilling Co.: SCI

Geologist: L. Fess

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
(1) 0-5	44	60				CL	0	Clay w/silt dark brn w/ organics (roots grass) 4.6" sub gravel rounded 1/8 - 1/2" and ~5% mottling w brn very ~~dark~~ stiff	1" temp well sand to 2' above screen 3/8 bent. to top/surf.
							1		
							2		
							3		
							4	chalky limest gravel 9" layer	5' screen
(2) 5-10	60	60				CL	5	clay w/ silt dk brn as above w/ chalky gravel occ'l to 7' brn ~~dkbrn~~ stiff, dry	
							6		
							7	Clay, silty dk brn ~~and~~ and brn mottles breaking on 1/2" bedding planes, stiff	
							8		
							9		
(3) 10-15	60	60				CL ~~CH~~	10	10-12.5' Clay w/ silt ~~above~~ (slightly sandy) ~5% org-brn same gravel and 1/16 - 1/8	→ calc mods
							1		
							2		
							3	Clay w/ frag gravel, ~ ironstone, calc material, org brn, most clayey silt clay matrix, moist, ~ 40% gravel rounded → sub angular (fine - coarse) fat-lean clay	
(4) 15-20'						GC	4		
							5		
							6	as above sat'd, increasing clay content	
							7		
							8		
						CH	9	Clay, org brn	push to 20' set at 19'
							20		

Notes:	Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:			1)			
	Diameter:	Screen:			2)			
	Wellhead:	Grount:			3)			
	Ballards:	Bent/Seal:			4)			
	Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS4TMW

Page 1 of 2

Start Date/Time: 12/5/16

End Date/Time: 12/5/16

Total Depth: 25 ft bgs

Sampling Method: PVC Sleeves 5"X1.75"

Drilling Equipment: DPT 6600, 2.25" dia

Drilling Co.: SCI

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
1	0-5	90%		0-2.5		CL/ML	0	Clay with some silt & gravel, dark brown w/ 10% black mottling, stiff, dry, lean clay, angular to rounded chalky limestone gravel to pebbles coarse to fine	
				2.5-3		GC	2	chalky limestone gravel, with some clay, white gravel	
				3-10.5		CL/ML	3	brown clay, dense dry, angular gravel Silty clay to clayey silt, brown to dark brown, stiff, dry, increasing limestone gravel content @ 4.5 ft bgs. lean clay @ 5.5 to 6.5 ft bgs 10 to 15% orange mottling @ 7.5 ft bgs increasing fat clay content, to 8.5 dark brown. 5 to 10% rounded sandstone gravel fine	
2	5-10	100%					5		
3	10-15	100%		10.5-22.4		CH	10	Fat clay, olive gray, medium stiff, moist, minor silt content & calcite nodules	
4	15-20	100%					5	SAA	

Notes:	Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:	+2	18	1)			
	Diameter:	Screen:	18	23	2)			
	Wellhead:	Grount:	—	—	3)			
	Ballards:	Bent/Seal:	0	10	4)			
	Pad:	Sand Pack:	10	23	5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS4TMW

Start Date/Time:

Page 2 of 2

End Date/Time:

Total Depth: 25

Sampling Method:

Drilling Equipment:

Drilling Co.: SCI

Geologist:

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
5 20-25		100%				CH	20	SAA	
							21		
							22		
				22.4-22.9		SC		Clayey sand to sandy clay, orange med. dense, moist to wet, fine to med sand, fat clay	
				22.9-25		CH	23	Fat clay, orange to gray, stiff, moist	
							24		
							25	BOBH	
							6		
							7		
							8		
							9		
							0		
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		

FSS4

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 088812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FSS5 TMW

Start Date/Time: 12/5/2016 @ 845

End Date/Time: 12/5/2016 @ 1040

Page 1 of 1

Total Depth: 20

Sampling Method: DPT - Plastic Sleeves - 5'

Drilling Equipment: DPT 6600

Drilling Co.: SCI

Geologist: E. J. Brickner

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
1	0-5	80%	0 - 1.25			CL/ML	0	Clay to clay with some silt, brown w/5 to 10% Black & tan mottling; med-stiff, tan to fat moist. with organics & roots	
			1.25 - 1.5			GC	1	Limestone to chalk gravel with some clay, tan to white. some sandstone, angular to rounded	
			1.5 - 5			CL/ML	2 3 4	Silty clay to clayey silt, brown with some iron staining on bedding planes, medium stiff, dry, 0.5 inch bedding planes	
2	5-10	100%	5 - 5.7				5	SAA	
			5.7 - 8			ML/CL	6 7	Silt with some clay & gravel, orangish-brown med. stiff to stiff, dry. white chalky to limestone angular gravel with depth.	
			8 - 9			GM/GC	8	Limestone gravel, white, med. consolidated dry some silt & clay (brown)	
			9 - 10			ML	9 10	Silt with clay, sand & gravel, orangish-brown stiff dry	
3	10-15	100%	10 - 10.5			CL	1	Clay with sand, tan to orange, med. stiff, dry to moist, med sand	
			10.5 - 12.5				2		
			12.5 - 15			SC	3	Clayey sand to sandy clay, tan to orange soft to med. ~~stiff~~ dense moist to wet	
						SC/CH	4	med to fine sand @ 13 ft wet to saturated inorganic clay (fat clay)	
4	15-20	100%				SC	5 6		
						SC/CH	7 8 9 20	Fat clay lens	

BOBH

Boring Collapsed 17.5 - 20

FSS5

Notes:

Well Constuction			Top	Base	Sample ID	Time	Interval	Analyses
Material:	Sch 40 PVC	Casing:	+2.5	7.5	1)			
Diameter:	1"	Screen:	7.5	17.5	2)			
Wellhead:	\	Grount:	—	—	3)			
Ballards:	\	Bent/Seal:	0	4	4)			
Pad:	\	Sand Pack:	4	17.5	5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

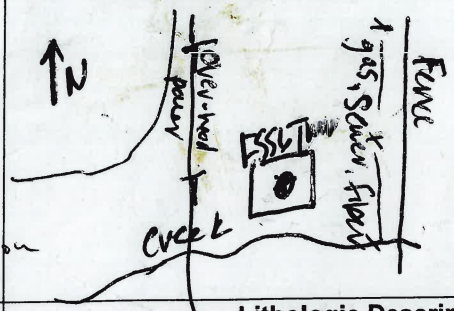
Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location



Location ID: FSSLTWW

Page 1 of 1

Start Date/Time: 12/6/16 @ 0835

End Date/Time: 12/6/16 @ 1030

Total Depth: 21 ft bgs DPT Refusal

Sampling Method: 5'-2.25" O.D. dia Sampler w/ PVC Sleeve

Drilling Equipment: DPT 6600

Drilling Co.: ~~SCI~~ Strata Core

Geologist: E. J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
1	0-4					CH	0	Fat clay, with some gravel, dark brown with 10 to 15% orange & tan mottling, med stiff, moist, rounded sandstone gravel (fine to coarse) ~ 10%. - Some organics	Hand Auger (0-4')
							1		
							2		
							3		
1900 Start pushing.						CH	4	@ 4 ft bgs transitions to fat clay, light gray, soft to med. stiff, moist, increasing silt content	Bentonite chips
2	4-9 ~~4-10~~	100%					5		
							6		
						CL	7	Clay with silt @ 8 ft, ~~1A~~ gB light gray with 15% oranges mottles, stiff to hard, dry	
							8		
3	9-12	100%					9	@ 9 hard -	20/40 filter pack (Bridge?)
							10		
							11	@ 11.5 to 11.7 orange, lean to fat	
4	12-16	70%					12		
							13	@ 13 interbedded & laminated, 15 to 20% orange mottles	
							14		
							15		
5	16-19	100%					16		
							17		
							18	@ 17.5 to 18.5 white crystaline percipitate along bedding planes & fractures	
6	19-21	100%		19-21		WS	19	Weathered shale, gray (10% orange), consolidated, significant percipitate along horizontal & vertical fractures & beds	
							20		
							21	DPT refusal	

Notes: First hand auger identified an obstruction at 3 ft bgs. Move West 2 ft & clear. 25 ft PVC total

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material: Sch. 40 PVC	Casing:	+4	11	1) —			
Diameter: 1"	Screen:	11	21	2) —			
Wellhead:	Grount:	—	—	3) —			
Ballards: —	Bent/Seal:	0	4	4) —			
Pad: —	Sand Pack:	4	21	5) —			

↳ bridged ~ 1/2 bag of sand

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FIFS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA1TMW

Start Date/Time: 12/7/16 @ 1000

End Date/Time: 12/7/16 @ 1100

Page 1 of 2

Total Depth: 28

Sampling Method: 5' x 1.75" PVC Sleeves

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: SCI

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
1	0-4	100	0-3.5			ML	0	Silt, orange to tan, stiff, dry to moist. @0-0.8 with roots	
							1		
							2	@2-3.5 semi consolidated, dry	
							3		
2	4-8	100%	3.5-9.2			SP	4	Sand, tan, loose, dry fine to very fine	
							5		
							6		
							7	@7.5 with some subangular fine sandstone gravel	
3	8-12	100%					8	@8.5 abundant rounded fine sandstone gravel, dry	
							9		
			9.2-28			CL	10	Clay with silt, light brown, med. stiff to stiff, dry, fat to lean	
							11	@11 ft bgs No silt, some (10% black organics)	
4	12-16	100%					12		
							13		
							14		
							15	@15.5 to 15.7 SP seam, fine to med sand, dry	
						SP			
5	16-20	100%				CL	16	SAA	
							17		
							18	@18 with some sand	
							19		
							20		

FFTA1

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 088812796 FIFS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FF7A1TMW

Start Date/Time: 12/7/16 @ 1000

End Date/Time: 12/7/16 @ 1100

Page 2 of 2

Total Depth: 28

Sampling Method:

Drilling Equipment:

Drilling Co.: SCI

Geologist:

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
6	20-24					CL	0	SAA	
							1		
							2		
							3		
7	24-28						4		
							25	@25.5-26 with rounded fine sandstone gravel	
							6		
							7		
							28	BOB H	
							9		
							0	No saturation identified Hole will remain open until ±24hrs, at which time it will be evaluated for the presence/absence of gw.	
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		

FF7A1

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 088812796 FI FS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA2 TMW

Start Date/Time: 12/7/16 @ 1120

Page 1 of ____

End Date/Time:

Total Depth:

Sampling Method: 4' x 1.75" PVC Liners

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: ~~SAE~~ EJB Strata Core

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
① 0-4		100%		0-9		CL	0	Clay with sand & silt, average, med stiff moist, some organics, some 5% gravel & cobbles med. to fine sand	
							1		
							2	fat to lean	
							3		
② 4-8		80%					4		
							5	@5.5 to 5.7 abundant rounded fine to coarse sands & gravel. wet	
							6	@5.7 soft to med. stiff.	
							7	@7 to 7.2 gravel moist	
③ 8-9		100%					8		
				9-9.3		SC	9	@9 to 9.3 clayey sand, lean, soft, saturated fine to med sand, fat clay	
				9.3-16		CH	10	Fat clay with some sand, gray, soft, wet, fine sand	
							11		
④ 12-16		75%					12		
							13	@13-13.5 saturated SC seam	
							14		
							15		
							16	BOBH	
							17		
							18		
							19		

FFTA2

Notes:

Well Constuction		Top	Base
Material:	Casing:	11	9
Diameter:	Screen:	9	14
Wellhead:	Grount:	—	—
Ballards:	Bent/Seal:	0	6
Pad:	Sand Pack:	6	14

Sample ID	Time	Interval	Analyses
1)			
2)			
3)			
4)			
5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FI FS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA3MW

Start Date/Time: 12/7/16 @ 1230

End Date/Time: 12/7/16

Page 1 of 2

Total Depth: 28

Sampling Method: PVC Sleeves 4' x 1.17"

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: SCI

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Generic Notes (Sample Interval) (Well Material)
1	0-4	90%		0-4		CL	0	Clay with sand, silt, & gravel, orange to tan, med. stiff, dry, med. sand, coarse angular to rounded gravel, lean clay	
							1		
							2		
							3		
2	4-8	100					4		
							5		
							6	@6 fat, soft to med. stiff, moist	
				7.5-7.7		SP/SC	7	@7.5 to 7.7 sand seam (SP/SC) wet, loose some clay	
3	8-12	100%		7.7-28		CH	8	Fat clay, tan to orange, med. stiff moist	
							9		
							10		
							11	@11 ft bgs. 1 to 2" sand seam.	
4	12-16	100%					12	SAA, dry	
							13		
							14		
							15		
5	16-20	100%					16	SAA	
							17		
							18		
							19		
							20		

FFTA3

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:	No Well Set		1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 08888 12796 FIFS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA3 TMW

Start Date/Time: 12/7/16

End Date/Time: 12/7/16

Page 2 of 2

Total Depth: 28

Sampling Method: —

Drilling Equipment: —

Drilling Co.: ~~SCI~~

Geologist: —

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
6	20-24	100%				CH	20	SAA	
							21	21 to 21.5 sandy clay, moist med. stiff	
							22		
							23		
7	24-28	100%					24	SAA	
							25	@ 26 ft bgs organics & gravel, dry	
							26		
							27		
							28	BCBH	
							9	leave hole open. Move over & ~~set well~~ push to ~~at~~ 12 ft bgs.	
							0		
							1	Limited saturation. Hole remained open for 24 hrs. & no water accumulated. Hole was abandoned	
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		

FFTA3

Notes:

Well Constuction		Top	Base
Material:	Casing:	No Well	
Diameter:	Screen:		
Wellhead:	Grount:	Set	
Ballards:	Bent/Seal:		
Pad:	Sand Pack:		

Sample ID	Time	Interval	Analyses
1)			
2)			
3)			
4)			
5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA4 TMW

Page 1 of 1

Start Date/Time: 12/7/16

End Date/Time: 12/7/16@1445

Total Depth: 12

Sampling Method: PVC Sleeves

Drilling Equipment: Geoprobe 6600

Drilling Co.: SCI

Geologist: EJ Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
① 0-4		100%		0-6.8		CL	0	Clay with silt, sand, & gravel, orange to tan, med. stiff, dry to moist, med. sand. abundant angular sandstone, d	
							1		
							2	@3ft. abundant gravel fine, tan	
							3		
② 4-8		80%					4		
							5	↓ to 5.1 ft bgs @5.1 abundant sand & clay moist	
							6		
				6.8-9.5		CH/	7	Fat clay, tan, med. stiff dry to moist, with sand, moist.	
③ 8-12		100%					8		
							9	9.5 to 10 with clay gravel, angular fine to coarse wet to saturated	
				9.5-10		GC			
				10-12		CH	10	Fat clay, brown to orange, stiff, dry	
							11		
							12	BCBH	
							3		
							4		
							5		
							6		
							7		
							8		
							9		

FFTA4

Notes:	Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:	11	6	1)			
	Diameter:	Screen:	6	11	2)			
	Wellhead:	Grount:	—	—	3)			
	Ballards:	Bent/Seal:	0	4	4)			
	Pad:	Sand Pack:	4	11	5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA5 TMW

Start Date/Time: 12/7/16 @ 1446 Page 1 of 1

End Date/Time: 12/7/16 @ 1515 Total Depth: 11

Sampling Method: 4' x 1.75" PVC

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: SCI

Geologist: E. J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
① 0-4		75%		0 - 4		CL	0	Clay with silt. to clayey silt. med stiff. friable, tan to gray, dry.	
							1		
							2		
							3	@3 ft bgs. angular to sub-rounded. sandstone gravel coarse to fine.	
② 4-8		100%		4-7			4	SAA	
							5	finley bedded. gray	
							6		
③ 8-11		100%		7-11		WS	7	Weathered shale. gray with some orange mottles (10%). fissile, moist	
							8		
							9		
							10		
							11	BOBH DPT refusal @ 11 ft bgs	
							12		
							3		
							4		
							5		
							6		
							7		
							8		
							9		

FFTA5

Notes:	Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:	+2	6	1)			
	Diameter:	Screen:	6	11	2)			
	Wellhead:	Grount:	—	—	3)			
	Ballards:	Bent/Seal:	0	5	4)			
	Pad:	Sand Pack:	~~6~~ 5	~~11~~ 11	5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 088812796 FIFS

Purpose: Temp Well Install

Project: PFAS GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

N

308ASTMW

FFTA5-TMW

Fence

FFTA4-TMW

Location ID: FFTA6TMW

12/8/2016@0815 Page 1 of 1

Start Date/Time: 12/8/2016

End Date/Time:

Total Depth: 20

Sampling Method: 4'x1.75" PVC Sleeve

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: SCI

Geologist: E.J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
1	0-4	100%		0-9		CL/ML	0–9	clay with silt to silt with clay, with some sand & gravel. tan to gray, med stiff dry. med. sand. bedded/fissile @3.5 ft abundant angular to subrounded gravel, tan @5.5 gray with 10% orange mottles @7 ft bgs some rounded sands & gravel	sand 7.4
2	4-8	100%							
3	8-11	100%							
				9-17.4		WS	9–17.4	Weathered Shale, gray to tan with 25% orange mottles, dry, fissile/friable @12 to 12.5 orange	17.4
4	11-14								
5	14-20							Push from 14 to 20 without collecting a sample	
				17.4-20		SH	17.4–20	Shale observed on DPT point ±2 ft from bottom of bore hole DPT Refusal @20 ft bgs	

FFTA6TMW

Notes: Dry. No gw sample collected.

Well Constuction		Top	Base
Material:	Casing:	+2.6	7.4
Diameter:	Screen:	7.4	17.4
Wellhead:	Grount:	—	—
Ballards:	Bent/Seal:	0	4
Pad:	Sand Pack:	4	17.4

Sample ID	Time	Interval	Analyses
1)			
2)			
3)			
4)			
5)			

RESOLUTION CONSULTANTS

Client: NAS Dallas

Project #: 0888812796 FIFS

Purpose: Temp Well Install

Project: PFAs GW Investigation

Location: Grand Prairie, TX

Sketch of Boring Location

Location ID: FFTA7TMW

Start Date/Time: 12/8/16 @ 0940

Page 1 of 1

End Date/Time: 12/8/16

Total Depth: 12

Sampling Method: 4' x 1.75" PVC Screens

Drilling Equipment: Geoprobe 6600 DPT

Drilling Co.: SCI

Geologist: E. J. Brickman

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Other	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)	Generic Notes (Sample Interval) (Well Material)
1	0-4	100%				CL	0	Clay with silt, tan to gray with 10 to 15% orange mottles, med. stiff, dry	
2	4-8	100%					4	SAA	
3	8-12	100%				WS	8	Weathered Shale, gray with 10% orange dry. ~~[illegible]~~ consolidated	
						SH	11	Shale, dark gray, consolidated, dry hard DPT refusal = BOBH	

No saturation observed, no well set. Leave hole open to evaluate for water on 12/9/16.

FFTA7TMW

Notes: Dry. No gw sample collected.

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

MUILI PARAMETER METER INSPECTION / CALIBRATION FORM

Site NAS Dallas – PFAs GW Investigation Make YSI Model 556 Serial # 12C101846

Source - Argus- Hazco

Clean / good shape? ☑ Yes ☐ No Others: Hach 2100 11050C009356

Batteries in good shape? ☑ Yes ☐ No

Generally Functioning Properly? ☑ Yes ☐ No

Sensors in good shape? ☑ Yes ☐ No

Dissolved Oxygen Calibration and Check

Elevation of Site _____ ft Source: _____

Barometric Pressure Inches of Hg X 25.4 = mm of Hg

Barometric Pressure Source _____

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)]

_____mm/Hg = _____ - [2.5 * (_____/100)]

Date &Time	Temp °C	Calc. DO mg/l (Table below)	Meter Reading	If Δ> 0.3 mg/l recalibrate

Additional Dissolved Oxygen Calibration and Check

Barometric Pressure Inches of Hg X 25.4 = mm of Hg

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)]

_____mm/Hg = _____ - [2.5 * (_____/100)]

Date Time	Temp °C	Calc. DO mg/l (Table below)	Meter Reading	If Δ> 0.3 mg/L recalibrate

DO in mg/L at Given Temps

C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L
0	14.621	7	12.139	14	10.306	21	8.915	28	7.827	35	6.950
1	14.216	8	11.843	15	10.084	22	8.743	29	7.691	36	6.837
2	13.829	9	11.559	16	9.870	23	8.578	30	7.559	37	6.727
3	13.460	10	11.288	17	9.665	24	8.418	31	7.430	38	6.620
4	13.107	11	11.027	18	9.467	25	8.263	32	7.305	39	6.515
5	12.770	12	10.777	19	9.276	26	8.113	33	7.183		
6	12.447	13	10.537	20	9.092	27	7.968	34	7.065		

ORP Ag/AgCl Volts = 0.231 + 0.0013 (25 - °C) Note: Most meters read in millivolts mv=Volts x 1000

Other Calibrations and Checks

Sensor	Time	Standard (s) Value	Source & Lot	Expiration Date	Meter Reading	Acceptance Criteria
Spec Cond	9:05	4.49	12326 Argus-Hazco	08/05/2017	3.968	± 5%
pH	9:10	4.00	Argus-Hazco	08/05/2017	3.97	± 0.2
ORP	–	–	–	–	–	±10 mV
Turbidity		10 NTU	AMCO C583309 ~~C57715~~	10/16	10.9	0.1 – 10 ±10% 11-40 ± 8%
Additional Checks						
Spec Cond		20 NTU	C582840	10/16	18.2	± 5%
pH		100 NTU	C580401	10/16	99.0	± 0.2
ORP		800 NTU	C577155	10/18	815	±10 mV
Turbidity		1020			pass	0.1 – 10 ±10% 11-40 ± 8%

Signature L.F. Print Laura Foss Date 11/29/2016

Alex Coutelles Alex Coutelles 11/29/16

MUILI PARAMETER METER INSPECTION / CALIBRATION FORM

Site NAS Dallas – PFAs GW Investigation Source - Argus- Hazco

Make YSI Model 556 Serial # #12C101846

Clean / good shape? ☑ Yes ☐ No

Batteries in good shape? ☑ Yes ☐ No

Generally Functioning Properly? ☑ Yes ☐ No

Sensors in good shape? ☑ Yes ☐ No

Others: #12C101846-YSI #1130301 - HACH/210CQ

Dissolved Oxygen Calibration and Check

Elevation of Site _____ ft Source: _____

Barometric Pressure Inches of Hg X 25.4 752.4 = mm of Hg YSI

Barometric Pressure Source YSI - #12C101846

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)] _____mm/Hg = _____ - [2.5 * (_____/100)]

Date &Time 12/1/2016 0814 Temp °C 13.58 Calc. DO mg/l (Table below) 8.40 pre Meter Reading 10.00 **If Δ> 0.3 mg/l recalibrate**

Additional Dissolved Oxygen Calibration and Check

Barometric Pressure Inches of Hg X 25.4 = mm of Hg

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)] _____mm/Hg = _____ - [2.5 * (_____/100)]

Date Time Temp °C Calc. DO mg/l (Table below) Meter Reading **If Δ> 0.3 mg/L recalibrate**

DO in mg/L at Given Temps

C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L
0	14.621	7	12.139	14	10.306	21	8.915	28	7.827	35	6.950
1	14.216	8	11.843	15	10.084	22	8.743	29	7.691	36	6.837
2	13.829	9	11.559	16	9.870	23	8.578	30	7.559	37	6.727
3	13.460	10	11.288	17	9.665	24	8.418	31	7.430	38	6.620
4	13.107	11	11.027	18	9.467	25	8.263	32	7.305	39	6.515
5	12.770	12	10.777	19	9.276	26	8.113	33	7.183		
6	12.447	13	10.537	20	9.092	27	7.968	34	7.065		

ORP Ag/AgCl Volts = 0.231 + 0.0013 (25 - °C) Note: Most meters read in millivolts mv=Volts x 1000

Other Calibrations and Checks

Sensor	Time	Standard (s) Value	Source & Lot	Expiration Date	Meter Reading	Acceptance Criteria
Spec Cond	0820	4.49 mS/cm	Argus-H		pre 4.506	± 5% post 4.491
pH	~~7.0~~800	7.00 su	#606677 6/18	6/30/18	7.05	± 0.2 post 6.99
pH ~~ORP~~	~~10~~.810	10.00 su	#601208 3 01/18	01/30/18	9.95	±10 mV 10.00
Turbidity						0.1 – 10 ±10% 11-40 ± 8%

Additional Checks

Spec Cond		20 NTU	Argus-H		20.1	± 5%
pH		100 NTU			101	± 0.2
ORP		800 NTU			805	±10 mV
Turbidity	0815	10 NTU	See above	See above	11.0 pass	0.1 – 10 ±10% 11-40 ± 8%

Signature Emily J Brickman Print Emily Brickman Date 12/1/2016

MUILI PARAMETER METER INSPECTION / CALIBRATION FORM

Site NAS Dallas – PFAs GW Investigation Source - Argus- Hazco Make YSI Model 556 Serial # 12210184

Clean / good shape? ✓ Yes ☐ No Others:

Batteries in good shape? ✓ Yes ☐ No

Generally Functioning Properly? ✓ Yes ☐ No

Sensors in good shape? ✓ Yes ☐ No

Dissolved Oxygen Calibration and Check

Elevation of Site _____ ft Source: _____

Barometric Pressure Inches of Hg X 25.4 = mm of Hg

Barometric Pressure Source _____

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)]
_____mm/Hg = _____ - [2.5 * (_____/100)]

Date &Time	Temp °C	Calc. DO mg/l (Table below)	Meter Reading	If Δ> 0.3 mg/l recalibrate

Additional Dissolved Oxygen Calibration and Check

Barometric Pressure Inches of Hg X 25.4 = mm of Hg

Corrected Barometric Pressure (if required for meter) (Station's BP in mmHg)–[2.5 * (Site Elevation in ft. /100)]
_____mm/Hg = _____ - [2.5 * (_____/100)]

Date Time	Temp °C	Calc. DO mg/l (Table below)	Meter Reading	If Δ> 0.3 mg/L recalibrate

DO in mg/L at Given Temps

C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L	°C	mg/L
0	14.621	7	12.139	14	10.306	21	8.915	28	7.827	35	6.950
1	14.216	8	11.843	15	10.084	22	8.743	29	7.691	36	6.837
2	13.829	9	11.559	16	9.870	23	8.578	30	7.559	37	6.727
3	13.460	10	11.288	17	9.665	24	8.418	31	7.430	38	6.620
4	13.107	11	11.027	18	9.467	25	8.263	32	7.305	39	6.515
5	12.770	12	10.777	19	9.276	26	8.113	33	7.183		
6	12.447	13	10.537	20	9.092	27	7.968	34	7.065		

ORP Ag/AgCl Volts = 0.231 + 0.0013 (25 - °C) Note: Most meters read in millivolts mv=Volts x 1000

Other Calibrations and Checks

Sensor	Time	Standard (s) Value	Source & Lot	Expiration Date	Meter Reading	Acceptance Criteria
Spec Cond	8:25	4.49	12326 Argus-Hazco	08/05/17	3.862	± 5%
pH	8:29	4.00		08/05/17	3.98	± 0.2
PH 7.00 ~~ORP~~	8:35	7.00		08/05/17	7.00	±10 mV
Turbidity						0.1 – 10 ±10% 11-40 ± 8%

Additional Checks

Spec Cond		20 NTU			20.2	± 5%
pH		100 NTU			100	± 0.2
ORP		800 NTU			804	±10 mV
Turbidity	0805	10 NTU			11.0	0.1 – 10 ±10% 11-40 ± 8%

Signature _____ Print _____ Date _____

Calibration of YSI

YSI Multi 556 12C101846

Sensor	Time/Date	Standard Value	Meter Reading	Acceptance Criteria
	12/5/16 7:50	4.49 MS/cm		
Spec Cond	7:50	4.49 MS/cm	4.431	4.44
pH		7.00	6.98	7.00
Turbidity				
Spec Cond	12/6/16 8:15	4.49 MC/cm	4.498	4.49
pH		7.00	6.82	6.99
	12/7/16 8:20	4.49 MS/cm	4.426	4.43
Spec Cond		7.00	6.97	6.98
pH				

Former FSS

RESOLUTION CONSULTANTS

Well ID: 606D150mw

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 11/29/2016
Time: Start 1005 am/pm
Finish 1130 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: breezy cool clear
Collector(s): LFoss AGonzalez BHomby

CONDITION OF WELL: OK	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material _____

b. Depth to water from TOC (ft): 9.53 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1050		22.62	6.69	4.406	1.22	120.6	1.59		9.53	clear
1055		22.55	6.68	4.387	1.19	82.7	0.81		9.98	no odor
1100		22.61	6.68	4.357	0.97	70.0	0.83		10.10	
1105		22.82	6.67	4.355	0.85	58.9	0.82		10.29	
1110		23.19	6.67	4.270	0.60	52.6	0.82		10.39	
1115		23.14	6.67	4.349	0.56	51.9	0.77		10.51	
1120	~0.5	23.34	6.67	4.349	0.49	48.3	0.86		10.62	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
606D150MW-LF-1116	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1130

Comments

Signature _____ Date 11/29/16

Well ID: 608D161MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 11/29/2016
Time: Start 1200 am/pm
Finish 1240 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: clear breezy cool
Collector(s): L Foss A Gonzales B Hamby

CONDITION OF WELL: OK	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material _____

b. Depth to water from TOC (ft): 5.80 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1218		24.63	6.87	2.045	1.60	154.8	2.52	115	5.89	clear
1223		24.84	6.87	2.054	0.69	140.1	1.66	115	5.89	
1228		24.89	6.88	2.024	0.57	127.1	0.57	115	5.89	no odor
1233		24.79	6.88	2.021	0.62	114.6	0.47	115	5.89	
1238		24.71	6.88	2.058	0.59	110.0	0.82	115	5.89	
	~ 0.5G									
	0.5G									

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☑
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
08D161MW-LF-1116	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1240

Comments _____

Signature L. Foss Date 11/29/2016

Well ID: 508FS1MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 11/29/2016
Time: Start 1410 am/pm
Finish _____ am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: warm, clear, breezy
Collector(s): LFos, A Gonzalez, B Hamby

CONDITION OF WELL: OK	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 6.98 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1435		25.34	6.75	8.729	2.09	50.4	2.30	120	7.30	clear
1440		25.31	6.75	8.723	1.03	40.5	0.78	120	7.54	
1445		25.28	6.75	8.722	0.92	35.4	1.39	120	7.69	clear
1450		25.27	6.74	8.719	0.74	30.6	2.25	120	7.89	no odor
1455		25.20	6.73	8.671	0.63	27.1	2.37	120	8.10	
1500		25.27	6.72	8.664	0.64	24.3	2.95	120	8.39	
	~0.5 G									

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
508FS1MW-LF-11/16	Plastic	2 - 250 mL	cool	PFAs	1505
		+ 4 - 25 mL MS / MSD		by U.S. EPA Method 537 modified	

After sampling, took EBs 2 - 25 mL

Comments EB GW 112916 off WL probe 1515

Signature L. Fo

Date 11/29/16

Well ID: [illegible]

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas	Date: [illegible]	Time: Start 0840 am/pm
Project No: 0888812796 FI FS		Finish 0945 am/pm
Site Location: Grand Prairie, TX		
Weather Conds: [illegible]	Collector(s): [illegible]	

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ☑ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length [illegible] Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 10.83 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
0904	1 gallon	19.59	6.81	1.837	2.46	122.3	[illegible]	60	11.03	[illegible]
0909		20.01	6.77	1.857	3.37	93.1	0.8[illegible]		11.11	no odor
0914		20.75	6.78	1.882	2.93	89.2	0.81		11.14	
0919		21.[illegible]	6.79	1.905	2.85	[illegible]	0.62		11.2[illegible]	
0924		21.57	6.77	1.920	2.35	92.9	0.88		11.29	
0929		21.64	6.76	1.924	2.69	91.6	0.81		11.30	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
[illegible]D132MW-LF-1116	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	0940

Comments

Signature [illegible] Date [illegible]

RESOLUTION CONSULTANTS

Well ID: 608D33MW

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 11/30/2016
Time: Start 10:5 am/pm
Finish 1110 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: clear, breezy, cold
Collector(s): L Fox A Gonzales

CONDITION OF WELL: OK	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 7.49 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
Solinst 100' water level meter			60389/59615
YSI multi		556	12C101846
Hach turbidity meter		2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1030		21.73	10.37	0.714	3.27	93.5	4.37	60	8.24	clear
1035		22.21	10.51	0.737	3.04	82.1	4.35		8.55	
1040		22.59	10.56	0.754	2.74	65.8	3.43		9.80	no odor
1045		22.96	10.61	0.760	2.76	60.4	2.99		10.10	
1050		23.00	10.62	0.793	2.83	51.1	2.93		10.35	
1055		22.91	10.60	0.762	2.73	49.0	2.56		10.51	
	✓									

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
608D33MW-[illegible]	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1100

Comments _____

Signature [signature] Date 11/30/16

Well ID: G139[illegible]MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: [illegible] | Time: Start 1200 am/pm
Project No: 0888812796 FI FS | Finish 1250 am/pm
Site Location: Grand Prairie, TX
Weather Conds: [illegible] | Collector(s): [illegible]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ✓ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 9.42 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1215		25.86	7.33	1.649	7.27	175.5	1.30	[illegible]	10.19	clear
1218		[illegible]	[illegible]	[illegible]	[illegible]	173.0	0.74	[illegible]	10.75	
1223		25.49	7.35	1.653	5.26	170.6	0.79	65	10.92	no Odor
1224		25.59	7.36	1.658	5.38	170.2	0.58	[illegible]	11.1	
1233		25.76	7.31	1.668	5.25	165.5	0.71	[illegible]	11.50	
1235		25.31	7.37	[illegible]	5.23	162.1	0.56	[illegible]	11.73	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
G139[illegible]MW-LF-[illegible]	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1245

Comments _____

Signature [illegible] Date [illegible]

Well ID: GI3D41MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas	Date: 11/30/16	Time: Start 1310 am/pm	
Project No: 0888812796 FI FS		Finish _____ am/pm	
Site Location: Grand Prairie, TX			
Weather Conds: clear cool breezy	Collector(s): Louis A Gonzales		

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 9.81 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1300		25.10	6.89	1.346	3.03	166.8	2.58	75	9.75	
1335		25.26	6.90	1.303	1.76	151.8	2.62		9.84	
1340		25.43	6.90	1.258	1.34	148.1	1.17		9.91	
1345		25.41	6.89	1.158	1.11	146.7	0.69		9.98	
1350		25.62	6.94	1.060	1.65	145.4	1.12		10.06	
1355										

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
GI3D41MW-GF-1116	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1355

Comments _____

Signature _____ Date 11/30/16

Well ID: 613D39MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 11/30/14
Time: Start 1430 am/pm
Finish 1530 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: Cool clear breezy
Collector(s): LFoss AGonzalez

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ☒ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 8.84 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1448		24.29	6.85	1.294	2.49	205.7	5.95	75	9.17	clear
1453		24.36	6.85	1.305	2.21	191.1	4.15		9.21	
1458		24.30	6.85	1.307	1.98	178.4	3.34		9.19	no odor
1503		24.33	6.84	1.314	1.73	168.6	2.55		9.19	
1508		24.34	6.85	1.322	1.54	161.2	3.35		9.19	
1513		24.37	6.84	1.327	1.41	154.5			9.19	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☒	☒
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
613D39MW-LF-1116	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1520

Comments

Signature _____ Date _____

Well ID: [illegible]

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: 12/1/16 | Time: Start 0850 am/pm
Project No: 0888812796 FI FS | Finish [illegible] am/pm
Site Location: Grand Prairie, TX
Weather Conds: clear and cold | Collector(s): [illegible]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ☒ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material _____

b. Depth to water from TOC (ft): [illegible] Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
0913		21.88	6.75	8.362	5.01	249.2	1.49	75	7.10	clear
0918		21.91	6.73	8.336	2.39	217.1	1.66		7.28	
0923		22.25	6.76	8.346	1.41	196.2	1.70		7.41	no odor
0928		22.50	6.76	8.350	1.26	183.7	1.64		7.85	
0933		22.60	6.75	8.399	0.89	184.5	1.42		8.09	
0938		22.75	6.74	8.475	1.03	181.7	1.09		8.24	
0943		22.81	6.74	8.516	0.80	177.5	0.95		8.39	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
[illegible]-GE-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	0955

Comments _____

Signature [illegible] Date 12/1/16

Well ID: 4000MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas Date: [illegible] Time: Start [illegible] am/pm
Project No: 0888812796 FI FS Finish [illegible] am/pm
Site Location: Grand Prairie, TX
Weather Conds: [illegible] Collector(s): [illegible]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 5.09 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1045		20.83	6.72	9.167	2.57	80.2	1.96	50	5.26	clear
1050		20.84	6.72	9.215	1.63	71.3	1.72		5.32	no odor
1055		20.99	6.71	9.225	1.70	64.2	1.86		5.39	
1100		21.23	6.72	9.310	1.17	66.3	1.59		5.45	
1105		21.45	6.72	9.355	0.88	67.2	1.65		5.50	
1110		21.76	[illegible]	9.381	0.68	69.1	1.82		5.56	
1115		21.76	6.71	9.395	0.66	70.4	2.01		5.60	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
4000MW62 [illegible]	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1125

Comments

Signature [illegible] Date [illegible]

Well ID: 8 61201MW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas Date: 12/1/16 Time: Start 1210 am/pm
Project No: 0888812796 FI FS Finish 1300 am/pm
Site Location: Grand Prairie, TX
Weather Conds: clear cool breezy Collector(s): L Foss A Gonzales

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ✓ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 4.10 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1224		24.70	7.42	0.923	2.15	152.7	8.43	80	4.10	
1229		24.76	7.42	0.942	1.22	149.2	8.35	80	4.11	clear
1234		25.07	7.41	0.965	0.63	143.6	7.70	120	4.13	no odor
1239		25.44	7.42	0.973	0.47	139.9	7.19	150	4.15	
1244		25.45	7.41	0.975	0.34	128.4	5.93	120	4.15	
1249		25.47	7.41	0.977	0.28	128.0	5.00	120	4.15	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
61201MW-LF-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1255

Comments _____

Signature [signature] Date 12/1/2016

RESOLUTION CONSULTANTS

Well ID: 603D71AW

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 12/1/16
Time: Start 1320 am/pm
Finish 1420 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: clear cool breezy
Collector(s): L Foss A Gonzales

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD ✓ REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 5.36 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1340		23.21	6.85	2.980	3.51	208.2	1.58	45	5.55	
1345		23.62	6.86	2.961	4.02	204.8	0.36		5.61	
1350		23.77	6.88	2.792	3.85	197.9	0.63		5.64	
1355		23.62	6.91	2.630	3.64	193.5	0.86		5.65	
1400		23.69	6.99	2.485	3.64	186.7	0.98		5.67	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
603D11MW-LF-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1410

Comments

Signature L. [signature] Date 12/1/16

Former FSS
Temporary Wells

Well ID: FSS2 TMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 12/8/2016
Time: Start 1045 am/pm
Finish _____ am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: cold cloudy windy
Collector(s): A Gonzalez L Foss

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 1"

b. Depth to water from TOC (ft): 5.20 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1056		15.73	7.24	0.804	3.66	-97.9	57.2	80	5.87	murky
1101		16.71	7.25	0.823	2.70	-140.7	50.7		5.94	
1106		17.56	7.24	0.841	1.65	-163.6	22.4		6.01	
1111		17.94	7.23	0.840	1.63	-179.8	20.1		6.01	
1116		17.79	7.21	0.849	1.60	-243.4	20.9		6.02	clearing
1121	0.59	17.63	7.20	0.846	1.61	-253.2	19.2		5.99	
1126	~	17.65	7.20	0.846	1.64	-256.1	19.5		6.01	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
FSS2TMW-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1135

Comments

Signature _____ Date 12/8/2016

Resolution Consultants LowFlow-GW Form.xls

Well ID: FSS3TMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: 12-7-16 | Time: Start 8:15 am/pm
Project No: 0888812796 FI FS | Finish 9:10 am/pm
Site Location: Grand Prairie, TX
Weather Conds: Cloudy 60 Cool | Collector(s): [illegible]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 20.00 Length of Water Column 6.01 (a-b) Casing Diameter/Material 1" PVC

b. Depth to water from TOC (ft): 13.99 Calculated 1 Volume (see back) 2.46 Calculated 3 Volumes ____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
8:30		20.03	7.06	0.590	3.47	4.8	26.9	350	13.99	
8:35		21.32	7.06	-440	1.52	130.0	9.07	400	14.05	
8:40		21.63	7.05	0.607	0.96	-225.0	6.21	"	14.05	
8:45		21.42	7.04	0.604	1.22	-240.0	4.40	"	14.04	
8:50		21.44	7.04	0.605	1.23	-240.0	4.41		14.05	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	8:55

Comments Purged 4 gallons of water

Signature [illegible] Date 12/7/16

Well ID FSS4TMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: 12/6/16 | Time: Start 11:30 am/pm | Finish 12:30 am/pm

Project No: 0888812796 FI FS

Site Location: Grand Prairie, TX

Weather Conds: Cold 60 Cloudy | Collector(s): Alex Gonzales

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 25.00 Length of Water Column 11.79 (a-b) Casing Diameter/Material 1" PVC

b. Depth to water from TOC (ft): 13.21 Calculated 1 Volume (see back) 4.83 Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
11:40		20.94	6.89	1.005	0.99	-234.1	36.1	175	20.16	Murky Odor
11:45		20.84	6.88	1.008	0.81	-235.0	5.4	160	20.30	Clear None
11:50		20.69	6.88	1.007	0.78	-212.0	5.6	160	20.24	Clear
11:55		20.81	6.87	1.008	0.77	-210.0	5.4	160	20.24	Clear
12:00		20.90	6.88	1.007	0.75	-201.0	5.1	160	20.24	Clear

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	12:20

Comments Screen (18-23)
Tubing @ 20.00 feet. purged 3 gallons

Signature Alex Gonzales Date 12/6/16

7.5/17.5 screen

Well ID FSS5THN

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas Date: 12/6/16 Time: Start 10:10 am/pm
Project No: 0888812796 FI FS Finish 11:15 am/pm
Site Location: Grand Prairie, TX
Weather Conds: Cloudy Cold 58° Collector(s): Alex Gonzales

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 20.00 Length of Water Column 3.19 (a-b) Casing Diameter/Material 1" PVC

b. Depth to water from TOC (ft): 16.81 Calculated 1 Volume (see back) 1.30 Calculated 3 Volumes ____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
10:30		22.67	6.88	0.982	3.64	-252.6	13.0	230	17.99	Clear/None
10:35		23.09	6.87	1.089	2.35	-268.4	44.3	245	17.85	
10:40		23.27	6.86	1.031	1.97	-268.6	23.5	250	17.80	
10:45		23.10	6.86	1.048	1.94	-269.4	20.0	250	17.81	
10:50		23.91	6.86	1.039	1.92	-268.3	17.4	250	17.80	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	11:00

Comments Purged 4 gallons
Screen @ 7.5 - 17.5' Tubing Set @ ~~[illegible]~~ 12 feet

Signature Alex Gonzales Date 12/6/16

Well ID: FS5G TMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas	Date: 12/4/16 * Develop 12/7/16 12/8/16	Time: Start 0750 am/pm	0930 0840
Project No: 0888812796 FI FS		Finish 0850 am/pm	
Site Location: Grand Prairie, TX			
Weather Conds: cold rainy windy	Collector(s): Gross		

CONDITION OF WELL: Temp	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length (21.5) 25' Length of Water Column 4.47 (a-b) (14.33) Casing Diameter/Material 1"

b. Depth to water from TOC (ft): 20.53 (7.17) Calculated 1 Volume (see back) 0.18 G (0.58 G) Calculated 3 Volumes

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
0900		13.15	7.33	9.321	8.33	278.9	52.4	75	8.76	slhly
0905		11.33	7.33	8.772	7.99	278.3	62.6	7	9.70	murky
0910		10.29	7.34	8.794	7.19	272.0	51.0		10.41	
0915	9.34 ~~11.04~~		7.33	8.714	6.98	265.3	55.3		11.09	
0920		9.14	7.32	8.731	6.88	26.8	47.2		11.89	
0925										

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

no metals analyses

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
FS5G TMW - 12/4	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	~~0850 12/7/16~~ 0930 12/8/16

Comments

* Well was dry on the sixth 4.47' of water 0750 12/7. Cut down full casing. Per EB collected sample prior to developing well in order to assure collection. Apparent recharge. Purging well dry. 12/8 Recharge -> Sample over

Signature _____ Date 12/4-8/16

Resolution Consultants LowFlow-GW Form.xls

21.5 toc 300.0 256.5 60.0 43.5

Former FFTA

Well ID: FFTA2TMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: 12/8/16 | Time: Start 1205 am/pm | Finish 1310 am/pm

Project No: 0888812796 FI FS

Site Location: Grand Prairie, TX

Weather Conds: cold, windy, overcast | Collector(s): LFoss

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length _____ Length of Water Column _____ (a-b) Casing Diameter/Material 1"

b. Depth to water from TOC (ft): 5.84 Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1216		13.84	7.49	0.736	3.52	-17.3	68.9	90	6.01	murky
1221		13.82	7.46	0.736	1.24	-24.2	63.2		6.04	
1226		13.90	7.47	0.737	1.18	-26.2	61.9		6.02	
1231		13.93	7.46	0.738	1.19	-26.1	62.3		6.04	
1236		14.02	7.46	0.740	1.12	-25.7	62.2		6.04	
1241										
1246										

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
FFTA2TMW-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1240

Comments 2 + 4 ms/msD

Signature L. Foss Date 12/8/16

Well ID: FFTA-4

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas | Date: 12/8/16 | Time: Start 13:40 am/pm
Project No: 0888812796 FI FS | Finish 14:30 am/pm
Site Location: Grand Prairie, TX
Weather Conds: Cold 50 windy | Collector(s): [signature]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 15.00 Length of Water Column 5.3 (a-b) Casing Diameter/Material 1" PVC

b. Depth to water from TOC (ft): 9.70 Calculated 1 Volume (see back) 2.17 Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
13:50		13.4	7.55	0.72	7.30	88.1	0.44	50ML	9.77	Mostly [illegible]
13:55		13.91	7.59	0.729	7.58	89.6	0.32		9.71	
14:00		14.13	7.59	0.736	7.47	76.1	0.39		9.72	
14:05		14.09	7.59	0.734	7.43	74.0	0.28		9.77	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	14:10

Comments _____

Signature [signature] Date 12/8/16

Well ID: 308ASIMW

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 12/7/2016
Time: Start 1255 am/pm
Finish 1353 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: cool, breezy, overcast
Collector(s): L Foss

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ X N/A	BOLLARDS: X GOOD o REPAIR #____ o N/A
LOCK: o GOOD X REPLACE o N/A	EXPANSION CAP: o GOOD X REPLACE	PAD: X GOOD o REPAIR (Comment Below) Cut Casing

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 17.48 Length of Water Column 2.11 (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 15.37 Calculated 1 Volume (see back) 0.34 G Calculated 3 Volumes ____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1306		18.01	6.85	3.392	7.71	232.1	1.58	~50	15.61	clear
1311		17.97	6.84	3.442	3.77	215.7	1.43		15.65	no odor
1316		17.86	6.84	3.439	2.09	199.9	1.41		15.68	
1321		17.80	6.84	3.435	1.85	197.2	1.29		15.71	
1326		17.71	6.82	3.432	1.86	182.1	1.18		15.72	
1331	~0.25G	17.70	6.82	3.435	1.88	182.7	1.16		15.74	
1336										

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
308ASIMW-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1340

Comments
Due to lol of water in casing, very low flow

Signature L. F. Date 12/7/2016

30807MW

Well ID: SWMU1-01

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 12/7/2016
Time: Start 1405 am/pm
Finish 1455 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds: cool, breezy, overcast
Collector(s): L Foss

CONDITION OF WELL:	BOLTS: X GOOD o REPLACE #____ o N/A	BOLLARDS: X GOOD o REPAIR #____ o N/A one
LOCK: o GOOD o REPLACE X N/A	EXPANSION CAP: X GOOD o REPLACE	PAD: X GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

a. Total Well Length 24.23 Length of Water Column 11.4 (a-b) Casing Diameter/Material 2"

b. Depth to water from TOC (ft): 12.88 Calculated 1 Volume (see back) ~1.9 G Calculated 3 Volumes

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Solinst 100' water level meter		60389/59615
	YSI multi	556	12C101846
	Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
1415		18.81	6.92	3.251	1.82	-24.0	3.63	~80	13.15	clear
1420		19.05	6.91	3.267	1.24	-26.8	2.54		13.21	strong
1425		19.31	6.92	3.285	0.79	-30.2	1.98		13.23	rotten egg
1430		19.35	6.91	3.287	0.85	-30.0	1.80		13.35	odor
1435		19.38	6.90	3.287	0.90	-32.1	1.62		13.42	
1440	~1G	19.44	6.90	3.290	0.87	-30.9	1.69		13.48	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
SWMU1-01-1216	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	1445

Comments

Signature L. F

Date 12/7/2016

30809MW

Well ID: SWMW 1-02

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: NAS Dallas
Date: 12/7/16
Time: Start 11:10 am/pm
Finish 12:00 am/pm
Project No: 0888812796 FI FS
Site Location: Grand Prairie, TX
Weather Conds:
Collector(s): [illegible]

CONDITION OF WELL:	BOLTS: o GOOD o REPLACE #____ o N/A	BOLLARDS: o GOOD o REPAIR #____ o N/A
LOCK: o GOOD o REPLACE o N/A	EXPANSION CAP: o GOOD o REPLACE	PAD: o GOOD o REPAIR (Comment Below)

1. WATER LEVEL DATA: (measured from Top of Casing, TOC)

29.10 a. Total Well Length [redacted] Length of Water Column 10.65 (a-b)

Casing Diameter/Material 2" PVC

18.45 Depth to water from b. TOC (ft): [redacted] Calculated 1 Volume (see back) _____ Calculated 3 Volumes _____

2. WELL PURGE DATA

a. Purge Method: peristaltic pump (pegasus alexis peri pump - internal battery) 80990/76579

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	- D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
Solinst 100' water level meter		60389/59615
YSI multi	556	12C101846
Hach turbidity meter	2100Q	11050C009356

Time (24hr)	Volume Removed (gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (feet)	Color/Odor
11:30		16.5	6.75	4.806	5.37	227.6	2.92	200	18.51	Clear None
11:35		16.16	6.76	4.816	3.26	226.4	2.01		18.96	
11:40		16.19	6.75	4.812	2.91	226.4	2.06		19.19	
11:45		16.18	6.74	4.871	2.69	219.3	1.94		19.26	
11:50		16.22	6.76	4.892	2.90	220.0	2.01		19.29	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: low flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	Plastic	2 - 250 mL	cool	PFAs by U.S. EPA Method 537 modified	12:00

Comments Purged 1.5 gallons of water

Signature [illegible] Date 12/7/16

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. CJB112416 | Page 1 of 1

Project Name: PFAS Groundwater Investigation | PO No. 21529 | Project No. 08880/2796 | Phase FIFS

Site Location: NAS Dallas

CTO No. JM78 | RC Project Manager: Tom Wilbury

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAS [illegible]										Extra Volume for MS/MSD	HOLD
	GOGD150MW-LF-1116	GOGD150MW	11/29/16	1130	WG	N	N	2	X											
	GORD161MW-LF-1116	GORD161MW	11/29/16	1240	WG	N	N	2	X											
	SORF51MW-LF-1116	SORF51MW	11/29/16	1335	WG	N	N	6	X										X	
	EBGW112916	—	11/29/16	1510	WQ	EB	N	2	X											

***Field* Comments:** TRRP Reporting — no preservative

***Lab* Comments:** Modified — 7 Day Hold — 16 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	11/29/16	1450	1		
2			2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes ✓ No____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 11/29/2016

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: HA=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

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RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB112016 | Page 1 of 1

Project Name: PFA Groundwater Investigation | PO No. 21529 | Project No. [illegible] Phase RI/FS

Site Location: NAS Dallas

CTO No. JM23 | RC Project Manager: Tim Cubbage

Sampler/Site Phone#

Lab Name: Test America Savannah | Turnaround Time(specify): 21 Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers	PFAS Analysis (3)→										Extra Volume for MS/MSD	HOLD
	608D132MW-LF-111616	608D132MW	11/16/16	0910	WG	N	N	2	X											
	608D133MW-LF-111616	608D133MW		1100	WG	N	N	2	X											
	613D41MW-LF-111616	613D41MW		1245	WG	N	N	2	X											
	613D41MW-LF-111616	613D41MW		1355	WG	N	N	2	X											
	613D39MW-LF-111616	613D39MW	11/16/16	1530	WG	N	N	2	X											
	FB112016	—	11/16/16	1535	WQ	FB	N	2	X											

***Field* Comments:** TRRP Reporting no Groundwater

***Lab* Comments:** Manifest 7 Day Hold 16FAB

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	11/16/16	1640	1		
2			2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes____ No____

Method of Shipment: FedEx

Airbill No:

Date Shipped: 11/30/16

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: HA=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

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RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. ESB120116 | Page 1 of 1

Project Name: PFAS Groundwater Investigation | PO No. 21529 | Project No. [illegible]12786 Phase E1FS

Site Location: NAS Dallas

CTO No. SM78 | RC Project Manager: [illegible]

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAS USEPA Method 537										Extra Volume for MS/MSD	HOLD
	40001MW-LF-1216	40001MW	12/01/16	0955	WG	N	N	2	X											
	40001MW-LF-1216	40001MW	12/01/16	1125	WG	N	N	2	X											
	61201MW-LF-1216	61201MW	12/01/16	1255	WG	N	N	2	X											
	603D71MW-LF-1216	603D71MW	12/01/16	1410	WG	N	N	2	X											
	EBGW120116	—	12/01/16	1440	WG	EB	N	2	X											
	FB120116	—	12/01/16	1450	WG	FB	N	2	X											

***Field* Comments:** PFAS Reporting - no preservative -

***Lab* Comments:** Modified - 7 Day Hold - 14 PFAS

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	12/1/2016	1550	1		
2			2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/01/2016

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: HA=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

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RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. [illegible] | Page 1 of 1

Project Name: PFAS Groundwater Investigation | PO No. 21529 | Project No. [illegible] | Phase FIES

Site Location: NAS Dallas

CTO No. TM 73 | RC Project Manager: Tim Wibey

Sampler/Site Phone#

Lab Name: TestAmerica Sacramento | Turnaround Time(specify): 21 Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAS Analysis (537.1)										Extra Volume for MS/MSD	HOLD
	FS54TMW-1216	FS54TMW	12/06/16	1230	WG	N	N	2	X											
	FS55TMW-1216	FS55TMW	12/06/16	1130	WG	N	N	2	X											
	EBGW120616	—	12/06/16	1245	WQ	EB	N	2	X											
	EDWC120616	—	12/06/16	1310	WQ	ED	N	2	X											

***Field* Comments:** TRRP Recertification — no preservative —

***Lab* Comments:** Month 1 7-Day Hold 16 PFAS

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/6/2016

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 TRRP Recertification			1		
2 [illegible]	12/06/2016	1445	2		
3			3		

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) **Sample Type: AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) **Preservative added: HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

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RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJT120716 | Page 1 of 1

Project Name: PFAS Groundwater Investigation | PO No. 21529 | Project No. 0558812796 | Phase F1 F3

Site Location: NAS Dallas

CTO No. 1M73 | RC Project Manager: Tom Wiberg

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAS US EPA Method 537										Extra Volume for MS/MSD	HOLD
	30BASTMW-LF-1216	30BASTMW	12/7/16	1340	WG	N	N	2	X											
	SWMW1-01-1216	SWMW1-01	12/7/16	1415	WG	N	N	2	X											
	FFTASTMW-1216	FFTASTMW	12/7/16	0855	WG	N	N	2	X											
	SWMW1-02-1216	SWMW1-02	12/7/16	1200	WG	N	N	2	X											

LF

***Field* Comments:** TRRP Reporting - no preservative -

***Lab* Comments:** Modified 7 day hold 16 PFAS

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	12/7/2016	1670	1		
2			2		
3			3		

Samples Iced?(check) Yes ✓ No____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/7/2016

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: HA=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

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RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. [illegible] | Page 1 of 1

Project Name: [illegible]

PO No. [illegible] | Project No. [illegible] Phase [illegible]

Site Location: NAS Dallas

CTO No. JM33 RC Project Manager: [illegible]

Sampler/Site Phone#

Lab Name: [illegible] Turnaround Time(specify): [illegible]

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers	[illegible]										Extra Volume for MS/MSD	HOLD
(3)→									F											
	FS56TMW-1216	FS56TMW	12/8/16	0930	WG	N	N	2	X											
	FS52TMW-1216	FS52TMW	12/8/16	1135	WG	N	N	3	X											
	FFTA2TMW-1216	FFTA2TMW	12/8/16	1240	WG	N	N	6	X										X	
	FB120816	—	12/8/16	1320	WQ	FB	N	2	X											
	EDWC120816-A	—	12/8/16	0850	WQ	FB	N	2	X											
	EDWC120816-B	—	12/8/16	0850	WQ	FD	N	2	X											
	EDDPT120816-A	—	12/8/16	0810	WQ	FB	N	2	X											
	EDDPT120816-B	—	12/8/16	0930	WQ	FD	N	2	X											
	FFTA4TMW-1216	FFTA4TMW	12/8/16	1410	WG	N	N	2	X											
	FFTA4TMW-1216-D	—	12/8/16	—	WQ	FD	N	2	X											

Field **Comments:** [illegible]

Lab **Comments:** [illegible]

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [illegible]			1		
2 [illegible]	12/8/2016	1530	2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No____

Method of Shipment: [illegible]

Airbill No:

Date Shipped: 12/8/16

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate. If **NO preservative** added leave blank

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Appendix C
Investigation Derived Waste Disposal Documentation

Stericycle®
Environmental Solutions

Dallas, Texas
945 E Pleasant Run Road
Lancaster, Texas 75146

Pasadena, Texas
9950 Chemical Road
Pasadena, Texas 77507

Austin, Texas
6220 Banning Ln.
Austin, Texas 78724

Snyder, Texas
749 S. CR 221
Snyder, Texas 79549

Office: 972-329-1200 / 1-877-207-1299 Fax: 972-329-1206

Order/Invoice #: 147894

Invoice Date: 1/12/2017
Order Date: 1/03/2017

RECEIVED
JAN 17 2017

Billing Information:
EnSafe, Inc.
5724 Summer Trees Dr.
Memphis, TN 38134

Billing ID #: 2618

Customer Information:
Naval Air Station Dallas (NAS)
c/o EnSafe Inc.
4545 Fuller Dr., Suite 342
Irving, TX 75038

Customer No.: 1008464
Customer P.O. No.: 22273
Project #: 0-0

*** PICKUP ITEMS ***

Item#	Qty. Shipped	Vol./Wt.	Item # - Material Description - Manifest #	Price/Unit	Item Total $
1	1 DM (55 G)	55 G 495 P	5110167655 - IDW Soil cuttings NR, PC: 737S Manifest #: NHM-147894-01	$95.00 Per Container	$95.00
2	3 DM (55 G)	165 G 1485 P	5110167656 - IDW purge and decon waters NR, PC: 737L Manifest #: NHM-147894-02	$115.00 Per Container	$345.00
				Pickup Items Total:	$440.00

*** DELIVERY ITEMS ***

Item#	Shipped	Product # - Description	Price/Unit	Item Total $
1	4.000	91007-104 - Transportation / 55 gallon drums	$25.00	$100.00
2	540.000	77300-001 - E&I Fee	$0.12	$64.80
			Delivery Items Total:	$164.80

Sales Tax : $0.00

Total Invoice: $604.80

Terms: Net 30 Days

Comments:

Thank You For Your Business !!!

Please Remit Payment To:
Stericycle Environmental Solutions
27727 Network Place
Chicago, IL 60673

Servicing Your Environmental Needs With Excellence !!!

We Accept VISA, Master Card and Discover

Appendix D
Data Usability Study and Laboratory Data

Data Usability Summary
For Groundwater Samples
Collected November and December 2016
Former Naval Air Station Dallas
Dallas, Texas

FOREWORD

This appendix contains the data usability summary report, indicating the quality and usability of groundwater analytical results for samples collected in November and December 2016. This report assesses whether sample handling, preparation, analysis, quality control, and reporting were accomplished in accordance with United States Environmental Protection Agency analytical methods and Texas Commission of Environmental Quality guidelines.

Laboratory data were reported and reviewed in accordance with the Texas Commission of Environmental Quality guidance document *Review and Reporting of COC Concentration Data under TRRP* (RG-366/TRRP-13), May 2010. All required Texas Risk Reduction Program data quality elements, laboratory review checklists, and exception reports were provided by the laboratories.

Attachment A of this data usability summary provides analytical parameters for each sample and cross-references between laboratory and field sample identifications.

Attachment B presents final results, after data review, in tabular format.

Attachment C contains laboratory reports, laboratory review checklists, and exception reports.

1.0 DATA USABILITY SUMMARY

This report presents the analytical data collected as part of long term monitoring activities at the Former Naval Air Station Dallas, Texas site and the quality assurance/quality control (QA/QC) evaluation of those data. Data were evaluated independently from the laboratory to assess data quality. Samples discussed in this report were collected between 29 November and 8 December 2016, and were submitted to TestAmerica Laboratories, Inc. in West Sacramento, California. Tina Cantwell, Resolution Consultants chemist, reviewed the data package reported for these samples. All data were reviewed for conformance to the requirements of the Texas Commission on Environmental Quality guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13)(May 2010) and the *Draft Final Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Attenuation Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas,* (October 2016). The quality assurance criteria used to assess all data were established by the analytical methods and consistent with the relevant standards in the following guidance documents:

- *Department of Defense Quality Systems Manual for Environmental Laboratories,* Version 5.0. (July 2013).

- *National Functional Guidelines for Superfund Organic Methods Data Review*, EPA-540-R-2016-002. (United States Environmental Protection Agency [U.S. EPA] September 2016).

- *National Functional Guidelines for High Resolution Superfund Methods Data Review,* EPA-542-B-16-001. (U.S. EPA April 2016).

1.1 Intended Use of the Data

The intended use of the data is to determine the presence/absence of perfluoroalkyl substances (PFAS) in site groundwater at the Former Naval Air Station Dallas, Texas project site.

1.2 Requested Analysis

Groundwater samples were analyzed for the following:

- PFAS by high-performance liquid chromatography tandem mass spectrometry (LC/MS/MS) via modified U.S. EPA 537 and TestAmerica Laboratories standard operating procedure *Perfluorinated Compounds in Water, Soils, Sediments and Tissue by LC/MS/MS*, WS-LC-0025, Rev. 2.1, 9 December 2016.

1.3 Laboratory Submittals and Field Data Examined

Laboratory submittals and field data examined are as follows:

- Reportable data
- Laboratory review checklists and associated exception reports
- Applicable field records, preservation, and handling procedures prior to shipment to the laboratory

2.0 INTRODUCTION

The following lists sample matrix, quantities and analyses:

- Select VOCs — 22 groundwater samples, 1 groundwater duplicate, 8 equipment blanks, and 3 field blanks

The samples collected and sample identification cross-references are summarized in Attachment A.

Data Evaluation Criteria

Laboratory Quality Control (QC): The laboratory's statistically-derived recovery QC limits for accuracy and precision were used.

Field Duplicate Precision: Relative percent difference (RPD) of 30 for water

3.0 DATA REVIEW RESULTS

Groundwater samples discussed in this report were analyzed and reported as definitive data and QC summary information and raw data were submitted for U.S. EPA Stage 4 data validation. The data were reported by the laboratory in six sample delivery groups: 320-23884-1, 320-23931-1, 320-23996-1, 320-24149-1, 320-24184-1, and 320-24236-1. Elements of the deliverables provided by the laboratory were as follows:

• Completed chain-of-custody documentation • Analytical results • Results for re-analyzed and diluted samples • Sample receipt and log-in information • Laboratory case narrative • Reporting Limits • Data qualifiers applied to sample results • Sample preparation information	• Summary of QC results — Labelled isotope dilution analytes — Laboratory control samples (LCS) — Matrix spike/matrix spike duplicate (MS/MSD) — Laboratory method blanks — Field Blanks — Calibration data — Field Duplicates • Raw analytical data including: chromatograms, quantitation reports, standard traceability, instrument run logs, and sample preparation logs

The following flags were used by the laboratory to annotate results:

Laboratory Qualifiers

B = **Blank Contamination** — The analyte was detected in the associated method blank.

D = **Dilution** — The compound was re-analyzed at a secondary dilution factor.

E = **Estimated** — The value is outside calibration range.

H = **Estimated** — The result was analyzed outside of the recommended holding time.

J = **Estimated** — The analyte was detected above the sample detection limit (SDL) but less than the method quantitation limit (MQL).

M = Manually integrated compound

Q = **Estimated** — One or more quality control criteria failed.

U = **Undetected** — The analyte was undetected above the SDL.

When the QC parameters did not fall within the specific method or data review guidelines, the data reviewer annotated or "flagged" the corresponding compounds. Flags used during this data review are as follows:

Data Review Qualifiers

J = **Estimated Value** — One or more QC parameters were outside control limits or the concentration of the analyte was above the SDL, but less than the MQL.

JH = **Estimated and Biased High —** Bias in sample result is likely to be high.

JL = **Estimated and Biased Low —** Bias in sample result is likely to be low.

U = **Undetected** — The analyte was undetected above the SDL or was qualified as undetected during blank examination; the associated value presented is the SDL.

UJ = **Undetected and Estimated** — The parameter was analyzed but undetected and was estimated because at least one QC parameter was outside control limits.

UJL = **Undetected**, **Estimated, and Biased Low** — The parameter was undetected and the bias in the result is likely to be low.

UR = **Rejected/Unusable Data** — One or more parameters grossly exceeded control limits.

3.1 Analytical Results

All undetected results are reported at less than the value of the SDL as defined by the Texas Risk Reduction Program rule. All values were estimated (J-flagged) by the laboratory when results were reported below the MQL but above the SDL.

3.2 Data Review Findings

The overall data quality for the sample results were evaluated based on method compliance, data usability, and scope-of-work satisfaction. In accordance with the project Sampling and Analysis Plan, data evaluation for the samples included the following parameters:

- Sample receipt, preservation, and holding times
- Labeled isotope dilution analytes
- Laboratory control samples
- Matrix spike matrix spike duplicates
- Laboratory blank analysis (method)
- Field blank analysis (equipment and field)
- Tuning data
- Calibration data
- Field duplicate precision
- Sample re-analysis and dilutions
- Raw data examination

The following sections detail the data review findings and qualifications performed.

3.2.1 Sample Receipt, Preservation, and Holding Times

All samples were received by the laboratory intact, properly preserved, and under proper chain-of-custody. All coolers were received by the laboratory at temperatures below 6 degrees Celsius, which met acceptance limits. All samples were prepared and analyzed within holding times except for the re-analyzed samples shown in Table 3-1; affected results were qualified as estimated "JL" and may be biased low.

Table 3-1
Holding Time Outliers

Sample	Analyte	Sample Date	Preparation Date	Date Analyzed	Preparation Holding Time	Days Past Preparation Hold Time	Flags
508F51MW-LF-1116 Re-analysis	All PFAS	11/29/2016	12/19/2016	12/20/2016	20	6	JL
SWMU1-01-1216 Re-analysis	Perfluorohexanoic acid (PFHXA)	12/7/2016	1/4/2017	1/5/2017	28	14	JL
SWMU1-02-1216 Re-analysis	Perfluorohexanoic acid (PFHXA)	12/7/2016	1/4/2017	1/5/2017	28	14	JL

Notes:
JL = Positive and undetected results were qualified as estimated indicating potential low bias.

3.2.2 Labelled Isotope Dilution Analytes

The isotope dilution analytes (IDA) consist of carbon-13 labeled analogs, oxygen-18 labeled analogs, or deuterated analogs of the compounds of interest, and they are spiked into every standard and sample at the time of extraction. This provides a correction for recovery of each corresponding native compound because the native compound and its labeled compound exhibit similar effects upon extraction, concentration, and analysis. By determining the ratio of these amounts, both the quantity and mass of the compound can be ascertained.

Labelled IDAs were reviewed in accordance with *National Functional Guidelines for High Resolution Superfund Methods Data Review,* (U.S. EPA April 2016). IDAs %Rs above the laboratory control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. %Rs below 10% indicate potential extreme low bias and undetected results should be rejected while positive values should be qualified as estimated "JL".

Several IDAs had %Rs outside the 25-150% control limit and some were below 10%. The laboratory re-analyzed and/or diluted many samples due to elevated concentrations and/or not meeting control limits for IDA and other parameters. During data review, results from multiple runs were assessed and those that represented the best quality and the lowest quantitation limits were reported. Table 3-2 shows IDA outliers for data reported for interpretation.

Table 3-2
Labelled Isotope Dilution Outliers

SDG	Sample ID	Dilution Factor	IDA Analyte	%R	Associated Analyte	Qualifier
320-23884-1	606D150MW-LF-1116	1	13C8 PFOSA	11	Perfluorooctane sulfonamide (PFOSA)	UJL
320-23884-1	608D161MW-LF-1116	1	13C5 PFNA	17	Perfluorononanoic acid (PFNA)	JL
320-23931-1	608D132MW-LF-1116	1	13C8 PFOSA	18	Perfluorooctane sulfonamide (PFOSA)	UJL
320-23931-1	608D132MW-LF-1116	50	13C4 PFOS	1317	Perfluorooctane sulfonic acid (PFOS)	JH
320-23931-1	608D132MW-LF-1116	50	13C5-PFPeA	1140	Perfluoropentanoic acid (PFPA)	JH
320-23931-1	608D132MW-LF-1116	50	13C2-PFHXA	857	Perfluorohexanoic acid (PFHXA)	JH
320-23931-1	608D132MW-LF-1116	50	13C4 PFOA	1153	Perfluorooctanoic acid (PFOA)	JH
320-23931-1	608D132MW-LF-1116	50	18O2 PFHxS	842	Perfluorohexanesulfonic acid (PFHXS)	JH
320-23931-1	608D132MW-LF-1116	50	13C4 PFBA	802	Perfluorobutanoic acid (PFBA)	JH
320-23931-1	608D33MW-LF-1116	1	13C4 PFBA	9	Perfluorobutanoic acid (PFBA)	JL
320-23931-1	608D33MW-LF-1116	1	13C8 PFOSA	8	Perfluorooctane sulfonamide (PFOSA)	JL
320-23931-1	608D33MW-LF-1116	100	13C5-PFPeA	179	Perfluoropentanoic acid (PFPA)	JH
320-23931-1	608D33MW-LF-1116	100	13C2-PFHXA	154	Perfluorohexanoic acid (PFHXA)	JH
320-23931-1	61301MW-LF-1116	1	13C8 PFOSA	9	Perfluorooctane sulfonamide (PFOSA)	UR
320-23931-1	613D41MW-LF-1116	1	13C8 PFOSA	15	Perfluorooctane sulfonamide (PFOSA)	UJL
320-23931-1	613D39MW-LF-1116	1	13C8 PFOSA	13	Perfluorooctane sulfonamide (PFOSA)	UJL
320-23996-1	40003MW-LF-1216	1	13C8 PFOSA	15	Perfluorooctane sulfonamide (PFOSA)	UJL

Table 3-2
Labelled Isotope Dilution Outliers

SDG	Sample ID	Dilution Factor	IDA Analyte	%R	Associated Analyte	Qualifier
320-23996-1	61201MW-LF-1216	1	13C8 PFOSA	16	Perfluorooctane sulfonamide (PFOSA)	UJL
320-23996-1	603D71MW-LF-1216	1	13C8 PFOSA	19	Perfluorooctane sulfonamide (PFOSA)	JL
320-23996-1	603D71MW-LF-1216	100	13C4 PFOS	154	Perfluorooctane sulfonic acid (PFOS)	JH
320-23996-1	603D71MW-LF-1216	100	13C5-PFPeA	182	Perfluoropentanoic acid (PFPA)	JH
320-23996-1	603D71MW-LF-1216	100	13C2-PFHXA	151	Perfluorohexanoic acid (PFHXA)	JH
320-23996-1	603D71MW-LF-1216	100	13C4 PFOA	171	Perfluorooctanoic acid (PFOA)	JH
320-23996-1	603D71MW-LF-1216	100	18O2 PFHxS	158	Perfluorohexanesulfonic acid (PFHXS)	JH
320-23996-1	603D71MW-LF-1216	100	13C4 PFBA	166	Perfluorobutanoic acid (PFBA)	JH
320-23996-1	603D71MW-LF-1216	100	13C4-PFHpA	153	Perfluoroheptanoic acid (PFHPA)	JH
320-24149-1	FSS4TMW-1216	1	13C5 PFNA	5	Perfluorononanoic acid (PFNA)	JL
320-24149-1	FSS4TMW-1216	200	18O2 PFHxS	206	Perfluorohexanesulfonic acid (PFHXS)	JH
320-24149-1	FSS5TMW-1216	1	13C8 PFOSA	4	Perfluorooctane sulfonamide (PFOSA)	UR
320-24149-1	308A51MW-LF-1216	1	13C8 PFOSA	10	Perfluorooctane sulfonamide (PFOSA)	JL
320-24149-1	SWMU1-01-1216	1	13C8 PFOSA	7	Perfluorooctane sulfonamide (PFOSA)	UR
320-24149-1	FSS3TMW-1216	1	13C5 PFNA	9	Perfluorononanoic acid (PFNA)	JL
320-24149-1	SWMU1-02-1216	1	13C8 PFOSA	12	Perfluorooctane sulfonamide (PFOSA)	JL
320-24236-1	FSS6TMW-1216	1	13C8 PFOSA	13	Perfluorooctane sulfonamide (PFOSA)	JL
320-24236-1	FFTA4TMW-1216-D	1	13C8 PFOSA	2	Perfluorooctane sulfonamide (PFOSA)	UR
320-24236-1	FFTA2TMW-1216	1	13C8 PFOSA	4	Perfluorooctane sulfonamide (PFOSA)	JL
320-24236-1	FFTA4TMW-1216	1	13C8 PFOSA	2	Perfluorooctane sulfonamide (PFOSA)	UR

Notes:
SDG = Sample delivery group
IDA = Isotope dilution analyte
%R = Percent recovery
UJL = Undetected, estimated, and biased low — The parameter was undetected and the bias in the result is likely to be low.
JL = Estimated and biased low — Bias in sample result is likely to be low.
JH = Estimated and biased high — Bias in sample result is likely to be high.
UR = Rejected/unusable data — One or more parameters grossly exceeded control limits.

3.2.3 Laboratory Control Samples

LCS results are used to monitor the overall performance of each step during analysis, including sample preparation and %R results should fall within the laboratory's control limits. All LCS results were acceptable.

3.2.4 Matrix Spike Matrix Spike Duplicate

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD %Rs assess the effect of the sample matrix on the accuracy of the analytical results. %Rs above the laboratory control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. The RPD between the MS and MSD results is evaluated to assess sample precision.

Site samples FFTA2TMW-1216 and 508F51MW-LF-1116 were used for the MS/MSD analysis. Table 3-3 summarizes MS/MSD %R outliers where samples were qualified during validation. MS/MSD outliers that did not require sample qualification for the following reasons are not shown in this table: positive results greater than four times the spike amount and undetected results with high bias.

Table 3-3
Matrix Spike/Matrix Spike Duplicate Outliers

SDG	Sample ID	Analyte	MS %R	MSD %R	Limits	Flags
320-24236-1	FFTA2TMW-1216	Perfluorooctane sulfonamide (PFOSA)	-24*	-38*	60-140	JL
320-23884-1	508F51MW-LF-1116 Re-analysis	Perfluorobutanoic acid (PFBA)	131	141*	60-140	JH

Notes:

SDG = Sample delivery group
MS = Matrix spike
MSD = Matrix spike duplicate
%R = Percent recovery
* = Value is outside the control limits
JL = Estimated and biased low — Bias in sample result is likely to be low.
JH = Estimated and biased high — Bias in sample result is likely to be high.

3.2.5 Laboratory Method Blanks

Laboratory method blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular laboratory blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data. Several PFAS analytes were detected in laboratory method blanks. Results qualified as undetected "U" are summarized in Table 3-4.

Table 3-4
Laboratory Method Blank Outliers

Blank	Preparation Batch	Analyte	Result (µg/L)	Samples Qualified "U"
MB 320-140536/1-A	320-140536	Perfluorotetradecanoic acid (PFTEDA)	0.000656	40003MW-LF-1216, 603D71MW-LF-1216, 606D150MW-LF-1116, 608D132MW-LF-1116, 608D161MW-LF-1116, 608D33MW-LF-1116, 61301MW-LF-1116, 613D39MW-LF-1116, 613D41MW-LF-1116, EBGW112916, FB113016
MB 320-142964/1-A	320-142964	Perfluorotetradecanoic acid (PFTEDA)	0.000552	508F51MW-LF-1116
MB 320-142967/1-A	320-142967	Perfluorohexanoic acid (PFHXA)	0.00147	FFTA2TMW-1216
MB 320-142967/1-A	320-142967	Perfluorooctanoic acid (PFOA)	0.00116	FFTA2TMW-1216

Table 3-4
Laboratory Method Blank Outliers

Blank	Preparation Batch	Analyte	Result (µg/L)	Samples Qualified "U"
MB 320-142967/1-A	320-142967	Perfluorohexanesulfonic acid (PFHXS)	0.000944	EBDPT120816-A, EBWC120616, EBWC120816-A, EBWC120816-B, FB120816, FFTA2TMW-1216

Notes:
µg/L = Micrograms per liter
U = Results were qualified as undetected due to associated laboratory method blank detections.

3.2.6 Field Blank Analysis (Equipment and Field)

Equipment and field blanks help determine how much, if any, contamination was introduced in the field and/or laboratory sources. Equipment blanks were collected by transferring laboratory-supplied water over a cleaned sampling device. Field blanks were collected by opening the laboratory supplied water bottle and transferring the water to a clean bottle at one of the sampling locations. All data associated with a particular blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data. During this sampling event, eight equipment blanks and three field blanks were collected and submitted to the laboratory. Several PFAS analytes were detected in equipment and field blanks and results qualified as undetected "U" are summarized in Table 3-5.

Table 3-5
Equipment and Field Blank Outliers

Blank	Analyte	Result (µg/L)	Samples Qualified "U"
EBGW112916	Perfluorotetradecanoic acid (PFTEDA)	0.00041	508F51MW-LF-1116, 606D150MW-LF-1116, 608D161MW-LF-1116
FB113016	Perfluorotetradecanoic acid (PFTEDA)	0.00041	606D150MW-LF-1116, 608D132MW-LF-1116, 608D161MW-LF-1116, 608D33MW-LF-1116, 61301MW-LF-1116, 613D39MW-LF-1116, 613D41MW-LF-1116
EBWC120816-A	Perfluorohexanesulfonic acid (PFHXS)	0.00087	FFTA2TMW-1216
EBWC120816-B	Perfluorohexanesulfonic acid (PFHXS)	0.00092	FFTA2TMW-1216
FB120816	Perfluorohexanesulfonic acid (PFHXS)	0.0011	FFTA2TMW-1216
EBDPT120816-A	Perfluorohexanesulfonic acid (PFHXS)	0.00089	FFTA2TMW-1216
EBDPT120816-A	Perfluorooctane sulfonic acid (PFOS)	0.0033	FFTA2TMW-1216
EBDPT120816-A	Perfluorotetradecanoic acid (PFTEDA)	0.00044	FFTA2TMW-1216, FFTA4TMW-1216, FFTA4TMW-1216-D, FSS2TMW-1216, FSS3TMW-1216, FSS6TMW-1216
EBDPT120816-B	Perfluorotetradecanoic acid (PFTEDA)	0.0004	FFTA2TMW-1216, FFTA4TMW-1216, FFTA4TMW-1216-D, FSS2TMW-1216, FSS3TMW-1216, FSS6TMW-1216

Table 3-5
Equipment and Field Blank Outliers

Blank	Analyte	Result (µg/L)	Samples Qualified "U"
EBWC120816-A	Perfluorotetradecanoic acid (PFTEDA)	0.00042	FFTA2TMW-1216, FFTA4TMW-1216, FFTA4TMW-1216-D, FSS2TMW-1216, FSS3TMW-1216, FSS6TMW-1216
EBWC120816-B	Perfluorotetradecanoic acid (PFTEDA)	0.00057	FFTA2TMW-1216, FFTA4TMW-1216, FFTA4TMW-1216-D, FSS2TMW-1216, FSS3TMW-1216, FSS6TMW-1216

Notes:
µg/L = Micrograms per liter
U = Results were qualified as undetected due to associated equipment and/or field blank detections.

3.2.7 Tuning Data

The first level standard from the initial calibration curve was used to evaluate the tune criteria. The instrument mass windows were set at +/-0.5 atomic mass units and analyte detection within this window served as verification that the assigned masses were within this limit.

3.2.8 Calibration Data

Initial calibration demonstrates that the instrument is capable of acceptable performance and the results are used to quantitate sample values. Initial and continuing calibration verification checks satisfactory performance of the instrument on a day-to-day basis. If calibration results are close to the expected values, the reported analyte concentrations are assumed to be accurate. All initial calibration and initial calibration verification criteria were met. Table 3-6 shows the continuing calibration outliers and qualifications applied during the data review.

Table 3-6
Continuing Calibration Outliers

SDG	Calibration ID	Analyte	%D	Associated Samples Reported From Calibration	Flags
320-23884-1	CCV 320-142751/16	Perfluorobutanesulfonic acid (PFBS)	25.4	EBGW112916	UJ
320-23931-1	CCV 320-142751/16	Perfluorobutanesulfonic acid (PFBS)	25.4	FB113016	UJ
320-23996-1	CCV 320-142751/16	Perfluorobutanesulfonic acid (PFBS)	25.4	40001MW-LF-1216, EBGW120116, FB120116	UJ

Notes:
SDG = Sample delivery group
%D = Percent difference
UJ = Analyte was undetected and qualified as estimated.

3.2.9 Field Duplicate Precision

Sample FFTA4TMW-1216 was duplicated in the field to assess precision. All field duplicate RPDs were below 30 for analytes detected above the twice the MQL which met the acceptance criteria for field duplicate precision.

3.2.10 Sample Re-analysis and Dilutions

All investigative samples, except 40001MW-LF-1216, were either re-analyzed or diluted due to elevated concentrations and/or not meeting control limits QC parameters. During data review, results from multiple runs were assessed and those that represented the best quality and the lowest quantitation limits were reported.

Table 3-7 summarizes results reported from re-analysis and dilutions. Due to inconsistent results between the parent sample 508F51MW-LF-1116 and MS/MSD, the parent sample and MS/MSD were re-extracted. During data review, the re-extracted analyses was reported for interpretation based on reviewer judgment.

Table 3-7
Results Reported From Re-Analysis and Dilutions

Sample Delivery Group	Sample ID	Laboratory ID	Run	Dilution Factor	Analyte
320-23884-1	606D150MW-LF-1116	320-23884-1	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorobutanoic acid (PFBA)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluoroheptanoic acid (PFHPA)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorohexanoic acid (PFHXA)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorooctane sulfonic acid (PFOS)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluorooctanoic acid (PFOA)
320-23884-1	608D161MW-LF-1116	320-23884-2	DL1	100	Perfluoropentanoic acid (PFPA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorobutanesulfonic acid (PFBS)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorobutanoic acid (PFBA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorodecanesulfonic acid (PFDCS)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorodecanoic acid (PFDA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorododecanoic acid (PFDOA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluoroheptanoic acid (PFHPA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorohexanesulfonic acid (PFHXS)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorohexanoic acid (PFHXA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorononanoic acid (PFNA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorooctane sulfonic acid (PFOS)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorooctanoic acid (PFOA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluoropentanoic acid (PFPA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorotetradecanoic acid (PFTEDA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluorotridecanoic acid (PFTRA)
320-23884-1	508F51MW-LF-1116	320-23884-3	RE	1	Perfluoroundecanoic acid (PFUNA)

Table 3-7
Results Reported From Re-Analysis and Dilutions

Sample Delivery Group	Sample ID	Laboratory ID	Run	Dilution Factor	Analyte
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorobutanesulfonic acid (PFBS)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorobutanoic acid (PFBA)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorohexanesulfonic acid (PFHXS)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorohexanoic acid (PFHXA)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorooctane sulfonic acid (PFOS)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluorooctanoic acid (PFOA)
320-23931-1	608D132MW-LF-1116	320-23931-1	DL1	50	Perfluoropentanoic acid (PFPA)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluorobutanoic acid (PFBA)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluorohexanoic acid (PFHXA)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluorooctane sulfonic acid (PFOS)
320-23931-1	608D33MW-LF-1116	320-23931-2	DL1	100	Perfluoropentanoic acid (PFPA)
320-23931-1	61301MW-LF-1116	320-23931-3	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23931-1	613D41MW-LF-1116	320-23931-4	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23931-1	613D39MW-LF-1116	320-23931-5	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23996-1	40003MW-LF-1216	320-23996-1	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23996-1	61201MW-LF-1216	320-23996-3	RA	1	Perfluorobutanesulfonic acid (PFBS)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorobutanoic acid (PFBA)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluoroheptanoic acid (PFHPA)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorohexanoic acid (PFHXA)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorooctane sulfonic acid (PFOS)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluorooctanoic acid (PFOA)
320-23996-1	603D71MW-LF-1216	320-23996-4	DL1	100	Perfluoropentanoic acid (PFPA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluorobutanesulfonic acid (PFBS)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluorobutanoic acid (PFBA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluoroheptanoic acid (PFHPA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluorohexanesulfonic acid (PFHXS)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluorohexanoic acid (PFHXA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluorooctanoic acid (PFOA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL1	200	Perfluoropentanoic acid (PFPA)
320-24149-1	FSS4TMW-1216	320-24149-1	DL2	4000	Perfluorooctane sulfonic acid (PFOS)
320-24149-1	FSS5TMW-1216	320-24149-2	DL1	10	Perfluorohexanesulfonic acid (PFHXS)
320-24149-1	FSS5TMW-1216	320-24149-2	DL1	10	Perfluorohexanoic acid (PFHXA)
320-24149-1	FSS5TMW-1216	320-24149-2	DL1	10	Perfluorooctane sulfonic acid (PFOS)
320-24149-1	EBWC120616	320-24149-4	RA	1	Perfluorooctane sulfonic acid (PFOS)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorobutanesulfonic acid (PFBS)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorobutanoic acid (PFBA)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluoroheptanoic acid (PFHPA)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorohexanesulfonic acid (PFHXS)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorohexanoic acid (PFHXA)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorooctane sulfonic acid (PFOS)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluorooctanoic acid (PFOA)
320-24184-1	308A51MW-LF-1216	320-24184-1	DL1	50	Perfluoropentanoic acid (PFPA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorobutanesulfonic acid (PFBS)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorobutanoic acid (PFBA)

Table 3-7
Results Reported From Re-Analysis and Dilutions

Sample Delivery Group	Sample ID	Laboratory ID	Run	Dilution Factor	Analyte
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorodecanesulfonic acid (PFDCS)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluoroheptanoic acid (PFHPA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorohexanesulfonic acid (PFHXS)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorohexanoic acid (PFHXA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorooctane sulfonamide (PFOSA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluorooctanoic acid (PFOA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL1	200	Perfluoropentanoic acid (PFPA)
320-24184-1	FSS3TMW-1216	320-24184-3	DL2	2000	Perfluorooctane sulfonic acid (PFOS)
320-24184-1	SWMU1-02-1216	320-24184-4	DL1	10	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorobutanoic acid (PFBA)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluoroheptanoic acid (PFHPA)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorohexanoic acid (PFHXA)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluorooctanoic acid (PFOA)
320-24236-1	FSS6TMW-1216	320-24236-1	DL1	100	Perfluoropentanoic acid (PFPA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorobutanesulfonic acid (PFBS)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorobutanoic acid (PFBA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorodecanesulfonic acid (PFDCS)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluoroheptanoic acid (PFHPA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorohexanoic acid (PFHXA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorononanoic acid (PFNA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorooctane sulfonamide (PFOSA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluorooctanoic acid (PFOA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL1	200	Perfluoropentanoic acid (PFPA)
320-24236-1	FSS2TMW-1216	320-24236-2	DL2	4000	Perfluorohexanesulfonic acid (PFHXS)
320-24236-1	FSS2TMW-1216	320-24236-2	DL2	4000	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluoroheptanoic acid (PFHPA)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluorohexanesulfonic acid (PFHXS)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluorohexanoic acid (PFHXA)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluorooctanoic acid (PFOA)
320-24236-1	FFTA2TMW-1216	320-24236-3	DL1	20	Perfluoropentanoic acid (PFPA)
320-24236-1	FB120816	320-24236-4	RA	1	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	EBWC120816-A	320-24236-5	RA	1	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	EBWC120816-B	320-24236-6	RA	1	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	EBDPT120816-A	320-24236-7	RA	1	Perfluorooctane sulfonic acid (PFOS)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluorobutanoic acid (PFBA)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluoroheptanoic acid (PFHPA)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluorohexanoic acid (PFHXA)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluorooctanoic acid (PFOA)
320-24236-1	FFTA4TMW-1216	320-24236-9	DL1	100	Perfluoropentanoic acid (PFPA)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluorobutanesulfonic acid (PFBS)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluorobutanoic acid (PFBA)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluoroheptanoic acid (PFHPA)

Table 3-7
Results Reported From Re-Analysis and Dilutions

Sample Delivery Group	Sample ID	Laboratory ID	Run	Dilution Factor	Analyte
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluorohexanesulfonic acid (PFHXS)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluorohexanoic acid (PFHXA)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluorooctanoic acid (PFOA)
320-24236-1	FFTA4TMW-1216-D	320-24236-10	DL1	100	Perfluoropentanoic acid (PFPA)

Notes:
RA = Re-analysis
DL1 = Dilution number 1
RE = Re-extraction
DL2 = Dilution number 2

3.2.11 Raw Data Examination

A minimum of 10% of the detections were recalculated from the raw instrument output. Chromatograms were checked for the following: peak integration (10% of automated integration and 100% of manual integrations), baseline, and interferences; minimum signal to noise mass spectra ratios; and retention times or relative retention times.

4.0 OVERALL ASSESSMENT

The data were reviewed independently from the laboratory to assess data quality. Analytes outside individual QC criteria were flagged during this evaluation.

Laboratory analysis for this project had a completeness goal greater than 95% to account for unanticipated results that may be rejected during data validation. A total of 545 measurements were reported for interpretation. Of this total, 540 measurements were considered valid and five measurements were rejected (flagged "R"). Analytical completeness was calculated to be 99.1%. Therefore, the analytical data met the project analytical completeness goal of 95%.

Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. EPA and Texas Commission on Environmental Quality guidelines.

Attachment A provides analytical parameters for each sample and cross-references between laboratory and field sample identifications. Attachment B presents final results, after data review, in tabular format, and Attachment C contains laboratory reports, laboratory review checklists, and exception reports.

Attachment A
Sample Identifications and Analytical Parameters

Table A-1
Sample Identifications and Analytical Parameters
Perfluoroalkyl Substances via U.S. EPA Method 537 Modified

Sample Delivery Group	Laboratory Identification	Sample Identification	Location	Sample Date	Sample Type
320-23884-1	320-23884-1	606D150MW-LF-1116	606D150MW	11/29/2016	Groundwater
320-23884-1	320-23884-2	608D161MW-LF-1116	608D161MW	11/29/2016	Groundwater
320-23884-1	320-23884-3	508F51MW-LF-1116	508F51MW	11/29/2016	Groundwater
320-23884-1	320-23884-4	EBGW112916		11/29/2016	Equipment Blank
320-23931-1	320-23931-1	608D132MW-LF-1116	608D132MW	11/30/2016	Groundwater
320-23931-1	320-23931-2	608D33MW-LF-1116	608D33MW	11/30/2016	Groundwater
320-23931-1	320-23931-3	61301MW-LF-1116	61301MW	11/30/2016	Groundwater
320-23931-1	320-23931-4	613D41MW-LF-1116	613D41MW	11/30/2016	Groundwater
320-23931-1	320-23931-5	613D39MW-LF-1116	613D39MW	11/30/2016	Groundwater
320-23931-1	320-23931-6	FB113016		11/30/2016	Field Blank
320-23996-1	320-23996-1	40003MW-LF-1216	40003MW	12/1/2016	Groundwater
320-23996-1	320-23996-2	40001MW-LF-1216	40001MW	12/1/2016	Groundwater
320-23996-1	320-23996-3	61201MW-LF-1216	61201MW	12/1/2016	Groundwater
320-23996-1	320-23996-4	603D71MW-LF-1216	603D71MW	12/1/2016	Groundwater
320-23996-1	320-23996-5	EBGW120116		12/1/2016	Equipment Blank
320-23996-1	320-23996-6	FB120116		12/1/2016	Field Blank
320-24149-1	320-24149-1	FSS4TMW-1216	FSS4TMW	12/6/2016	Groundwater
320-24149-1	320-24149-2	FSS5TMW-1216	FSS5TMW	12/6/2016	Groundwater
320-24149-1	320-24149-3	EBGW120616		12/6/2016	Equipment Blank
320-24149-1	320-24149-4	EBWC120616		12/6/2016	Equipment Blank
320-24184-1	320-24184-1	308A51MW-LF-1216	308A51MW	12/7/2016	Groundwater
320-24184-1	320-24184-2	SWMU1-01-1216	30807MW	12/7/2016	Groundwater
320-24184-1	320-24184-3	FSS3TMW-1216	FSS3TMW	12/7/2016	Groundwater
320-24184-1	320-24184-4	SWMU1-02-1216	30809MW	12/7/2016	Groundwater
320-24236-1	320-24236-1	FSS6TMW-1216	FSS6TMW	12/8/2016	Groundwater
320-24236-1	320-24236-10	FFTA4TMW-1216-D	FFTA4TMW	12/8/2016	Duplicate of FFTA4TMW-1216
320-24236-1	320-24236-2	FSS2TMW-1216	FSS2TMW	12/8/2016	Groundwater
320-24236-1	320-24236-3	FFTA2TMW-1216	FFTA2TMW	12/8/2016	Groundwater
320-24236-1	320-24236-4	FB120816		12/8/2016	Field Blank
320-24236-1	320-24236-5	EBWC120816-A		12/8/2016	Equipment Blank
320-24236-1	320-24236-6	EBWC120816-B		12/8/2016	Equipment Blank
320-24236-1	320-24236-7	EBDPT120816-A		12/8/2016	Equipment Blank
320-24236-1	320-24236-8	EBDPT120816-B		12/8/2016	Equipment Blank
320-24236-1	320-24236-9	FFTA4TMW-1216	FFTA4TMW	12/8/2016	Groundwater

Attachment B

Final Results after Data Review

Table B-1
Final Results after Data Review

		Sample Delivery Group	320-23884-1			320-23884-1			320-23884-1			320-23884-1		
		Lab Identification	320-23884-1			320-23884-2			320-23884-3			320-23884-4		
		Sample Identification	606D150MW-LF-1116			608D161MW-LF-1116			508F51MW-LF-1116			EBGW112916		
		Sample Date	11/29/2016			11/29/2016			11/29/2016			11/29/2016		
		Sample Type	Groundwater			Groundwater			Groundwater			Equipment Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	0.055			3.4			0.021	JL	h	0.00078	UJ	c
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.043			1.1			0.034	JL	h,m	0.00039	U	
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0011	U		0.0011	UJL	h	0.001	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.00041	U		0.0039			0.00068	JL	h	0.00037	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00055	U		0.00053	U		0.00052	UJL	h	0.0005	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.022			0.88			0.01	JL	h	0.00068	U	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	0.19			18			0.06	JL	h	0.00074	U	
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	0.1			4.9			0.058	JL	h	0.00067	U	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.0018	J		0.054	JL	lc	0.00058	UJL	h	0.00056	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.0006	UJL	lc	0.002	J		0.00057	U		0.00054	U	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	0.052			52	J	ej	0.036	JL	h	0.0011	J	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.058			1.8			0.034	JL	h	0.00064	U	
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.054			1.8			0.039	JL	h	0.00084	U	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00037	U	bl,be,bf	0.00037	U	bl,be,bf	0.00036	UJL	bl,be,h	0.00034	U	bl
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00052	U		0.0005	U		0.00049	UJL	h	0.00047	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.0007	U		0.00068	U		0.00067	UJL	h	0.00064	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-23931-1			320-23931-1			320-23931-1			320-23931-1		
		Lab Identification	320-23931-1			320-23931-2			320-23931-3			320-23931-4		
		Sample Identification	608D132MW-LF-1116			608D33MW-LF-1116			61301MW-LF-1116			613D41MW-LF-1116		
		Sample Date	11/30/2016			11/30/2016			11/30/2016			11/30/2016		
		Sample Type	Groundwater			Groundwater			Groundwater			Groundwater		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	1.5			0.73			0.014			0.0053		
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.52	JH	lc	0.29			0.17			0.012		
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0039			0.0011	U		0.0011	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.00042	U		0.0022	J		0.0016	J		0.00063	J	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00055	U		0.00056	U		0.00055	U		0.00055	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.32			0.21			0.11			0.0036		
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	3.7	JH	lc	5.4			0.071			0.032		
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	2.1	JH	lc	0.94	JH	lc	0.15			0.0074		
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.00064	J		0.017			0.008			0.00092	J	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.0006	UJL	lc	0.043	JL	lc	0.0006	UR	lc	0.0006	UJL	lc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	1.4	JH	lc	21			0.061			0.07		
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.55	JH	lc	0.38			0.1			0.035		
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.76	JH	lc	0.47	JH	lc	0.18			0.0063		
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00038	U	bl,bf	0.00038	U	bl,bf	0.00038	U	bl,bf	0.00038	U	bl,bf
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00052	U		0.00053	U		0.00052	U		0.00052	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00071	U		0.00072	U		0.0007	U		0.0007	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-23931-1			320-23931-1			320-23996-1			320-23996-1		
		Lab Identification	320-23931-5			320-23931-6			320-23996-1			320-23996-2		
		Sample Identification	613D39MW-LF-1116			FB113016			40003MW-LF-1216			40001MW-LF-1216		
		Sample Date	11/30/2016			11/30/2016			12/1/2016			12/1/2016		
		Sample Type	Groundwater			Field Blank			Groundwater			Groundwater		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	0.0062			0.00082	UJ	c	0.0016	J		0.00087	UJ	c
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.0028			0.00041	U		0.01			0.00043	U	
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0011	U		0.0012	U		0.0011	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.0004	U		0.00039	U		0.00043	U		0.00041	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00053	U		0.00052	U		0.00057	U		0.00055	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.00072	U		0.00072	U		0.0017	J		0.00076	U	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	0.022			0.00078	U		0.00085	U		0.00091	J	
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	0.00071	U		0.0007	U		0.0048			0.00074	U	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.00059	U		0.00058	U		0.00064	U		0.00062	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.00057	UJL	lc	0.00057	U		0.00062	UJL	lc	0.0006	U	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	0.026			0.0011	U		0.0017	J		0.0017	J	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.0013	J		0.00067	U		0.0047			0.00071	U	
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.00089	U		0.00088	U		0.01			0.00093	U	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00036	U	bl,bf	0.00036	U	bl	0.00039	U	bl	0.00038	U	
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.0005	U		0.00049	U		0.00054	U		0.00052	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00067	U		0.00067	U		0.00073	U		0.00071	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-23996-1			320-23996-1			320-23996-1			320-23996-1		
		Lab Identification	320-23996-3			320-23996-4			320-23996-5			320-23996-6		
		Sample Identification	61201MW-LF-1216			603D71MW-LF-1216			EBGW120116			FB120116		
		Sample Date	12/1/2016			12/1/2016			12/1/2016			12/1/2016		
		Sample Type	Groundwater			Groundwater			Equipment Blank			Field Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	0.0051			2.2			0.00085	UJ	c	0.0009	UJ	c
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.009			0.97	JH	lc	0.00042	U		0.00045	U	
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0011	U		0.0011	U		0.0012	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.00062	J		0.0011	J		0.00041	U		0.00043	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00053	U		0.00054	U		0.00054	U		0.00057	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.003			0.63	JH	lc	0.00074	U		0.00079	U	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	0.012			8.1	JH	lc	0.0008	U		0.00086	U	
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	0.0068			3.3	JH	lc	0.00072	U		0.00077	U	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.0025			0.027			0.0006	U		0.00064	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.00058	UJL	lc	0.00076	JL	lc	0.00059	U		0.00063	U	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	0.073			13	JH	lc	0.0012	U		0.0013	U	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.022			1.3	JH	lc	0.00069	U		0.00074	U	
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.0058			1.9	JH	lc	0.00091	U		0.00097	U	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00036	U		0.00037	U	bl	0.00037	U		0.00039	U	
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.0005	U		0.00051	U		0.00051	U		0.00054	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00068	U		0.00069	U		0.00069	U		0.00074	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-24149-1			320-24149-1			320-24149-1			320-24149-1		
		Lab Identification	320-24149-1			320-24149-2			320-24149-3			320-24149-4		
		Sample Identification	FSS4TMW-1216			FSS5TMW-1216			EBGW120616			EBWC120616		
		Sample Date	12/6/2016			12/6/2016			12/6/2016			12/6/2016		
		Sample Type	Groundwater			Groundwater			Equipment Blank			Equipment Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	7.2			0.22			0.00084	U		0.00087	U	
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	5			0.22			0.00042	U		0.00043	U	
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.11			0.0011	U		0.0011	U		0.0011	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.026			0.0026			0.0004	U		0.00042	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00052	U		0.00051	U		0.00053	U		0.00055	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	6.1			0.17			0.00073	U		0.00076	U	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	59	JH	lc	0.63			0.00079	U		0.00082	U	bl
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	28			0.53			0.00072	U		0.00074	U	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.18	JL	lc	0.01			0.0006	U		0.00062	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.012			0.00056	UR	lc	0.00058	U		0.0006	U	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	1200			0.95			0.0012	U		0.0012	U	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	47			0.2			0.00068	U		0.00071	U	
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	12			0.3			0.0009	U		0.00093	U	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00036	U	be	0.00035	U	be	0.00036	U		0.00038	U	
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00049	U		0.00048	U		0.0005	U		0.00052	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00066	U		0.00065	U		0.00068	U		0.00071	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-24184-1			320-24184-1			320-24184-1			320-24184-1		
		Lab Identification	320-24184-1			320-24184-2			320-24184-3			320-24184-4		
		Sample Identification	308A51MW-LF-1216			SWMU1-01-1216			FSS3TMW-1216			SWMU1-02-1216		
		Sample Date	12/7/2016			12/7/2016			12/7/2016			12/7/2016		
		Sample Type	Groundwater			Groundwater			Groundwater			Groundwater		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	4.3			0.00092	J		19			0.01		
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	5.3			0.02			8.6			0.016		
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0012	U		0.22	U		0.0064		
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.0027			0.00043	U		0.067			0.00072	J	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00054	U		0.00058	U		0.00052	U		0.00052	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	4.3			0.00079	U		4			0.00081	J	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	17			0.0034			61			0.033		
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	11			0.0057			38			0.012		
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.13			0.00064	U		0.19	JL	lc	0.00058	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.0021	JL	lc	0.00063	UR	lc	0.63			0.018	JL	lc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	11			0.0013	U		300			1.2		
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	2.6			0.0028			13			0.0047		
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	9.1			0.0039			12			0.0049		
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00047	J		0.0011	J		0.00036	U	be	0.00044	J	
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00051	U		0.00054	U		0.00049	U		0.00049	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00069	U		0.00074	U		0.0021	J		0.00067	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-24236-1			320-24236-1			320-24236-1			320-24236-1		
		Lab Identification	320-24236-1			320-24236-10			320-24236-2			320-24236-3		
		Sample Identification	FSS6TMW-1216			FFTA4TMW-1216-D			FSS2TMW-1216			FFTA2TMW-1216		
		Sample Date	12/8/2016			12/8/2016			12/8/2016			12/8/2016		
		Sample Type	Groundwater			Duplicate			Groundwater			Groundwater		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	4.3			2.1			26			0.26		
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	2.1			0.44			18			0.31		
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0012	U		0.0012	U		0.24	U		0.0013	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.0014	J		0.00042	U		0.046			0.017		
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.0006	U		0.00056	U		0.00058	U		0.0006	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	4.4			1.2			6.4			0.74	J	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	29			15			240			0.018	U	bl,be,bf
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	10			8.1			50			0.016	U	bl
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.13			0.005			0.61			0.029		
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.0057	JL	lc	0.00061	UR	lc	0.76			0.088	JL	lc,m
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	6.5			0.064			680			0.026	U	be
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	4.1			23			23			0.015	U	bl
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	5.5			1.4			21			1	J	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00041	U	be	0.00038	U	be	0.0004	U	be	0.00041	U	be
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00056	U		0.00053	U		0.00054	U		0.00057	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00076	U		0.00072	U		0.0049			0.00077	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-24236-1			320-24236-1			320-24236-1			320-24236-1		
		Lab Identification	320-24236-4			320-24236-5			320-24236-6			320-24236-7		
		Sample Identification	FB120816			EBWC120816-A			EBWC120816-B			EBDPT120816-A		
		Sample Date	12/8/2016			12/8/2016			12/8/2016			12/8/2016		
		Sample Type	Field Blank			Equipment Blank			Equipment Blank			Equipment Blank		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	0.00082	U		0.00089	U		0.00095	U		0.00086	U	
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.00041	U		0.00044	U		0.00047	U		0.00043	U	
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0012	U		0.0013	U		0.0011	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.00039	U		0.00042	U		0.00046	U		0.00041	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00052	U		0.00056	U		0.0006	U		0.00055	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.00072	U		0.00077	U		0.00083	U		0.00075	U	
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	0.00078	U	bl	0.00084	U	bl	0.0009	U	bl	0.00082	U	bl
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	0.0007	U		0.00076	U		0.00081	U		0.00074	U	
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.00059	U		0.00063	U		0.00068	U		0.00061	U	
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.00057	U		0.00062	U		0.00066	U		0.0006	U	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	0.0011	U		0.0012	U		0.0013	U		0.0033	J	
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.00067	U		0.00072	U		0.00077	U		0.0007	U	
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.00089	U		0.00095	U		0.001	U		0.00093	U	
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.00036	U		0.00042	J		0.00057	J		0.00044	J	
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.00049	U		0.00053	U		0.00057	U		0.00052	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00067	U		0.00072	U		0.00077	U		0.0007	U	

Table B-1 (Continued)
Final Results after Data Review

		Sample Delivery Group	320-24236-1			320-24236-1		
		Lab Identification	320-24236-8			320-24236-9		
		Sample Identification	EBDPT120816-B			FFTA4TMW-1216		
		Sample Date	12/8/2016			12/8/2016		
		Sample Type	Equipment Blank			Groundwater		
Analyte	**CAS No**	**Units**	Result	Qual	RC	Result	Qual	RC
Perfluorobutanesulfonic acid (PFBS)	375-73-5	µg/L	0.00084	U		2		
Perfluorobutanoic acid (PFBA)	375-22-4	µg/L	0.00042	U		0.43		
Perfluorodecanesulfonic acid (PFDCS)	335-77-3	µg/L	0.0011	U		0.0012	U	
Perfluorodecanoic acid (PFDA)	335-76-2	µg/L	0.0004	U		0.00042	U	
Perfluorododecanoic acid (PFDOA)	307-55-1	µg/L	0.00053	U		0.00056	U	
Perfluoroheptanoic acid (PFHPA)	375-85-9	µg/L	0.00073	U		1.2		
Perfluorohexanesulfonic acid (PFHXS)	355-46-4	µg/L	0.0008	U		15		
Perfluorohexanoic acid (PFHXA)	307-24-4	µg/L	0.00072	U		7.6		
Perfluorononanoic acid (PFNA)	375-95-1	µg/L	0.0006	U		0.0055		
Perfluorooctane sulfonamide (PFOSA)	754-91-6	µg/L	0.00058	U		0.00061	UR	lc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	µg/L	0.0012	U		0.068		
Perfluorooctanoic acid (PFOA)	335-67-1	µg/L	0.00068	U		23		
Perfluoropentanoic acid (PFPA)	2706-90-3	µg/L	0.00091	U		1.4		
Perfluorotetradecanoic acid (PFTEDA)	376-06-7	µg/L	0.0004	J		0.00038	U	be
Perfluorotridecanoic acid (PFTRA)	72629-94-8	µg/L	0.0005	U		0.00053	U	
Perfluoroundecanoic acid (PFUNA)	2058-94-8	µg/L	0.00068	U		0.00072	U	

Table B-1 (Continued)
Final Results after Data Review

Notes:

Qual = Final interpreted qualifier (See definition below)
RC = Reason code (See definition below)
µg/L = Micrograms per liter
J = Estimated value — One or more quality control parameters were outside control limits or the concentration of the analyte was above the sample detection limit, but less than the method quantitation limit.
JH = Estimated and biased high — Bias in sample result is likely to be high.
JL = Estimated and biased low — Bias in sample result is likely to be low.
U = Undetected — The analyte was undetected above the sample detection limit or was qualified as undetected during blank examination; the associated value presented is the sample detection limit.
UJ = Undetected and estimated — The parameter was analyzed but undetected and was estimated because at least one quality control parameter was outside control limits.
UJL = Undetected, estimated, and biased Low — The parameter was undetected and the bias in the result is likely to be low.
UR = Rejected/Unusable Data — One or more parameters grossly exceeded control limits.

Qualification Reason Codes (multiple reason codes may be applied):

be = Equipment blank results (Representativeness Indicator)
bf = Field blank results (Representativeness Indicator)
bl = Laboratory blank results (Representativeness Indicator)
c = Calibration results (Accuracy Indicator)
ej = Result reported above calibration range (Accuracy Indicator)
h = Holding times (Representativeness Indicator)
lc = Labelled isotope dilution analyte recovery (Accuracy Indicator)
m = Matrix spike/matrix spike duplicate percent recovery (Accuracy Indicator)

Attachment C
Analytical Data Packages

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-23884-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
12/21/2016 5:58:36 PM
Micah Smith, Project Manager II
(916)374-4302
micah.smith@testamericainc.com

Designee for

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Qualifiers

LCMS

Qualifier	Qualifier Description
M	Manual integrated compound.
Q	One or more quality control criteria failed.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
E	Result exceeded calibration range.
D	The reported value is from a dilution.
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
H	Sample was prepped or analyzed beyond the specified holding time
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-23884-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-23884-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 11/30/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.2 C.

PFAS

Due to inconsistence results between the parent sample 508F51MW-LF-1116 (320-23884-3) and matrix spike / matrix spike duplicate (MS/MSD) 508F51MW-LF-1116 (320-23884-3[MS]) and 508F51MW-LF-1116 (320-23884-3[MSD]) in the original preparation batch 320-140536, the parent sample and MS/MSD were re-extracted and the data evaluated in analytical batch 320-143248. The samples were re-extracted outside of holding time, so both sets of data have been reported.

Perfluorotetradecanoic acid (PFTeA) was detected in method blank MB 320-140536/1-A and method blank MB 320-142964/1-A at a level that was above the DL. This target analyte concentration was less than half the LOQ in both method blanks; therefore, re-extraction and re-analysis of samples was not performed.

Job ID: 320-23884-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

The matrix spike (MS) recoveries for Perfluorotetradecanoic acid (PFTeA) and the matrix spike duplicate (MSD) recoveries for Perfluorobutanoic acid (PFBA) in preparation batch 320-142964 and analytical batch 320-143248 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The continuing calibration verification (CCV) (CCV 320-142751/16) associated with batch 320-142751 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS). The following sample associated with this CCV was non-detects for the affected analytes; therefore, the data have been reported: EBGW112916 (320-23884-4).

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the following sample are below the method recommended limit: 606D150MW-LF-1116 (320-23884-1), 608D161MW-LF-1116 (320-23884-2) and 508F51MW-LF-1116 (320-23884-3[MSD]). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The Isotope Dilution Analyte (IDA) recovery for 13C8 FOSA in the following sample is below the method recommended limit: 508F51MW-LF-1116 (320-23884-3) and 508F51MW-LF-1116 (320-23884-3[MS]). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: 608D161MW-LF-1116 (320-23884-2). These samples have been run at dilution and both sets of data have been reported and the reporting limits have been adjusted accordingly.

The concentration of Perfluorooctanesulfonic acid (PFOS) in the following sample exceeded the instrument calibration range: 608D161MW-LF-1116 (320-23884-2). This analyte has been qualified; however, the peak did not saturate the instrument detector. The maximum dilution was performed for the sample.

The extracts of the following samples had an unusual color, after dryness and the addition of methanol the extracts turned purple: 608D161MW-LF-1116 (320-23884-2) and 508F51MW-LF-1116 (320-23884-3[MS]).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: 606D150MW-LF-1116 — Lab Sample ID: 320-23884-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.043	M	0.0023	0.00043	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.054	M	0.0023	0.00093	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.10		0.0023	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.022		0.0023	0.00075	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.058	M	0.0023	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0018	J	0.0023	0.00061	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00053	J	0.0023	0.00037	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.19		0.0023	0.00081	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.052		0.0037	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.055		0.0023	0.00086	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 608D161MW-LF-1116 — Lab Sample ID: 320-23884-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.91	E	0.0023	0.00042	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.0	E	0.0023	0.00090	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.2	E	0.0023	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.84	E	0.0023	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	E	0.0023	0.00068	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.054		0.0023	0.00060	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0039		0.0023	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00038	J	0.0023	0.00037	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.6	E	0.0023	0.00080	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19	E M	0.0037	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.0020	J	0.0023	0.00058	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	1.1	D	0.23	0.042	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	1.8	D	0.23	0.090	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	4.9	D	0.23	0.072	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.88	D	0.23	0.073	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1.8	D M	0.23	0.068	ug/L	100		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.079	J D	0.23	0.060	ug/L	100		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	3.4	D	0.23	0.084	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	18	D	0.23	0.080	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	52	D E	0.37	0.12	ug/L	100		537 (Modified)	Total/NA

Client Sample ID: 508F51MW-LF-1116 — Lab Sample ID: 320-23884-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.18	J	0.0022	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.24	J	0.0022	0.00089	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.48	E J	0.0022	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.0022	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.26	J M	0.0022	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0069		0.0022	0.00059	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.00074	J	0.0022	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.5	E J	0.0022	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.4	E J	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: 508F51MW-LF-1116 (Continued) — Lab Sample ID: 320-23884-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA) - RE	0.034	H J M	0.0022	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - RE	0.039	H M	0.0022	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	0.058	H	0.0022	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	0.010	H	0.0022	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	0.034	H M	0.0022	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA) - RE	0.00068	J H	0.0022	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA) - RE	0.00062	H J	0.0022	0.00036	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	0.021	H M	0.0022	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	0.060	H	0.0022	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.036	H	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: EBGW112916 — Lab Sample ID: 320-23884-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00041	J	0.0021	0.00034	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0011	J M	0.0034	0.0011	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: 606D150MW-LF-1116

Lab Sample ID: 320-23884-1
Date Collected: 11/29/16 11:30
Matrix: Water
Date Received: 11/30/16 09:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.043**	**M**	0.0023	0.00043	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluoropentanoic acid (PFPeA)	**0.054**	**M**	0.0023	0.00093	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorohexanoic acid (PFHxA)	**0.10**		0.0023	0.00074	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluoroheptanoic acid (PFHpA)	**0.022**		0.0023	0.00075	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorooctanoic acid (PFOA)	**0.058**	**M**	0.0023	0.00070	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorononanoic acid (PFNA)	**0.0018**	**J**	0.0023	0.00061	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorodecanoic acid (PFDA)	0.00094	U	0.0023	0.00041	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0023	0.00070	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0023	0.00055	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0023	0.00052	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorotetradecanoic acid (PFTeA)	**0.00053**	**J**	0.0023	0.00037	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorohexanesulfonic acid (PFHxS)	**0.19**		0.0023	0.00081	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorooctanesulfonic acid (PFOS)	**0.052**		0.0037	0.0012	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0037	0.0011	ug/L		12/05/16 08:31	12/16/16 18:45	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0023	0.00060	ug/L		12/05/16 08:31	12/16/16 18:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*11*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C4 PFBA	*30*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C2 PFHxA	*73*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C4 PFOA	*83*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C5 PFNA	*83*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C2 PFDA	*87*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C2 PFUnA	*92*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C2 PFDoA	*93*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
18O2 PFHxS	*87*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C4 PFOS	*98*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C5-PFPeA	*68*	*M*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*
13C4-PFHpA	*82*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:45*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**0.055**		0.0023	0.00086	ug/L		12/05/16 08:31	12/20/16 18:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*12/05/16 08:31*	*12/20/16 18:44*	*1*

Client Sample ID: 608D161MW-LF-1116

Lab Sample ID: 320-23884-2
Date Collected: 11/29/16 12:40
Matrix: Water
Date Received: 11/30/16 09:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.91**	**E**	0.0023	0.00042	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluoropentanoic acid (PFPeA)	**1.0**	**E**	0.0023	0.00090	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorohexanoic acid (PFHxA)	**1.2**	**E**	0.0023	0.00072	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluoroheptanoic acid (PFHpA)	**0.84**	**E**	0.0023	0.00073	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorooctanoic acid (PFOA)	**1.5**	**E**	0.0023	0.00068	ug/L		12/05/16 08:31	12/16/16 18:52	1

Client Sample ID: 608D161MW-LF-1116

Lab Sample ID: 320-23884-2

Date Collected: 11/29/16 12:40

Matrix: Water

Date Received: 11/30/16 09:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	**0.054**		0.0023	0.00060	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorodecanoic acid (PFDA)	**0.0039**		0.0023	0.00040	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00068	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00053	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00050	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorotetradecanoic acid (PFTeA)	**0.00038**	**J**	0.0023	0.00037	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorohexanesulfonic acid (PFHxS)	**6.6**	**E**	0.0023	0.00080	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorooctanesulfonic acid (PFOS)	**19**	**E M**	0.0037	0.0012	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0037	0.0011	ug/L		12/05/16 08:31	12/16/16 18:52	1
Perfluorooctane Sulfonamide (FOSA)	**0.0020**	**J**	0.0023	0.00058	ug/L		12/05/16 08:31	12/16/16 18:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*31*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C4 PFBA	*26*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C2 PFHxA	*30*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C4 PFOA	*32*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C5 PFNA	*17*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C2 PFDA	*86*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C2 PFUnA	*97*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C2 PFDoA	*86*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
18O2 PFHxS	*15*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C4 PFOS	*13*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C5-PFPeA	*41*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*
13C4-PFHpA	*19*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 18:52*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.1**	**D**	0.23	0.042	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluoropentanoic acid (PFPeA)	**1.8**	**D**	0.23	0.090	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorohexanoic acid (PFHxA)	**4.9**	**D**	0.23	0.072	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluoroheptanoic acid (PFHpA)	**0.88**	**D**	0.23	0.073	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorooctanoic acid (PFOA)	**1.8**	**D M**	0.23	0.068	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorononanoic acid (PFNA)	**0.079**	**J D**	0.23	0.060	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorodecanoic acid (PFDA)	0.091	U	0.23	0.040	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluoroundecanoic acid (PFUnA)	0.18	U	0.23	0.068	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorododecanoic acid (PFDoA)	0.18	U	0.23	0.053	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorotridecanoic Acid (PFTriA)	0.18	U	0.23	0.050	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorotetradecanoic acid (PFTeA)	0.091	U	0.23	0.037	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorobutanesulfonic acid (PFBS)	**3.4**	**D**	0.23	0.084	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorohexanesulfonic acid (PFHxS)	**18**	**D**	0.23	0.080	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorooctanesulfonic acid (PFOS)	**52**	**D E**	0.37	0.12	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorodecanesulfonic acid (PFDS)	0.27	U	0.37	0.11	ug/L		12/05/16 08:31	12/20/16 18:14	100
Perfluorooctane Sulfonamide (FOSA)	0.18	U	0.23	0.058	ug/L		12/05/16 08:31	12/20/16 18:14	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*49*		*25 - 150*	*12/05/16 08:31*	*12/20/16 18:14*	*100*

Client Sample ID: 608D161MW-LF-1116 — Lab Sample ID: 320-23884-2

Date Collected: 11/29/16 12:40
Date Received: 11/30/16 09:30
Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	129		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C2 PFHxA	118		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C4 PFOA	143		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C5 PFNA	98		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C2 PFDA	134		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C2 PFUnA	116		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C2 PFDoA	119		25 - 150	12/05/16 08:31	12/20/16 18:14	100
18O2 PFHxS	129		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C4 PFOS	111		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C5-PFPeA	141		25 - 150	12/05/16 08:31	12/20/16 18:14	100
13C4-PFHpA	109		25 - 150	12/05/16 08:31	12/20/16 18:14	100

Client Sample ID: 508F51MW-LF-1116 — Lab Sample ID: 320-23884-3

Date Collected: 11/29/16 15:05
Date Received: 11/30/16 09:30
Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.18**	**J**	0.0022	0.00041	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluoropentanoic acid (PFPeA)	**0.24**	**J**	0.0022	0.00089	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorohexanoic acid (PFHxA)	**0.48**	**E J**	0.0022	0.00071	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluoroheptanoic acid (PFHpA)	**0.11**	**J**	0.0022	0.00072	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorooctanoic acid (PFOA)	**0.26**	**J M**	0.0022	0.00067	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorononanoic acid (PFNA)	**0.0069**		0.0022	0.00059	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorodecanoic acid (PFDA)	**0.00074**	**J**	0.0022	0.00040	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0022	0.00067	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00053	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00050	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorotetradecanoic acid (PFTeA)	0.00090	U J	0.0022	0.00036	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorohexanesulfonic acid (PFHxS)	**1.5**	**E J**	0.0022	0.00078	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorooctanesulfonic acid (PFOS)	**4.4**	**E J**	0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 19:00	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U M	0.0022	0.00057	ug/L		12/05/16 08:31	12/16/16 19:00	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	26		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C4 PFBA	30		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C2 PFHxA	66		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C4 PFOA	77		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C5 PFNA	39		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C2 PFDA	108		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C2 PFUnA	118		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C2 PFDoA	124		25 - 150	12/05/16 08:31	12/16/16 19:00	1
18O2 PFHxS	49		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C4 PFOS	41		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C5-PFPeA	66		25 - 150	12/05/16 08:31	12/16/16 19:00	1
13C4-PFHpA	52		25 - 150	12/05/16 08:31	12/16/16 19:00	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: 508F51MW-LF-1116

Lab Sample ID: 320-23884-3
Date Collected: 11/29/16 15:05
Matrix: Water
Date Received: 11/30/16 09:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.034**	**H J M**	0.0022	0.00041	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluoropentanoic acid (PFPeA)	**0.039**	**H M**	0.0022	0.00088	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorohexanoic acid (PFHxA)	**0.058**	**H**	0.0022	0.00070	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluoroheptanoic acid (PFHpA)	**0.010**	**H**	0.0022	0.00071	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorooctanoic acid (PFOA)	**0.034**	**H M**	0.0022	0.00067	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorononanoic acid (PFNA)	0.0018	U H	0.0022	0.00058	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorodecanoic acid (PFDA)	**0.00068**	**J H**	0.0022	0.00039	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U H	0.0022	0.00067	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorododecanoic acid (PFDoA)	0.0018	U H	0.0022	0.00052	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U H	0.0022	0.00049	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorotetradecanoic acid (PFTeA)	**0.00062**	**H J**	0.0022	0.00036	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorobutanesulfonic acid (PFBS)	**0.021**	**H M**	0.0022	0.00082	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorohexanesulfonic acid (PFHxS)	**0.060**	**H**	0.0022	0.00077	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorooctanesulfonic acid (PFOS)	**0.036**	**H**	0.0036	0.0011	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U H	0.0036	0.0011	ug/L		12/19/16 14:29	12/20/16 16:44	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U H	0.0022	0.00057	ug/L		12/19/16 14:29	12/20/16 16:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*7*	*Q*	*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C4 PFBA	*30*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C2 PFHxA	*85*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C4 PFOA	*93*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C5 PFNA	*87*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C2 PFDA	*92*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C2 PFUnA	*94*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C2 PFDoA	*97*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
18O2 PFHxS	*102*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C4 PFOS	*116*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C5-PFPeA	*75*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*
13C4-PFHpA	*94*		*25 - 150*	*12/19/16 14:29*	*12/20/16 16:44*	*1*

Client Sample ID: EBGW112916

Lab Sample ID: 320-23884-4
Date Collected: 11/29/16 15:10
Matrix: Water
Date Received: 11/30/16 09:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00085	U	0.0021	0.00039	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluoropentanoic acid (PFPeA)	0.0017	U	0.0021	0.00084	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorohexanoic acid (PFHxA)	0.0017	U	0.0021	0.00067	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluoroheptanoic acid (PFHpA)	0.0017	U	0.0021	0.00068	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorooctanoic acid (PFOA)	0.0017	U	0.0021	0.00064	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorononanoic acid (PFNA)	0.0017	U	0.0021	0.00056	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorodecanoic acid (PFDA)	0.00085	U	0.0021	0.00037	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluoroundecanoic acid (PFUnA)	0.0017	U	0.0021	0.00064	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorododecanoic acid (PFDoA)	0.0017	U	0.0021	0.00050	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorotridecanoic Acid (PFTriA)	0.0017	U	0.0021	0.00047	ug/L		12/05/16 08:31	12/16/16 19:22	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: EBGW112916

Date Collected: 11/29/16 15:10
Date Received: 11/30/16 09:30

Lab Sample ID: 320-23884-4

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	**0.00041**	**J**	0.0021	0.00034	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorobutanesulfonic acid (PFBS)	0.0017	U Q	0.0021	0.00078	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorohexanesulfonic acid (PFHxS)	0.0017	U M	0.0021	0.00074	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorooctanesulfonic acid (PFOS)	**0.0011**	**J M**	0.0034	0.0011	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorodecanesulfonic acid (PFDS)	0.0026	U	0.0034	0.0010	ug/L		12/05/16 08:31	12/16/16 19:22	1
Perfluorooctane Sulfonamide (FOSA)	0.0017	U	0.0021	0.00054	ug/L		12/05/16 08:31	12/16/16 19:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*48*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C4 PFBA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C2 PFHxA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C4 PFOA	*110*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C5 PFNA	*110*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C2 PFDA	*120*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C2 PFUnA	*121*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C2 PFDoA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
18O2 PFHxS	*101*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C4 PFOS	*103*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C5-PFPeA	*118*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*
13C4-PFHpA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:22*	*1*

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C2 PFHx (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)	3C2 PFUn (25-150)	3C2 PFDo (25-150)
320-23884-1	606D150MW-LF-1116	11 Q	30	73	83	83	87	92	93
320-23884-1 - RA	606D150MW-LF-1116								
320-23884-2	608D161MW-LF-1116	31	26	30	32	17 Q	86	97	86
320-23884-2 - DL	608D161MW-LF-1116	49	129	118	143	98	134	116	119
320-23884-3	508F51MW-LF-1116	26	30	66	77	39	108	118	124
320-23884-3 - RE	508F51MW-LF-1116	7 Q	30	85	93	87	92	94	97
320-23884-3 MS	508F51MW-LF-1116	29	28	70	84	82	87	94	97
320-23884-3 MS - RE	508F51MW-LF-1116	2 Q	30	83	81	61	52	50	57
320-23884-3 MSD	508F51MW-LF-1116	11 Q	29	67	79	79	81	89	95
320-23884-3 MSD - RE	508F51MW-LF-1116	26	30	87	97	93	98	101	115
320-23884-4	EBGW112916	48	109	109	110	110	120	121	111
LCS 320-140536/2-A	Lab Control Sample	90	106	103	103	103	104	104	107
LCS 320-142964/2-A	Lab Control Sample	28	133	123	132	133	144	137	131
MB 320-140536/1-A	Method Blank	100	112	109	116	109	111	115	111
MB 320-142964/1-A	Method Blank	29	133	123	138	135	143	139	133

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	8O2 PFHx (25-150)	3C4 PFOS (25-150)	3C5-PFPe (25-150)	3C4-PFHp (25-150)
320-23884-1	606D150MW-LF-1116	87	98	68 M	82
320-23884-1 - RA	606D150MW-LF-1116	111			
320-23884-2	608D161MW-LF-1116	15 Q	13 Q	41	19 Q
320-23884-2 - DL	608D161MW-LF-1116	129	111	141	109
320-23884-3	508F51MW-LF-1116	49	41	66	52
320-23884-3 - RE	508F51MW-LF-1116	102	116	75	94
320-23884-3 MS	508F51MW-LF-1116	89	102	62	84
320-23884-3 MS - RE	508F51MW-LF-1116	103	118	71	89
320-23884-3 MSD	508F51MW-LF-1116	85	97	63	77
320-23884-3 MSD - RE	508F51MW-LF-1116	103	120	75	97
320-23884-4	EBGW112916	101	103	118	111
LCS 320-140536/2-A	Lab Control Sample	97	99	109	102
LCS 320-142964/2-A	Lab Control Sample	124	129	137	125
MB 320-140536/1-A	Method Blank	105	102	118	112
MB 320-142964/1-A	Method Blank	123	129	139	133

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C5-PFPeA = 13C5-PFPeA
13C4-PFHpA = 13C4-PFHpA

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-140536/1-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140536

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00079	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotetradecanoic acid (PFTeA)	0.000656	J	0.0025	0.00040	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/05/16 08:31	12/16/16 18:30	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*100*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFBA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFHxA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOA	*116*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5 PFNA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFUnA	*115*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDoA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
18O2 PFHxS	*105*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOS	*102*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5-PFPeA	*118*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4-PFHpA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0446		ug/L		112	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0431		ug/L		108	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0427		ug/L		107	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0443		ug/L		111	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0425		ug/L		106	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0428		ug/L		107	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0420		ug/L		105	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0410		ug/L		103	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0436		ug/L		109	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0557		ug/L		139	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0464		ug/L		131	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0375		ug/L		103	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0398		ug/L		107	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0412		ug/L		107	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0445		ug/L		111	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*90*		*25 - 150*
13C4 PFBA	*106*		*25 - 150*
13C2 PFHxA	*103*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C5 PFNA	*103*		*25 - 150*
13C2 PFDA	*104*		*25 - 150*
13C2 PFUnA	*104*		*25 - 150*
13C2 PFDoA	*107*		*25 - 150*
18O2 PFHxS	*97*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*
13C5-PFPeA	*109*		*25 - 150*
13C4-PFHpA	*102*		*25 - 150*

Lab Sample ID: 320-23884-3 MS
Matrix: Water
Analysis Batch: 142751

Client Sample ID: 508F51MW-LF-1116
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.18	J	0.0362	0.102	4 M	ug/L		-224	60 - 140
Perfluoropentanoic acid (PFPeA)	0.24	J	0.0362	0.0781	4	ug/L		-439	60 - 140
Perfluorohexanoic acid (PFHxA)	0.48	E J	0.0362	0.0993	4	ug/L		-1050	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.0362	0.0492	J	ug/L		-180	60 - 140
Perfluorooctanoic acid (PFOA)	0.26	J M	0.0362	0.0689	4 M	ug/L		-518	60 - 140
Perfluorononanoic acid (PFNA)	0.0069		0.0362	0.0391		ug/L		89	60 - 140
Perfluorodecanoic acid (PFDA)	0.00074	J	0.0362	0.0387		ug/L		105	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0362	0.0367		ug/L		101	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0362	0.0375		ug/L		103	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0362	0.0436		ug/L		120	50 - 150
Perfluorotetradecanoic acid (PFTeA)	0.00090	U J	0.0362	0.0534		ug/L		148	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.41	Q E J	0.0320	0.0552	4	ug/L		-1118	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	1.5	E J	0.0329	0.0951	4	ug/L		-4283	60 - 140

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-23884-3 MS — **Client Sample ID: 508F51MW-LF-1116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 142751 — **Prep Batch: 140536**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	4.4	E J	0.0336	0.0709	4	ug/L		-1283 1	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0349	0.0366		ug/L		105	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0018	U M	0.0362	0.0376		ug/L		104	60 - 140

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C8 FOSA	*29*		*25 - 150*
13C4 PFBA	*28*		*25 - 150*
13C2 PFHxA	*70*		*25 - 150*
13C4 PFOA	*84*		*25 - 150*
13C5 PFNA	*82*		*25 - 150*
13C2 PFDA	*87*		*25 - 150*
13C2 PFUnA	*94*		*25 - 150*
13C2 PFDoA	*97*		*25 - 150*
18O2 PFHxS	*89*		*25 - 150*
13C4 PFOS	*102*		*25 - 150*
13C5-PFPeA	*62*		*25 - 150*
13C4-PFHpA	*84*		*25 - 150*

Lab Sample ID: 320-23884-3 MSD — **Client Sample ID: 508F51MW-LF-1116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 142751 — **Prep Batch: 140536**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	0.18	J	0.0369	0.0917	4 M	ug/L		-248	60 - 140	11	30
Perfluoropentanoic acid (PFPeA)	0.24	J	0.0369	0.0792	4	ug/L		-428	60 - 140	1	30
Perfluorohexanoic acid (PFHxA)	0.48	E J	0.0369	0.101	4	ug/L		-1025	60 - 140	2	30
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.0369	0.0495	J	ug/L		-176	60 - 140	0	30
Perfluorooctanoic acid (PFOA)	0.26	J M	0.0369	0.0723	4 M	ug/L		-499	60 - 140	5	30
Perfluorononanoic acid (PFNA)	0.0069		0.0369	0.0393		ug/L		88	60 - 140	1	30
Perfluorodecanoic acid (PFDA)	0.00074	J	0.0369	0.0412		ug/L		110	60 - 140	6	30
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0369	0.0365		ug/L		99	60 - 140	0	30
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0369	0.0354		ug/L		96	60 - 140	6	30
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0369	0.0456		ug/L		124	50 - 150	5	30
Perfluorotetradecanoic acid (PFTeA)	0.00090	U J	0.0369	0.0578	J	ug/L		157	50 - 150	8	30
Perfluorobutanesulfonic acid (PFBS)	0.41	Q E J	0.0326	0.0557	4	ug/L		-1096	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	1.5	E J	0.0336	0.0934	4	ug/L		-4211	60 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	4.4	E J	0.0342	0.0683	4	ug/L		-1260 7	60 - 140	4	30
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0355	0.0363		ug/L		102	50 - 150	1	30
Perfluorooctane Sulfonamide (FOSA)	0.0018	U M	0.0369	0.0379		ug/L		103	60 - 140	1	30

QC Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C8 FOSA	11	Q	25 - 150
13C4 PFBA	29		25 - 150
13C2 PFHxA	67		25 - 150
13C4 PFOA	79		25 - 150
13C5 PFNA	79		25 - 150
13C2 PFDA	81		25 - 150
13C2 PFUnA	89		25 - 150
13C2 PFDoA	95		25 - 150
18O2 PFHxS	85		25 - 150
13C4 PFOS	97		25 - 150
13C5-PFPeA	63		25 - 150
13C4-PFHpA	77		25 - 150

Lab Sample ID: MB 320-142964/1-A
Matrix: Water
Analysis Batch: 143248

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142964

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00079	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorotetradecanoic acid (PFTeA)	0.000552	J	0.0025	0.00040	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/19/16 14:29	12/20/16 16:29	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/19/16 14:29	12/20/16 16:29	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	29		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C4 PFBA	133		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C2 PFHxA	123		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C4 PFOA	138		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C5 PFNA	135		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C2 PFDA	143		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C2 PFUnA	139		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C2 PFDoA	133		25 - 150	12/19/16 14:29	12/20/16 16:29	1
18O2 PFHxS	123		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C4 PFOS	129		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C5-PFPeA	139		25 - 150	12/19/16 14:29	12/20/16 16:29	1
13C4-PFHpA	133		25 - 150	12/19/16 14:29	12/20/16 16:29	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-142964/2-A
Matrix: Water
Analysis Batch: 143248

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142964

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0425		ug/L		106	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0403		ug/L		101	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0383		ug/L		96	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0405		ug/L		101	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0392		ug/L		98	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0374		ug/L		93	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0380		ug/L		95	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0379		ug/L		95	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0369		ug/L		92	50 - 150
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0462		ug/L		116	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0433		ug/L		123	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0378		ug/L		104	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0397		ug/L		107	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0382		ug/L		99	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0371		ug/L		93	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*28*		*25 - 150*
13C4 PFBA	*133*		*25 - 150*
13C2 PFHxA	*123*		*25 - 150*
13C4 PFOA	*132*		*25 - 150*
13C5 PFNA	*133*		*25 - 150*
13C2 PFDA	*144*		*25 - 150*
13C2 PFUnA	*137*		*25 - 150*
13C2 PFDoA	*131*		*25 - 150*
18O2 PFHxS	*124*		*25 - 150*
13C4 PFOS	*129*		*25 - 150*
13C5-PFPeA	*137*		*25 - 150*
13C4-PFHpA	*125*		*25 - 150*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE

Lab Sample ID: 320-23884-3 MS
Matrix: Water
Analysis Batch: 143248

Client Sample ID: 508F51MW-LF-1116
Prep Type: Total/NA
Prep Batch: 142964

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA) - RE	0.034	H J M	0.0370	0.0825	H M	ug/L		131	60 - 140
Perfluoropentanoic acid (PFPeA) - RE	0.039	H M	0.0370	0.0756	H	ug/L		99	60 - 140

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE (Continued)

Lab Sample ID: 320-23884-3 MS — **Client Sample ID: 508F51MW-LF-1116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 143248 — **Prep Batch: 142964**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA) - RE	0.058	H	0.0370	0.0934	H	ug/L		95	60 - 140
Perfluoroheptanoic acid (PFHpA) - RE	0.010	H	0.0370	0.0441	H	ug/L		91	60 - 140
Perfluorooctanoic acid (PFOA) - RE	0.034	H M	0.0370	0.0676	H M	ug/L		90	60 - 140
Perfluorononanoic acid (PFNA) - RE	0.0018	U H	0.0370	0.0326	H	ug/L		88	60 - 140
Perfluorodecanoic acid (PFDA) - RE	0.00068	J H	0.0370	0.0328	H	ug/L		87	60 - 140
Perfluoroundecanoic acid (PFUnA) - RE	0.0018	U H	0.0370	0.0320	H	ug/L		86	60 - 140
Perfluorododecanoic acid (PFDoA) - RE	0.0018	U H	0.0370	0.0313	H	ug/L		85	60 - 140
Perfluorotridecanoic Acid (PFTriA) - RE	0.0018	U H	0.0370	0.0436	H	ug/L		118	50 - 150
Perfluorotetradecanoic acid (PFTeA) - RE	0.00062	J H J	0.0370	0.0677	H J	ug/L		181	50 - 150
Perfluorobutanesulfonic acid (PFBS) - RE	0.021	H M	0.0327	0.0508	H	ug/L		92	50 - 150
Perfluorohexanesulfonic acid (PFHxS) - RE	0.060	H	0.0337	0.0896	H	ug/L		89	60 - 140
Perfluorooctanesulfonic acid (PFOS) - RE	0.036	H	0.0344	0.0660	H	ug/L		86	60 - 140
Perfluorodecanesulfonic acid (PFDS) - RE	0.0027	U H	0.0357	0.0310	H	ug/L		87	50 - 150
Perfluorooctane Sulfonamide (FOSA) - RE	0.0018	U H	0.0370	0.0327	H	ug/L		88	60 - 140

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C8 FOSA - RE	*2*	*Q*	*25 - 150*
13C4 PFBA - RE	*30*		*25 - 150*
13C2 PFHxA - RE	*83*		*25 - 150*
13C4 PFOA - RE	*81*		*25 - 150*
13C5 PFNA - RE	*61*		*25 - 150*
13C2 PFDA - RE	*52*		*25 - 150*
13C2 PFUnA - RE	*50*		*25 - 150*
13C2 PFDoA - RE	*57*		*25 - 150*
18O2 PFHxS - RE	*103*		*25 - 150*
13C4 PFOS - RE	*118*		*25 - 150*
13C5-PFPeA - RE	*71*		*25 - 150*
13C4-PFHpA - RE	*89*		*25 - 150*

Lab Sample ID: 320-23884-3 MSD — **Client Sample ID: 508F51MW-LF-1116**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 143248 — **Prep Batch: 142964**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA) - RE	0.034	H J M	0.0360	0.0846	H J M	ug/L		141	60 - 140	2	30
Perfluoropentanoic acid (PFPeA) - RE	0.039	H M	0.0360	0.0797	H M	ug/L		113	60 - 140	5	30

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE (Continued)

Lab Sample ID: 320-23884-3 MSD
Matrix: Water
Analysis Batch: 143248

Client Sample ID: 508F51MW-LF-1116
Prep Type: Total/NA
Prep Batch: 142964

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA) - RE	0.058	H	0.0360	0.0975	H	ug/L		109	60 - 140	4	30
Perfluoroheptanoic acid (PFHpA) - RE	0.010	H	0.0360	0.0517	H	ug/L		115	60 - 140	16	30
Perfluorooctanoic acid (PFOA) - RE	0.034	H M	0.0360	0.0726	H M	ug/L		107	60 - 140	7	30
Perfluorononanoic acid (PFNA) - RE	0.0018	U H	0.0360	0.0393	H	ug/L		109	60 - 140	19	30
Perfluorodecanoic acid (PFDA) - RE	0.00068	J H	0.0360	0.0398	H	ug/L		109	60 - 140	19	30
Perfluoroundecanoic acid (PFUnA) - RE	0.0018	U H	0.0360	0.0400	H	ug/L		111	60 - 140	22	30
Perfluorododecanoic acid (PFDoA) - RE	0.0018	U H	0.0360	0.0401	H	ug/L		111	60 - 140	25	30
Perfluorotridecanoic Acid (PFTriA) - RE	0.0018	U H	0.0360	0.0441	H	ug/L		122	50 - 150	1	30
Perfluorotetradecanoic acid (PFTeA) - RE	0.00062	J H J	0.0360	0.0535	H	ug/L		147	50 - 150	23	30
Perfluorobutanesulfonic acid (PFBS) - RE	0.021	H M	0.0318	0.0564	H	ug/L		112	50 - 150	10	30
Perfluorohexanesulfonic acid (PFHxS) - RE	0.060	H	0.0327	0.0967	H	ug/L		113	60 - 140	8	30
Perfluorooctanesulfonic acid (PFOS) - RE	0.036	H	0.0334	0.0765	H	ug/L		120	60 - 140	15	30
Perfluorodecanesulfonic acid (PFDS) - RE	0.0027	U H	0.0347	0.0401	H	ug/L		116	50 - 150	26	30
Perfluorooctane Sulfonamide (FOSA) - RE	0.0018	U H	0.0360	0.0400	H	ug/L		111	60 - 140	20	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C8 FOSA - RE	*26*		*25 - 150*
13C4 PFBA - RE	*30*		*25 - 150*
13C2 PFHxA - RE	*87*		*25 - 150*
13C4 PFOA - RE	*97*		*25 - 150*
13C5 PFNA - RE	*93*		*25 - 150*
13C2 PFDA - RE	*98*		*25 - 150*
13C2 PFUnA - RE	*101*		*25 - 150*
13C2 PFDoA - RE	*115*		*25 - 150*
18O2 PFHxS - RE	*103*		*25 - 150*
13C4 PFOS - RE	*120*		*25 - 150*
13C5-PFPeA - RE	*75*		*25 - 150*
13C4-PFHpA - RE	*97*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

LCMS

Prep Batch: 140536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23884-1 - RA	606D150MW-LF-1116	Total/NA	Water	3535	
320-23884-1	606D150MW-LF-1116	Total/NA	Water	3535	
320-23884-2	608D161MW-LF-1116	Total/NA	Water	3535	
320-23884-2 - DL	608D161MW-LF-1116	Total/NA	Water	3535	
320-23884-3	508F51MW-LF-1116	Total/NA	Water	3535	
320-23884-4	EBGW112916	Total/NA	Water	3535	
MB 320-140536/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	3535	
320-23884-3 MS	508F51MW-LF-1116	Total/NA	Water	3535	
320-23884-3 MSD	508F51MW-LF-1116	Total/NA	Water	3535	

Analysis Batch: 142751

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23884-1	606D150MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23884-2	608D161MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23884-3	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23884-4	EBGW112916	Total/NA	Water	537 (Modified)	140536
MB 320-140536/1-A	Method Blank	Total/NA	Water	537 (Modified)	140536
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	140536
320-23884-3 MS	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23884-3 MSD	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	140536

Prep Batch: 142964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23884-3 - RE	508F51MW-LF-1116	Total/NA	Water	3535	
MB 320-142964/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-142964/2-A	Lab Control Sample	Total/NA	Water	3535	
320-23884-3 MS - RE	508F51MW-LF-1116	Total/NA	Water	3535	
320-23884-3 MSD - RE	508F51MW-LF-1116	Total/NA	Water	3535	

Analysis Batch: 143248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23884-3 - RE	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	142964
MB 320-142964/1-A	Method Blank	Total/NA	Water	537 (Modified)	142964
LCS 320-142964/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	142964
320-23884-3 MS - RE	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	142964
320-23884-3 MSD - RE	508F51MW-LF-1116	Total/NA	Water	537 (Modified)	142964

Analysis Batch: 143259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23884-1 - RA	606D150MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23884-2 - DL	608D161MW-LF-1116	Total/NA	Water	537 (Modified)	140536

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Client Sample ID: 606D150MW-LF-1116 — Lab Sample ID: 320-23884-1

Date Collected: 11/29/16 11:30 — **Matrix: Water**
Date Received: 11/30/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			267.1 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 18:45	SBC	TAL SAC
Total/NA	Prep	3535	RA		267.1 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 18:44	SBC	TAL SAC

Client Sample ID: 608D161MW-LF-1116 — Lab Sample ID: 320-23884-2

Date Collected: 11/29/16 12:40 — **Matrix: Water**
Date Received: 11/30/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			273.4 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 18:52	SBC	TAL SAC
Total/NA	Prep	3535	DL		273.4 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			143259	12/20/16 18:14	SBC	TAL SAC

Client Sample ID: 508F51MW-LF-1116 — Lab Sample ID: 320-23884-3

Date Collected: 11/29/16 15:05 — **Matrix: Water**
Date Received: 11/30/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.8 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 19:00	SBC	TAL SAC
Total/NA	Prep	3535	RE		280.8 mL	0.5 mL	142964	12/19/16 14:29	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RE	1			143248	12/20/16 16:44	SBC	TAL SAC

Client Sample ID: EBGW112916 — Lab Sample ID: 320-23884-4

Date Collected: 11/29/16 15:10 — **Matrix: Water**
Date Received: 11/30/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			294.1 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 19:22	SBC	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-29-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23884-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23884-1	606D150MW-LF-1116	Water	11/29/16 11:30	11/30/16 09:30
320-23884-2	608D161MW-LF-1116	Water	11/29/16 12:40	11/30/16 09:30
320-23884-3	508F51MW-LF-1116	Water	11/29/16 15:05	11/30/16 09:30
320-23884-4	EBGW112916	Water	11/29/16 15:10	11/30/16 09:30

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB112916 | Page 1 of 1

Project Name: PFAs Groundwater Investigation | PO No. 21529 | Project No. 00000012796 | Phase FIFS

Site Location: NAS Dulles

CTO No. JM78 | RC Project Manager: Tom Wibery

Sampler/Site Phone#

Lab Name: TestAmerica Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAs by EPA Method 537									Extra Volume for MS/MSD	HOLD
	606D150MW-LF-1116	606D150MW	11/29/16	1130	WG	N	N	2	X										
	608D161MW-LF-1116	608D161MW	11/29/16	1240	WG	N	N	2	X										
	508FS1MW-LF-1116	508FS1MW	11/29/16	1505	WG	N	N	6	X									X	
	EBGW112916	—	11/29/16	1510	WQ	EB	N	2	X										

320-23884 Chain of Custody

Field **Comments:**
TRRP Reporting — no preservative

Lab **Comments:**
Modified — 7 Day Hold — 16 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	11/29/16	1450	1 [signature] Troy C. Turner TAS	11/30/16	09:30
2			2		
3			3		

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes ✓ No____ ø.2° ice
Method of Shipment: Fed Ex
Airbill No:
Date Shipped: 11/29/2016

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water
(2) **Sample Type: AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk
(3) **Preservative added**: **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-23884-1

Login Number: 23884
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-23931-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
12/22/2016 2:48:08 PM
David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Designee for

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
E	Result exceeded calibration range.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
M	Manual integrated compound.
D	The reported value is from a dilution.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-23931-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-23931-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/01/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.4 C.

PFAS

Perfluorotetradecanoic acid (PFTeA) was detected in method blank MB 320-140536/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Job ID: 320-23931-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

The continuing calibration verification (CCV) associated with batch 320-142751 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS). The following samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported: FB113016 (320-23931-6) and (CCV 320-142751/16).

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the following sample are below the method recommended limit: 608D132MW-LF-1116 (320-23931-1), 608D33MW-LF-1116 (320-23931-2), 61301MW-LF-1116 (320-23931-3), 613D41MW-LF-1116 (320-23931-4), 613D39MW-LF-1116 (320-23931-5) and (320-23884-A-3-C MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The Isotope Dilution Analyte (IDA) recovery for 13C8 FOSA in the following sample is below the method recommended limit in the diluted sample analysis: 608D33MW-LF-1116 (320-23931-2). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

Isotope Dilution Analyte (IDA) recoveries for several analytes are above the method recommended limit for the following samples in the diluted sample analysis: 608D132MW-LF-1116 (320-23931-1) and 608D33MW-LF-1116 (320-23931-2). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: 608D132MW-LF-1116 (320-23931-1) and 608D33MW-LF-1116 (320-23931-2). These samples have been run at dilution and both sets of data have been reported.

The following sample was diluted due to the nature of the sample matrix: 608D132MW-LF-1116 (320-23931-1) and 608D33MW-LF-1116 (320-23931-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: 608D132MW-LF-1116 — Lab Sample ID: 320-23931-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.50	E	0.0024	0.00043	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.61	E	0.0024	0.00093	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.5	E	0.0024	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.32		0.0024	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.52	E M	0.0024	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.00064	J	0.0024	0.00062	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00056	J	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.6	E	0.0024	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	E	0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.52	D	0.12	0.022	ug/L	50		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	0.76	D	0.12	0.047	ug/L	50		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	2.1	D	0.12	0.037	ug/L	50		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.34	D	0.12	0.038	ug/L	50		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.55	D M	0.12	0.035	ug/L	50		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	1.5	D	0.12	0.043	ug/L	50		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	3.7	D	0.12	0.041	ug/L	50		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.4	D	0.19	0.060	ug/L	50		537 (Modified)	Total/NA

Client Sample ID: 608D33MW-LF-1116 — Lab Sample ID: 320-23931-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.26	M	0.0024	0.00044	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.40	E	0.0024	0.00095	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.80	E	0.0024	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.21		0.0024	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.38	M	0.0024	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.017		0.0024	0.00063	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0022	J M	0.0024	0.00042	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00039	J	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.4	E	0.0024	0.00084	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10	E M	0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	0.0039		0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.043		0.0024	0.00061	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.29	D	0.24	0.044	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	0.47	D	0.24	0.095	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	0.94	D	0.24	0.076	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.21	J D	0.24	0.077	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.43	D M	0.24	0.072	ug/L	100		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	0.73	D	0.24	0.088	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	5.4	D	0.24	0.084	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	21	D	0.38	0.12	ug/L	100		537 (Modified)	Total/NA

Client Sample ID: 61301MW-LF-1116 — Lab Sample ID: 320-23931-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.17	M	0.0024	0.00043	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: 61301MW-LF-1116 (Continued) — Lab Sample ID: 320-23931-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanoic acid (PFPeA)	0.18		0.0024	0.00093	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.15		0.0024	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11		0.0024	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.10	M	0.0024	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0080		0.0024	0.00062	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0016	J	0.0024	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00079	J	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.071		0.0024	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.061		0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.014		0.0024	0.00086	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 613D41MW-LF-1116 — Lab Sample ID: 320-23931-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.012	M	0.0024	0.00043	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.0063		0.0024	0.00093	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.0074		0.0024	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0036	M	0.0024	0.00075	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.035	M	0.0024	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.00092	J M	0.0024	0.00062	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.00063	J	0.0024	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00078	J M	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.032		0.0024	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.070		0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.0053		0.0024	0.00086	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 613D39MW-LF-1116 — Lab Sample ID: 320-23931-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.0028		0.0023	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.0013	J	0.0023	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00062	J	0.0023	0.00036	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.022		0.0023	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.026		0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.0062		0.0023	0.00083	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: FB113016 — Lab Sample ID: 320-23931-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00041	J	0.0022	0.00036	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: 608D132MW-LF-1116

Lab Sample ID: 320-23931-1

Date Collected: 11/30/16 09:40
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.50**	**E**	0.0024	0.00043	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluoropentanoic acid (PFPeA)	**0.61**	**E**	0.0024	0.00093	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorohexanoic acid (PFHxA)	**1.5**	**E**	0.0024	0.00074	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluoroheptanoic acid (PFHpA)	**0.32**		0.0024	0.00076	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorooctanoic acid (PFOA)	**0.52**	**E M**	0.0024	0.00071	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorononanoic acid (PFNA)	**0.00064**	**J**	0.0024	0.00062	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorodecanoic acid (PFDA)	0.00095	U	0.0024	0.00042	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00071	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00055	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00052	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorotetradecanoic acid (PFTeA)	**0.00056**	**J**	0.0024	0.00038	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorohexanesulfonic acid (PFHxS)	**2.6**	**E**	0.0024	0.00082	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorooctanesulfonic acid (PFOS)	**1.2**	**E**	0.0038	0.0012	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/05/16 08:31	12/16/16 19:30	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00060	ug/L		12/05/16 08:31	12/16/16 19:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*18*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C4 PFBA	*32*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C2 PFHxA	*41*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C4 PFOA	*62*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C5 PFNA	*72*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C2 PFDA	*106*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C2 PFUnA	*104*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C2 PFDoA	*104*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
18O2 PFHxS	*35*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C4 PFOS	*84*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C5-PFPeA	*52*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*
13C4-PFHpA	*37*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:30*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.52**	**D**	0.12	0.022	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluoropentanoic acid (PFPeA)	**0.76**	**D**	0.12	0.047	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorohexanoic acid (PFHxA)	**2.1**	**D**	0.12	0.037	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluoroheptanoic acid (PFHpA)	**0.34**	**D**	0.12	0.038	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorooctanoic acid (PFOA)	**0.55**	**D M**	0.12	0.035	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorononanoic acid (PFNA)	0.095	U	0.12	0.031	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorodecanoic acid (PFDA)	0.047	U	0.12	0.021	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluoroundecanoic acid (PFUnA)	0.095	U	0.12	0.035	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorododecanoic acid (PFDoA)	0.095	U	0.12	0.028	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorotridecanoic Acid (PFTriA)	0.095	U	0.12	0.026	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorotetradecanoic acid (PFTeA)	0.047	U	0.12	0.019	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorobutanesulfonic acid (PFBS)	**1.5**	**D**	0.12	0.043	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorohexanesulfonic acid (PFHxS)	**3.7**	**D**	0.12	0.041	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorooctanesulfonic acid (PFOS)	**1.4**	**D**	0.19	0.060	ug/L		12/05/16 08:31	12/20/16 18:37	50

Client Sample ID: 608D132MW-LF-1116 — Lab Sample ID: 320-23931-1

Date Collected: 11/30/16 09:40 — **Matrix: Water**
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	0.14	U	0.19	0.057	ug/L		12/05/16 08:31	12/20/16 18:37	50
Perfluorooctane Sulfonamide (FOSA)	0.095	U	0.12	0.030	ug/L		12/05/16 08:31	12/20/16 18:37	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*224*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C4 PFBA	*802*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C2 PFHxA	*857*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C4 PFOA	*1153*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C5 PFNA	*1303*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C2 PFDA	*1335*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C2 PFUnA	*1305*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C2 PFDoA	*1231*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
18O2 PFHxS	*842*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C4 PFOS	*1317*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C5-PFPeA	*1140*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*
13C4-PFHpA	*751*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/20/16 18:37*	*50*

Client Sample ID: 608D33MW-LF-1116 — Lab Sample ID: 320-23931-2

Date Collected: 11/30/16 11:00 — **Matrix: Water**
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.26**	**M**	0.0024	0.00044	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluoropentanoic acid (PFPeA)	**0.40**	**E**	0.0024	0.00095	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorohexanoic acid (PFHxA)	**0.80**	**E**	0.0024	0.00076	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluoroheptanoic acid (PFHpA)	**0.21**		0.0024	0.00077	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorooctanoic acid (PFOA)	**0.38**	**M**	0.0024	0.00072	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorononanoic acid (PFNA)	**0.017**		0.0024	0.00063	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorodecanoic acid (PFDA)	**0.0022**	**J M**	0.0024	0.00042	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00072	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00056	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00053	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorotetradecanoic acid (PFTeA)	**0.00039**	**J**	0.0024	0.00038	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorohexanesulfonic acid (PFHxS)	**2.4**	**E**	0.0024	0.00084	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorooctanesulfonic acid (PFOS)	**10**	**E M**	0.0038	0.0012	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorodecanesulfonic acid (PFDS)	**0.0039**		0.0038	0.0012	ug/L		12/05/16 08:31	12/16/16 19:37	1
Perfluorooctane Sulfonamide (FOSA)	**0.043**		0.0024	0.00061	ug/L		12/05/16 08:31	12/16/16 19:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*8*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C4 PFBA	*9*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C2 PFHxA	*47*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C4 PFOA	*60*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C5 PFNA	*27*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C2 PFDA	*97*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*
13C2 PFUnA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 19:37*	*1*

Client Sample ID: 608D33MW-LF-1116

Lab Sample ID: 320-23931-2
Date Collected: 11/30/16 11:00
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDoA	108		25 - 150	12/05/16 08:31	12/16/16 19:37	1
18O2 PFHxS	34		25 - 150	12/05/16 08:31	12/16/16 19:37	1
13C4 PFOS	21	Q	25 - 150	12/05/16 08:31	12/16/16 19:37	1
13C5-PFPeA	42		25 - 150	12/05/16 08:31	12/16/16 19:37	1
13C4-PFHpA	36		25 - 150	12/05/16 08:31	12/16/16 19:37	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.29**	**D**	0.24	0.044	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluoropentanoic acid (PFPeA)	**0.47**	**D**	0.24	0.095	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorohexanoic acid (PFHxA)	**0.94**	**D**	0.24	0.076	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluoroheptanoic acid (PFHpA)	**0.21**	**J D**	0.24	0.077	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorooctanoic acid (PFOA)	**0.43**	**D M**	0.24	0.072	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorononanoic acid (PFNA)	0.19	U	0.24	0.063	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorodecanoic acid (PFDA)	0.096	U	0.24	0.042	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluoroundecanoic acid (PFUnA)	0.19	U	0.24	0.072	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorododecanoic acid (PFDoA)	0.19	U	0.24	0.056	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorotridecanoic Acid (PFTriA)	0.19	U	0.24	0.053	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorotetradecanoic acid (PFTeA)	0.096	U	0.24	0.038	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorobutanesulfonic acid (PFBS)	**0.73**	**D**	0.24	0.088	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorohexanesulfonic acid (PFHxS)	**5.4**	**D**	0.24	0.084	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorooctanesulfonic acid (PFOS)	**21**	**D**	0.38	0.12	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorodecanesulfonic acid (PFDS)	0.29	U	0.38	0.12	ug/L		12/05/16 08:31	12/20/16 18:22	100
Perfluorooctane Sulfonamide (FOSA)	0.19	U	0.24	0.061	ug/L		12/05/16 08:31	12/20/16 18:22	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	17	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C4 PFBA	54		25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C2 PFHxA	154	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C4 PFOA	181	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C5 PFNA	145		25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C2 PFDA	162	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C2 PFUnA	163	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C2 PFDoA	155	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
18O2 PFHxS	150		25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C4 PFOS	144		25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C5-PFPeA	179	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100
13C4-PFHpA	154	Q	25 - 150	12/05/16 08:31	12/20/16 18:22	100

Client Sample ID: 61301MW-LF-1116

Lab Sample ID: 320-23931-3
Date Collected: 11/30/16 12:45
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.17**	**M**	0.0024	0.00043	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluoropentanoic acid (PFPeA)	**0.18**		0.0024	0.00093	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorohexanoic acid (PFHxA)	**0.15**		0.0024	0.00074	ug/L		12/05/16 08:31	12/16/16 20:15	1

Client Sample ID: 61301MW-LF-1116

Lab Sample ID: 320-23931-3
Date Collected: 11/30/16 12:45
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	0.11		0.0024	0.00076	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorooctanoic acid (PFOA)	0.10	M	0.0024	0.00070	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorononanoic acid (PFNA)	0.0080		0.0024	0.00062	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorodecanoic acid (PFDA)	0.0016	J	0.0024	0.00041	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00070	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00055	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00052	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorotetradecanoic acid (PFTeA)	0.00079	J	0.0024	0.00038	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorohexanesulfonic acid (PFHxS)	0.071		0.0024	0.00082	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorooctanesulfonic acid (PFOS)	0.061		0.0038	0.0012	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/05/16 08:31	12/16/16 20:15	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00060	ug/L		12/05/16 08:31	12/16/16 20:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*9*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C4 PFBA	*45*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C2 PFHxA	*78*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C4 PFOA	*85*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C5 PFNA	*88*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C2 PFDA	*97*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C2 PFUnA	*104*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C2 PFDoA	*104*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
18O2 PFHxS	*93*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C4 PFOS	*102*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C5-PFPeA	*78*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*
13C4-PFHpA	*82*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:15*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.014		0.0024	0.00086	ug/L		12/05/16 08:31	12/20/16 18:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*12/05/16 08:31*	*12/20/16 18:52*	*1*

Client Sample ID: 613D41MW-LF-1116

Lab Sample ID: 320-23931-4
Date Collected: 11/30/16 13:55
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.012	M	0.0024	0.00043	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluoropentanoic acid (PFPeA)	0.0063		0.0024	0.00093	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorohexanoic acid (PFHxA)	0.0074		0.0024	0.00074	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluoroheptanoic acid (PFHpA)	0.0036	M	0.0024	0.00075	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorooctanoic acid (PFOA)	0.035	M	0.0024	0.00070	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorononanoic acid (PFNA)	0.00092	J M	0.0024	0.00062	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorodecanoic acid (PFDA)	0.00063	J	0.0024	0.00041	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00070	ug/L		12/05/16 08:31	12/16/16 20:22	1

Client Sample ID: 613D41MW-LF-1116

Lab Sample ID: 320-23931-4
Matrix: Water
Date Collected: 11/30/16 13:55
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00055	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00052	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorotetradecanoic acid (PFTeA)	**0.00078**	**J M**	0.0024	0.00038	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorohexanesulfonic acid (PFHxS)	**0.032**		0.0024	0.00082	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorooctanesulfonic acid (PFOS)	**0.070**		0.0038	0.0012	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/05/16 08:31	12/16/16 20:22	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00060	ug/L		12/05/16 08:31	12/16/16 20:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*15*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C4 PFBA	*48*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C2 PFHxA	*77*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C4 PFOA	*77*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C5 PFNA	*70*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C2 PFDA	*68*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C2 PFUnA	*70*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C2 PFDoA	*77*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
18O2 PFHxS	*96*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C4 PFOS	*101*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C5-PFPeA	*80*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*
13C4-PFHpA	*77*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:22*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**0.0053**		0.0024	0.00086	ug/L		12/05/16 08:31	12/20/16 18:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*126*		*25 - 150*	*12/05/16 08:31*	*12/20/16 18:59*	*1*

Client Sample ID: 613D39MW-LF-1116

Lab Sample ID: 320-23931-5
Matrix: Water
Date Collected: 11/30/16 15:20
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.0028**		0.0023	0.00041	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0023	0.00089	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0023	0.00071	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00072	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorooctanoic acid (PFOA)	**0.0013**	**J**	0.0023	0.00067	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00059	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorodecanoic acid (PFDA)	0.00090	U	0.0023	0.00040	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00067	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00053	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00050	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorotetradecanoic acid (PFTeA)	**0.00062**	**J**	0.0023	0.00036	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorohexanesulfonic acid (PFHxS)	**0.022**		0.0023	0.00078	ug/L		12/05/16 08:31	12/16/16 20:30	1

Client Sample ID: 613D39MW-LF-1116

Lab Sample ID: 320-23931-5
Date Collected: 11/30/16 15:20
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**0.026**		0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 20:30	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0023	0.00057	ug/L		12/05/16 08:31	12/16/16 20:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*13*	*Q*	*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C4 PFBA	*43*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C2 PFHxA	*77*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C4 PFOA	*92*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C5 PFNA	*93*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C2 PFDA	*97*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C2 PFUnA	*97*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C2 PFDoA	*86*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
18O2 PFHxS	*92*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C4 PFOS	*99*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C5-PFPeA	*76*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*
13C4-PFHpA	*86*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:30*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**0.0062**		0.0023	0.00083	ug/L		12/05/16 08:31	12/20/16 19:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*12/05/16 08:31*	*12/20/16 19:07*	*1*

Client Sample ID: FB113016

Lab Sample ID: 320-23931-6
Date Collected: 11/30/16 15:35
Matrix: Water
Date Received: 12/01/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00089	U	0.0022	0.00041	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0022	0.00088	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0022	0.00070	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00072	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00058	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorodecanoic acid (PFDA)	0.00089	U	0.0022	0.00039	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0022	0.00067	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00052	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00049	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorotetradecanoic acid (PFTeA)	**0.00041**	**J**	0.0022	0.00036	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U Q	0.0022	0.00082	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0022	0.00078	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/05/16 08:31	12/16/16 20:37	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0022	0.00057	ug/L		12/05/16 08:31	12/16/16 20:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*55*		*25 - 150*	*12/05/16 08:31*	*12/16/16 20:37*	*1*

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: FB113016

Date Collected: 11/30/16 15:35
Date Received: 12/01/16 09:50

Lab Sample ID: 320-23931-6

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	106		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C2 PFHxA	105		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C4 PFOA	110		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C5 PFNA	109		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C2 PFDA	115		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C2 PFUnA	116		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C2 PFDoA	104		25 - 150	12/05/16 08:31	12/16/16 20:37	1
18O2 PFHxS	102		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C4 PFOS	102		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C5-PFPeA	113		25 - 150	12/05/16 08:31	12/16/16 20:37	1
13C4-PFHpA	111		25 - 150	12/05/16 08:31	12/16/16 20:37	1

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C2 PFHx (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)	3C2 PFUn (25-150)	3C2 PFDo (25-150)
320-23931-1	608D132MW-LF-1116	18 Q	32	41	62	72	106	104	104
320-23931-1 - DL	608D132MW-LF-1116	224 Q	802 Q	857 Q	1153 Q	1303 Q	1335 Q	1305 Q	1231 Q
320-23931-2	608D33MW-LF-1116	8 Q	9 Q	47	60	27	97	112	108
320-23931-2 - DL	608D33MW-LF-1116	17 Q	54	154 Q	181 Q	145	162 Q	163 Q	155 Q
320-23931-3	61301MW-LF-1116	9 Q	45	78	85	88	97	104	104
320-23931-3 - RA	61301MW-LF-1116								
320-23931-4	613D41MW-LF-1116	15 Q	48	77	77	70	68	70	77
320-23931-4 - RA	613D41MW-LF-1116								
320-23931-5	613D39MW-LF-1116	13 Q	43	77	92	93	97	97	86
320-23931-5 - RA	613D39MW-LF-1116								
320-23931-6	FB113016	55	106	105	110	109	115	116	104
LCS 320-140536/2-A	Lab Control Sample	90	106	103	103	103	104	104	107
MB 320-140536/1-A	Method Blank	100	112	109	116	109	111	115	111

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	8O2 PFHx (25-150)	3C4 PFOS (25-150)	3C5-PFPe (25-150)	3C4-PFHp (25-150)
320-23931-1	608D132MW-LF-1116	35	84	52	37
320-23931-1 - DL	608D132MW-LF-1116	842 Q	1317 Q	1140 Q	751 Q
320-23931-2	608D33MW-LF-1116	34	21 Q	42	36
320-23931-2 - DL	608D33MW-LF-1116	150	144	179 Q	154 Q
320-23931-3	61301MW-LF-1116	93	102	78	82
320-23931-3 - RA	61301MW-LF-1116	111			
320-23931-4	613D41MW-LF-1116	96	101	80	77
320-23931-4 - RA	613D41MW-LF-1116	126			
320-23931-5	613D39MW-LF-1116	92	99	76	86
320-23931-5 - RA	613D39MW-LF-1116	116			
320-23931-6	FB113016	102	102	113	111
LCS 320-140536/2-A	Lab Control Sample	97	99	109	102
MB 320-140536/1-A	Method Blank	105	102	118	112

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C5-PFPeA = 13C5-PFPeA
13C4-PFHpA = 13C4-PFHpA

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-140536/1-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140536

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00079	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotetradecanoic acid (PFTeA)	0.000656	J	0.0025	0.00040	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/05/16 08:31	12/16/16 18:30	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*100*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFBA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFHxA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOA	*116*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5 PFNA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFUnA	*115*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDoA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
18O2 PFHxS	*105*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOS	*102*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5-PFPeA	*118*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4-PFHpA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0446		ug/L		112	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0431		ug/L		108	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0427		ug/L		107	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0443		ug/L		111	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0425		ug/L		106	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0428		ug/L		107	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0420		ug/L		105	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0410		ug/L		103	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0436		ug/L		109	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0557		ug/L		139	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0464		ug/L		131	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0375		ug/L		103	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0398		ug/L		107	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0412		ug/L		107	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0445		ug/L		111	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*90*		*25 - 150*
13C4 PFBA	*106*		*25 - 150*
13C2 PFHxA	*103*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C5 PFNA	*103*		*25 - 150*
13C2 PFDA	*104*		*25 - 150*
13C2 PFUnA	*104*		*25 - 150*
13C2 PFDoA	*107*		*25 - 150*
18O2 PFHxS	*97*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*
13C5-PFPeA	*109*		*25 - 150*
13C4-PFHpA	*102*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

LCMS

Prep Batch: 140536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23931-1 - DL	608D132MW-LF-1116	Total/NA	Water	3535	
320-23931-1	608D132MW-LF-1116	Total/NA	Water	3535	
320-23931-2	608D33MW-LF-1116	Total/NA	Water	3535	
320-23931-2 - DL	608D33MW-LF-1116	Total/NA	Water	3535	
320-23931-3	61301MW-LF-1116	Total/NA	Water	3535	
320-23931-3 - RA	61301MW-LF-1116	Total/NA	Water	3535	
320-23931-4	613D41MW-LF-1116	Total/NA	Water	3535	
320-23931-4 - RA	613D41MW-LF-1116	Total/NA	Water	3535	
320-23931-5	613D39MW-LF-1116	Total/NA	Water	3535	
320-23931-5 - RA	613D39MW-LF-1116	Total/NA	Water	3535	
320-23931-6	FB113016	Total/NA	Water	3535	
MB 320-140536/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 142751

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23931-1	608D132MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-2	608D33MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-3	61301MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-4	613D41MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-5	613D39MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-6	FB113016	Total/NA	Water	537 (Modified)	140536
MB 320-140536/1-A	Method Blank	Total/NA	Water	537 (Modified)	140536
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	140536

Analysis Batch: 143259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23931-1 - DL	608D132MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-2 - DL	608D33MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-3 - RA	61301MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-4 - RA	613D41MW-LF-1116	Total/NA	Water	537 (Modified)	140536
320-23931-5 - RA	613D39MW-LF-1116	Total/NA	Water	537 (Modified)	140536

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: 608D132MW-LF-1116 — Lab Sample ID: 320-23931-1

Date Collected: 11/30/16 09:40 — **Matrix: Water**
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.5 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 19:30	SBC	TAL SAC
Total/NA	Prep	3535	DL		264.5 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	50			143259	12/20/16 18:37	SBC	TAL SAC

Client Sample ID: 608D33MW-LF-1116 — Lab Sample ID: 320-23931-2

Date Collected: 11/30/16 11:00 — **Matrix: Water**
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.2 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 19:37	SBC	TAL SAC
Total/NA	Prep	3535	DL		260.2 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			143259	12/20/16 18:22	SBC	TAL SAC

Client Sample ID: 61301MW-LF-1116 — Lab Sample ID: 320-23931-3

Date Collected: 11/30/16 12:45 — **Matrix: Water**
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.5 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:15	SBC	TAL SAC
Total/NA	Prep	3535	RA		265.5 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 18:52	SBC	TAL SAC

Client Sample ID: 613D41MW-LF-1116 — Lab Sample ID: 320-23931-4

Date Collected: 11/30/16 13:55 — **Matrix: Water**
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.7 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:22	SBC	TAL SAC
Total/NA	Prep	3535	RA		265.7 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 18:59	SBC	TAL SAC

Client Sample ID: 613D39MW-LF-1116 — Lab Sample ID: 320-23931-5

Date Collected: 11/30/16 15:20 — **Matrix: Water**
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.6 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:30	SBC	TAL SAC
Total/NA	Prep	3535	RA		277.6 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Client Sample ID: 613D39MW-LF-1116

Lab Sample ID: 320-23931-5
Date Collected: 11/30/16 15:20
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 19:07	SBC	TAL SAC

Client Sample ID: FB113016

Lab Sample ID: 320-23931-6
Date Collected: 11/30/16 15:35
Matrix: Water
Date Received: 12/01/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			280.2 mL	0.5 mL	140536	12/05/16 08:31	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:37	SBC	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-29-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23931-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23931-1	608D132MW-LF-1116	Water	11/30/16 09:40	12/01/16 09:50
320-23931-2	608D33MW-LF-1116	Water	11/30/16 11:00	12/01/16 09:50
320-23931-3	61301MW-LF-1116	Water	11/30/16 12:45	12/01/16 09:50
320-23931-4	613D41MW-LF-1116	Water	11/30/16 13:55	12/01/16 09:50
320-23931-5	613D39MW-LF-1116	Water	11/30/16 15:20	12/01/16 09:50
320-23931-6	FB113016	Water	11/30/16 15:35	12/01/16 09:50

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB113016 | Page 1 of 1

Project Name: PFAs Groundwater Investigation | PO No. 21529 | Project No. 88331277.6 Phase F1F3

Site Location: NAS Dallas

CTO No. JM73 | RC Project Manager: Tom Wilberg

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers	(3)→ * PFAs by EPA Method 537	Extra Volume for MS/MSD	HOLD
	608D132MW-LF-1116	608D132MW	11/30/16	0940	WG	N	N	2	X		
	608D33MW-LF-1116	608D33MW		1100	WG	N	N	2	X		
	61301MW-LF-1116	61301MW		1245	WG	N	N	2	X		
	613D41MW-LF-1116	613D41MW		1355	WG	N	N	2	X		
	613D39MW-LF-1116	613D39MW	11/30/16	1520	WG	N	N	2	X		
	FB113016	—	11/30/16	1535	WQ	FB	N	2	X		

320-23931 Chain of Custody

Field **Comments:** TRRP Reporting no preservative

Lab **Comments:** *Modified 7-Day Hold 16 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	11/30/16	1645	1 [signature]	12/1/16	0950
2			2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No____

Method of Shipment: Fed EX

Airbill No:

Date Shipped: 11/30/16

6.4°C

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) **Sample Type: AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) **Preservative added**: **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-23931-1

Login Number: 23931
List Number: 1
Creator: Turpen, Troy

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	ESS Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-23996-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
12/22/2016 2:47:53 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
E	Result exceeded calibration range.
D	The reported value is from a dilution.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-23996-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-23996-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/02/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0 C.

PFAS

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The continuing calibration verification (CCV) associated with batch 320-142751 recovered above the upper control limit for Perfluorobutanesulfonic acid (PFBS). The following samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported: 40001MW-LF-1216 (320-23996-2), EBGW120116 (320-23996-5), FB120116 (320-23996-6) and (CCV 320-142751/16).

Job ID: 320-23996-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the 1X analysis for the following sample are below the method recommended limit: 40003MW-LF-1216 (320-23996-1), 61201MW-LF-1216 (320-23996-3), 603D71MW-LF-1216 (320-23996-4) and (320-23884-A-3-C MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

Isotope Dilution Analyte (IDA) recoveries for several analytes are above the method recommended limit in the dilution analysis for the following sample: 603D71MW-LF-1216 (320-23996-4). Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

The following sample was diluted due to the nature of the sample matrix: 603D71MW-LF-1216 (320-23996-4). Elevated reporting limits (RLs) are provided.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 320-140536 and analytical batch 320-142751 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: 40003MW-LF-1216 — Lab Sample ID: 320-23996-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.010	M	0.0024	0.00045	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.010		0.0024	0.00096	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.0048	M	0.0024	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0017	J M	0.0024	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.0047		0.0024	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00045	J	0.0024	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0017	J M	0.0039	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.0016	J M	0.0024	0.00089	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 40001MW-LF-1216 — Lab Sample ID: 320-23996-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00091	J M	0.0024	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0017	J M	0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 61201MW-LF-1216 — Lab Sample ID: 320-23996-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.0090	M	0.0023	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.0058		0.0023	0.00090	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.0068		0.0023	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0030		0.0023	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.022	M	0.0023	0.00068	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0025		0.0023	0.00059	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.00062	J M	0.0023	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.012		0.0023	0.00079	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.073		0.0036	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	0.0051		0.0023	0.00083	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: 603D71MW-LF-1216 — Lab Sample ID: 320-23996-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.80	E	0.0023	0.00042	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.96	E	0.0023	0.00091	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.7	E	0.0023	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.58	E	0.0023	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.0	E M	0.0023	0.00069	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.027		0.0023	0.00060	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0011	J M	0.0023	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00055	J	0.0023	0.00037	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.2	E	0.0023	0.00080	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.9	E	0.0037	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.00076	J	0.0023	0.00059	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.97	D	0.23	0.042	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	1.9	D	0.23	0.091	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	3.3	D	0.23	0.072	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.63	D M	0.23	0.074	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	1.3	D M	0.23	0.069	ug/L	100		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: 603D71MW-LF-1216 (Continued) — Lab Sample ID: 320-23996-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS) - DL	2.2	D	0.23	0.084	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	8.1	D	0.23	0.080	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	13	D	0.37	0.12	ug/L	100		537 (Modified)	Total/NA

Client Sample ID: EBGW120116 — Lab Sample ID: 320-23996-5

No Detections.

Client Sample ID: FB120116 — Lab Sample ID: 320-23996-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: 40003MW-LF-1216

Lab Sample ID: 320-23996-1
Date Collected: 12/01/16 09:55
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.010**	**M**	0.0024	0.00045	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluoropentanoic acid (PFPeA)	**0.010**		0.0024	0.00096	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorohexanoic acid (PFHxA)	**0.0048**	**M**	0.0024	0.00076	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluoroheptanoic acid (PFHpA)	**0.0017**	**J M**	0.0024	0.00078	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorooctanoic acid (PFOA)	**0.0047**		0.0024	0.00073	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00064	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorodecanoic acid (PFDA)	0.00097	U	0.0024	0.00043	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00073	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00057	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00054	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorotetradecanoic acid (PFTeA)	**0.00045**	**J**	0.0024	0.00039	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorohexanesulfonic acid (PFHxS)	0.0019	U M	0.0024	0.00085	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorooctanesulfonic acid (PFOS)	**0.0017**	**J M**	0.0039	0.0012	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorodecanesulfonic acid (PFDS)	0.0029	U	0.0039	0.0012	ug/L		12/05/16 11:33	12/16/16 20:45	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00062	ug/L		12/05/16 11:33	12/16/16 20:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*15*	*Q*	*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C4 PFBA	*32*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C2 PFHxA	*73*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C4 PFOA	*80*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C5 PFNA	*84*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C2 PFDA	*90*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C2 PFUnA	*94*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C2 PFDoA	*93*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
18O2 PFHxS	*99*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C4 PFOS	*101*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C5-PFPeA	*63*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*
13C4-PFHpA	*78*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:45*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**0.0016**	**J M**	0.0024	0.00089	ug/L		12/05/16 11:33	12/20/16 19:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*117*		*25 - 150*	*12/05/16 11:33*	*12/20/16 19:44*	*1*

Client Sample ID: 40001MW-LF-1216

Lab Sample ID: 320-23996-2
Date Collected: 12/01/16 11:25
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00094	U	0.0024	0.00043	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluoropentanoic acid (PFPeA)	0.0019	U	0.0024	0.00093	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorohexanoic acid (PFHxA)	0.0019	U	0.0024	0.00074	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		12/05/16 11:33	12/16/16 20:52	1

Client Sample ID: 40001MW-LF-1216

Lab Sample ID: 320-23996-2
Date Collected: 12/01/16 11:25
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid (PFDA)	0.00094	U	0.0024	0.00041	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00071	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00055	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00052	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorotetradecanoic acid (PFTeA)	0.00094	U M	0.0024	0.00038	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U Q	0.0024	0.00087	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00091**	**J M**	0.0024	0.00082	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorooctanesulfonic acid (PFOS)	**0.0017**	**J M**	0.0038	0.0012	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/05/16 11:33	12/16/16 20:52	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00060	ug/L		12/05/16 11:33	12/16/16 20:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*32*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C4 PFBA	*37*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C2 PFHxA	*76*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C4 PFOA	*84*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C5 PFNA	*87*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C2 PFDA	*91*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C2 PFUnA	*95*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C2 PFDoA	*93*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
18O2 PFHxS	*100*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C4 PFOS	*106*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C5-PFPeA	*73*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*
13C4-PFHpA	*83*		*25 - 150*	*12/05/16 11:33*	*12/16/16 20:52*	*1*

Client Sample ID: 61201MW-LF-1216

Lab Sample ID: 320-23996-3
Date Collected: 12/01/16 12:55
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.0090**	**M**	0.0023	0.00041	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluoropentanoic acid (PFPeA)	**0.0058**		0.0023	0.00090	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorohexanoic acid (PFHxA)	**0.0068**		0.0023	0.00071	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluoroheptanoic acid (PFHpA)	**0.0030**		0.0023	0.00073	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorooctanoic acid (PFOA)	**0.022**	**M**	0.0023	0.00068	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorononanoic acid (PFNA)	**0.0025**		0.0023	0.00059	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorodecanoic acid (PFDA)	**0.00062**	**J M**	0.0023	0.00040	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00068	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00053	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00050	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorotetradecanoic acid (PFTeA)	0.00091	U M	0.0023	0.00036	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorohexanesulfonic acid (PFHxS)	**0.012**		0.0023	0.00079	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorooctanesulfonic acid (PFOS)	**0.073**		0.0036	0.0012	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/05/16 11:33	12/16/16 21:00	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0023	0.00058	ug/L		12/05/16 11:33	12/16/16 21:00	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: 61201MW-LF-1216

Lab Sample ID: 320-23996-3
Date Collected: 12/01/16 12:55
Matrix: Water
Date Received: 12/02/16 09:40

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*16*	*Q*	*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C4 PFBA	*46*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C2 PFHxA	*87*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C4 PFOA	*98*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C5 PFNA	*97*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C2 PFDA	*102*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C2 PFUnA	*108*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C2 PFDoA	*99*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
18O2 PFHxS	*97*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C4 PFOS	*100*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C5-PFPeA	*87*	*M*	*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*
13C4-PFHpA	*95*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:00*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**0.0051**		0.0023	0.00083	ug/L		12/05/16 11:33	12/20/16 19:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*12/05/16 11:33*	*12/20/16 19:52*	*1*

Client Sample ID: 603D71MW-LF-1216

Lab Sample ID: 320-23996-4
Date Collected: 12/01/16 14:10
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.80**	**E**	0.0023	0.00042	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluoropentanoic acid (PFPeA)	**0.96**	**E**	0.0023	0.00091	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorohexanoic acid (PFHxA)	**1.7**	**E**	0.0023	0.00072	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluoroheptanoic acid (PFHpA)	**0.58**	**E**	0.0023	0.00074	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorooctanoic acid (PFOA)	**1.0**	**E M**	0.0023	0.00069	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorononanoic acid (PFNA)	**0.027**		0.0023	0.00060	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorodecanoic acid (PFDA)	**0.0011**	**J M**	0.0023	0.00040	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00069	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00054	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00051	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorotetradecanoic acid (PFTeA)	**0.00055**	**J**	0.0023	0.00037	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorohexanesulfonic acid (PFHxS)	**3.2**	**E**	0.0023	0.00080	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorooctanesulfonic acid (PFOS)	**6.9**	**E**	0.0037	0.0012	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0037	0.0011	ug/L		12/05/16 11:33	12/16/16 21:07	1
Perfluorooctane Sulfonamide (FOSA)	**0.00076**	**J**	0.0023	0.00059	ug/L		12/05/16 11:33	12/16/16 21:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*19*	*Q*	*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*
13C4 PFBA	*27*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*
13C2 PFHxA	*41*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*
13C4 PFOA	*49*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*
13C5 PFNA	*34*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*
13C2 PFDA	*106*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:07*	*1*

Client Sample ID: 603D71MW-LF-1216

Lab Sample ID: 320-23996-4
Matrix: Water
Date Collected: 12/01/16 14:10
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	113		25 - 150	12/05/16 11:33	12/16/16 21:07	1
13C2 PFDoA	105		25 - 150	12/05/16 11:33	12/16/16 21:07	1
18O2 PFHxS	29		25 - 150	12/05/16 11:33	12/16/16 21:07	1
13C4 PFOS	31		25 - 150	12/05/16 11:33	12/16/16 21:07	1
13C5-PFPeA	44		25 - 150	12/05/16 11:33	12/16/16 21:07	1
13C4-PFHpA	32		25 - 150	12/05/16 11:33	12/16/16 21:07	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.97**	**D**	0.23	0.042	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluoropentanoic acid (PFPeA)	**1.9**	**D**	0.23	0.091	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorohexanoic acid (PFHxA)	**3.3**	**D**	0.23	0.072	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluoroheptanoic acid (PFHpA)	**0.63**	**D M**	0.23	0.074	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorooctanoic acid (PFOA)	**1.3**	**D M**	0.23	0.069	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorononanoic acid (PFNA)	0.18	U	0.23	0.060	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorodecanoic acid (PFDA)	0.092	U	0.23	0.040	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluoroundecanoic acid (PFUnA)	0.18	U	0.23	0.069	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorododecanoic acid (PFDoA)	0.18	U	0.23	0.054	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorotridecanoic Acid (PFTriA)	0.18	U	0.23	0.051	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorotetradecanoic acid (PFTeA)	0.092	U	0.23	0.037	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorobutanesulfonic acid (PFBS)	**2.2**	**D**	0.23	0.084	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorohexanesulfonic acid (PFHxS)	**8.1**	**D**	0.23	0.080	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorooctanesulfonic acid (PFOS)	**13**	**D**	0.37	0.12	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorodecanesulfonic acid (PFDS)	0.28	U	0.37	0.11	ug/L		12/05/16 11:33	12/20/16 18:29	100
Perfluorooctane Sulfonamide (FOSA)	0.18	U	0.23	0.059	ug/L		12/05/16 11:33	12/20/16 18:29	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	31		25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C4 PFBA	166	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C2 PFHxA	151	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C4 PFOA	171	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C5 PFNA	158	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C2 PFDA	155	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C2 PFUnA	160	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C2 PFDoA	164	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
18O2 PFHxS	158	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C4 PFOS	154	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C5-PFPeA	182	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100
13C4-PFHpA	153	Q	25 - 150	12/05/16 11:33	12/20/16 18:29	100

Client Sample ID: EBGW120116

Lab Sample ID: 320-23996-5
Matrix: Water
Date Collected: 12/01/16 14:40
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00092	U	0.0023	0.00042	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0023	0.00091	ug/L		12/05/16 11:33	12/16/16 21:15	1

Client Sample ID: EBGW120116

Lab Sample ID: 320-23996-5
Date Collected: 12/01/16 14:40
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0023	0.00072	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00074	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00069	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorodecanoic acid (PFDA)	0.00092	U	0.0023	0.00041	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00069	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00054	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00051	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorotetradecanoic acid (PFTeA)	0.00092	U	0.0023	0.00037	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U Q	0.0023	0.00085	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0037	0.0012	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0037	0.0011	ug/L		12/05/16 11:33	12/16/16 21:15	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0023	0.00059	ug/L		12/05/16 11:33	12/16/16 21:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*38*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C4 PFBA	*115*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C2 PFHxA	*106*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C4 PFOA	*114*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C5 PFNA	*114*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C2 PFDA	*131*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C2 PFUnA	*126*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C2 PFDoA	*124*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
18O2 PFHxS	*107*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C4 PFOS	*110*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C5-PFPeA	*122*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*
13C4-PFHpA	*116*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:15*	*1*

Client Sample ID: FB120116

Lab Sample ID: 320-23996-6
Date Collected: 12/01/16 14:50
Matrix: Water
Date Received: 12/02/16 09:40

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00098	U	0.0025	0.00045	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00097	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00077	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00079	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00074	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00064	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorodecanoic acid (PFDA)	0.00098	U	0.0025	0.00043	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00074	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00057	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00054	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorotetradecanoic acid (PFTeA)	0.00098	U	0.0025	0.00039	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U Q	0.0025	0.00090	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00086	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0039	0.0013	ug/L		12/05/16 11:33	12/16/16 21:22	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0039	0.0012	ug/L		12/05/16 11:33	12/16/16 21:22	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: FB120116

Date Collected: 12/01/16 14:50
Date Received: 12/02/16 09:40

Lab Sample ID: 320-23996-6

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00063	ug/L		12/05/16 11:33	12/16/16 21:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*96*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C4 PFBA	*115*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C2 PFHxA	*109*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C4 PFOA	*114*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C5 PFNA	*113*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C2 PFDA	*118*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C2 PFUnA	*114*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C2 PFDoA	*104*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
18O2 PFHxS	*109*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C4 PFOS	*108*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C5-PFPeA	*121*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*
13C4-PFHpA	*113*		*25 - 150*	*12/05/16 11:33*	*12/16/16 21:22*	*1*

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C2 PFHx (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)	3C2 PFUn (25-150)	3C2 PFDo (25-150)
320-23996-1	40003MW-LF-1216	15 Q	32	73	80	84	90	94	93
320-23996-1 - RA	40003MW-LF-1216								
320-23996-2	40001MW-LF-1216	32	37	76	84	87	91	95	93
320-23996-3	61201MW-LF-1216	16 Q	46	87	98	97	102	108	99
320-23996-3 - RA	61201MW-LF-1216								
320-23996-4	603D71MW-LF-1216	19 Q	27	41	49	34	106	113	105
320-23996-4 - DL	603D71MW-LF-1216	31	166 Q	151 Q	171 Q	158 Q	155 Q	160 Q	164 Q
320-23996-5	EBGW120116	38	115	106	114	114	131	126	124
320-23996-6	FB120116	96	115	109	114	113	118	114	104
LCS 320-140536/2-A	Lab Control Sample	90	106	103	103	103	104	104	107
MB 320-140536/1-A	Method Blank	100	112	109	116	109	111	115	111

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	8O2 PFHx (25-150)	3C4 PFOS (25-150)	3C5-PFPe (25-150)	3C4-PFHp (25-150)
320-23996-1	40003MW-LF-1216	99	101	63	78
320-23996-1 - RA	40003MW-LF-1216	117			
320-23996-2	40001MW-LF-1216	100	106	73	83
320-23996-3	61201MW-LF-1216	97	100	87 M	95
320-23996-3 - RA	61201MW-LF-1216	121			
320-23996-4	603D71MW-LF-1216	29	31	44	32
320-23996-4 - DL	603D71MW-LF-1216	158 Q	154 Q	182 Q	153 Q
320-23996-5	EBGW120116	107	110	122	116
320-23996-6	FB120116	109	108	121	113
LCS 320-140536/2-A	Lab Control Sample	97	99	109	102
MB 320-140536/1-A	Method Blank	105	102	118	112

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C2 PFHxA = 13C2 PFHxA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS
13C5-PFPeA = 13C5-PFPeA
13C4-PFHpA = 13C4-PFHpA

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-140536/1-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140536

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00079	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanoic acid (PFOA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorotetradecanoic acid (PFTeA)	0.000656	J	0.0025	0.00040	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorohexanesulfonic acid (PFHxS)	0.0020	U	0.0025	0.00087	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0040	0.0013	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/05/16 08:31	12/16/16 18:30	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/05/16 08:31	12/16/16 18:30	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*100*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFBA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFHxA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOA	*116*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5 PFNA	*109*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFUnA	*115*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C2 PFDoA	*111*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
18O2 PFHxS	*105*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4 PFOS	*102*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C5-PFPeA	*118*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*
13C4-PFHpA	*112*		*25 - 150*	*12/05/16 08:31*	*12/16/16 18:30*	*1*

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0446		ug/L		112	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0431		ug/L		108	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0427		ug/L		107	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0443		ug/L		111	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0425		ug/L		106	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0428		ug/L		107	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0420		ug/L		105	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0410		ug/L		103	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0436		ug/L		109	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-140536/2-A
Matrix: Water
Analysis Batch: 142751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140536

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0557		ug/L		139	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0464		ug/L		131	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0375		ug/L		103	60 - 140
Perfluorooctanesulfonic acid (PFOS)	0.0371	0.0398		ug/L		107	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0412		ug/L		107	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0445		ug/L		111	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*90*		*25 - 150*
13C4 PFBA	*106*		*25 - 150*
13C2 PFHxA	*103*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C5 PFNA	*103*		*25 - 150*
13C2 PFDA	*104*		*25 - 150*
13C2 PFUnA	*104*		*25 - 150*
13C2 PFDoA	*107*		*25 - 150*
18O2 PFHxS	*97*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*
13C5-PFPeA	*109*		*25 - 150*
13C4-PFHpA	*102*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

LCMS

Prep Batch: 140536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23996-1 - RA	40003MW-LF-1216	Total/NA	Water	3535	
320-23996-1	40003MW-LF-1216	Total/NA	Water	3535	
320-23996-2	40001MW-LF-1216	Total/NA	Water	3535	
320-23996-3	61201MW-LF-1216	Total/NA	Water	3535	
320-23996-3 - RA	61201MW-LF-1216	Total/NA	Water	3535	
320-23996-4	603D71MW-LF-1216	Total/NA	Water	3535	
320-23996-4 - DL	603D71MW-LF-1216	Total/NA	Water	3535	
320-23996-5	EBGW120116	Total/NA	Water	3535	
320-23996-6	FB120116	Total/NA	Water	3535	
MB 320-140536/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 142751

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23996-1	40003MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-2	40001MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-3	61201MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-4	603D71MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-5	EBGW120116	Total/NA	Water	537 (Modified)	140536
320-23996-6	FB120116	Total/NA	Water	537 (Modified)	140536
MB 320-140536/1-A	Method Blank	Total/NA	Water	537 (Modified)	140536
LCS 320-140536/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	140536

Analysis Batch: 143259

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-23996-1 - RA	40003MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-3 - RA	61201MW-LF-1216	Total/NA	Water	537 (Modified)	140536
320-23996-4 - DL	603D71MW-LF-1216	Total/NA	Water	537 (Modified)	140536

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: 40003MW-LF-1216 — Lab Sample ID: 320-23996-1

Date Collected: 12/01/16 09:55 — **Matrix: Water**
Date Received: 12/02/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			257.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:45	SBC	TAL SAC
Total/NA	Prep	3535	RA		257.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 19:44	SBC	TAL SAC

Client Sample ID: 40001MW-LF-1216 — Lab Sample ID: 320-23996-2

Date Collected: 12/01/16 11:25 — **Matrix: Water**
Date Received: 12/02/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 20:52	SBC	TAL SAC

Client Sample ID: 61201MW-LF-1216 — Lab Sample ID: 320-23996-3

Date Collected: 12/01/16 12:55 — **Matrix: Water**
Date Received: 12/02/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			276.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 21:00	SBC	TAL SAC
Total/NA	Prep	3535	RA		276.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			143259	12/20/16 19:52	SBC	TAL SAC

Client Sample ID: 603D71MW-LF-1216 — Lab Sample ID: 320-23996-4

Date Collected: 12/01/16 14:10 — **Matrix: Water**
Date Received: 12/02/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			272.4 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 21:07	SBC	TAL SAC
Total/NA	Prep	3535	DL		272.4 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			143259	12/20/16 18:29	SBC	TAL SAC

Client Sample ID: EBGW120116 — Lab Sample ID: 320-23996-5

Date Collected: 12/01/16 14:40 — **Matrix: Water**
Date Received: 12/02/16 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.3 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 21:15	SBC	TAL SAC

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Client Sample ID: FB120116

Date Collected: 12/01/16 14:50
Date Received: 12/02/16 09:40

Lab Sample ID: 320-23996-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			254.2 mL	0.5 mL	140536	12/05/16 11:33	HJA	TAL SAC
Total/NA	Analysis	537 (Modified)		1			142751	12/16/16 21:22	SBC	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-29-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-23996-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-23996-1	40003MW-LF-1216	Water	12/01/16 09:55	12/02/16 09:40
320-23996-2	40001MW-LF-1216	Water	12/01/16 11:25	12/02/16 09:40
320-23996-3	61201MW-LF-1216	Water	12/01/16 12:55	12/02/16 09:40
320-23996-4	603D71MW-LF-1216	Water	12/01/16 14:10	12/02/16 09:40
320-23996-5	EBGW120116	Water	12/01/16 14:40	12/02/16 09:40
320-23996-6	FB120116	Water	12/01/16 14:50	12/02/16 09:40

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB120116 | Page 1 of 1

Project Name: PFAS Groundwater Investigation | PO No. 21529 | Project No. 12796 Phase FIFS

Site Location: NAS Dallas

CTO No. SM78 | RC Project Manager: Tom Wiberg

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAS USEPA Method 537	Extra Volume for MS/MSD	HOLD
	40003MW-LF-1216	40003 MW	12/01/16	0955	WG	N	N	2	X		
	40001MW-LF-1216	40001 MW	12/01/16	1125	WG	N	N	2	X		
	61201MW LF-1216	61201MW	12/01/16	1255	WG	N	N	2	X		
	603D71MW-LF-1216	603D71MW	12/01/16	1410	WG	N	N	2	X		
	EBGW120116	—	12/01/16	1440	WQ	EB	N	2	X		
	FB120116	—	12/01/16	1450	WQ	FB	N	2	X		

320-23996 Chain of Custody

Field **Comments:** TRRP Reporting – no preservative –

Lab **Comments:** Modified – 7 Day Hold – 14 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	12/1/2016	1550	1 [signature]	12/2/16	0940
2			2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____ 3.0°C

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/01/2016

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: HA=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-23996-1

Login Number: 23996
List Number: 1
Creator: Edman, Connor M

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-24149-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
1/13/2017 12:16:41 PM
David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Designee for

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
E	Result exceeded calibration range.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
D	The reported value is from a dilution.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-24149-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-24149-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/07/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.2 C.

PFAS

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) were detected in method blank MB 320-142967/1-A at levels that were above the method detection limit but below ½ the reporting limit. The values should be considered estimates, and have been flagged.

Job ID: 320-24149-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

The method blank for preparation batch 320-142967 and analytical batch 320-144253 contained Perfluorohexanoic acid (PFHxA) above half the reporting limit (1/2RL). Associated samples were not re-extracted and/or re-analyzed because results for PFHxA were either greater than 10X the value found in the method blank or not detected.

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the following samples is below the method recommended limit: FSS5TMW-1216 (320-24149-2), EBWC120616 (320-24149-4. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: FSS5TMW-1216 (320-24149-2). The sample has been run at dilution and both sets of data have been reported.

The following samples (FSS4TMW-1216 (320-24149-1)) required complex dilutions in order for the target analyte concentration of Perfluorooctanesulfonic acid (PFOS) to be within the calibration range. Due to software limitations the complex dilution samples will have a dilution factor of 1.0 in the dilution factor field and a DL2 suffix. The complex dilution factors are as follows. FSS4TMW-1216 (320-24149-1) - 4000X dilution. Detection limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: FSS4TMW-1216 — Lab Sample ID: 320-24149-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.7	E	0.0022	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.2	E	0.0022	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	2.3	E B	0.0022	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.5	E	0.0022	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	13	E	0.0022	0.00066	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.18		0.0022	0.00058	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.026		0.0022	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00046	J	0.0022	0.00036	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.2	E M	0.0022	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.8	E	0.0022	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	41	E Q	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	0.11		0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.012	M	0.0022	0.00057	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	5.0	D	0.44	0.081	ug/L	200		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	12	D	0.44	0.18	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	28	B D	0.44	0.14	ug/L	200		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	6.1	D	0.44	0.14	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	47	D M	0.44	0.13	ug/L	200		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.17	J D	0.44	0.12	ug/L	200		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	7.2	D	0.44	0.16	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	59	D	0.44	0.15	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	670	E D	0.71	0.23	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL2	1200		14	4.5	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: FSS5TMW-1216 — Lab Sample ID: 320-24149-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.22		0.0022	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.30		0.0022	0.00086	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.40	E B	0.0022	0.00069	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.17		0.0022	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.20	M	0.0022	0.00065	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.010		0.0022	0.00057	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0026		0.0022	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00037	J	0.0022	0.00035	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.22		0.0022	0.00080	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.48	E	0.0022	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.23	D	0.022	0.0040	ug/L	10		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	0.40	D	0.022	0.0086	ug/L	10		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	0.53	D B	0.022	0.0069	ug/L	10		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.17	D	0.022	0.0070	ug/L	10		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	0.21	D M	0.022	0.0065	ug/L	10		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.010	J D	0.022	0.0057	ug/L	10		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	0.36	D	0.022	0.0080	ug/L	10		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	0.63	D M	0.022	0.0076	ug/L	10		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: FSS5TMW-1216 (Continued) — Lab Sample ID: 320-24149-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS) - DL	0.95	D	0.035	0.011	ug/L	10		537 (Modified)	Total/NA

Client Sample ID: EBGW120616 — Lab Sample ID: 320-24149-3

No Detections.

Client Sample ID: EBWC120616 — Lab Sample ID: 320-24149-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.0014	J	0.0024	0.00082	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: FSS4TMW-1216

Date Collected: 12/06/16 12:20
Date Received: 12/07/16 10:30

Lab Sample ID: 320-24149-1

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.7	E	0.0022	0.00041	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluoropentanoic acid (PFPeA)	1.2	E	0.0022	0.00088	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorohexanoic acid (PFHxA)	2.3	E B	0.0022	0.00070	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluoroheptanoic acid (PFHpA)	5.5	E	0.0022	0.00071	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorooctanoic acid (PFOA)	13	E	0.0022	0.00066	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorononanoic acid (PFNA)	0.18		0.0022	0.00058	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorodecanoic acid (PFDA)	0.026		0.0022	0.00039	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0022	0.00066	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00052	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00049	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorotetradecanoic acid (PFTeA)	0.00046	J	0.0022	0.00036	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorobutanesulfonic acid (PFBS)	2.2	E M	0.0022	0.00082	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorohexanesulfonic acid (PFHxS)	4.8	E	0.0022	0.00077	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorooctanesulfonic acid (PFOS)	41	E Q	0.0036	0.0011	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorodecanesulfonic acid (PFDS)	0.11		0.0036	0.0011	ug/L		12/19/16 14:38	12/29/16 00:21	1
Perfluorooctane Sulfonamide (FOSA)	0.012	M	0.0022	0.00057	ug/L		12/19/16 14:38	12/29/16 00:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*61*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C4 PFBA	*29*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C5-PFPeA	*22*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C2 PFHxA	*17*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C4-PFHpA	*5*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C4 PFOA	*7*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C5 PFNA	*5*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C2 PFDA	*73*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C2 PFUnA	*110*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C2 PFDoA	*102*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
18O2 PFHxS	*13*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*
13C4 PFOS	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:21*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	5.0	D	0.44	0.081	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluoropentanoic acid (PFPeA)	12	D	0.44	0.18	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorohexanoic acid (PFHxA)	28	B D	0.44	0.14	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluoroheptanoic acid (PFHpA)	6.1	D	0.44	0.14	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorooctanoic acid (PFOA)	47	D M	0.44	0.13	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorononanoic acid (PFNA)	0.17	J D	0.44	0.12	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorodecanoic acid (PFDA)	0.18	U	0.44	0.078	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorododecanoic acid (PFDoA)	0.36	U	0.44	0.10	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorobutanesulfonic acid (PFBS)	7.2	D	0.44	0.16	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorohexanesulfonic acid (PFHxS)	59	D	0.44	0.15	ug/L		12/19/16 14:38	12/30/16 12:33	200

Client Sample ID: FSS4TMW-1216

Lab Sample ID: 320-24149-1
Matrix: Water
Date Collected: 12/06/16 12:20
Date Received: 12/07/16 10:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**670**	**E D**	0.71	0.23	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorodecanesulfonic acid (PFDS)	0.53	U	0.71	0.21	ug/L		12/19/16 14:38	12/30/16 12:33	200
Perfluorooctane Sulfonamide (FOSA)	0.36	U	0.44	0.11	ug/L		12/19/16 14:38	12/30/16 12:33	200

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*128*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C4 PFBA	*142*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C5-PFPeA	*134*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C2 PFHxA	*143*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C4-PFHpA	*65*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C4 PFOA	*88*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C5 PFNA	*58*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C2 PFDA	*153*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C2 PFUnA	*146*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C2 PFDoA	*160*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
18O2 PFHxS	*206*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*
13C4 PFOS	*57*		*25 - 150*	*12/19/16 14:38*	*12/30/16 12:33*	*200*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL2

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**1200**		14	4.5	ug/L		12/19/16 14:38	01/04/17 21:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*117*		*25 - 150*	*12/19/16 14:38*	*01/04/17 21:25*	*1*

Client Sample ID: FSS5TMW-1216

Lab Sample ID: 320-24149-2
Matrix: Water
Date Collected: 12/06/16 11:00
Date Received: 12/07/16 10:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.22**		0.0022	0.00040	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluoropentanoic acid (PFPeA)	**0.30**		0.0022	0.00086	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorohexanoic acid (PFHxA)	**0.40**	**E B**	0.0022	0.00069	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluoroheptanoic acid (PFHpA)	**0.17**		0.0022	0.00070	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorooctanoic acid (PFOA)	**0.20**	**M**	0.0022	0.00065	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorononanoic acid (PFNA)	**0.010**		0.0022	0.00057	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorodecanoic acid (PFDA)	**0.0026**		0.0022	0.00038	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluoroundecanoic acid (PFUnA)	0.0017	U	0.0022	0.00065	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorododecanoic acid (PFDoA)	0.0017	U	0.0022	0.00051	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorotridecanoic Acid (PFTriA)	0.0017	U	0.0022	0.00048	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorotetradecanoic acid (PFTeA)	**0.00037**	**J**	0.0022	0.00035	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorobutanesulfonic acid (PFBS)	**0.22**		0.0022	0.00080	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorohexanesulfonic acid (PFHxS)	**0.48**	**E**	0.0022	0.00076	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorodecanesulfonic acid (PFDS)	0.0026	U	0.0035	0.0011	ug/L		12/19/16 14:38	12/29/16 00:29	1
Perfluorooctane Sulfonamide (FOSA)	0.0017	U	0.0022	0.00056	ug/L		12/19/16 14:38	12/29/16 00:29	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: FSS5TMW-1216

Date Collected: 12/06/16 11:00
Date Received: 12/07/16 10:30

Lab Sample ID: 320-24149-2

Matrix: Water

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C4 PFBA	*45*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C5-PFPeA	*79*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C2 PFHxA	*87*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C4-PFHpA	*76*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C4 PFOA	*90*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C5 PFNA	*65*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C2 PFDA	*97*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C2 PFUnA	*98*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
13C2 PFDoA	*98*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*
18O2 PFHxS	*91*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:29*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.23**	**D**	0.022	0.0040	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluoropentanoic acid (PFPeA)	**0.40**	**D**	0.022	0.0086	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorohexanoic acid (PFHxA)	**0.53**	**D B**	0.022	0.0069	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluoroheptanoic acid (PFHpA)	**0.17**	**D**	0.022	0.0070	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorooctanoic acid (PFOA)	**0.21**	**D M**	0.022	0.0065	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorononanoic acid (PFNA)	**0.010**	**J D**	0.022	0.0057	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorodecanoic acid (PFDA)	0.0087	U	0.022	0.0038	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluoroundecanoic acid (PFUnA)	0.017	U	0.022	0.0065	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorododecanoic acid (PFDoA)	0.017	U	0.022	0.0051	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorotridecanoic Acid (PFTriA)	0.017	U	0.022	0.0048	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorotetradecanoic acid (PFTeA)	0.0087	U	0.022	0.0035	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorobutanesulfonic acid (PFBS)	**0.36**	**D**	0.022	0.0080	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorohexanesulfonic acid (PFHxS)	**0.63**	**D M**	0.022	0.0076	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorooctanesulfonic acid (PFOS)	**0.95**	**D**	0.035	0.011	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorodecanesulfonic acid (PFDS)	0.026	U	0.035	0.011	ug/L		12/19/16 14:38	12/30/16 13:03	10
Perfluorooctane Sulfonamide (FOSA)	0.017	U	0.022	0.0056	ug/L		12/19/16 14:38	12/30/16 13:03	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C4 PFBA	*96*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C5-PFPeA	*116*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C2 PFHxA	*102*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C4-PFHpA	*100*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C4 PFOA	*96*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C5 PFNA	*96*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C2 PFDA	*88*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C2 PFUnA	*86*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C2 PFDoA	*91*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
18O2 PFHxS	*121*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*
13C4 PFOS	*112*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:03*	*10*

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: EBGW120616

Lab Sample ID: 320-24149-3
Date Collected: 12/06/16 12:45
Matrix: Water
Date Received: 12/07/16 10:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00091	U	0.0023	0.00042	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0023	0.00090	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0023	0.00072	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorodecanoic acid (PFDA)	0.00091	U	0.0023	0.00040	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00068	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00053	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00050	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorotetradecanoic acid (PFTeA)	0.00091	U	0.0023	0.00036	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00084	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00079	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0012	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/19/16 14:38	12/30/16 13:26	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0023	0.00058	ug/L		12/19/16 14:38	12/30/16 13:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*42*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C4 PFBA	*131*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C5-PFPeA	*131*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C2 PFHxA	*118*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C4-PFHpA	*120*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C4 PFOA	*126*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C5 PFNA	*122*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C2 PFDA	*135*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C2 PFUnA	*133*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C2 PFDoA	*132*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
18O2 PFHxS	*122*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*
13C4 PFOS	*127*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:26*	*1*

Client Sample ID: EBWC120616

Lab Sample ID: 320-24149-4
Date Collected: 12/06/16 13:10
Matrix: Water
Date Received: 12/07/16 10:30

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00094	U	0.0024	0.00043	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluoropentanoic acid (PFPeA)	0.0019	U	0.0024	0.00093	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorohexanoic acid (PFHxA)	0.0019	U	0.0024	0.00074	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00076	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00071	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00062	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorodecanoic acid (PFDA)	0.00094	U	0.0024	0.00042	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00071	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00055	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00052	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorotetradecanoic acid (PFTeA)	0.00094	U	0.0024	0.00038	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00087	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0014**	**J**	0.0024	0.00082	ug/L		12/19/16 14:38	12/29/16 00:44	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: EBWC120616

Date Collected: 12/06/16 13:10
Date Received: 12/07/16 10:30

Lab Sample ID: 320-24149-4

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/19/16 14:38	12/29/16 00:44	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00060	ug/L		12/19/16 14:38	12/29/16 00:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*55*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C4 PFBA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C5-PFPeA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C2 PFHxA	*122*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C4-PFHpA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C4 PFOA	*129*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C5 PFNA	*124*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C2 PFDA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C2 PFUnA	*122*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
13C2 PFDoA	*118*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*
18O2 PFHxS	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:44*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0028	U	0.0038	0.0012	ug/L		12/19/16 14:38	12/30/16 16:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*116*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:26*	*1*

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C5-PFPe (25-150)	3C2 PFHx (25-150)	3C4-PFHp (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)
320-24149-1	FSS4TMW-1216	61	29	22 Q	17 Q	5 Q	7 Q	5 Q	73
320-24149-1 - DL	FSS4TMW-1216	128	142	134	143	65	88	58	153 Q
320-24149-1 - DL2	FSS4TMW-1216								
320-24149-2	FSS5TMW-1216	4 Q	45	79	87	76	90	65	97
320-24149-2 - DL	FSS5TMW-1216	4 Q	96	116	102	100	96	96	88
320-24149-3	EBGW120616	42	131	131	118	120	126	122	135
320-24149-4	EBWC120616	55	126	132	122	126	129	124	127
320-24149-4 - RA	EBWC120616								
LCS 320-142967/2-A	Lab Control Sample	62	131	132	126	128	127	123	127
LCS 320-142967/2-A - RA	Lab Control Sample								
MB 320-142967/1-A	Method Blank	64	131	137	131	132	133	126	130
MB 320-142967/1-A - RA	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	3C2 PFUn (25-150)	3C2 PFDo (25-150)	3O2 PFHx (25-150)	3C4 PFO! (25-150)
320-24149-1	FSS4TMW-1216	110	102	13 Q	4 Q
320-24149-1 - DL	FSS4TMW-1216	146	160 Q	206 Q	57
320-24149-1 - DL2	FSS4TMW-1216				117
320-24149-2	FSS5TMW-1216	98	98	91	
320-24149-2 - DL	FSS5TMW-1216	86	91	121	112
320-24149-3	EBGW120616	133	132	122	127
320-24149-4	EBWC120616	122	118	126	
320-24149-4 - RA	EBWC120616				116
LCS 320-142967/2-A	Lab Control Sample	119	114	128	128
LCS 320-142967/2-A - RA	Lab Control Sample				126
MB 320-142967/1-A	Method Blank	127	112	130	126
MB 320-142967/1-A - RA	Method Blank				113

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C5-PFPeA = 13C5-PFPeA
13C2 PFHxA = 13C2 PFHxA
13C4-PFHpA = 13C4-PFHpA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanoic acid (PFHxA)	0.00147	J	0.0025	0.00079	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctanoic acid (PFOA)	0.00116	J	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotetradecanoic acid (PFTeA)	0.0010	U	0.0025	0.00040	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanesulfonic acid (PFHxS)	0.000944	J	0.0025	0.00087	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/19/16 14:38	12/29/16 00:06	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*64*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFBA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5-PFPeA	*137*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFHxA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4-PFHpA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5 PFNA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDA	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFUnA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDoA	*112*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
18O2 PFHxS	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOS	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0441		ug/L		110	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0413		ug/L		103	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0418		ug/L		104	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0406		ug/L		101	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0384		ug/L		96	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0399		ug/L		100	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0382		ug/L		95	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0384		ug/L		96	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0478		ug/L		120	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0432		ug/L		122	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0397		ug/L		109	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0385		ug/L		100	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0384		ug/L		96	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*62*		*25 - 150*
13C4 PFBA	*131*		*25 - 150*
13C5-PFPeA	*132*		*25 - 150*
13C2 PFHxA	*126*		*25 - 150*
13C4-PFHpA	*128*		*25 - 150*
13C4 PFOA	*127*		*25 - 150*
13C5 PFNA	*123*		*25 - 150*
13C2 PFDA	*127*		*25 - 150*
13C2 PFUnA	*119*		*25 - 150*
13C2 PFDoA	*114*		*25 - 150*
18O2 PFHxS	*128*		*25 - 150*
13C4 PFOS	*128*		*25 - 150*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS) - RA	0.0030	U	0.0040	0.0013	ug/L		12/19/16 14:38	12/30/16 16:11	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS - RA	*113*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:11*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS) - RA	0.0371	0.0511		ug/L		138	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOS - RA	*126*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

LCMS

Prep Batch: 142967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24149-1 - DL	FSS4TMW-1216	Total/NA	Water	3535	
320-24149-1	FSS4TMW-1216	Total/NA	Water	3535	
320-24149-1 - DL2	FSS4TMW-1216	Total/NA	Water	3535	
320-24149-2 - DL	FSS5TMW-1216	Total/NA	Water	3535	
320-24149-2	FSS5TMW-1216	Total/NA	Water	3535	
320-24149-3	EBGW120616	Total/NA	Water	3535	
320-24149-4	EBWC120616	Total/NA	Water	3535	
320-24149-4 - RA	EBWC120616	Total/NA	Water	3535	
MB 320-142967/1-A	Method Blank	Total/NA	Water	3535	
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	3535	
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	3535	
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 144253

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24149-1	FSS4TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24149-2	FSS5TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24149-4	EBWC120616	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 144510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24149-1 - DL	FSS4TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24149-2 - DL	FSS5TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24149-3	EBGW120616	Total/NA	Water	537 (Modified)	142967
320-24149-4 - RA	EBWC120616	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 145022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24149-1 - DL2	FSS4TMW-1216	Total/NA	Water	537 (Modified)	145739

Cleanup Batch: 145739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24149-1 - DL2	FSS4TMW-1216	Total/NA	Water	Dilution	142967

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Client Sample ID: FSS4TMW-1216 — Lab Sample ID: 320-24149-1

Date Collected: 12/06/16 12:20 — **Matrix: Water**
Date Received: 12/07/16 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			281.4 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 00:21	TTP	TAL SAC
Total/NA	Prep	3535	DL		281.4 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	200			144510	12/30/16 12:33	CBW	TAL SAC
Total/NA	Prep	3535	DL2		281.4 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Cleanup	Dilution	DL2		0.075 uL	300 uL	145739	12/19/16 14:38	TTP	TAL SAC
Total/NA	Analysis	537 (Modified)	DL2	1			145022	01/04/17 21:25	SBC	TAL SAC

Client Sample ID: FSS5TMW-1216 — Lab Sample ID: 320-24149-2

Date Collected: 12/06/16 11:00 — **Matrix: Water**
Date Received: 12/07/16 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			286 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 00:29	TTP	TAL SAC
Total/NA	Prep	3535	DL		286 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	10			144510	12/30/16 13:03	CBW	TAL SAC

Client Sample ID: EBGW120616 — Lab Sample ID: 320-24149-3

Date Collected: 12/06/16 12:45 — **Matrix: Water**
Date Received: 12/07/16 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			274.2 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144510	12/30/16 13:26	CBW	TAL SAC

Client Sample ID: EBWC120616 — Lab Sample ID: 320-24149-4

Date Collected: 12/06/16 13:10 — **Matrix: Water**
Date Received: 12/07/16 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264.8 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 00:44	TTP	TAL SAC
Total/NA	Prep	3535	RA		264.8 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			144510	12/30/16 16:26	CBW	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-28-18

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24149-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24149-1	FSS4TMW-1216	Water	12/06/16 12:20	12/07/16 10:30
320-24149-2	FSS5TMW-1216	Water	12/06/16 11:00	12/07/16 10:30
320-24149-3	EBGW120616	Water	12/06/16 12:45	12/07/16 10:30
320-24149-4	EBWC120616	Water	12/06/16 13:10	12/07/16 10:30

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB120614 | Page 1 of 1

Project Name: PFAs Groundwater Investigation | PO No. 21529 | Project No. 12796 | Phase EIFS

Site Location: NAS Dallas

CTO No. JM78 | RC Project Manager: Tom Wiberg

Sampler/Site Phone#

Lab Name: TestAmerica Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAs USEPA Method 537	Extra Volume for MS/MSD	HOLD
	FSS4TMW-1216	FSS4TMW	12/06/16	1220	WG	N	N	2	X		
	FSS5TMW-1216	FSS5TMW	12/06/16	1100	WG	N	N	2	X		
	EBGW120616	—	12/06/16	1245	WQ	EB	N	2	X		
	EBWC120616	—	12/06/16	1310	WQ	EB	N	2	X		

320-24149 Chain of Custody

Field **Comments:** TRRP Reporting — no preservative —

Lab **Comments:** Modified 7-Day Hold 16 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 TRRP Reporting LF	—		1		
2 [signature]	12/06/2016	1445	2 [signature] Troy Cutler-per TAS	12/7/16	1030 1.2°C
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/6/2016

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-24149-1

Login Number: 24149
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-24184-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
1/13/2017 12:34:00 PM
David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Designee for

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

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Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
E	Result exceeded calibration range.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
D	The reported value is from a dilution.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-24184-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-24184-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/08/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.4 C.

PFAS

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The continuing calibration verification (CCV) associated with batch 320-144253 recovered above the upper control limit for Perfluorooctanesulfonic acid (PFOS). The sample FSS3TMW-1216 (320-24184-3) associated with this CCV was greater than the calibration range. The sample was analyzed at a dilution and reported from a analytical batch 320-145022.

Job ID: 320-24184-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) were detected in method blank MB 320-142967/1-A at levels that were above the method detection limit but below ½ the reporting limit. The values should be considered estimates, and have been flagged.

The method blank for preparation batch 320-142967 and analytical batch 320-144253 contained Perfluorohexanoic acid (PFHxA) above half the reporting limit (1/2RL). Any samples that were either greater than 10X the value found in the method blank or not detected were reported with no further corrective action. Any sample with a detection less than 10x the level found in the method blank were re-extracted outside of holding time and both sets of data reported..

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the following samples is below the method recommended limit: 308A51MW-LF-1216 (320-24184-1), SWMU1-01-1216 (320-24184-2), FSS3TMW-1216 (320-24184-3), and SWMU1-02-1216 (320-24184-4). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The following samples were diluted to bring the concentration of target analytes within the calibration range: 308A51MW-LF-1216 (320-24184-1), FSS3TMW-1216 (320-24184-3), and SWMU1-02-1216 (320-24184-4. Elevated reporting limits (RLs) are provided.

The following samples (FSS3TMW-1216 (320-24184-3)) required complex dilutions in order for the target analyte concentrations to be within the calibration range. Due to software limitations the complex dilution samples will have a dilution factor of 1.0 in the dilution factor field and a DL2 suffix. The complex dilution factors are as follows. FSS3TMW-1216 (320-24184-3) - 2000X dilution

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

The following sample was a cloudy white color after adding the methanol and water for the final volume. 308A51MW-LF-1216 (320-24184-1)

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 320-144971.

The following sample was re-prepared outside of preparation holding time because the Method Blank was above 1/2 the reporting limit for PFHxA:SWMU1-01-1216 (320-24184-2) and SWMU1-02-1216 (320-24184-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: 308A51MW-LF-1216 — Lab Sample ID: 320-24184-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	2.9	E	0.0023	0.00042	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.6	E	0.0023	0.00091	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.4	E B	0.0023	0.00073	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3	E	0.0023	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	E M	0.0023	0.00069	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.13		0.0023	0.00060	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0027		0.0023	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00047	J	0.0023	0.00037	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.6	E M	0.0023	0.00085	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.9	E	0.0023	0.00080	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.0021	J	0.0023	0.00059	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	5.3	D	0.12	0.021	ug/L	50		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	9.1	D	0.12	0.046	ug/L	50		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	11	D B	0.12	0.036	ug/L	50		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	4.3	D	0.12	0.037	ug/L	50		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	2.6	D M	0.12	0.035	ug/L	50		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.13	D	0.12	0.030	ug/L	50		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	4.3	D	0.12	0.042	ug/L	50		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	17	D	0.12	0.040	ug/L	50		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	11	D	0.18	0.059	ug/L	50		537 (Modified)	Total/NA

Client Sample ID: SWMU1-01-1216 — Lab Sample ID: 320-24184-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.020	M	0.0025	0.00045	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.0039	M	0.0025	0.00098	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.0057	B	0.0025	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.0028		0.0025	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.0011	J	0.0025	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.00092	J	0.0025	0.00091	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0034		0.0025	0.00086	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	0.0057	H	0.0024	0.00074	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: FSS3TMW-1216 — Lab Sample ID: 320-24184-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	E	0.0022	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.4	E	0.0022	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	3.4	E B	0.0022	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.2	E	0.0022	0.00071	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	6.9	E	0.0022	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.19		0.0022	0.00058	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.067		0.0022	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.0021	J	0.0022	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00042	J	0.0022	0.00036	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	4.4	E M	0.0022	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.6	E	0.0022	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	21	E Q	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: FSS3TMW-1216 (Continued) — Lab Sample ID: 320-24184-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanesulfonic acid (PFDS)	0.51	E	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.61	E	0.0022	0.00057	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	8.6	D	0.45	0.082	ug/L	200		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	12	D	0.45	0.18	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	38	D B	0.45	0.14	ug/L	200		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	4.0	D	0.45	0.14	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	13	D M	0.45	0.13	ug/L	200		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.16	J D	0.45	0.12	ug/L	200		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	19	D	0.45	0.16	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	61	D	0.45	0.15	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	260	E D	0.71	0.23	ug/L	200		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA) - DL	0.63	D	0.45	0.11	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL2	300		7.1	2.3	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: SWMU1-02-1216 — Lab Sample ID: 320-24184-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.016	M	0.0022	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.0049	M	0.0022	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.012	B	0.0022	0.00070	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00081	J	0.0022	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	0.0047	M	0.0022	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.00072	J	0.0022	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00044	J	0.0022	0.00036	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.010		0.0022	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.033	M	0.0022	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.99	E	0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	0.0064		0.0036	0.0011	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.018		0.0022	0.00057	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.016	J D M	0.022	0.0041	ug/L	10		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	0.011	J D B	0.022	0.0070	ug/L	10		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	0.0095	J D	0.022	0.0082	ug/L	10		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	0.030	D	0.022	0.0078	ug/L	10		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.2	D	0.036	0.011	ug/L	10		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA) - DL	0.017	J D	0.022	0.0057	ug/L	10		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	0.0081	H M	0.0023	0.00072	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: 308A51MW-LF-1216

Date Collected: 12/07/16 13:40
Date Received: 12/08/16 10:00

Lab Sample ID: 320-24184-1

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.9**	**E**	0.0023	0.00042	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluoropentanoic acid (PFPeA)	**1.6**	**E**	0.0023	0.00091	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorohexanoic acid (PFHxA)	**1.4**	**E B**	0.0023	0.00073	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluoroheptanoic acid (PFHpA)	**2.3**	**E**	0.0023	0.00074	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorooctanoic acid (PFOA)	**1.6**	**E M**	0.0023	0.00069	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorononanoic acid (PFNA)	**0.13**		0.0023	0.00060	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorodecanoic acid (PFDA)	**0.0027**		0.0023	0.00041	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00069	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00054	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00051	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorotetradecanoic acid (PFTeA)	**0.00047**	**J**	0.0023	0.00037	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorobutanesulfonic acid (PFBS)	**1.6**	**E M**	0.0023	0.00085	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorohexanesulfonic acid (PFHxS)	**4.9**	**E**	0.0023	0.00080	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0037	0.0011	ug/L		12/19/16 14:38	12/29/16 00:52	1
Perfluorooctane Sulfonamide (FOSA)	**0.0021**	**J**	0.0023	0.00059	ug/L		12/19/16 14:38	12/29/16 00:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*10*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C4 PFBA	*15*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C5-PFPeA	*24*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C2 PFHxA	*31*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C4-PFHpA	*23*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C4 PFOA	*49*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C5 PFNA	*39*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C2 PFDA	*117*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C2 PFUnA	*121*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C2 PFDoA	*110*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
18O2 PFHxS	*20*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*
13C4 PFOS	*38*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:52*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**5.3**	**D**	0.12	0.021	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluoropentanoic acid (PFPeA)	**9.1**	**D**	0.12	0.046	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorohexanoic acid (PFHxA)	**11**	**D B**	0.12	0.036	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluoroheptanoic acid (PFHpA)	**4.3**	**D**	0.12	0.037	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorooctanoic acid (PFOA)	**2.6**	**D M**	0.12	0.035	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorononanoic acid (PFNA)	**0.13**	**D**	0.12	0.030	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorodecanoic acid (PFDA)	0.046	U	0.12	0.020	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluoroundecanoic acid (PFUnA)	0.092	U	0.12	0.035	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorododecanoic acid (PFDoA)	0.092	U	0.12	0.027	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorotridecanoic Acid (PFTriA)	0.092	U	0.12	0.025	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorotetradecanoic acid (PFTeA)	0.046	U	0.12	0.018	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorobutanesulfonic acid (PFBS)	**4.3**	**D**	0.12	0.042	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorohexanesulfonic acid (PFHxS)	**17**	**D**	0.12	0.040	ug/L		12/19/16 14:38	12/30/16 13:33	50

Client Sample ID: 308A51MW-LF-1216

Lab Sample ID: 320-24184-1
Date Collected: 12/07/16 13:40
Matrix: Water
Date Received: 12/08/16 10:00

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**11**	**D**	0.18	0.059	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorodecanesulfonic acid (PFDS)	0.14	U	0.18	0.056	ug/L		12/19/16 14:38	12/30/16 13:33	50
Perfluorooctane Sulfonamide (FOSA)	0.092	U	0.12	0.029	ug/L		12/19/16 14:38	12/30/16 13:33	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*11*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C4 PFBA	*117*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C5-PFPeA	*130*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C2 PFHxA	*118*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C4-PFHpA	*98*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C4 PFOA	*140*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C5 PFNA	*120*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C2 PFDA	*122*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C2 PFUnA	*124*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C2 PFDoA	*126*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
18O2 PFHxS	*112*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*
13C4 PFOS	*125*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:33*	*50*

Client Sample ID: SWMU1-01-1216

Lab Sample ID: 320-24184-2
Date Collected: 12/07/16 14:45
Matrix: Water
Date Received: 12/08/16 10:00

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.020**	**M**	0.0025	0.00045	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluoropentanoic acid (PFPeA)	**0.0039**	**M**	0.0025	0.00098	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorohexanoic acid (PFHxA)	**0.0057**	**B**	0.0025	0.00078	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00079	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorooctanoic acid (PFOA)	**0.0028**		0.0025	0.00074	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00064	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorodecanoic acid (PFDA)	0.00099	U	0.0025	0.00043	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00074	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00054	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorotetradecanoic acid (PFTeA)	**0.0011**	**J**	0.0025	0.00039	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorobutanesulfonic acid (PFBS)	**0.00092**	**J**	0.0025	0.00091	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0034**		0.0025	0.00086	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorooctanesulfonic acid (PFOS)	0.0030	U	0.0039	0.0013	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0039	0.0012	ug/L		12/19/16 14:38	12/30/16 13:41	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00063	ug/L		12/19/16 14:38	12/30/16 13:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*7*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*
13C4 PFBA	*37*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*
13C5-PFPeA	*93*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*
13C2 PFHxA	*113*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*
13C4-PFHpA	*106*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*
13C4 PFOA	*100*		*25 - 150*	*12/19/16 14:38*	*12/30/16 13:41*	*1*

Client Sample ID: SWMU1-01-1216

Lab Sample ID: 320-24184-2
Date Collected: 12/07/16 14:45
Matrix: Water
Date Received: 12/08/16 10:00

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFNA	95		25 - 150	12/19/16 14:38	12/30/16 13:41	1
13C2 PFDA	96		25 - 150	12/19/16 14:38	12/30/16 13:41	1
13C2 PFUnA	103		25 - 150	12/19/16 14:38	12/30/16 13:41	1
13C2 PFDoA	104		25 - 150	12/19/16 14:38	12/30/16 13:41	1
18O2 PFHxS	118		25 - 150	12/19/16 14:38	12/30/16 13:41	1
13C4 PFOS	116		25 - 150	12/19/16 14:38	12/30/16 13:41	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.0057	H	0.0024	0.00074	ug/L		01/04/17 16:57	01/05/17 15:38	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	116		25 - 150	01/04/17 16:57	01/05/17 15:38	1

Client Sample ID: FSS3TMW-1216

Lab Sample ID: 320-24184-3
Date Collected: 12/07/16 08:55
Matrix: Water
Date Received: 12/08/16 10:00

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	1.6	E	0.0022	0.00041	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluoropentanoic acid (PFPeA)	1.4	E	0.0022	0.00088	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorohexanoic acid (PFHxA)	3.4	E B	0.0022	0.00070	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluoroheptanoic acid (PFHpA)	3.2	E	0.0022	0.00071	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorooctanoic acid (PFOA)	6.9	E	0.0022	0.00067	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorononanoic acid (PFNA)	0.19		0.0022	0.00058	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorodecanoic acid (PFDA)	0.067		0.0022	0.00039	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluoroundecanoic acid (PFUnA)	0.0021	J	0.0022	0.00067	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00052	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00049	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorotetradecanoic acid (PFTeA)	0.00042	J	0.0022	0.00036	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorobutanesulfonic acid (PFBS)	4.4	E M	0.0022	0.00082	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorohexanesulfonic acid (PFHxS)	9.6	E	0.0022	0.00077	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorooctanesulfonic acid (PFOS)	21	E Q	0.0036	0.0011	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorodecanesulfonic acid (PFDS)	0.51	E	0.0036	0.0011	ug/L		12/19/16 14:38	12/29/16 01:07	1
Perfluorooctane Sulfonamide (FOSA)	0.61	E	0.0022	0.00057	ug/L		12/19/16 14:38	12/29/16 01:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	32		25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C4 PFBA	25		25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C5-PFPeA	22	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C2 PFHxA	17	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C4-PFHpA	9	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C4 PFOA	12	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C5 PFNA	9	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C2 PFDA	46		25 - 150	12/19/16 14:38	12/29/16 01:07	1

Client Sample ID: FSS3TMW-1216

Lab Sample ID: 320-24184-3

Date Collected: 12/07/16 08:55

Matrix: Water

Date Received: 12/08/16 10:00

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFUnA	119		25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C2 PFDoA	113		25 - 150	12/19/16 14:38	12/29/16 01:07	1
18O2 PFHxS	9	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1
13C4 PFOS	6	Q	25 - 150	12/19/16 14:38	12/29/16 01:07	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**8.6**	**D**	0.45	0.082	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluoropentanoic acid (PFPeA)	**12**	**D**	0.45	0.18	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorohexanoic acid (PFHxA)	**38**	**D B**	0.45	0.14	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluoroheptanoic acid (PFHpA)	**4.0**	**D**	0.45	0.14	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorooctanoic acid (PFOA)	**13**	**D M**	0.45	0.13	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorononanoic acid (PFNA)	**0.16**	**J D**	0.45	0.12	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorodecanoic acid (PFDA)	0.18	U	0.45	0.078	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluoroundecanoic acid (PFUnA)	0.36	U	0.45	0.13	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorododecanoic acid (PFDoA)	0.36	U	0.45	0.10	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorotridecanoic Acid (PFTriA)	0.36	U	0.45	0.098	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorotetradecanoic acid (PFTeA)	0.18	U	0.45	0.071	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorobutanesulfonic acid (PFBS)	**19**	**D**	0.45	0.16	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorohexanesulfonic acid (PFHxS)	**61**	**D**	0.45	0.15	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorooctanesulfonic acid (PFOS)	**260**	**E D**	0.71	0.23	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorodecanesulfonic acid (PFDS)	0.53	U	0.71	0.22	ug/L		12/19/16 14:38	12/30/16 12:41	200
Perfluorooctane Sulfonamide (FOSA)	**0.63**	**D**	0.45	0.11	ug/L		12/19/16 14:38	12/30/16 12:41	200

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	73		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C4 PFBA	105		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C5-PFPeA	103		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C2 PFHxA	108		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C4-PFHpA	73		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C4 PFOA	91		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C5 PFNA	66		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C2 PFDA	106		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C2 PFUnA	105		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C2 PFDoA	117		25 - 150	12/19/16 14:38	12/30/16 12:41	200
18O2 PFHxS	124		25 - 150	12/19/16 14:38	12/30/16 12:41	200
13C4 PFOS	71		25 - 150	12/19/16 14:38	12/30/16 12:41	200

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL2

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**300**		7.1	2.3	ug/L		12/19/16 14:38	01/04/17 21:33	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	105		25 - 150	12/19/16 14:38	01/04/17 21:33	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: SWMU1-02-1216

Date Collected: 12/07/16 12:00
Date Received: 12/08/16 10:00

Lab Sample ID: 320-24184-4

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.016**	**M**	0.0022	0.00041	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluoropentanoic acid (PFPeA)	**0.0049**	**M**	0.0022	0.00088	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorohexanoic acid (PFHxA)	**0.012**	**B**	0.0022	0.00070	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluoroheptanoic acid (PFHpA)	**0.00081**	**J**	0.0022	0.00072	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorooctanoic acid (PFOA)	**0.0047**	**M**	0.0022	0.00067	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00058	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorodecanoic acid (PFDA)	**0.00072**	**J**	0.0022	0.00039	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0022	0.00067	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00052	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00049	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorotetradecanoic acid (PFTeA)	**0.00044**	**J**	0.0022	0.00036	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorobutanesulfonic acid (PFBS)	**0.010**		0.0022	0.00082	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorohexanesulfonic acid (PFHxS)	**0.033**	**M**	0.0022	0.00078	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorooctanesulfonic acid (PFOS)	**0.99**	**E**	0.0036	0.0011	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorodecanesulfonic acid (PFDS)	**0.0064**		0.0036	0.0011	ug/L		12/19/16 14:38	12/30/16 14:11	1
Perfluorooctane Sulfonamide (FOSA)	**0.018**		0.0022	0.00057	ug/L		12/19/16 14:38	12/30/16 14:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*12*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C4 PFBA	*31*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C5-PFPeA	*91*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C2 PFHxA	*115*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C4-PFHpA	*116*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C4 PFOA	*110*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C5 PFNA	*62*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C2 PFDA	*104*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C2 PFUnA	*112*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C2 PFDoA	*109*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
18O2 PFHxS	*118*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*
13C4 PFOS	*80*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:11*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.016**	**J D M**	0.022	0.0041	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluoropentanoic acid (PFPeA)	0.018	U M	0.022	0.0088	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorohexanoic acid (PFHxA)	**0.011**	**J D B**	0.022	0.0070	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluoroheptanoic acid (PFHpA)	0.018	U	0.022	0.0072	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorooctanoic acid (PFOA)	0.018	U	0.022	0.0067	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorononanoic acid (PFNA)	0.018	U	0.022	0.0058	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorodecanoic acid (PFDA)	0.0089	U	0.022	0.0039	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluoroundecanoic acid (PFUnA)	0.018	U	0.022	0.0067	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorododecanoic acid (PFDoA)	0.018	U	0.022	0.0052	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorotridecanoic Acid (PFTriA)	0.018	U	0.022	0.0049	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorotetradecanoic acid (PFTeA)	0.0089	U	0.022	0.0036	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorobutanesulfonic acid (PFBS)	**0.0095**	**J D**	0.022	0.0082	ug/L		12/19/16 14:38	12/30/16 14:03	10

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: SWMU1-02-1216

Date Collected: 12/07/16 12:00
Date Received: 12/08/16 10:00

Lab Sample ID: 320-24184-4

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**0.030**	**D**	0.022	0.0078	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorooctanesulfonic acid (PFOS)	**1.2**	**D**	0.036	0.011	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorodecanesulfonic acid (PFDS)	0.027	U	0.036	0.011	ug/L		12/19/16 14:38	12/30/16 14:03	10
Perfluorooctane Sulfonamide (FOSA)	**0.017**	**J D**	0.022	0.0057	ug/L		12/19/16 14:38	12/30/16 14:03	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*12*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C4 PFBA	*93*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C5-PFPeA	*148*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C2 PFHxA	*125*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C4-PFHpA	*123*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C4 PFOA	*114*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C5 PFNA	*96*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C2 PFDA	*98*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C2 PFUnA	*99*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C2 PFDoA	*101*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
18O2 PFHxS	*139*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*
13C4 PFOS	*123*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:03*	*10*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RE

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0081**	**H M**	0.0023	0.00072	ug/L		01/04/17 16:57	01/05/17 15:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*108*		*25 - 150*	*01/04/17 16:57*	*01/05/17 15:45*	*1*

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	3C8 FOS/ (25-150)	3C4 PFB/ (25-150)	3C5-PFPe (25-150)	3C2 PFHx (25-150)	3C4-PFHp (25-150)	3C4 PFO/ (25-150)	3C5 PFN/ (25-150)	3C2 PFD/ (25-150)
320-24184-1	308A51MW-LF-1216	10 Q	15 Q	24 Q	31	23 Q	49	39	117
320-24184-1 - DL	308A51MW-LF-1216	11 Q	117	130	118	98	140	120	122
320-24184-2	SWMU1-01-1216	7 Q	37	93	113	106	100	95	96
320-24184-2 - RE	SWMU1-01-1216				116				
320-24184-3	FSS3TMW-1216	32	25	22 Q	17 Q	9 Q	12 Q	9 Q	46
320-24184-3 - DL	FSS3TMW-1216	73	105	103	108	73	91	66	106
320-24184-3 - DL2	FSS3TMW-1216								
320-24184-4 - DL	SWMU1-02-1216	12 Q	93	148	125	123	114	96	98
320-24184-4	SWMU1-02-1216	12 Q	31	91	115	116	110	62	104
320-24184-4 - RE	SWMU1-02-1216				108				
LCS 320-142967/2-A	Lab Control Sample	62	131	132	126	128	127	123	127
LCS 320-142967/2-A - RA	Lab Control Sample								
LCS 320-144971/2-A	Lab Control Sample				109				
LCSD 320-144971/3-A	Lab Control Sample Dup				117				
MB 320-142967/1-A	Method Blank	64	131	137	131	132	133	126	130
MB 320-142967/1-A - RA	Method Blank								
MB 320-144971/1-A	Method Blank				139				

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	3C2 PFUn (25-150)	3C2 PFDo (25-150)	3O2 PFHx (25-150)	3C4 PFO: (25-150)
320-24184-1	308A51MW-LF-1216	121	110	20 Q	38
320-24184-1 - DL	308A51MW-LF-1216	124	126	112	125
320-24184-2	SWMU1-01-1216	103	104	118	116
320-24184-2 - RE	SWMU1-01-1216				
320-24184-3	FSS3TMW-1216	119	113	9 Q	6 Q
320-24184-3 - DL	FSS3TMW-1216	105	117	124	71
320-24184-3 - DL2	FSS3TMW-1216				105
320-24184-4 - DL	SWMU1-02-1216	99	101	139	123
320-24184-4	SWMU1-02-1216	112	109	118	80
320-24184-4 - RE	SWMU1-02-1216				
LCS 320-142967/2-A	Lab Control Sample	119	114	128	128
LCS 320-142967/2-A - RA	Lab Control Sample				126
LCS 320-144971/2-A	Lab Control Sample				
LCSD 320-144971/3-A	Lab Control Sample Dup				
MB 320-142967/1-A	Method Blank	127	112	130	126
MB 320-142967/1-A - RA	Method Blank				113
MB 320-144971/1-A	Method Blank				

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C5-PFPeA = 13C5-PFPeA
13C2 PFHxA = 13C2 PFHxA
13C4-PFHpA = 13C4-PFHpA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanoic acid (PFHxA)	0.00147	J	0.0025	0.00079	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctanoic acid (PFOA)	0.00116	J	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotetradecanoic acid (PFTeA)	0.0010	U	0.0025	0.00040	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanesulfonic acid (PFHxS)	0.000944	J	0.0025	0.00087	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/19/16 14:38	12/29/16 00:06	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*64*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFBA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5-PFPeA	*137*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFHxA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4-PFHpA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5 PFNA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDA	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFUnA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDoA	*112*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
18O2 PFHxS	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOS	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0441		ug/L		110	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0413		ug/L		103	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0418		ug/L		104	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0406		ug/L		101	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0384		ug/L		96	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0399		ug/L		100	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0382		ug/L		95	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0384		ug/L		96	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0478		ug/L		120	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0432		ug/L		122	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0397		ug/L		109	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0385		ug/L		100	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0384		ug/L		96	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*62*		*25 - 150*
13C4 PFBA	*131*		*25 - 150*
13C5-PFPeA	*132*		*25 - 150*
13C2 PFHxA	*126*		*25 - 150*
13C4-PFHpA	*128*		*25 - 150*
13C4 PFOA	*127*		*25 - 150*
13C5 PFNA	*123*		*25 - 150*
13C2 PFDA	*127*		*25 - 150*
13C2 PFUnA	*119*		*25 - 150*
13C2 PFDoA	*114*		*25 - 150*
18O2 PFHxS	*128*		*25 - 150*
13C4 PFOS	*128*		*25 - 150*

Lab Sample ID: MB 320-144971/1-A
Matrix: Water
Analysis Batch: 145242

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144971

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.0020	U	0.0025	0.00079	ug/L		01/04/17 16:57	01/05/17 15:15	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*139*		*25 - 150*	*01/04/17 16:57*	*01/05/17 15:15*	*1*

Lab Sample ID: LCS 320-144971/2-A
Matrix: Water
Analysis Batch: 145242

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144971

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.0400	0.0402		ug/L		101	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*109*		*25 - 150*

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCSD 320-144971/3-A
Matrix: Water
Analysis Batch: 145242

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 144971

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)			0.0400	0.0424		ug/L		106	60 - 140	5	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*117*		*25 - 150*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS) - RA	0.0030	U	0.0040	0.0013	ug/L		12/19/16 14:38	12/30/16 16:11	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS - RA	*113*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:11*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorooctanesulfonic acid (PFOS) - RA			0.0371	0.0511		ug/L		138	60 - 140		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOS - RA	*126*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

LCMS

Prep Batch: 142967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-1	308A51MW-LF-1216	Total/NA	Water	3535	
320-24184-1 - DL	308A51MW-LF-1216	Total/NA	Water	3535	
320-24184-2	SWMU1-01-1216	Total/NA	Water	3535	
320-24184-3	FSS3TMW-1216	Total/NA	Water	3535	
320-24184-3 - DL	FSS3TMW-1216	Total/NA	Water	3535	
320-24184-3 - DL2	FSS3TMW-1216	Total/NA	Water	3535	
320-24184-4	SWMU1-02-1216	Total/NA	Water	3535	
320-24184-4 - DL	SWMU1-02-1216	Total/NA	Water	3535	
MB 320-142967/1-A	Method Blank	Total/NA	Water	3535	
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	3535	
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	3535	
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	3535	

Analysis Batch: 144253

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-1	308A51MW-LF-1216	Total/NA	Water	537 (Modified)	142967
320-24184-3	FSS3TMW-1216	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 144510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-1 - DL	308A51MW-LF-1216	Total/NA	Water	537 (Modified)	142967
320-24184-2	SWMU1-01-1216	Total/NA	Water	537 (Modified)	142967
320-24184-3 - DL	FSS3TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24184-4 - DL	SWMU1-02-1216	Total/NA	Water	537 (Modified)	142967
320-24184-4	SWMU1-02-1216	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	537 (Modified)	142967

Prep Batch: 144971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-2 - RE	SWMU1-01-1216	Total/NA	Water	3535	
320-24184-4 - RE	SWMU1-02-1216	Total/NA	Water	3535	
MB 320-144971/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-144971/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-144971/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 145022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-3 - DL2	FSS3TMW-1216	Total/NA	Water	537 (Modified)	145739

Analysis Batch: 145242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-2 - RE	SWMU1-01-1216	Total/NA	Water	537 (Modified)	144971
320-24184-4 - RE	SWMU1-02-1216	Total/NA	Water	537 (Modified)	144971
MB 320-144971/1-A	Method Blank	Total/NA	Water	537 (Modified)	144971
LCS 320-144971/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	144971
LCSD 320-144971/3-A	Lab Control Sample Dup	Total/NA	Water	537 (Modified)	144971

LCMS (Continued)

Cleanup Batch: 145739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24184-3 - DL2	FSS3TMW-1216	Total/NA	Water	Dilution	142967

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Client Sample ID: 308A51MW-LF-1216 — Lab Sample ID: 320-24184-1

Date Collected: 12/07/16 13:40 — **Matrix: Water**
Date Received: 12/08/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 00:52	TTP	TAL SAC
Total/NA	Prep	3535	DL		271 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	50			144510	12/30/16 13:33	CBW	TAL SAC

Client Sample ID: SWMU1-01-1216 — Lab Sample ID: 320-24184-2

Date Collected: 12/07/16 14:45 — **Matrix: Water**
Date Received: 12/08/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			253.5 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144510	12/30/16 13:41	CBW	TAL SAC
Total/NA	Prep	3535	RE		264.7 mL	0.50 mL	144971	01/04/17 16:57	JER	TAL SAC
Total/NA	Analysis	537 (Modified)	RE	1			145242	01/05/17 15:38	SBC	TAL SAC

Client Sample ID: FSS3TMW-1216 — Lab Sample ID: 320-24184-3

Date Collected: 12/07/16 08:55 — **Matrix: Water**
Date Received: 12/08/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			280.7 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 01:07	TTP	TAL SAC
Total/NA	Prep	3535	DL		280.7 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	200			144510	12/30/16 12:41	CBW	TAL SAC
Total/NA	Prep	3535	DL2		280.7 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Cleanup	Dilution	DL2		0.15 uL	300 uL	145739	12/19/16 14:38	TTP	TAL SAC
Total/NA	Analysis	537 (Modified)	DL2	1			145022	01/04/17 21:33	SBC	TAL SAC

Client Sample ID: SWMU1-02-1216 — Lab Sample ID: 320-24184-4

Date Collected: 12/07/16 12:00 — **Matrix: Water**
Date Received: 12/08/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		279.8 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	10			144510	12/30/16 14:03	CBW	TAL SAC
Total/NA	Prep	3535			279.8 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144510	12/30/16 14:11	CBW	TAL SAC
Total/NA	Prep	3535	RE		272.4 mL	0.50 mL	144971	01/04/17 16:57	JER	TAL SAC
Total/NA	Analysis	537 (Modified)	RE	1			145242	01/05/17 15:45	SBC	TAL SAC

Laboratory References:
TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-28-18

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24184-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24184-1	308A51MW-LF-1216	Water	12/07/16 13:40	12/08/16 10:00
320-24184-2	SWMU1-01-1216	Water	12/07/16 14:45	12/08/16 10:00
320-24184-3	FSS3TMW-1216	Water	12/07/16 08:55	12/08/16 10:00
320-24184-4	SWMU1-02-1216	Water	12/07/16 12:00	12/08/16 10:00

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. EJB120716 | Page 1 of 1

Project Name: PFAs Groundwater Investigation | PO No. 21529 | Project No. 0833812796 | Phase FIFS

Site Location: NAS Dulles

CTO No. JM78 | RC Project Manager: Tom Wiberg

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	PFAs GS ECA Method 537										Extra Volume for MS/MSD	HOLD
	308AS1MW-LF-1216	308AS1MW	12/7/16	1340	WG	N	N	2	X											
	SWMU1-01-1216	SWMU1-01	12/7/16	1445	WG	N	N	2	X											
	FFTA3TMW-1216	FFTA3TMW	12/7/16	0955	WG	N	N	2	X											
	SWMU1-02-1216	SWMU1-02	12/7/16	1200	WG	N	N	2	X											

320-24184 Chain of Custody

Field **Comments:** TRRP Reporting — no preservative —

Lab **Comments:** Modified 7-day hold 16 PFAs

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____ 3.4°C TCE

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/7/2016

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 [signature]	12/7/2016	1630	1 [signature] Troy G. Turpen	12/8/16	1000
2			2		
3			3		

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) **Sample Type:** **AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) **Preservative added**: **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-24184-1

Login Number: 24184
List Number: 1
Creator: Edman, Connor M

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-24236-1
Client Project/Site: PFAS, NAS Dallas

For:
EnSafe, Inc.
4545 Fuller Drive
Suite 342
Irving, Texas 75038

Attn: Thomas Wiberg

Authorized for release by:
1/13/2017 12:35:19 PM
David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Designee for

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

LCMS

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
E	Result exceeded calibration range.
M	Manual integrated compound.
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
D	The reported value is from a dilution.
J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-24236-1

Laboratory: TestAmerica Sacramento

Narrative

CASE NARRATIVE

Client: EnSafe, Inc.

Project: PFAS, NAS Dallas

Report Number: 320-24236-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica West Sacramento attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

TestAmerica utilizes USEPA approved methods and DOD QSM, where applicable, in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

All parameters for which TestAmerica West Sacramento has certification were evaluated to the QSM specified reporting convention or to the client specified format if different from QSM. Parameters not certified under QSM, if any, were evaluated to the detection limit (DL) and include qualified results where applicable.

The sample(s) that contain constituents flagged with U are undetected. The result associated with this flag is the limit of detection (LOD).

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/09/2016; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.2 C.

PFAS

The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

The continuing calibration verification (CCV) associated with batch 320-144253 recovered above the upper control limit for Perfluorooctanesulfonic acid (PFOS). The samples associated with this CCV were greater than the calibration range for Perfluorooctanesulfonic acid (PFOS). The samples were diluted and reported in a subsequent analytical batch. The following samples are

Job ID: 320-24236-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

impacted: FFTA2TMW-1216 (320-24236-3), FFTA2TMW-1216 (320-24236-3[MS]) and FFTA2TMW-1216 (320-24236-3[MSD]).

The method blank for preparation batch 320-142967 and analytical batch 320-144253 contained Perfluorohexanoic acid (PFHxA) above half the reporting limit (1/2RL). Associated samples were not re-extracted and/or re-analyzed because results for PFHxA were either greater than 10X the value found in the method blank or not detected.

Perfluorohexanesulfonic acid (PFHxS) and Perfluorooctanoic acid (PFOA) were detected in method blank MB 320-142967/1-A at levels that were above the method detection limit but below ½ the reporting limit. The values should be considered estimates, and have been flagged.

The Isotope Dilution Analyte (IDA) recoveries for several analytes in the following samples is below the method recommended limit: FSS6TMW-1216 (320-24236-1), FSS2TMW-1216 (320-24236-2), FFTA2TMW-1216 (320-24236-3), FFTA2TMW-1216 (320-24236-3[MS]), FFTA2TMW-1216 (320-24236-3[MSD]), FFTA4TMW-1216 (320-24236-9), and FFTA4TMW-1216-D (320-24236-10). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for Perfluorooctane Sulfonamide (FOSA) and Perfluorotetradecanoic acid (PFTeA) in preparation batch 320-142967 and analytical batch 320-144253 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Due to the high concentration of Perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonic acid (PFHxS), Perfluorohexanoic acid (PFHxA), Perfluorooctanesulfonic acid (PFOS), Perfluorooctanoic acid (PFOA), and Perfluoropentanoic acid (PFPeA), the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-142967 and analytical batch 320-144253 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

The concentration of one or more analytes associated with the following samples exceeded the instrument calibration range: FSS6TMW-1216 (320-24236-1), FSS2TMW-1216 (320-24236-2), FFTA2TMW-1216 (320-24236-3), FFTA2TMW-1216 (320-24236-3[MS]), FFTA2TMW-1216 (320-24236-3[MSD]), FFTA4TMW-1216 (320-24236-9) and FFTA4TMW-1216-D (320-24236-10). These samples have been run at dilution and both sets of data have been reported.

Samples FSS6TMW-1216 (320-24236-1)[100X], FSS2TMW-1216 (320-24236-2)[200X], FFTA2TMW-1216 (320-24236-3)[20X], FFTA4TMW-1216 (320-24236-9)[100X] and FFTA4TMW-1216-D (320-24236-10)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The following samples (FSS2TMW-1216 (320-24236-2)) required complex dilutions in order for the target analyte concentrations to be within the calibration range. Due to software limitations the complex dilution samples will have a dilution factor of 1.0 in the dilution factor field and a DL2 suffix. The complex dilution factors are as follows. FSS2TMW-1216 (320-24236-2) - 4000X dilution

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 3535: The following samples were decanted into another poly bottles due to having sediment and potentially clogging our SPE cartridges. The decanting was done prior to spiking and the extraction. FSS6TMW-1216 (320-24236-1), FFTA2TMW-1216 (320-24236-3), FFTA2TMW-1216 (320-24236-3[MS]) and FFTA2TMW-1216 (320-24236-3[MSD])

Method(s) 3535: The following sample was a cloudy white color after adding the methanol and water for the final volume. FSS6TMW-1216 (320-24236-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: FSS6TMW-1216 — Lab Sample ID: 320-24236-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1.6	E	0.0025	0.00047	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.98	E	0.0025	0.0010	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.4	E B	0.0025	0.00080	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.7	E	0.0025	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.5	E	0.0025	0.00076	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.13		0.0025	0.00067	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.0014	J	0.0025	0.00045	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00068	J	0.0025	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.0	E M	0.0025	0.00094	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.5	E	0.0025	0.00089	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.0057		0.0025	0.00065	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	2.1	D	0.25	0.047	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	5.5	D	0.25	0.10	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	10	D B	0.25	0.080	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	4.4	D	0.25	0.082	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	4.1	D	0.25	0.076	ug/L	100		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.12	J D	0.25	0.067	ug/L	100		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	4.3	D	0.25	0.094	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	29	D	0.25	0.089	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	6.5	D	0.41	0.13	ug/L	100		537 (Modified)	Total/NA

Client Sample ID: FSS2TMW-1216 — Lab Sample ID: 320-24236-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	3.3	E	0.0025	0.00045	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	2.3	E	0.0025	0.00098	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	4.4	E B	0.0025	0.00078	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.1	E	0.0025	0.00079	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	11	E M	0.0025	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.61	E	0.0025	0.00065	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.046		0.0025	0.00043	ug/L	1		537 (Modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.0049		0.0025	0.00074	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00069	J	0.0025	0.00040	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	5.0	E M	0.0025	0.00091	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.8	E	0.0025	0.00086	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	62	E Q	0.0040	0.0013	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanesulfonic acid (PFDS)	0.63	E	0.0040	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.60	E	0.0025	0.00063	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	18	D	0.49	0.091	ug/L	200		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	21	D	0.49	0.20	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	50	D B	0.49	0.16	ug/L	200		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	6.4	D	0.49	0.16	ug/L	200		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	23	D M	0.49	0.15	ug/L	200		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.61	D	0.49	0.13	ug/L	200		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	26	D	0.49	0.18	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	82	E D	0.49	0.17	ug/L	200		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: FSS2TMW-1216 (Continued) — Lab Sample ID: 320-24236-2

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS) - DL	580	E D	0.79	0.25	ug/L	200		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA) - DL	0.76	D	0.49	0.13	ug/L	200		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL2	240		9.9	3.4	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL2	680	M	16	5.0	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: FFTA2TMW-1216 — Lab Sample ID: 320-24236-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.31		0.0026	0.00047	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.58	E J	0.0026	0.0010	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	0.87	E J B	0.0026	0.00081	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.66	E J	0.0026	0.00083	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3.8	E J M	0.0026	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.029		0.0026	0.00068	ug/L	1		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.017		0.0026	0.00046	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00059	J	0.0026	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.26		0.0026	0.00095	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.5	E J	0.0026	0.00090	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	Q E J	0.0041	0.0013	ug/L	1		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA)	0.088	J	0.0026	0.00066	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.31	D	0.052	0.0095	ug/L	20		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	1.0	D J	0.052	0.020	ug/L	20		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	1.7	D B J	0.052	0.016	ug/L	20		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	0.74	D J	0.052	0.017	ug/L	20		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	7.1	D M J	0.052	0.015	ug/L	20		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA) - DL	0.030	J D	0.052	0.014	ug/L	20		537 (Modified)	Total/NA
Perfluorodecanoic acid (PFDA) - DL	0.016	J D	0.052	0.0091	ug/L	20		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	0.13	D	0.052	0.019	ug/L	20		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	5.0	D J	0.052	0.018	ug/L	20		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1.3	D J	0.083	0.026	ug/L	20		537 (Modified)	Total/NA
Perfluorooctane Sulfonamide (FOSA) - DL	0.087	D J	0.052	0.013	ug/L	20		537 (Modified)	Total/NA

Client Sample ID: FB120816 — Lab Sample ID: 320-24236-4

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.0011	J	0.0022	0.00078	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: EBWC120816-a — Lab Sample ID: 320-24236-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00042	J	0.0024	0.00039	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00087	J	0.0024	0.00084	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: EBWC120816-b — Lab Sample ID: 320-24236-6

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: EBWC120816-b (Continued) — Lab Sample ID: 320-24236-6

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00057	J	0.0026	0.00041	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00092	J	0.0026	0.00090	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: EBDPT120816-a — Lab Sample ID: 320-24236-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00044	J	0.0023	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00089	J	0.0023	0.00082	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RA	0.0033	J M	0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: EBDPT120816-b — Lab Sample ID: 320-24236-8

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorotetradecanoic acid (PFTeA)	0.00040	J	0.0023	0.00037	ug/L	1		537 (Modified)	Total/NA

Client Sample ID: FFTA4TMW-1216 — Lab Sample ID: 320-24236-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.40	E	0.0024	0.00044	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.74	E	0.0024	0.00095	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.1	E B	0.0024	0.00075	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	E	0.0024	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	7.3	E M	0.0024	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0055		0.0024	0.00063	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00048	J	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.0	E M	0.0024	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.9	E	0.0024	0.00083	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.068		0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.43	D	0.24	0.044	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	1.4	D	0.24	0.095	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	7.6	B D	0.24	0.075	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	1.2	D	0.24	0.077	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	23	D M	0.24	0.072	ug/L	100		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	2.0	D	0.24	0.088	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	15	D	0.24	0.083	ug/L	100		537 (Modified)	Total/NA

Client Sample ID: FFTA4TMW-1216-D — Lab Sample ID: 320-24236-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	0.42	E	0.0024	0.00044	ug/L	1		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	0.76	E	0.0024	0.00095	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.0	E B	0.0024	0.00075	ug/L	1		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	E	0.0024	0.00077	ug/L	1		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA)	7.5	E M	0.0024	0.00072	ug/L	1		537 (Modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.0050		0.0024	0.00063	ug/L	1		537 (Modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.00091	J	0.0024	0.00038	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.1	E M	0.0024	0.00088	ug/L	1		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.2	E	0.0024	0.00083	ug/L	1		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: FFTA4TMW-1216-D (Continued) — Lab Sample ID: 320-24236-10

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.064		0.0038	0.0012	ug/L	1		537 (Modified)	Total/NA
Perfluorobutanoic acid (PFBA) - DL	0.44	D	0.24	0.044	ug/L	100		537 (Modified)	Total/NA
Perfluoropentanoic acid (PFPeA) - DL	1.4	D	0.24	0.095	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanoic acid (PFHxA) - DL	8.1	B D	0.24	0.075	ug/L	100		537 (Modified)	Total/NA
Perfluoroheptanoic acid (PFHpA) - DL	1.2	D	0.24	0.077	ug/L	100		537 (Modified)	Total/NA
Perfluorooctanoic acid (PFOA) - DL	23	D M	0.24	0.072	ug/L	100		537 (Modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS) - DL	2.1	D	0.24	0.088	ug/L	100		537 (Modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	15	D	0.24	0.083	ug/L	100		537 (Modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: FSS6TMW-1216

Date Collected: 12/08/16 09:30
Date Received: 12/09/16 09:50

Lab Sample ID: 320-24236-1

Matrix: Water

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1.6**	**E**	0.0025	0.00047	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluoropentanoic acid (PFPeA)	**0.98**	**E**	0.0025	0.0010	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorohexanoic acid (PFHxA)	**1.4**	**E B**	0.0025	0.00080	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluoroheptanoic acid (PFHpA)	**2.7**	**E**	0.0025	0.00082	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorooctanoic acid (PFOA)	**2.5**	**E**	0.0025	0.00076	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorononanoic acid (PFNA)	**0.13**		0.0025	0.00067	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorodecanoic acid (PFDA)	**0.0014**	**J**	0.0025	0.00045	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00076	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00060	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00056	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorotetradecanoic acid (PFTeA)	**0.00068**	**J**	0.0025	0.00041	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorobutanesulfonic acid (PFBS)	**2.0**	**E M**	0.0025	0.00094	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorohexanesulfonic acid (PFHxS)	**6.5**	**E**	0.0025	0.00089	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorodecanesulfonic acid (PFDS)	0.0031	U	0.0041	0.0012	ug/L		12/19/16 14:38	12/29/16 01:37	1
Perfluorooctane Sulfonamide (FOSA)	**0.0057**		0.0025	0.00065	ug/L		12/19/16 14:38	12/29/16 01:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*13*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C4 PFBA	*19*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C5-PFPeA	*34*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C2 PFHxA	*34*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C4-PFHpA	*19*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C4 PFOA	*42*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C5 PFNA	*52*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C2 PFDA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C2 PFUnA	*123*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C2 PFDoA	*110*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
18O2 PFHxS	*17*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*
13C4 PFOS	*54*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:37*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**2.1**	**D**	0.25	0.047	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluoropentanoic acid (PFPeA)	**5.5**	**D**	0.25	0.10	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorohexanoic acid (PFHxA)	**10**	**D B**	0.25	0.080	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluoroheptanoic acid (PFHpA)	**4.4**	**D**	0.25	0.082	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorooctanoic acid (PFOA)	**4.1**	**D**	0.25	0.076	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorononanoic acid (PFNA)	**0.12**	**J D**	0.25	0.067	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorodecanoic acid (PFDA)	0.10	U	0.25	0.045	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluoroundecanoic acid (PFUnA)	0.20	U	0.25	0.076	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorododecanoic acid (PFDoA)	0.20	U	0.25	0.060	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorotridecanoic Acid (PFTriA)	0.20	U	0.25	0.056	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorotetradecanoic acid (PFTeA)	0.10	U	0.25	0.041	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorobutanesulfonic acid (PFBS)	**4.3**	**D**	0.25	0.094	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorohexanesulfonic acid (PFHxS)	**29**	**D**	0.25	0.089	ug/L		12/19/16 14:38	01/03/17 16:58	100

Client Sample ID: FSS6TMW-1216

Lab Sample ID: 320-24236-1
Date Collected: 12/08/16 09:30
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**6.5**	**D**	0.41	0.13	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorodecanesulfonic acid (PFDS)	0.31	U	0.41	0.12	ug/L		12/19/16 14:38	01/03/17 16:58	100
Perfluorooctane Sulfonamide (FOSA)	0.20	U	0.25	0.065	ug/L		12/19/16 14:38	01/03/17 16:58	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*18*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C4 PFBA	*139*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C5-PFPeA	*143*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C2 PFHxA	*119*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C4-PFHpA	*96*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C4 PFOA	*149*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C5 PFNA	*150*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C2 PFDA	*158*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C2 PFUnA	*154*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C2 PFDoA	*145*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
18O2 PFHxS	*120*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*
13C4 PFOS	*126*		*25 - 150*	*12/19/16 14:38*	*01/03/17 16:58*	*100*

Client Sample ID: FSS2TMW-1216

Lab Sample ID: 320-24236-2
Date Collected: 12/08/16 11:35
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**3.3**	**E**	0.0025	0.00045	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluoropentanoic acid (PFPeA)	**2.3**	**E**	0.0025	0.00098	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorohexanoic acid (PFHxA)	**4.4**	**E B**	0.0025	0.00078	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluoroheptanoic acid (PFHpA)	**5.1**	**E**	0.0025	0.00079	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorooctanoic acid (PFOA)	**11**	**E M**	0.0025	0.00074	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorononanoic acid (PFNA)	**0.61**	**E**	0.0025	0.00065	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorodecanoic acid (PFDA)	**0.046**		0.0025	0.00043	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluoroundecanoic acid (PFUnA)	**0.0049**		0.0025	0.00074	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00054	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorotetradecanoic acid (PFTeA)	**0.00069**	**J**	0.0025	0.00040	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorobutanesulfonic acid (PFBS)	**5.0**	**E M**	0.0025	0.00091	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorohexanesulfonic acid (PFHxS)	**6.8**	**E**	0.0025	0.00086	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorooctanesulfonic acid (PFOS)	**62**	**E Q**	0.0040	0.0013	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorodecanesulfonic acid (PFDS)	**0.63**	**E**	0.0040	0.0012	ug/L		12/19/16 14:38	12/29/16 01:44	1
Perfluorooctane Sulfonamide (FOSA)	**0.60**	**E**	0.0025	0.00063	ug/L		12/19/16 14:38	12/29/16 01:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*42*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:44*	*1*
13C4 PFBA	*13*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:44*	*1*
13C5-PFPeA	*15*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:44*	*1*

Client Sample ID: FSS2TMW-1216

Lab Sample ID: 320-24236-2

Date Collected: 12/08/16 11:35

Matrix: Water

Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	15	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C4-PFHpA	6	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C4 PFOA	10	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C5 PFNA	6	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C2 PFDA	60		25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C2 PFUnA	122		25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C2 PFDoA	119		25 - 150	12/19/16 14:38	12/29/16 01:44	1
18O2 PFHxS	9	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1
13C4 PFOS	4	Q	25 - 150	12/19/16 14:38	12/29/16 01:44	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**18**	**D**	0.49	0.091	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluoropentanoic acid (PFPeA)	**21**	**D**	0.49	0.20	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorohexanoic acid (PFHxA)	**50**	**D B**	0.49	0.16	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluoroheptanoic acid (PFHpA)	**6.4**	**D**	0.49	0.16	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorooctanoic acid (PFOA)	**23**	**D M**	0.49	0.15	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorononanoic acid (PFNA)	**0.61**	**D**	0.49	0.13	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorodecanoic acid (PFDA)	0.20	U	0.49	0.087	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluoroundecanoic acid (PFUnA)	0.40	U	0.49	0.15	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorododecanoic acid (PFDoA)	0.40	U	0.49	0.12	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorotridecanoic Acid (PFTriA)	0.40	U	0.49	0.11	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorotetradecanoic acid (PFTeA)	0.20	U	0.49	0.079	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorobutanesulfonic acid (PFBS)	**26**	**D**	0.49	0.18	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorohexanesulfonic acid (PFHxS)	**82**	**E D**	0.49	0.17	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorooctanesulfonic acid (PFOS)	**580**	**E D**	0.79	0.25	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorodecanesulfonic acid (PFDS)	0.59	U	0.79	0.24	ug/L		12/19/16 14:38	12/30/16 12:48	200
Perfluorooctane Sulfonamide (FOSA)	**0.76**	**D**	0.49	0.13	ug/L		12/19/16 14:38	12/30/16 12:48	200

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	97		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C4 PFBA	124		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C5-PFPeA	121		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C2 PFHxA	147		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C4-PFHpA	81		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C4 PFOA	95		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C5 PFNA	51		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C2 PFDA	129		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C2 PFUnA	129		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C2 PFDoA	129		25 - 150	12/19/16 14:38	12/30/16 12:48	200
18O2 PFHxS	149		25 - 150	12/19/16 14:38	12/30/16 12:48	200
13C4 PFOS	54		25 - 150	12/19/16 14:38	12/30/16 12:48	200

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL2

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**240**		9.9	3.4	ug/L		12/19/16 14:38	01/04/17 21:40	1

Client Sample ID: FSS2TMW-1216

Lab Sample ID: 320-24236-2
Date Collected: 12/08/16 11:35
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL2 (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	680	M	16	5.0	ug/L		12/19/16 14:38	01/04/17 21:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*12/19/16 14:38*	*01/04/17 21:40*	*1*
13C4 PFOS	*119*		*25 - 150*	*12/19/16 14:38*	*01/04/17 21:40*	*1*

Client Sample ID: FFTA2TMW-1216

Lab Sample ID: 320-24236-3
Date Collected: 12/08/16 12:40
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.31		0.0026	0.00047	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluoropentanoic acid (PFPeA)	0.58	E J	0.0026	0.0010	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorohexanoic acid (PFHxA)	0.87	E J B	0.0026	0.00081	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluoroheptanoic acid (PFHpA)	0.66	E J	0.0026	0.00083	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorooctanoic acid (PFOA)	3.8	E J M	0.0026	0.00077	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorononanoic acid (PFNA)	0.029		0.0026	0.00068	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorodecanoic acid (PFDA)	0.017		0.0026	0.00046	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluoroundecanoic acid (PFUnA)	0.0021	U	0.0026	0.00077	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorododecanoic acid (PFDoA)	0.0021	U	0.0026	0.00060	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorotridecanoic Acid (PFTriA)	0.0021	U	0.0026	0.00057	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorotetradecanoic acid (PFTeA)	0.00059	J	0.0026	0.00041	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorobutanesulfonic acid (PFBS)	0.26		0.0026	0.00095	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorohexanesulfonic acid (PFHxS)	2.5	E J	0.0026	0.00090	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorooctanesulfonic acid (PFOS)	1.2	Q E J	0.0041	0.0013	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorodecanesulfonic acid (PFDS)	0.0031	U	0.0041	0.0013	ug/L		12/19/16 14:38	12/29/16 01:52	1
Perfluorooctane Sulfonamide (FOSA)	0.088	J	0.0026	0.00066	ug/L		12/19/16 14:38	12/29/16 01:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C4 PFBA	*32*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C5-PFPeA	*63*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C2 PFHxA	*68*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C4-PFHpA	*41*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C4 PFOA	*31*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C5 PFNA	*72*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C2 PFDA	*111*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C2 PFUnA	*118*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
13C2 PFDoA	*106*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*
18O2 PFHxS	*38*		*25 - 150*	*12/19/16 14:38*	*12/29/16 01:52*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.31	D	0.052	0.0095	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluoropentanoic acid (PFPeA)	1.0	D J	0.052	0.020	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorohexanoic acid (PFHxA)	1.7	D B J	0.052	0.016	ug/L		12/19/16 14:38	12/30/16 14:26	20

Client Sample ID: FFTA2TMW-1216

Lab Sample ID: 320-24236-3
Date Collected: 12/08/16 12:40
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**0.74**	**D J**	0.052	0.017	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorooctanoic acid (PFOA)	**7.1**	**D M J**	0.052	0.015	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorononanoic acid (PFNA)	**0.030**	**J D**	0.052	0.014	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorodecanoic acid (PFDA)	**0.016**	**J D**	0.052	0.0091	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluoroundecanoic acid (PFUnA)	0.041	U	0.052	0.015	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorododecanoic acid (PFDoA)	0.041	U	0.052	0.012	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorotridecanoic Acid (PFTriA)	0.041	U	0.052	0.011	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorotetradecanoic acid (PFTeA)	0.021	U	0.052	0.0083	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorobutanesulfonic acid (PFBS)	**0.13**	**D**	0.052	0.019	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorohexanesulfonic acid (PFHxS)	**5.0**	**D J**	0.052	0.018	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorooctanesulfonic acid (PFOS)	**1.3**	**D J**	0.083	0.026	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorodecanesulfonic acid (PFDS)	0.062	U	0.083	0.025	ug/L		12/19/16 14:38	12/30/16 14:26	20
Perfluorooctane Sulfonamide (FOSA)	**0.087**	**D J**	0.052	0.013	ug/L		12/19/16 14:38	12/30/16 14:26	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C4 PFBA	*119*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C5-PFPeA	*142*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C2 PFHxA	*124*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C4-PFHpA	*101*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C4 PFOA	*94*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C5 PFNA	*121*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C2 PFDA	*126*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C2 PFUnA	*126*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C2 PFDoA	*123*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
18O2 PFHxS	*115*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*
13C4 PFOS	*125*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:26*	*20*

Client Sample ID: FB120816

Lab Sample ID: 320-24236-4
Date Collected: 12/08/16 13:20
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00090	U	0.0022	0.00041	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0022	0.00089	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0022	0.00070	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0022	0.00072	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0022	0.00067	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0022	0.00059	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorodecanoic acid (PFDA)	0.00090	U	0.0022	0.00039	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0022	0.00067	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0022	0.00052	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0022	0.00049	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorotetradecanoic acid (PFTeA)	0.00090	U	0.0022	0.00036	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0022	0.00082	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0011**	**J**	0.0022	0.00078	ug/L		12/19/16 14:38	12/29/16 02:14	1

Client Sample ID: FB120816

Lab Sample ID: 320-24236-4
Matrix: Water
Date Collected: 12/08/16 13:20
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0036	0.0011	ug/L		12/19/16 14:38	12/29/16 02:14	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0022	0.00057	ug/L		12/19/16 14:38	12/29/16 02:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*77*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C4 PFBA	*139*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C5-PFPeA	*137*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C2 PFHxA	*135*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C4-PFHpA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C4 PFOA	*135*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C5 PFNA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C2 PFDA	*144*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C2 PFUnA	*143*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
13C2 PFDoA	*134*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*
18O2 PFHxS	*135*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:14*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0036	0.0011	ug/L		12/19/16 14:38	12/30/16 14:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*128*		*25 - 150*	*12/19/16 14:38*	*12/30/16 14:49*	*1*

Client Sample ID: EBWC120816-a

Lab Sample ID: 320-24236-5
Matrix: Water
Date Collected: 12/08/16 07:50
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00096	U	0.0024	0.00044	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluoropentanoic acid (PFPeA)	0.0019	U	0.0024	0.00095	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorohexanoic acid (PFHxA)	0.0019	U	0.0024	0.00076	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0024	0.00077	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0024	0.00063	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorodecanoic acid (PFDA)	0.00096	U	0.0024	0.00042	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00056	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00053	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorotetradecanoic acid (PFTeA)	**0.00042**	**J**	0.0024	0.00039	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0024	0.00089	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00087**	**J**	0.0024	0.00084	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorodecanesulfonic acid (PFDS)	0.0029	U	0.0039	0.0012	ug/L		12/19/16 14:38	12/29/16 02:22	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00062	ug/L		12/19/16 14:38	12/29/16 02:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*64*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:22*	*1*
13C4 PFBA	*123*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:22*	*1*
13C5-PFPeA	*129*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:22*	*1*
13C2 PFHxA	*123*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:22*	*1*
13C4-PFHpA	*124*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:22*	*1*

Client Sample ID: EBWC120816-a

Lab Sample ID: 320-24236-5
Date Collected: 12/08/16 07:50
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	126		25 - 150	12/19/16 14:38	12/29/16 02:22	1
13C5 PFNA	122		25 - 150	12/19/16 14:38	12/29/16 02:22	1
13C2 PFDA	124		25 - 150	12/19/16 14:38	12/29/16 02:22	1
13C2 PFUnA	125		25 - 150	12/19/16 14:38	12/29/16 02:22	1
13C2 PFDoA	117		25 - 150	12/19/16 14:38	12/29/16 02:22	1
18O2 PFHxS	127		25 - 150	12/19/16 14:38	12/29/16 02:22	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0029	U	0.0039	0.0012	ug/L		12/19/16 14:38	12/30/16 16:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	131		25 - 150	12/19/16 14:38	12/30/16 16:34	1

Client Sample ID: EBWC120816-b

Lab Sample ID: 320-24236-6
Date Collected: 12/08/16 09:20
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0026	0.00047	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluoropentanoic acid (PFPeA)	0.0021	U	0.0026	0.0010	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorohexanoic acid (PFHxA)	0.0021	U	0.0026	0.00081	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluoroheptanoic acid (PFHpA)	0.0021	U	0.0026	0.00083	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorooctanoic acid (PFOA)	0.0021	U	0.0026	0.00077	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorononanoic acid (PFNA)	0.0021	U	0.0026	0.00068	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0026	0.00046	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluoroundecanoic acid (PFUnA)	0.0021	U	0.0026	0.00077	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorododecanoic acid (PFDoA)	0.0021	U	0.0026	0.00060	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorotridecanoic Acid (PFTriA)	0.0021	U	0.0026	0.00057	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorotetradecanoic acid (PFTeA)	**0.00057**	**J**	0.0026	0.00041	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorobutanesulfonic acid (PFBS)	0.0021	U	0.0026	0.00095	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00092**	**J**	0.0026	0.00090	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorodecanesulfonic acid (PFDS)	0.0031	U	0.0041	0.0013	ug/L		12/19/16 14:38	12/29/16 02:29	1
Perfluorooctane Sulfonamide (FOSA)	0.0021	U	0.0026	0.00066	ug/L		12/19/16 14:38	12/29/16 02:29	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	36		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C4 PFBA	124		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C5-PFPeA	129		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C2 PFHxA	120		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C4-PFHpA	128		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C4 PFOA	125		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C5 PFNA	123		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C2 PFDA	121		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C2 PFUnA	124		25 - 150	12/19/16 14:38	12/29/16 02:29	1
13C2 PFDoA	112		25 - 150	12/19/16 14:38	12/29/16 02:29	1
18O2 PFHxS	125		25 - 150	12/19/16 14:38	12/29/16 02:29	1

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: EBWC120816-b

Lab Sample ID: 320-24236-6
Date Collected: 12/08/16 09:20
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	0.0031	U	0.0041	0.0013	ug/L		12/19/16 14:38	12/30/16 16:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*132*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:41*	*1*

Client Sample ID: EBDPT120816-a

Lab Sample ID: 320-24236-7
Date Collected: 12/08/16 08:10
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00094	U	0.0023	0.00043	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluoropentanoic acid (PFPeA)	0.0019	U	0.0023	0.00093	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorohexanoic acid (PFHxA)	0.0019	U	0.0023	0.00074	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluoroheptanoic acid (PFHpA)	0.0019	U	0.0023	0.00075	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorooctanoic acid (PFOA)	0.0019	U	0.0023	0.00070	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorononanoic acid (PFNA)	0.0019	U	0.0023	0.00061	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorodecanoic acid (PFDA)	0.00094	U	0.0023	0.00041	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0023	0.00070	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0023	0.00055	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0023	0.00052	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorotetradecanoic acid (PFTeA)	**0.00044**	**J**	0.0023	0.00038	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorobutanesulfonic acid (PFBS)	0.0019	U	0.0023	0.00086	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00089**	**J**	0.0023	0.00082	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorodecanesulfonic acid (PFDS)	0.0028	U	0.0038	0.0011	ug/L		12/19/16 14:38	12/29/16 02:37	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0023	0.00060	ug/L		12/19/16 14:38	12/29/16 02:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*68*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C4 PFBA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C5-PFPeA	*134*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C2 PFHxA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C4-PFHpA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C4 PFOA	*134*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C5 PFNA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C2 PFDA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C2 PFUnA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
13C2 PFDoA	*123*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*
18O2 PFHxS	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:37*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**0.0033**	**J M**	0.0038	0.0012	ug/L		12/19/16 14:38	12/30/16 16:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*118*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:49*	*1*

Client Sample Results

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: EBDPT120816-b

Lab Sample ID: 320-24236-8
Date Collected: 12/08/16 09:30
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.00092	U	0.0023	0.00042	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluoropentanoic acid (PFPeA)	0.0018	U	0.0023	0.00091	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorohexanoic acid (PFHxA)	0.0018	U	0.0023	0.00072	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluoroheptanoic acid (PFHpA)	0.0018	U	0.0023	0.00073	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorooctanoic acid (PFOA)	0.0018	U	0.0023	0.00068	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorononanoic acid (PFNA)	0.0018	U	0.0023	0.00060	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorodecanoic acid (PFDA)	0.00092	U	0.0023	0.00040	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluoroundecanoic acid (PFUnA)	0.0018	U	0.0023	0.00068	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorododecanoic acid (PFDoA)	0.0018	U	0.0023	0.00053	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorotridecanoic Acid (PFTriA)	0.0018	U	0.0023	0.00050	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorotetradecanoic acid (PFTeA)	**0.00040**	**J**	0.0023	0.00037	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorobutanesulfonic acid (PFBS)	0.0018	U	0.0023	0.00084	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorohexanesulfonic acid (PFHxS)	0.0018	U	0.0023	0.00080	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorooctanesulfonic acid (PFOS)	0.0027	U	0.0037	0.0012	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorodecanesulfonic acid (PFDS)	0.0027	U	0.0037	0.0011	ug/L		12/19/16 14:38	12/29/16 02:59	1
Perfluorooctane Sulfonamide (FOSA)	0.0018	U	0.0023	0.00058	ug/L		12/19/16 14:38	12/29/16 02:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*53*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C4 PFBA	*123*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C5-PFPeA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C2 PFHxA	*125*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C4-PFHpA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C4 PFOA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C5 PFNA	*121*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C2 PFDA	*129*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C2 PFUnA	*134*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C2 PFDoA	*122*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
18O2 PFHxS	*124*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*
13C4 PFOS	*121*		*25 - 150*	*12/19/16 14:38*	*12/29/16 02:59*	*1*

Client Sample ID: FFTA4TMW-1216

Lab Sample ID: 320-24236-9
Date Collected: 12/08/16 14:10
Matrix: Water
Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.40**	**E**	0.0024	0.00044	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluoropentanoic acid (PFPeA)	**0.74**	**E**	0.0024	0.00095	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorohexanoic acid (PFHxA)	**1.1**	**E B**	0.0024	0.00075	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluoroheptanoic acid (PFHpA)	**1.0**	**E**	0.0024	0.00077	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorooctanoic acid (PFOA)	**7.3**	**E M**	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorononanoic acid (PFNA)	**0.0055**		0.0024	0.00063	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorodecanoic acid (PFDA)	0.00096	U	0.0024	0.00042	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00056	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00053	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorotetradecanoic acid (PFTeA)	**0.00048**	**J**	0.0024	0.00038	ug/L		12/19/16 14:38	12/29/16 03:07	1

Client Sample ID: FFTA4TMW-1216

Lab Sample ID: 320-24236-9

Date Collected: 12/08/16 14:10

Matrix: Water

Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.0**	**E M**	0.0024	0.00088	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorohexanesulfonic acid (PFHxS)	**3.9**	**E**	0.0024	0.00083	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorooctanesulfonic acid (PFOS)	**0.068**		0.0038	0.0012	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorodecanesulfonic acid (PFDS)	0.0029	U	0.0038	0.0012	ug/L		12/19/16 14:38	12/29/16 03:07	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00061	ug/L		12/19/16 14:38	12/29/16 03:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*2*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C4 PFBA	*38*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C5-PFPeA	*61*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C2 PFHxA	*43*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C4-PFHpA	*30*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C4 PFOA	*23*	*Q*	*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C5 PFNA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C2 PFDA	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C2 PFUnA	*135*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C2 PFDoA	*116*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
18O2 PFHxS	*25*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*
13C4 PFOS	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 03:07*	*1*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.43**	**D**	0.24	0.044	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluoropentanoic acid (PFPeA)	**1.4**	**D**	0.24	0.095	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorohexanoic acid (PFHxA)	**7.6**	**B D**	0.24	0.075	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluoroheptanoic acid (PFHpA)	**1.2**	**D**	0.24	0.077	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorooctanoic acid (PFOA)	**23**	**D M**	0.24	0.072	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorononanoic acid (PFNA)	0.19	U	0.24	0.063	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorodecanoic acid (PFDA)	0.096	U	0.24	0.042	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluoroundecanoic acid (PFUnA)	0.19	U	0.24	0.072	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorododecanoic acid (PFDoA)	0.19	U	0.24	0.056	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorotridecanoic Acid (PFTriA)	0.19	U	0.24	0.053	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorotetradecanoic acid (PFTeA)	0.096	U	0.24	0.038	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorobutanesulfonic acid (PFBS)	**2.0**	**D**	0.24	0.088	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorohexanesulfonic acid (PFHxS)	**15**	**D**	0.24	0.083	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorooctanesulfonic acid (PFOS)	0.29	U	0.38	0.12	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorodecanesulfonic acid (PFDS)	0.29	U	0.38	0.12	ug/L		12/19/16 14:38	01/03/17 17:06	100
Perfluorooctane Sulfonamide (FOSA)	0.19	U	0.24	0.061	ug/L		12/19/16 14:38	01/03/17 17:06	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*4*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C4 PFBA	*148*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C5-PFPeA	*149*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C2 PFHxA	*133*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C4-PFHpA	*122*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C4 PFOA	*138*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*
13C5 PFNA	*175*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:06*	*100*

Client Sample ID: FFTA4TMW-1216

Lab Sample ID: 320-24236-9

Date Collected: 12/08/16 14:10

Matrix: Water

Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFDA	175	Q	25 - 150	12/19/16 14:38	01/03/17 17:06	100
13C2 PFUnA	151	Q	25 - 150	12/19/16 14:38	01/03/17 17:06	100
13C2 PFDoA	150		25 - 150	12/19/16 14:38	01/03/17 17:06	100
18O2 PFHxS	138		25 - 150	12/19/16 14:38	01/03/17 17:06	100
13C4 PFOS	136		25 - 150	12/19/16 14:38	01/03/17 17:06	100

Client Sample ID: FFTA4TMW-1216-D

Lab Sample ID: 320-24236-10

Date Collected: 12/08/16 00:00

Matrix: Water

Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.42**	**E**	0.0024	0.00044	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluoropentanoic acid (PFPeA)	**0.76**	**E**	0.0024	0.00095	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorohexanoic acid (PFHxA)	**1.0**	**E B**	0.0024	0.00075	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluoroheptanoic acid (PFHpA)	**1.1**	**E**	0.0024	0.00077	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorooctanoic acid (PFOA)	**7.5**	**E M**	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorononanoic acid (PFNA)	**0.0050**		0.0024	0.00063	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorodecanoic acid (PFDA)	0.00096	U	0.0024	0.00042	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluoroundecanoic acid (PFUnA)	0.0019	U	0.0024	0.00072	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorododecanoic acid (PFDoA)	0.0019	U	0.0024	0.00056	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorotridecanoic Acid (PFTriA)	0.0019	U	0.0024	0.00053	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorotetradecanoic acid (PFTeA)	**0.00091**	**J**	0.0024	0.00038	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorobutanesulfonic acid (PFBS)	**1.1**	**E M**	0.0024	0.00088	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorohexanesulfonic acid (PFHxS)	**4.2**	**E**	0.0024	0.00083	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorooctanesulfonic acid (PFOS)	**0.064**		0.0038	0.0012	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorodecanesulfonic acid (PFDS)	0.0029	U	0.0038	0.0012	ug/L		12/19/16 14:38	12/29/16 03:14	1
Perfluorooctane Sulfonamide (FOSA)	0.0019	U	0.0024	0.00061	ug/L		12/19/16 14:38	12/29/16 03:14	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	2	Q	25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C4 PFBA	34		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C5-PFPeA	56		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C2 PFHxA	40		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C4-PFHpA	29		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C4 PFOA	21	Q	25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C5 PFNA	120		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C2 PFDA	129		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C2 PFUnA	133		25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C2 PFDoA	122		25 - 150	12/19/16 14:38	12/29/16 03:14	1
18O2 PFHxS	24	Q	25 - 150	12/19/16 14:38	12/29/16 03:14	1
13C4 PFOS	124		25 - 150	12/19/16 14:38	12/29/16 03:14	1

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**0.44**	**D**	0.24	0.044	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluoropentanoic acid (PFPeA)	**1.4**	**D**	0.24	0.095	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorohexanoic acid (PFHxA)	**8.1**	**B D**	0.24	0.075	ug/L		12/19/16 14:38	01/03/17 17:13	100

Client Sample ID: FFTA4TMW-1216-D

Lab Sample ID: 320-24236-10

Date Collected: 12/08/16 00:00

Matrix: Water

Date Received: 12/09/16 09:50

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	**1.2**	**D**	0.24	0.077	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorooctanoic acid (PFOA)	**23**	**D M**	0.24	0.072	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorononanoic acid (PFNA)	0.19	U	0.24	0.063	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorodecanoic acid (PFDA)	0.096	U	0.24	0.042	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluoroundecanoic acid (PFUnA)	0.19	U	0.24	0.072	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorododecanoic acid (PFDoA)	0.19	U	0.24	0.056	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorotridecanoic Acid (PFTriA)	0.19	U	0.24	0.053	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorotetradecanoic acid (PFTeA)	0.096	U	0.24	0.038	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorobutanesulfonic acid (PFBS)	**2.1**	**D**	0.24	0.088	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorohexanesulfonic acid (PFHxS)	**15**	**D**	0.24	0.083	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorooctanesulfonic acid (PFOS)	0.29	U	0.38	0.12	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorodecanesulfonic acid (PFDS)	0.29	U	0.38	0.12	ug/L		12/19/16 14:38	01/03/17 17:13	100
Perfluorooctane Sulfonamide (FOSA)	0.19	U	0.24	0.061	ug/L		12/19/16 14:38	01/03/17 17:13	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*3*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C4 PFBA	*143*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C5-PFPeA	*143*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C2 PFHxA	*122*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C4-PFHpA	*120*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C4 PFOA	*139*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C5 PFNA	*173*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C2 PFDA	*181*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C2 PFUnA	*172*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C2 PFDoA	*161*	*Q*	*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
18O2 PFHxS	*138*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*
13C4 PFOS	*133*		*25 - 150*	*12/19/16 14:38*	*01/03/17 17:13*	*100*

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		3C8 FOS/	3C4 PFB/	3C5-PFPe	3C2 PFHx	3C4-PFHp	3C4 PFO/	3C5 PFN/	3C2 PFD/
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)	(25-150)
320-24236-1	FSS6TMW-1216	13 Q	19 Q	34	34	19 Q	42	52	132
320-24236-1 - DL	FSS6TMW-1216	18 Q	139	143	119	96	149	150	158 Q
320-24236-2	FSS2TMW-1216	42	13 Q	15 Q	15 Q	6 Q	10 Q	6 Q	60
320-24236-2 - DL	FSS2TMW-1216	97	124	121	147	81	95	51	129
320-24236-2 - DL2	FSS2TMW-1216								
320-24236-3	FFTA2TMW-1216	4 Q	32	63	68	41	31	72	111
320-24236-3 - DL	FFTA2TMW-1216	4 Q	119	142	124	101	94	121	126
320-24236-3 MS	FFTA2TMW-1216	3 Q	34	66	70	43	33	83	112
320-24236-3 MS - DL	FFTA2TMW-1216	3 Q	117	141	119	102	96	129	124
320-24236-3 MSD	FFTA2TMW-1216	3 Q	34	67	72	45	33	88	107
320-24236-3 MSD - DL	FFTA2TMW-1216	3 Q	126	149	129	108	100	138	131
320-24236-4	FB120816	77	139	137	135	133	135	132	144
320-24236-4 - RA	FB120816								
320-24236-5	EBWC120816-a	64	123	129	123	124	126	122	124
320-24236-5 - RA	EBWC120816-a								
320-24236-6	EBWC120816-b	36	124	129	120	128	125	123	121
320-24236-6 - RA	EBWC120816-b								
320-24236-7	EBDPT120816-a	68	126	134	127	133	134	127	132
320-24236-7 - RA	EBDPT120816-a								
320-24236-8	EBDPT120816-b	53	123	127	125	127	126	121	129
320-24236-9	FFTA4TMW-1216	2 Q	38	61	43	30	23 Q	126	130
320-24236-9 - DL	FFTA4TMW-1216	4 Q	148	149	133	122	138	175 Q	175 Q
320-24236-10	FFTA4TMW-1216-D	2 Q	34	56	40	29	21 Q	120	129
320-24236-10 - DL	FFTA4TMW-1216-D	3 Q	143	143	122	120	139	173 Q	181 Q
LCS 320-142967/2-A	Lab Control Sample	62	131	132	126	128	127	123	127
LCS 320-142967/2-A - RA	Lab Control Sample								
MB 320-142967/1-A	Method Blank	64	131	137	131	132	133	126	130
MB 320-142967/1-A - RA	Method Blank								

		Percent Isotope Dilution Recovery (Acceptance Limits)			
		3C2 PFUn	3C2 PFDo	3O2 PFHx	3C4 PFOS
Lab Sample ID	Client Sample ID	(25-150)	(25-150)	(25-150)	(25-150)
320-24236-1	FSS6TMW-1216	123	110	17 Q	54
320-24236-1 - DL	FSS6TMW-1216	154 Q	145	120	126
320-24236-2	FSS2TMW-1216	122	119	9 Q	4 Q
320-24236-2 - DL	FSS2TMW-1216	129	129	149	54
320-24236-2 - DL2	FSS2TMW-1216			116	119
320-24236-3	FFTA2TMW-1216	118	106	38	
320-24236-3 - DL	FFTA2TMW-1216	126	123	115	125
320-24236-3 MS	FFTA2TMW-1216	111	106	41	99
320-24236-3 MS - DL	FFTA2TMW-1216	123	119	119	122
320-24236-3 MSD	FFTA2TMW-1216	111	102	43	
320-24236-3 MSD - DL	FFTA2TMW-1216	131	125	125	127
320-24236-4	FB120816	143	134	135	
320-24236-4 - RA	FB120816				128
320-24236-5	EBWC120816-a	125	117	127	
320-24236-5 - RA	EBWC120816-a				131
320-24236-6	EBWC120816-b	124	112	125	
320-24236-6 - RA	EBWC120816-b				132
320-24236-7	EBDPT120816-a	133	123	130	

Isotope Dilution Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)			
		3C2 PFUn	3C2 PFDo	3O2 PFHx	3C4 PFOS
Lab Sample ID	**Client Sample ID**	**(25-150)**	**(25-150)**	**(25-150)**	**(25-150)**
320-24236-7 - RA	EBDPT120816-a				118
320-24236-8	EBDPT120816-b	134	122	124	121
320-24236-9	FFTA4TMW-1216	135	116	25	130
320-24236-9 - DL	FFTA4TMW-1216	151 Q	150	138	136
320-24236-10	FFTA4TMW-1216-D	133	122	24 Q	124
320-24236-10 - DL	FFTA4TMW-1216-D	172 Q	161 Q	138	133
LCS 320-142967/2-A	Lab Control Sample	119	114	128	128
LCS 320-142967/2-A - RA	Lab Control Sample				126
MB 320-142967/1-A	Method Blank	127	112	130	126
MB 320-142967/1-A - RA	Method Blank				113

Surrogate Legend

13C8 FOSA = 13C8 FOSA
13C4 PFBA = 13C4 PFBA
13C5-PFPeA = 13C5-PFPeA
13C2 PFHxA = 13C2 PFHxA
13C4-PFHpA = 13C4-PFHpA
13C4 PFOA = 13C4 PFOA
13C5 PFNA = 13C5 PFNA
13C2 PFDA = 13C2 PFDA
13C2 PFUnA = 13C2 PFUnA
13C2 PFDoA = 13C2 PFDoA
18O2 PFHxS = 18O2 PFHxS
13C4 PFOS = 13C4 PFOS

Method: 537 (Modified) - Perfluorinated Hydrocarbons

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	0.0010	U	0.0025	0.00046	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoropentanoic acid (PFPeA)	0.0020	U	0.0025	0.00099	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanoic acid (PFHxA)	0.00147	J	0.0025	0.00079	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroheptanoic acid (PFHpA)	0.0020	U	0.0025	0.00080	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctanoic acid (PFOA)	0.00116	J	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorononanoic acid (PFNA)	0.0020	U	0.0025	0.00065	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanoic acid (PFDA)	0.0010	U	0.0025	0.00044	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluoroundecanoic acid (PFUnA)	0.0020	U	0.0025	0.00075	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorododecanoic acid (PFDoA)	0.0020	U	0.0025	0.00058	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotridecanoic Acid (PFTriA)	0.0020	U	0.0025	0.00055	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorotetradecanoic acid (PFTeA)	0.0010	U	0.0025	0.00040	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorobutanesulfonic acid (PFBS)	0.0020	U	0.0025	0.00092	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorohexanesulfonic acid (PFHxS)	0.000944	J	0.0025	0.00087	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorodecanesulfonic acid (PFDS)	0.0030	U	0.0040	0.0012	ug/L		12/19/16 14:38	12/29/16 00:06	1
Perfluorooctane Sulfonamide (FOSA)	0.0020	U	0.0025	0.00064	ug/L		12/19/16 14:38	12/29/16 00:06	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 FOSA	*64*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFBA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5-PFPeA	*137*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFHxA	*131*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4-PFHpA	*132*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOA	*133*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C5 PFNA	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDA	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFUnA	*127*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C2 PFDoA	*112*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
18O2 PFHxS	*130*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*
13C4 PFOS	*126*		*25 - 150*	*12/19/16 14:38*	*12/29/16 00:06*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.0400	0.0441		ug/L		110	60 - 140
Perfluoropentanoic acid (PFPeA)	0.0400	0.0422		ug/L		105	60 - 140
Perfluorohexanoic acid (PFHxA)	0.0400	0.0413		ug/L		103	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.0400	0.0418		ug/L		104	60 - 140
Perfluorooctanoic acid (PFOA)	0.0400	0.0406		ug/L		101	60 - 140
Perfluorononanoic acid (PFNA)	0.0400	0.0384		ug/L		96	60 - 140
Perfluorodecanoic acid (PFDA)	0.0400	0.0399		ug/L		100	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0400	0.0382		ug/L		95	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0400	0.0386		ug/L		96	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0400	0.0384		ug/L		96	50 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144253

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorotetradecanoic acid (PFTeA)	0.0400	0.0478		ug/L		120	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.0354	0.0432		ug/L		122	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	0.0364	0.0397		ug/L		109	60 - 140
Perfluorodecanesulfonic acid (PFDS)	0.0386	0.0385		ug/L		100	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.0400	0.0384		ug/L		96	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C8 FOSA	*62*		*25 - 150*
13C4 PFBA	*131*		*25 - 150*
13C5-PFPeA	*132*		*25 - 150*
13C2 PFHxA	*126*		*25 - 150*
13C4-PFHpA	*128*		*25 - 150*
13C4 PFOA	*127*		*25 - 150*
13C5 PFNA	*123*		*25 - 150*
13C2 PFDA	*127*		*25 - 150*
13C2 PFUnA	*119*		*25 - 150*
13C2 PFDoA	*114*		*25 - 150*
18O2 PFHxS	*128*		*25 - 150*
13C4 PFOS	*128*		*25 - 150*

Lab Sample ID: 320-24236-3 MS
Matrix: Water
Analysis Batch: 144253

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA)	0.31		0.0428	0.334	4	ug/L		62	60 - 140
Perfluoropentanoic acid (PFPeA)	0.58	E J	0.0428	0.582	E 4	ug/L		13	60 - 140
Perfluorohexanoic acid (PFHxA)	0.87	E J B	0.0428	0.852	E 4	ug/L		-37	60 - 140
Perfluoroheptanoic acid (PFHpA)	0.66	E J	0.0428	0.667	E 4	ug/L		10	60 - 140
Perfluorooctanoic acid (PFOA)	3.8	E J M	0.0428	3.73	E 4 M	ug/L		-104	60 - 140
Perfluorononanoic acid (PFNA)	0.029		0.0428	0.0667		ug/L		87	60 - 140
Perfluorodecanoic acid (PFDA)	0.017		0.0428	0.0503		ug/L		79	60 - 140
Perfluoroundecanoic acid (PFUnA)	0.0021	U	0.0428	0.0453		ug/L		106	60 - 140
Perfluorododecanoic acid (PFDoA)	0.0021	U	0.0428	0.0427		ug/L		100	60 - 140
Perfluorotridecanoic Acid (PFTriA)	0.0021	U	0.0428	0.0436		ug/L		102	50 - 150
Perfluorotetradecanoic acid (PFTeA)	0.00059	J J	0.0428	0.0633		ug/L		147	50 - 150
Perfluorobutanesulfonic acid (PFBS)	0.26		0.0378	0.299	4	ug/L		115	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	2.5	E J	0.0389	2.34	E 4	ug/L		-345	60 - 140
Perfluorooctanesulfonic acid (PFOS)	1.2	Q E J	0.0397	0.701	E 4	ug/L		-1329	60 - 140

Method: 537 (Modified) - Perfluorinated Hydrocarbons (Continued)

Lab Sample ID: 320-24236-3 MS
Matrix: Water
Analysis Batch: 144253

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorodecanesulfonic acid (PFDS)	0.0031	U	0.0412	0.0513		ug/L		124	50 - 150
Perfluorooctane Sulfonamide (FOSA)	0.088	J	0.0428	0.0780	J	ug/L		-24	60 - 140

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C8 FOSA	*3*	*Q*	*25 - 150*
13C4 PFBA	*34*		*25 - 150*
13C5-PFPeA	*66*		*25 - 150*
13C2 PFHxA	*70*		*25 - 150*
13C4-PFHpA	*43*		*25 - 150*
13C4 PFOA	*33*		*25 - 150*
13C5 PFNA	*83*		*25 - 150*
13C2 PFDA	*112*		*25 - 150*
13C2 PFUnA	*111*		*25 - 150*
13C2 PFDoA	*106*		*25 - 150*
18O2 PFHxS	*41*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*

Lab Sample ID: 320-24236-3 MSD
Matrix: Water
Analysis Batch: 144253

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	0.31		0.0424	0.341	4	ug/L		78	60 - 140	2	30
Perfluoropentanoic acid (PFPeA)	0.58	E J	0.0424	0.569	E 4	ug/L		-18	60 - 140	2	30
Perfluorohexanoic acid (PFHxA)	0.87	E J B	0.0424	0.835	E 4	ug/L		-78	60 - 140	2	30
Perfluoroheptanoic acid (PFHpA)	0.66	E J	0.0424	0.649	E 4	ug/L		-32	60 - 140	3	30
Perfluorooctanoic acid (PFOA)	3.8	E J M	0.0424	3.62	E 4 M	ug/L		-353	60 - 140	3	30
Perfluorononanoic acid (PFNA)	0.029		0.0424	0.0649		ug/L		84	60 - 140	3	30
Perfluorodecanoic acid (PFDA)	0.017		0.0424	0.0508		ug/L		81	60 - 140	1	30
Perfluoroundecanoic acid (PFUnA)	0.0021	U	0.0424	0.0451		ug/L		106	60 - 140	0	30
Perfluorododecanoic acid (PFDoA)	0.0021	U	0.0424	0.0461		ug/L		109	60 - 140	8	30
Perfluorotridecanoic Acid (PFTriA)	0.0021	U	0.0424	0.0484		ug/L		114	50 - 150	10	30
Perfluorotetradecanoic acid (PFTeA)	0.00059	J J	0.0424	0.0697	J	ug/L		163	50 - 150	10	30
Perfluorobutanesulfonic acid (PFBS)	0.26		0.0375	0.298	4	ug/L		112	50 - 150	1	30
Perfluorohexanesulfonic acid (PFHxS)	2.5	E J	0.0386	2.24	E 4	ug/L		-590	60 - 140	4	30
Perfluorooctanesulfonic acid (PFOS)	1.2	Q E J	0.0393	0.577	E 4	ug/L		-1658	60 - 140	19	30
Perfluorodecanesulfonic acid (PFDS)	0.0031	U	0.0408	0.0503		ug/L		123	50 - 150	2	30
Perfluorooctane Sulfonamide (FOSA)	0.088	J	0.0424	0.0723	J	ug/L		-38	60 - 140	8	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C8 FOSA	3	Q	25 - 150
13C4 PFBA	34		25 - 150
13C5-PFPeA	67		25 - 150
13C2 PFHxA	72		25 - 150
13C4-PFHpA	45		25 - 150
13C4 PFOA	33		25 - 150
13C5 PFNA	88		25 - 150
13C2 PFDA	107		25 - 150
13C2 PFUnA	111		25 - 150
13C2 PFDoA	102		25 - 150
18O2 PFHxS	43		25 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL

Lab Sample ID: 320-24236-3 MS — **Client Sample ID: FFTA2TMW-1216**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 144510 — **Prep Batch: 142967**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanoic acid (PFBA) - DL	0.31	D	0.0428	0.346	D 4	ug/L		87	60 - 140
Perfluoropentanoic acid (PFPeA) - DL	1.0	D J	0.0428	0.992	D 4	ug/L		-22	60 - 140
Perfluorohexanoic acid (PFHxA) - DL	1.7	D B J	0.0428	1.66	D 4	ug/L		-73	60 - 140
Perfluoroheptanoic acid (PFHpA) - DL	0.74	D J	0.0428	0.753	D 4	ug/L		41	60 - 140
Perfluorooctanoic acid (PFOA) - DL	7.1	D M J	0.0428	6.84	D M 4	ug/L		-545	60 - 140
Perfluorononanoic acid (PFNA) - DL	0.030	J D	0.0428	0.0660	D	ug/L		83	60 - 140
Perfluorodecanoic acid (PFDA) - DL	0.016	J D	0.0428	0.0472	J D	ug/L		73	60 - 140
Perfluoroundecanoic acid (PFUnA) - DL	0.041	U	0.0428	0.0450	J D	ug/L		105	60 - 140
Perfluorododecanoic acid (PFDoA) - DL	0.041	U	0.0428	0.0437	J D	ug/L		102	60 - 140
Perfluorotridecanoic Acid (PFTriA) - DL	0.041	U	0.0428	0.0411	J D	ug/L		96	50 - 150
Perfluorotetradecanoic acid (PFTeA) - DL	0.021	U	0.0428	0.0544	D	ug/L		127	50 - 150
Perfluorobutanesulfonic acid (PFBS) - DL	0.13	D	0.0378	0.177	D	ug/L		114	50 - 150
Perfluorohexanesulfonic acid (PFHxS) - DL	5.0	D J	0.0389	4.73	D M 4	ug/L		-747	60 - 140
Perfluorooctanesulfonic acid (PFOS) - DL	1.3	D J	0.0397	0.695	D 4	ug/L		-1640	60 - 140
Perfluorodecanesulfonic acid (PFDS) - DL	0.062	U	0.0412	0.0399	J D	ug/L		97	50 - 150
Perfluorooctane Sulfonamide (FOSA) - DL	0.087	D J	0.0428	0.0716	D J	ug/L		-37	60 - 140

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C8 FOSA - DL	3	Q	25 - 150
13C4 PFBA - DL	117		25 - 150
13C5-PFPeA - DL	141		25 - 150
13C2 PFHxA - DL	119		25 - 150
13C4-PFHpA - DL	102		25 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Lab Sample ID: 320-24236-3 MS
Matrix: Water
Analysis Batch: 144510

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4 PFOA - DL	96		25 - 150
13C5 PFNA - DL	129		25 - 150
13C2 PFDA - DL	124		25 - 150
13C2 PFUnA - DL	123		25 - 150
13C2 PFDoA - DL	119		25 - 150
18O2 PFHxS - DL	119		25 - 150
13C4 PFOS - DL	122		25 - 150

Lab Sample ID: 320-24236-3 MSD
Matrix: Water
Analysis Batch: 144510

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA) - DL	0.31	D	0.0424	0.347	D 4	ug/L		89	60 - 140	0	30
Perfluoropentanoic acid (PFPeA) - DL	1.0	D J	0.0424	0.982	D 4	ug/L		-46	60 - 140	1	30
Perfluorohexanoic acid (PFHxA) - DL	1.7	D B J	0.0424	1.65	D 4	ug/L		-110	60 - 140	1	30
Perfluoroheptanoic acid (PFHpA) - DL	0.74	D J	0.0424	0.743	D 4	ug/L		16	60 - 140	1	30
Perfluorooctanoic acid (PFOA) - DL	7.1	D M J	0.0424	6.88	D M 4	ug/L		-441	60 - 140	1	30
Perfluorononanoic acid (PFNA) - DL	0.030	J D	0.0424	0.0658	D	ug/L		84	60 - 140	0	30
Perfluorodecanoic acid (PFDA) - DL	0.016	J D	0.0424	0.0499	J D	ug/L		80	60 - 140	6	30
Perfluoroundecanoic acid (PFUnA) - DL	0.041	U	0.0424	0.0449	J D	ug/L		106	60 - 140	0	30
Perfluorododecanoic acid (PFDoA) - DL	0.041	U	0.0424	0.0448	J D	ug/L		106	60 - 140	3	30
Perfluorotridecanoic Acid (PFTriA) - DL	0.041	U	0.0424	0.0406	J D	ug/L		96	50 - 150	1	30
Perfluorotetradecanoic acid (PFTeA) - DL	0.021	U	0.0424	0.0581	D	ug/L		137	50 - 150	7	30
Perfluorobutanesulfonic acid (PFBS) - DL	0.13	D	0.0375	0.182	D	ug/L		128	50 - 150	3	30
Perfluorohexanesulfonic acid (PFHxS) - DL	5.0	D J	0.0386	4.67	D M 4	ug/L		-905	60 - 140	1	30
Perfluorooctanesulfonic acid (PFOS) - DL	1.3	D J	0.0393	0.577	D 4	ug/L		-1957	60 - 140	19	30
Perfluorodecanesulfonic acid (PFDS) - DL	0.062	U	0.0408	0.0420	J D	ug/L		103	50 - 150	5	30
Perfluorooctane Sulfonamide (FOSA) - DL	0.087	D J	0.0424	0.0749	D J	ug/L		-30	60 - 140	4	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C8 FOSA - DL	3	Q	25 - 150
13C4 PFBA - DL	126		25 - 150
13C5-PFPeA - DL	149		25 - 150
13C2 PFHxA - DL	129		25 - 150
13C4-PFHpA - DL	108		25 - 150

Method: 537 (Modified) - Perfluorinated Hydrocarbons - DL (Continued)

Lab Sample ID: 320-24236-3 MSD
Matrix: Water
Analysis Batch: 144510

Client Sample ID: FFTA2TMW-1216
Prep Type: Total/NA
Prep Batch: 142967

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFOA - DL	*100*		*25 - 150*
13C5 PFNA - DL	*138*		*25 - 150*
13C2 PFDA - DL	*131*		*25 - 150*
13C2 PFUnA - DL	*131*		*25 - 150*
13C2 PFDoA - DL	*125*		*25 - 150*
18O2 PFHxS - DL	*125*		*25 - 150*
13C4 PFOS - DL	*127*		*25 - 150*

Method: 537 (Modified) - Perfluorinated Hydrocarbons - RA

Lab Sample ID: MB 320-142967/1-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 142967

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS) - RA	0.0030	U	0.0040	0.0013	ug/L		12/19/16 14:38	12/30/16 16:11	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS - RA	*113*		*25 - 150*	*12/19/16 14:38*	*12/30/16 16:11*	*1*

Lab Sample ID: LCS 320-142967/2-A
Matrix: Water
Analysis Batch: 144510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 142967

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS) - RA	0.0371	0.0511		ug/L		138	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOS - RA	*126*		*25 - 150*

QC Association Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

LCMS

Prep Batch: 142967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-1	FSS6TMW-1216	Total/NA	Water	3535	
320-24236-1 - DL	FSS6TMW-1216	Total/NA	Water	3535	
320-24236-2 - DL	FSS2TMW-1216	Total/NA	Water	3535	
320-24236-2 - DL2	FSS2TMW-1216	Total/NA	Water	3535	
320-24236-2	FSS2TMW-1216	Total/NA	Water	3535	
320-24236-3	FFTA2TMW-1216	Total/NA	Water	3535	
320-24236-3 - DL	FFTA2TMW-1216	Total/NA	Water	3535	
320-24236-4 - RA	FB120816	Total/NA	Water	3535	
320-24236-4	FB120816	Total/NA	Water	3535	
320-24236-5 - RA	EBWC120816-a	Total/NA	Water	3535	
320-24236-5	EBWC120816-a	Total/NA	Water	3535	
320-24236-6 - RA	EBWC120816-b	Total/NA	Water	3535	
320-24236-6	EBWC120816-b	Total/NA	Water	3535	
320-24236-7	EBDPT120816-a	Total/NA	Water	3535	
320-24236-7 - RA	EBDPT120816-a	Total/NA	Water	3535	
320-24236-8	EBDPT120816-b	Total/NA	Water	3535	
320-24236-9 - DL	FFTA4TMW-1216	Total/NA	Water	3535	
320-24236-9	FFTA4TMW-1216	Total/NA	Water	3535	
320-24236-10 - DL	FFTA4TMW-1216-D	Total/NA	Water	3535	
320-24236-10	FFTA4TMW-1216-D	Total/NA	Water	3535	
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	3535	
MB 320-142967/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	3535	
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	3535	
320-24236-3 MS	FFTA2TMW-1216	Total/NA	Water	3535	
320-24236-3 MS - DL	FFTA2TMW-1216	Total/NA	Water	3535	
320-24236-3 MSD	FFTA2TMW-1216	Total/NA	Water	3535	
320-24236-3 MSD - DL	FFTA2TMW-1216	Total/NA	Water	3535	

Analysis Batch: 144253

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-1	FSS6TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-2	FSS2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-3	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-4	FB120816	Total/NA	Water	537 (Modified)	142967
320-24236-5	EBWC120816-a	Total/NA	Water	537 (Modified)	142967
320-24236-6	EBWC120816-b	Total/NA	Water	537 (Modified)	142967
320-24236-7	EBDPT120816-a	Total/NA	Water	537 (Modified)	142967
320-24236-8	EBDPT120816-b	Total/NA	Water	537 (Modified)	142967
320-24236-9	FFTA4TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-10	FFTA4TMW-1216-D	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A	Lab Control Sample	Total/NA	Water	537 (Modified)	142967
320-24236-3 MS	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-3 MSD	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 144510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-2 - DL	FSS2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-3 - DL	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-4 - RA	FB120816	Total/NA	Water	537 (Modified)	142967

LCMS (Continued)

Analysis Batch: 144510 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-5 - RA	EBWC120816-a	Total/NA	Water	537 (Modified)	142967
320-24236-6 - RA	EBWC120816-b	Total/NA	Water	537 (Modified)	142967
320-24236-7 - RA	EBDPT120816-a	Total/NA	Water	537 (Modified)	142967
MB 320-142967/1-A - RA	Method Blank	Total/NA	Water	537 (Modified)	142967
LCS 320-142967/2-A - RA	Lab Control Sample	Total/NA	Water	537 (Modified)	142967
320-24236-3 MS - DL	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-3 MSD - DL	FFTA2TMW-1216	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 144867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-1 - DL	FSS6TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-9 - DL	FFTA4TMW-1216	Total/NA	Water	537 (Modified)	142967
320-24236-10 - DL	FFTA4TMW-1216-D	Total/NA	Water	537 (Modified)	142967

Analysis Batch: 145022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-2 - DL2	FSS2TMW-1216	Total/NA	Water	537 (Modified)	145739

Cleanup Batch: 145739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-24236-2 - DL2	FSS2TMW-1216	Total/NA	Water	Dilution	142967

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: FSS6TMW-1216 — Lab Sample ID: 320-24236-1

Date Collected: 12/08/16 09:30 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			245.3 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 01:37	TTP	TAL SAC
Total/NA	Prep	3535	DL		245.3 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			144867	01/03/17 16:58	SBC	TAL SAC

Client Sample ID: FSS2TMW-1216 — Lab Sample ID: 320-24236-2

Date Collected: 12/08/16 11:35 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			253 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 01:44	TTP	TAL SAC
Total/NA	Prep	3535	DL		253 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	200			144510	12/30/16 12:48	CBW	TAL SAC
Total/NA	Prep	3535	DL2		253 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Cleanup	Dilution	DL2		0.075 uL	300 uL	145739	12/19/16 14:38	TTP	TAL SAC
Total/NA	Analysis	537 (Modified)	DL2	1			145022	01/04/17 21:40	SBC	TAL SAC

Client Sample ID: FFTA2TMW-1216 — Lab Sample ID: 320-24236-3

Date Collected: 12/08/16 12:40 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			241.5 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 01:52	TTP	TAL SAC
Total/NA	Prep	3535	DL		241.5 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	20			144510	12/30/16 14:26	CBW	TAL SAC

Client Sample ID: FB120816 — Lab Sample ID: 320-24236-4

Date Collected: 12/08/16 13:20 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.2 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 02:14	TTP	TAL SAC
Total/NA	Prep	3535	RA		279.2 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			144510	12/30/16 14:49	CBW	TAL SAC

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: EBWC120816-a — Lab Sample ID: 320-24236-5

Date Collected: 12/08/16 07:50 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			259.2 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 02:22	TTP	TAL SAC
Total/NA	Prep	3535	RA		259.2 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			144510	12/30/16 16:34	CBW	TAL SAC

Client Sample ID: EBWC120816-b — Lab Sample ID: 320-24236-6

Date Collected: 12/08/16 09:20 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			241.5 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 02:29	TTP	TAL SAC
Total/NA	Prep	3535	RA		241.5 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			144510	12/30/16 16:41	CBW	TAL SAC

Client Sample ID: EBDPT120816-a — Lab Sample ID: 320-24236-7

Date Collected: 12/08/16 08:10 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			266.1 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 02:37	TTP	TAL SAC
Total/NA	Prep	3535	RA		266.1 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	RA	1			144510	12/30/16 16:49	CBW	TAL SAC

Client Sample ID: EBDPT120816-b — Lab Sample ID: 320-24236-8

Date Collected: 12/08/16 09:30 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			273 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 02:59	TTP	TAL SAC

Client Sample ID: FFTA4TMW-1216 — Lab Sample ID: 320-24236-9

Date Collected: 12/08/16 14:10 — **Matrix: Water**
Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.1 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 03:07	TTP	TAL SAC
Total/NA	Prep	3535	DL		261.1 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			144867	01/03/17 17:06	SBC	TAL SAC

Lab Chronicle

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Client Sample ID: FFTA4TMW-1216-D

Lab Sample ID: 320-24236-10

Date Collected: 12/08/16 00:00

Matrix: Water

Date Received: 12/09/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.7 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)		1			144253	12/29/16 03:14	TTP	TAL SAC
Total/NA	Prep	3535	DL		260.7 mL	0.5 mL	142967	12/19/16 14:38	VPM	TAL SAC
Total/NA	Analysis	537 (Modified)	DL	100			144867	01/03/17 17:13	SBC	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Laboratory: TestAmerica Sacramento

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Oregon	NELAP	10	4040	01-28-18

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (Modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (Modified)	3535	Water	Perfluorobutanoic acid (PFBA)
537 (Modified)	3535	Water	Perfluorodecanesulfonic acid (PFDS)
537 (Modified)	3535	Water	Perfluorodecanoic acid (PFDA)
537 (Modified)	3535	Water	Perfluorododecanoic acid (PFDoA)
537 (Modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (Modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (Modified)	3535	Water	Perfluorohexanoic acid (PFHxA)
537 (Modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (Modified)	3535	Water	Perfluorooctane Sulfonamide (FOSA)
537 (Modified)	3535	Water	Perfluorooctanesulfonic acid (PFOS)
537 (Modified)	3535	Water	Perfluorooctanoic acid (PFOA)
537 (Modified)	3535	Water	Perfluoropentanoic acid (PFPeA)
537 (Modified)	3535	Water	Perfluorotetradecanoic acid (PFTeA)
537 (Modified)	3535	Water	Perfluorotridecanoic Acid (PFTriA)
537 (Modified)	3535	Water	Perfluoroundecanoic acid (PFUnA)

Method Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Method	Method Description	Protocol	Laboratory
537 (Modified)	Perfluorinated Hydrocarbons	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: EnSafe, Inc.
Project/Site: PFAS, NAS Dallas

TestAmerica Job ID: 320-24236-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-24236-1	FSS6TMW-1216	Water	12/08/16 09:30	12/09/16 09:50
320-24236-2	FSS2TMW-1216	Water	12/08/16 11:35	12/09/16 09:50
320-24236-3	FFTA2TMW-1216	Water	12/08/16 12:40	12/09/16 09:50
320-24236-4	FB120816	Water	12/08/16 13:20	12/09/16 09:50
320-24236-5	EBWC120816-a	Water	12/08/16 07:50	12/09/16 09:50
320-24236-6	EBWC120816-b	Water	12/08/16 09:20	12/09/16 09:50
320-24236-7	EBDPT120816-a	Water	12/08/16 08:10	12/09/16 09:50
320-24236-8	EBDPT120816-b	Water	12/08/16 09:30	12/09/16 09:50
320-24236-9	FFTA4TMW-1216	Water	12/08/16 14:10	12/09/16 09:50
320-24236-10	FFTA4TMW-1216-D	Water	12/08/16 00:00	12/09/16 09:50

RESOLUTION CONSULTANTS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. ESB120816 | Page 1 of 1

Project Name: PFAs Groundwater Investigation | PO No. 21529 | Project No. 0000 12296 | Phase F1 FS

Site Location: NAS Dallas

CTO No. JM78 | RC Project Manager: Tom Wiberg

Sampler/Site Phone#

Lab Name: Test America Sacramento | Turnaround Time(specify): 21-Day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (mm/dd/yy)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	Field Filtered (Y/N)	Total No. of Containers (3)→	USEPA Method 537	Extra Volume for MS/MSD	HOLD
	FSS6TMW-1216	FSS6TMW	12/8/16	0930	WG	N	N	2	X		
	FSS2TMW-1216	FSS2TMW	12/8/16	1135	WG	N	N	2	X		
	FFTA2TMW-1216	FFTA2TMW	12/8/16	1240	WG	N	N	6	X	X	
	FB120816	—	12/8/16	1320	WQ	FB	N	2	X		
	~~EB120816~~ EBWC120816-a	—	12/8/16	0750	WQ	EB	N	2	X		
	EBWC120816-b	—	12/8/16	0920	WQ	EB	N	2	X		
	EBDPT120816-a	—	12/8/16	0810	WQ	EB	N	2	X		
	EBDPT120816-b	—	12/8/16	0930	WQ	EB	N	2	X		
	FFTA4TMW-1216	FFTA4TMW	12/8/16	1410	WG	N	N	2	X		
	FFTA4TMW-1216-D	—	12/8/16	—	WQ	FD	N	2	X		

320-24236 Chain of Custody

Field **Comments:** 4°

Lab **Comments:** Modified - 7 Day Hold 16 PFAs

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 TRRP Reporting	- no Preservative		1 [signature]	12/9/16	09:50
2 [signature]	12/9/2016	1530	2		
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____

Method of Shipment: Fed Ex

Airbill No:

Date Shipped: 12/8/16 0.2°

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) **Sample Type:** **AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) **Preservative added:** **HA**=Hydrochloric Acid, **NI**=Nitric Acid, **SH**=Sodium Hydroxide, **SA**=Sulfuric Acid, **ME**=Methanol, **SB**=sodium bisulfate, **ST**=Sodium Thiosulfate, If **NO preservative** added leave blank

Rev 5/12

Login Sample Receipt Checklist

Client: EnSafe, Inc.

Job Number: 320-24236-1

Login Number: 24236
List Number: 1
Creator: Edman, Connor M

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	