

Naval Facilities Engineering Systems Command Washington Washington, D.C.

#### **Final**

Basewide Site Inspection Report
Per- and Polyfluoroalkyl Substances
Buildings 215 and 217 – Engine Test Area
Hangar 2905 – Aircraft Prototype Facility
Hangar 2133 – Joint Strike Fighter Aircraft Hangar
Bronson Road: Aircraft Crash Site

Naval Air Station Patuxent River St. Mary's County, Maryland

October 2021



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October 2021

Prepared for NAVFAC Washington by CH2M HILL, Inc. Herndon, Virginia Contract N62470-16-D-9000 CTO 4256



# **Executive Summary**

Historical use of aqueous film-forming foam (AFFF) during fire and emergency response, testing, and training activities at Naval Air Station (NAS) Patuxent River has prompted the Department of the Navy (Navy) to conduct a per- and polyfluoroalkyl substances (PFAS) Site Inspection (SI) at the installation. PFAS are considered "emerging chemicals of environmental concern" by the U.S. Environmental Protection Agency (USEPA) and the Department of Defense (DoD). There are currently no legally enforceable federal or Maryland standards for PFAS.

The following objectives of the PFAS SI at NAS Patuxent River were identified in the Final *Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan (SAP), Naval Air Station Patuxent River, St. Mary's County, Maryland* (CH2M HILL, Inc. [CH2M], 2020), hereinafter referred to as the SAP:

- Determine whether PFAS (if present) were detected at concentrations that exceed the project action limits (PALs)<sup>2</sup> for soil, groundwater, surface water, and sediment at the confirmed or suspected release areas.
- Determine the potential for PFAS (if present) to migrate offsite.

Historical research and interviews with fire department and installation personnel completed for the Preliminary Assessment (PA) report for PFAS at NAS Patuxent River (CH2M, 2018) identified 16 areas of interest (AOIs) at the installation requiring additional investigation for PFAS. This PFAS SI report is focused on four of these AOIs: Buildings 215 and 217 – Engine Test Area (Buildings 215 and 217); Hangar 2905 – Aircraft Prototype Facility (Hangar 2905); Hangar 2133 – Joint Strike Fighter Aircraft Hangar (Hangar 2133); and Bronson Road: Aircraft Crash Site (Bronson Road). Based on the PA and subsequent SAP, the field investigation for the SI at these four AOIs was conducted in July and August 2020. This effort consisted of the installation of shallow temporary piezometers and co-located soil borings at locations where AFFF may have been used or released, collection of soil (surface and subsurface) and grab groundwater samples to determine whether PFAS releases occurred, collection of depth to water measurements at the newly installed temporary piezometers to estimate the direction of groundwater flow in the surficial aquifer, and collection of co-located surface water and sediment samples at one of the sites (Hangar 2133). The field investigation for the SI was performed in general accordance with the SAP (CH2M, 2020).

Laboratory analysis of soil samples collected at Buildings 215 and 217 indicated that perfluorooctanoic acid (PFOA) and/or perfluorooctanesulfonic acid (PFOS) were present in samples from six soil borings. PFOA was detected at three surface soil sample locations and three subsurface soil sample locations. PFOS was detected at five surface soil sample locations and one subsurface soil sample location. None of the detected PFOA and PFOS concentrations exceeded the corresponding PALs. Perfluorobutanesulfonic acid (PFBS) was not detected in soil samples at Buildings 215 and 217. Laboratory analysis of grab groundwater samples collected at Buildings 215 and 217 indicated that PFOA, PFOS, and PFBS were each present in samples from seven temporary piezometers, with detected PFOA concentrations exceeding the corresponding PAL at two grab groundwater sample locations. None of the detected PFOS and PFBS concentrations exceeded the corresponding PALs at Buildings 215 and 217.

Laboratory analysis of soil samples collected at Hangar 2905 indicated that PFOA and/or PFOS were present in samples from two soil borings. PFOA was detected at one subsurface soil sample location but no surface soil sample locations. PFOS was detected at one surface soil sample location but no subsurface soil sample locations. None of the detected PFOA and PFOS concentrations exceeded the corresponding PALs. PFBS was not detected in soil samples at Hangar 2905. Laboratory analysis of grab groundwater samples collected at Hangar 2905 indicated that PFOA, PFOS, and PFBS were each present in samples from seven temporary piezometers, with detected PFOA

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The most current version of DoD Instruction 4715.18 (DoD, 2019a) defines emerging chemicals of environmental concern as "Chemicals relevant to the DoD that are characterized by a perceived or real threat to human health or the environment and that have new or changing toxicity values or new or changing human health or environmental regulatory standards. Changes may be due to new science discoveries, detection capabilities, or exposure pathways."

The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

concentrations exceeding the corresponding PAL at two grab groundwater sample locations and detected PFOS concentrations exceeding the corresponding PAL at four grab groundwater sample locations. None of the detected PFBS concentrations exceeded the corresponding PAL at Hangar 2905.

Laboratory analysis of soil samples collected at Hangar 2133 indicated that PFOA and/or PFOS were present in samples from five soil borings. PFOA was detected at four surface soil sample locations and PFOS was detected at three surface soil sample locations, but there were no detections at subsurface soil sample locations. None of the detected PFOA and PFOS concentrations exceeded the corresponding PALs. PFBS was not detected in soil samples at Hangar 2133. Laboratory analysis of grab groundwater samples collected at Hangar 2133 indicated that PFOA, PFOS, and PFBS were each present in samples from six temporary piezometers, with detected PFOA concentrations exceeding the corresponding PAL at three grab groundwater sample locations and detected PFOS concentrations exceeded the corresponding PAL at one grab groundwater sample location. None of the detected PFBS concentrations exceeded the corresponding PAL at Hangar 2133. Laboratory analysis of two surface water samples collected at Hangar 2133 indicated that PFOA, PFOS, and PFBS were each present in both samples, although none of the detected concentrations exceeded the corresponding PALs. Laboratory analysis of two sediment samples collected at Hangar 2133 indicated that PFOA and/or PFOS were present in both samples. PFOA was detected in one sediment sample and PFOS was detected in both sediment samples, although the sediment detections were all low-level estimated concentrations that did not exceed the corresponding PALs. PFBS was not detected in sediment at Hangar 2133.

Laboratory analysis of soil samples collected at Bronson Road indicated that PFOA and/or PFOS were present in samples from five soil borings. PFOA was detected at three surface soil sample locations and one subsurface soil sample location, although none of the detected PFOA concentrations exceeded the corresponding PAL. PFOS was detected at five surface soil sample locations and three subsurface soil sample locations, with detected PFOS concentrations exceeding the corresponding PAL at one surface soil sample location. PFBS was not detected in soil samples at Bronson Road. Laboratory analysis of grab groundwater samples collected at Bronson Road indicated that PFOA, PFOS, and PFBS were each present in samples from seven temporary piezometers, with detected PFOA concentrations exceeding the corresponding PAL at four grab groundwater sample locations and detected PFOS concentrations exceeding the corresponding PAL at all seven grab groundwater sample locations. None of the detected PFBS concentrations exceeded the corresponding PAL at Bronson Road.

Groundwater flow is predominantly to the east at Buildings 215 and 217 in the direction of the Chesapeake Bay, to the southeast at Hangar 2905 in the direction of Pine Hill Run and Hangar 2133 in the direction of the Chesapeake Bay, and to the northeast at Bronson Road in the direction of Harper's Creek. At each site, there is the potential for migration of PFAS in the direction of groundwater flow. However, because all the sites included in this report are not located in proximity to the installation boundaries, migration off-installation in groundwater is not of concern at this time. There is no potential drinking water exposure because groundwater flow is not toward off-installation wells, the surficial aquifer at the installation is not used for drinking water on- or off-installation, and there are confining units isolating the aquifers used for drinking water.

This investigation demonstrated that PFAS are present in environmental media at levels exceeding screening values at the four identified AOIs where AFFF was reportedly released. It is recommended that Remedial Investigations (RIs) are conducted at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road to fully delineate the nature and extent of PFAS releases and assess potential human health and ecological risks. The RIs should include the collection and analysis of representative environmental media at each AOI, including the installation and sampling of permanent monitoring wells. Based on the resulting data, conceptual site models should be developed, including discussions of the fate and transport of PFAS at the AOIs. Further, quantitative human health risk assessments should be performed to evaluate risks to human health associated with potential exposure to PFAS detected in environmental media at the AOIs, and an ecological risk screening should be performed. Potential risks associated with PFAS should be evaluated within the applicable DoD, Navy, and/or USEPA policy, guidance, or directives using the state-of-the-science toxicological information available and current at the time the RI report is prepared.

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# Acronyms and Abbreviations

°C degree(s) Celsius °F degree(s) Fahrenheit

μg/kg microgram(s) per kilogram

AFFF aqueous film-forming foam

AOI area of interest

bgs below ground surface

Bronson Road: Aircraft Crash Site

Buildings 215 and 217 Buildings 215 and 217 – Engine Test Area

CH2M CH2M HILL, Inc.

CSM conceptual site model

DoD Department of Defense
DPT direct-push technology

ERS ecological risk screening

Hangar 2133 Hangar 2133 – Joint Strike Fighter Aircraft Hangar

Hangar 2905 — Aircraft Prototype Facility

HHRA human health risk assessment IDW investigation-derived waste

LC-MS/MS Liquid Chromatography Tandem Mass Spectrometry

MDE Maryland Department of the Environment
METCOM St. Mary's County Metropolitan Commission

mg/L milligram(s) per liter

mS/cm millisiemen(s) per centimeter

msl mean sea level mV millivolt(s)

NAS Naval Air Station

NAVFAC Naval Facilities Engineering Systems Command

Navy Department of the Navy ng/L nanogram(s) per liter

NTU nephelometric turbidity unit(s)

ORP oxidation-reduction potential

PA Preliminary Assessment
PAL project action limit

PFAS per- and polyfluoroalkyl substances
PFBS perfluorobutanesulfonic acid
PFOA perfluorooctanoic acid
PFOS perfluorooctanesulfonic acid

PVC polyvinyl chloride

QA/QC quality assurance/quality control

QSM Quality Systems Manual
RI Remedial Investigation

SAP Sampling and Analysis Plan

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BASEWIDE PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION REPORT – BUILDINGS 215 AND 217, HANGAR 2905, HANGAR 2133, BRONSON ROAD NAVAL AIR STATION PATUXENT RIVER, ST. MARY'S COUNTY, MARYLAND

SI Site Inspection

SOP standard operating procedure

UCMR3 Third Unregulated Contaminant Monitoring Rule

USEPA U.S. Environmental Protection Agency

USGS U.S. Geological Survey

WWTP wastewater treatment plant

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# Introduction

This report presents the data and findings obtained from a per- and polyfluoroalkyl substances (PFAS) Site Inspection (SI) conducted at Naval Air Station (NAS) Patuxent River (also referred to as installation). PFAS are considered "emerging chemicals of environmental concern" by the U.S. Environmental Protection Agency (USEPA) and the Department of Defense (DoD).<sup>1</sup>

The following objectives of the PFAS SI at NAS Patuxent River were identified in the Final *Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan (SAP), Naval Air Station Patuxent River, St. Mary's County, Maryland* (CH2M HILL, Inc. [CH2M], 2020), hereinafter referred to as the SAP:

- Determine whether PFAS (if present) were detected at concentrations that exceed the project action limits (PALs)<sup>2</sup> for soil, groundwater, surface water, and sediment at the confirmed or suspected release areas.
- Determine the potential for PFAS (if present) to migrate offsite.

This report outlines the approach taken to achieve the listed objectives, provides conclusions based on data collected, and makes recommendations for further study. This report was prepared in accordance with Comprehensive Environmental Response, Compensation, and Liability Act requirements for the Department of the Navy (Navy), Naval Facilities Engineering Systems Command (NAVFAC) Washington, under the Comprehensive Long-term Environmental Action—Navy 9000 Program, Contract N62470-16-D-9000, Contract Task Order 4256, for submittal to the Navy (NAVFAC Washington), USEPA, and the Maryland Department of the Environment (MDE). The Navy, USEPA, and MDE work jointly as the NAS Patuxent River Tier 1 Partnering Team.

This report is organized as follows, with tables and figures provided at the end of each respective section and support information appended to the report as shown:

- Section 1 Introduction
- Section 2 Site Background and Physical Setting
- Section 3 Investigation Methodology
- Section 4 Investigation Results
- Section 5 Conclusions and Recommendations
- **Section 6** References
- Appendix A Survey Data
- Appendix B Investigation-Derived Waste Analytical Data, Waste Profiles, and Disposal Manifests
- Appendix C Data Quality Assessment
- Appendix D Laboratory Analytical Data

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The most current version of DoD Instruction 4715.18 (DoD, 2019a) defines emerging chemicals of environmental concern as "Chemicals relevant to the DoD that are characterized by a perceived or real threat to human health or the environment and that have new or changing toxicity values or new or changing human health or environmental regulatory standards. Changes may be due to new science discoveries, detection capabilities, or exposure pathways."

The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memo issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

# Site Background and Physical Setting

This section presents background information on NAS Patuxent River including applicable history and confirmed or suspected releases of PFAS, along with relevant information on the physical and hydrogeologic setting at the installation.

# 2.1 Site Background

NAS Patuxent River is located in St. Mary's County, Maryland, approximately 65 miles southeast of Washington D.C. (**Figure 2-1**). NAS Patuxent River was listed on the National Priorities List on June 30, 1994, and USEPA assigned NAS Patuxent River with USEPA Identification No. MD7170024536.

NAS Patuxent River encompasses approximately 7,900 acres, including both the primary installation parcel at the confluence of the Patuxent River and the Chesapeake Bay, and Webster Outlying Field annex, an outlying parcel located in St. Inigoes, Maryland, approximately 9 miles south of NAS Patuxent River. NAS Patuxent River contains buildings, runways, and infrastructure to support the NAS Patuxent River military mission, provide office space for Navy and civilian personnel, and provide housing for personnel posted to the installation. Several areas are used for recreational activities.

Interviews with fire department and installation personnel completed for the Preliminary Assessment (PA) report for PFAS at NAS Patuxent River (CH2M, 2018) identified 16 areas of interest (AOIs) requiring investigation as part of an SI due to confirmed or suspected releases of aqueous film-forming foam (AFFF). This PFAS SI report summarizes the outcome of SI activities at four of these AOIs (**Figure 2-2**): Buildings 215 and 217 – Engine Test Area (Buildings 215 and 217); Hangar 2905 – Aircraft Prototype Facility (Hangar 2905); Hangar 2133 – Joint Strike Fighter Aircraft Hangar (Hangar 2133); and Bronson Road: Aircraft Crash Site (Bronson Road). PFAS AOIs recommended for an SI in the PA but not included in this report are the subject of separate SI reports, which are being submitted in phases as per Partnering Team agreement for ease of review.

## 2.1.1 Buildings 215 and 217 Background

Buildings 215 and 217 are located in the southeast portion of the installation near the Chesapeake Bay Basin (Figures 2-2 and 2-3). The Engine Test Area between Building 215 (storage) and Building 217 (blast wall) is where the first potential reported use of AFFF for a fire occurred at NAS Patuxent River. In December 1970, an F-8 aircraft was being tested. The aircraft was chained to the ground to keep immobile while the jet engine was turned up for testing purposes. During the test, the engine and plane caught on fire. The Fire Department responded using AFFF to extinguish the fire. The release was not contained, and it was on a concrete apron. No other releases of AFFF have been documented in this area, and there is some uncertainty if protein foam or AFFF was used because 1970 was the approximate time the installation started using AFFF for emergency response (CH2M, 2018).

## 2.1.2 Hangar 2905 Background

Hangar 2905 is located in the south-central portion of the installation (**Figures 2-2** and **2-4**). The site is flat and is at an elevation of approximately 30 feet above mean sea level (msl). Hangar 2905 is an aircraft hangar used for research, test, and development purposes. Construction of the facility was completed in 2010 (Naval Air Warfare Center Aircraft Division, 2010). The facility is protected by a 750-gallon capacity trench-mounted AFFF fire suppression system. The system is charged with Chemguard 3 percent AFFF concentrate. The interior of the hangar was not observed during site visits due to access restrictions. The suppression system is equipped with automatic diversion to a 25,000-gallon AFFF retention tank. Reportedly, AFFF has never been released from the system within the hangar (CH2M, 2018).

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Two notable accidental releases have occurred within the fire suppression system mechanical room, one in May 2011, and another in November 2015. Both of these releases were 150 gallons of AFFF concentrate. The May 2011 release reportedly flowed into the floor drain, which discharged into the sanitary sewer system, and was then discharged to the St. Mary's County Metropolitan Commission (METCOM) wastewater treatment plant (WWTP). This event reportedly inundated the METCOM WWTP with foam. The floor drain was thereafter plugged to avoid recurrence. A similar release in 2015 occurred in this mechanical room; reportedly, AFFF concentrate was stopped from going down the drain and either never left the mechanical room or possibly flowed onto the ground outside (CH2M, 2018).

#### 2.1.3 Hangar 2133 Background

Hangar 2133 is located in the south-central portion of the installation, adjacent to Taxiway Echo (**Figures 2-2** and **2-5**). Hangar 2133 was built in 1933. The hangar is equipped with both overhead (water-only) and cannon (AFFF) fire suppression systems. Four 1,000-gallon tanks of Ansulite 3 percent AFFF concentrate supply the AFFF fire suppression system. The system was previously charged with 6 percent concentrate but was switched to 3 percent in approximately 2010 (CH2M, 2018).

Multiple inadvertent releases have occurred in the hangar. These releases occurred in November 2002, June 2005, and April 2010. During one of these incidents (date unknown), the cannon system for the entire hangar was activated inadvertently. The quantities of AFFF concentrate or foam for these releases are unknown. The 2010 release resulted in a notable quantity of foam to be sent to the sanitary sewer via the bypass valve of the oil/water separator, effectively "foaming" the METCOM WWTP. METCOM had to shut off sewage flow and manage the reactivated AFFF in all the aeration basins. An AFFF retention tank exists, but diversion to the tank is not automatic; it must be engaged using a T-valve that is located outside of the hangar bay doors. The collection system has never successfully been engaged during a release according to installation personnel. On at least one occasion, the AFFF has been intentionally pushed out the hangar bay doors and AFFF has come into contact with the grassy area southeast of the apron. Additionally, on at least two occasions, AFFF was observed down the stormwater culvert leading to the drainage ditch near Hangar 115 (CH2M, 2018).

### 2.1.4 Bronson Road Background

Bronson Road is located on the northern side of Runway 14-32 in the north-central portion of the installation and leads to Hangar 2805 (**Figures 2-2** and **2-6**). Bronson Road was the site of an F/A-18 Hornet crash in 1992. The pilot and copilot ejected from the aircraft, which then crashed and slid into a vehicle on the ground, killing the driver. Firefighters responded to the crash using AFFF from a crash truck. The one-time release was not contained, the amount of AFFF used is unknown, and the area consisted of asphalt, grass, and vegetation. No other releases of AFFF have been documented in this area (CH2M, 2018).

# 2.2 Physical Setting

This section describes the physical setting of NAS Patuxent River, including geologic features relevant to this investigation.

#### 2.2.1 Climate

The climate of St. Mary's County is moderated by its proximity to the Chesapeake Bay and the Atlantic Ocean. The climate is predominantly continental and is characterized by seasonal and daily fluctuations. According to the Maryland State Office of Climatology, the average winter temperature is 36.6 degrees Fahrenheit (°F), whereas the average summer temperature is 74.9°F. In St. Mary's County, the warmest and coldest months of the year are July (mean temperature of 77°F) and January (mean temperature of 35.5°F), respectively.

Annual precipitation averages 42 inches. July is typically the wettest month of the year, averaging 4.8 inches of precipitation. October is the driest month of the year, averaging 2.7 inches of precipitation. In general, precipitation is distributed evenly throughout the year.

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#### 2.2.2 Topography and Surface Drainage Features

Most of NAS Patuxent River is a flat plain that protrudes into the Chesapeake Bay at the mouth of the Patuxent River. Elevations in the lowland areas may be as high as 40 feet above msl but are typically less than 20 feet above msl. In the southwestern part of the installation, the land rises to an upland plateau, where elevations range from 40 to 120 feet above msl.

NAS Patuxent River is located in the Patuxent River basin. As shown on **Figure 2-2**, the majority of the streams that drain NAS Patuxent River are intermittent and originate northwest of State Highway 235. Streams that originate on the installation remain within the property boundaries and discharge into manmade ponds, the Patuxent River, or the Chesapeake Bay. A few small intermittent streams discharge primarily to Harper's Creek, Pearson Creek, or Goose Creek. Harper's Creek and Pearson Creek discharge into the Patuxent River, which is estuarine, in the vicinity of the installation. Goose Creek and Pine Hill Run discharge directly into the Chesapeake Bay. Manmade structures, such as aircraft runways and the stormwater drainage system, affect surface water flow. The stormwater drainage system consists of concrete storm sewers that receive surface water and groundwater seepage from a network of shallow roadside ditches, culverts, sub-drains, storm drains, associated laterals, and natural streams. Discharge points for the stormwater drainage system include onsite ponds, the Patuxent River, and the Chesapeake Bay.

Several broad wetland cover types have been identified at the installation. These include forested wetlands, scrub/shrub wetlands, saline marshes, freshwater tidal marshes, nontidal marshes, and open water/emergent wetlands. Five types of forests have been identified and include upland hardwoods, upland pine, bottomland pine, bottomland hardwood, and mixed forest. Approximately 37 percent of NAS Patuxent River is forested, with mature upland hardwoods and mixed pine/hardwood stands being the most common. Shrubs and young trees cover approximately 14 percent of NAS Patuxent River. Freshwater and saltwater marshes and open water habitats cover a little less than 9 percent of NAS Patuxent River.

Surface water drainage features are shown on the site layouts for Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road. As shown on **Figures 2-3** through **2-6**, the approximate surface water flow is generally to the east away from Buildings 215 and 217, radially away from Hangar 2905, toward the wetlands to the north and east and stormwater drainage area to the southeast surrounding Hangar 2133, and to the south at Bronson Road.

#### 2.2.3 Land Use

NAS Patuxent River contains buildings, runways, and infrastructure to support the military mission, provide office space for Navy and civilian personnel, and provide housing for personnel posted to the installation. Several areas are used for recreational activities. Creeks, ponds, forests, and beaches provide the opportunity for fishing, swimming, camping, and hunting at the installation. Although construction and other activities have disturbed approximately 3,000 acres since establishment of NAS Patuxent River in 1943, many of the disturbed areas have since been left fallow and are now covered with trees, shrubs, or tall grasses.

### 2.2.4 Geologic Setting

NAS Patuxent River is in the Coastal Plain physiographic province, approximately 50 miles southeast of the Piedmont physiographic province. The Coastal Plain sediments consist of a thick sequence of unconsolidated sand, clay, and gravel that dips gently (less than 1 degree) to the east and southeast (Fred C. Hart Associates, Inc., 1984). The thickness of the sedimentary units varies from approximately 2,000 feet in the northwestern part of St. Mary's County to 3,000 feet in the southeastern area of the county. Near NAS Patuxent River, the unconsolidated Coastal Plain sediments overlie crystalline rocks.

The Coastal Plain sediments range in age from Cretaceous to Recent. During the latter part of the Late Cretaceous and through Tertiary time, the sediments deposited were of estuarine and marine origin (Fred C. Hart Associates, Inc., 1984). The upper few hundred feet of sediments at NAS Patuxent River were deposited during the Tertiary (2 to 65 million years old) and Quaternary (up to 2 million years old) periods.

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The major regional geologic units for St. Mary's County are present near NAS Patuxent River. These units include some of the major water supply aquifers in the area. The uppermost geologic units are discussed as follows in order of increasing age (Chappelle and Drummond, 1983; McCartan, 1989):

The Lowland deposits consist of tan, gray, or greenish-gray stratified sand and gravel, clay, and silt. The
thickness of the unit ranges from 0 to 150 feet and averages 20 to 30 feet. Soil borings completed during
Remedial Investigation (RI) activities conducted for the Sites 1 and 12 Fishing Point Landfill (CH2M, 1998) and
the Site 4 Hermanville Landfill (CH2M, 2014) revealed 45 to 80 feet of sediments believed to correlate with
the Lowland deposits.

The Lowland deposits in southern St. Mary's County are reported to consist of three general units: (1) a thick basal sand and gravely sand; (2) a middle unit of thick clay that becomes silty and sandy in some areas; and (3) a surficial unit of fine to medium sand. This stratification is consistent with stratigraphy found at NAS Patuxent River, but the middle unit is a silty or clayey sand rather than a clay throughout most of the installation.

- The Upland deposits consist of tan to orange clay, silt, and sand. Included in the Upland deposits are the Chickamuxen Church Formation (tan to yellow-orange gravel and sand), the Park Hall Formation (silty sand and clay, interbedded with pebbles, cobbles, and boulders), and the Upland gravel unit (muddy sand grading to medium gravel, overlying well-sorted gravel and clean coarse sand). The thickness of the Upland deposits ranges from 10 to 60 feet near NAS Patuxent River (McCartan, 1989).
- Beneath the Upland and Lowland deposits is the Tertiary Chesapeake Group, which consists of three
  formations: the St. Mary's Formation, the Choptank Formation, and the Calvert Formation. The uppermost is
  the St. Mary's Formation, which consists of greenish-blue to yellowish-gray sandy clay and fine-grained clayey
  sand. The thickness of this unit ranges from 0 to 80 feet (Chappelle and Drummond, 1983). The predominant
  feature of the St. Mary's Formation is the presence of abundant oyster shells and shell hash.
  - The Choptank Formation underlies the St. Mary's Formation and consists of olive-gray to yellow sand, fine sandy silt, or silt and clay with prominent shell beds. The thickness of this unit ranges from 35 to 150 feet.
  - The Calvert Formation underlies the Choptank Formation. It consists of fossiliferous, slightly sandy greenish-gray silty clay. At the base of the Calvert Formation is the Fairhaven Member, a greenish-blue diatomaceous clay. The total thickness of the Calvert Formation ranges from 85 to 190 feet (McCartan, 1989).
- Beneath the Chesapeake Group is the Piney Point Formation, a gray to brownish-yellow, slightly glauconitic, medium- to coarse-grained sand. Near NAS Patuxent River, the top of the Piney Point Formation is approximately 240 to 250 feet below msl, and the unit ranges in thickness from 20 to 60 feet.
- Below the Piney Point Formation is the Nanjemoy Formation, a dark-green to gray, fine- to medium-grained
  glauconitic sand containing layers of shell fragments. Near NAS Patuxent River, the thickness ranges from 130
  to 170 feet. The top of the Nanjemoy Formation is found at approximately 270 feet below msl. The lower part
  of the Nanjemoy is olive-green silty clay.
- Between the Nanjemoy Formation and the deeper Aquia Formation lies the Marlboro Clay Formation, described as pink to silver-gray and plastic. The thickness of the Marlboro Clay ranges from 5 to 35 feet, thinning to the southeast.
- The Aquia Formation is located beneath the Nanjemoy Formation. It is described as a greenish- to yellow-brown, well-sorted glauconitic quartz sand containing localized carbonate shell beds. In the area of NAS Patuxent River, the Aquia Formation is approximately 125 to 150 feet thick. The top of the Aquia Formation is approximately 425 to 450 feet below msl near NAS Patuxent River (Chappelle and Drummond, 1983).

### 2.2.5 Hydrogeologic Setting

From shallowest to deepest, the aquifers of primary interest with respect to NAS Patuxent River are the surficial aquifer, the Piney Point-Nanjemoy aquifer, the Aquia aquifer, and the Patapsco aquifer.

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The surficial (water table) aquifer, the shallowest aquifer beneath NAS Patuxent River, occurs in the Lowland deposits (i.e., clay, silt, sand, and gravel), is unconfined, and ranges in thickness from 10 to 100 feet (U.S. Geological Survey [USGS], 2007). The St. Mary's Formation, as one formation of the low-permeability Chesapeake Group, functions primarily as a confining unit underlying the surficial aquifer. This confining unit is approximately 210 to 250 feet thick (USGS, 2007). The Piney Point-Nanjemoy, Aquia, and Upper Patapsco aquifers are deeper, confined aquifers below the St. Mary's Formation (Fred C. Hart Associates, Inc., 1984).

#### 2.2.6 Groundwater Flow

Groundwater from the surficial aquifer discharges to surface water bodies at NAS Patuxent River, including ponds, streams, the Patuxent River, and the Chesapeake Bay. The groundwater flow direction for the surficial aquifer across the installation is predominately to the northeast and southeast toward the Patuxent River and the Chesapeake Bay. The surficial aquifer is recharged by precipitation and infiltration. The groundwater flow direction for the Piney Point-Nanjemoy and Aquia aquifers is predominately toward the northeast and east at NAS Patuxent River (USGS, 2001). Site-specific groundwater flow data collected as part of this investigation are discussed in more detail in **Section 3**.

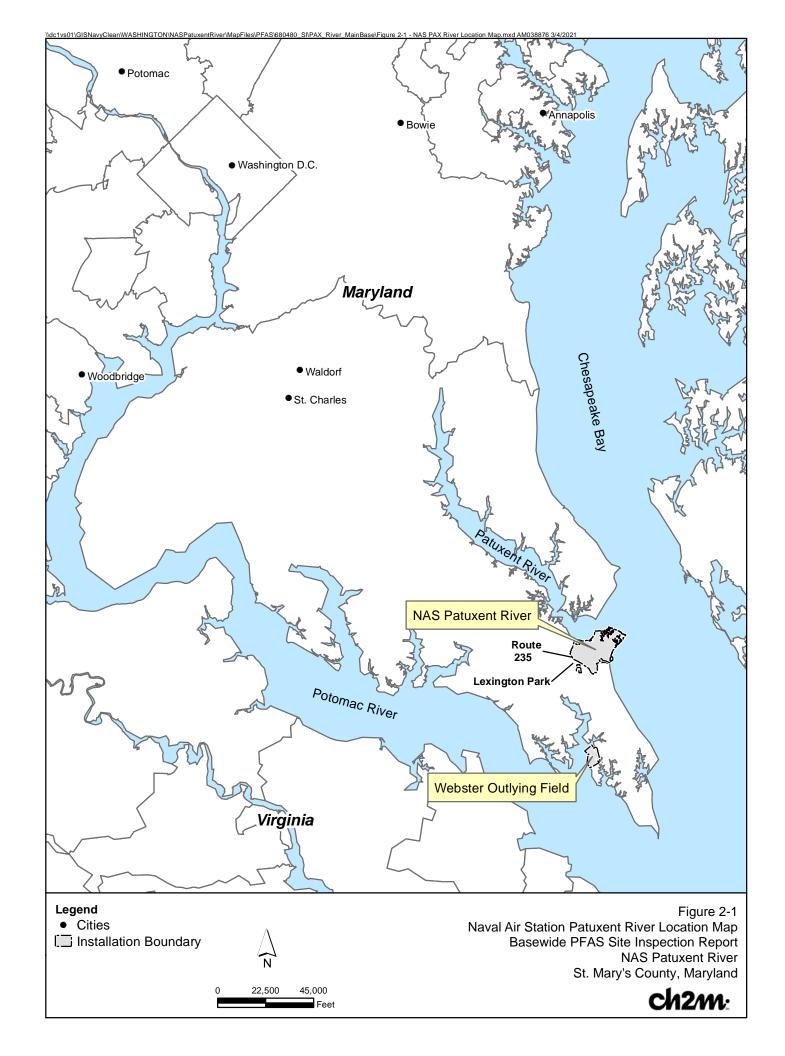
#### 2.2.7 Drinking Water

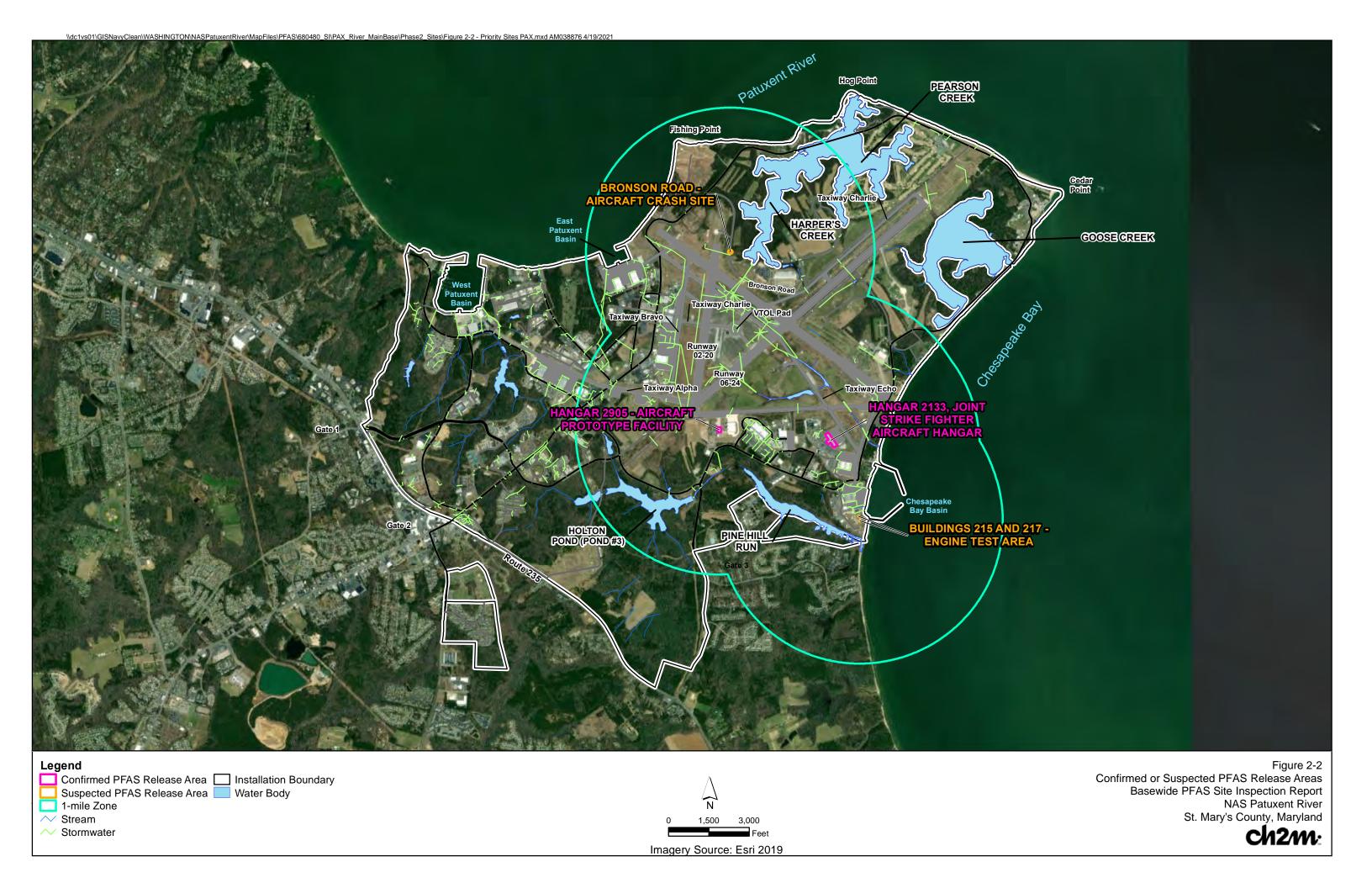
Water for drinking and industrial use at NAS Patuxent River is obtained from groundwater withdrawals from 24 production wells across the installation; however, no water production wells are installed in the surficial aquifer at the installation because such wells are not permitted by the St. Mary's County Health Department. All known properties with private drinking water wells are located off-installation and upgradient of confirmed or suspected PFAS release areas at the installation. Based on the PA report for PFAS at NAS Patuxent River (CH2M, 2018), there is no drinking water exposure from shallow groundwater at or within 1 mile of the installation.

Nineteen of the 24 production wells within the installation boundary are installed in the Aquia aguifer, with intake depths greater than 500 feet. Four of the wells are in the shallower Piney Point-Nanjemoy aquifer, with intake depths between 284 and 357 feet. Finally, one production well is installed in the Upper Patapsco aquifer at a depth greater than 900 feet. The production wells are used by the installation as either independent supply or community supply. Independent supply wells only provide water to one or two buildings at or adjacent to the production well location. Community supply wells are separated into three zones (Zones A, B, and C) and are all connected to the main water supply for the installation. Wells in the three zones can all be connected or isolated by valves to supply water. The installation has 18 community supply wells and 6 independent supply wells. In December 2014 and June 2015, 15 of the 24 production wells used in the public water system network at NAS Patuxent River were sampled at the well heads and before any combining into the main water supply system under the Third Unregulated Contaminant Monitoring Rule (UCMR3) (USEPA, 2012); none of the six PFAS analyzed for (perfluorooctanoic acid [PFOA], perfluorooctanesulfonic acid [PFOS], perfluorobutanesulfonic acid [PFBS], perfluorononanoic acid, perfluorohexanesulfonic acid, and perfluoroheptanoic acid) were detected during the sampling effort, as indicated in the PA report for PFAS at NAS Patuxent River (CH2M, 2018). According to installation personnel, the other nine production wells do not meet the criteria as public water supply wells, and therefore were not sampled as part of UCMR3. In addition, three public water supply wells in adjacent Lexington Park were sampled as part of UCMR3 in 2015. The same six PFAS were analyzed for and none of them were detected in the Lexington Park samples, as indicated in the PA report for PFAS at NAS Patuxent River (CH2M, 2018). The same 15 production wells at NAS Patuxent River were sampled again in December 2020 per DoD policy (DoD, 2020), and the samples were analyzed for 18 PFAS (including PFOA, PFOS, and PFBS) by USEPA Drinking Water Method 537.1; none of the 18 PFAS were detected.

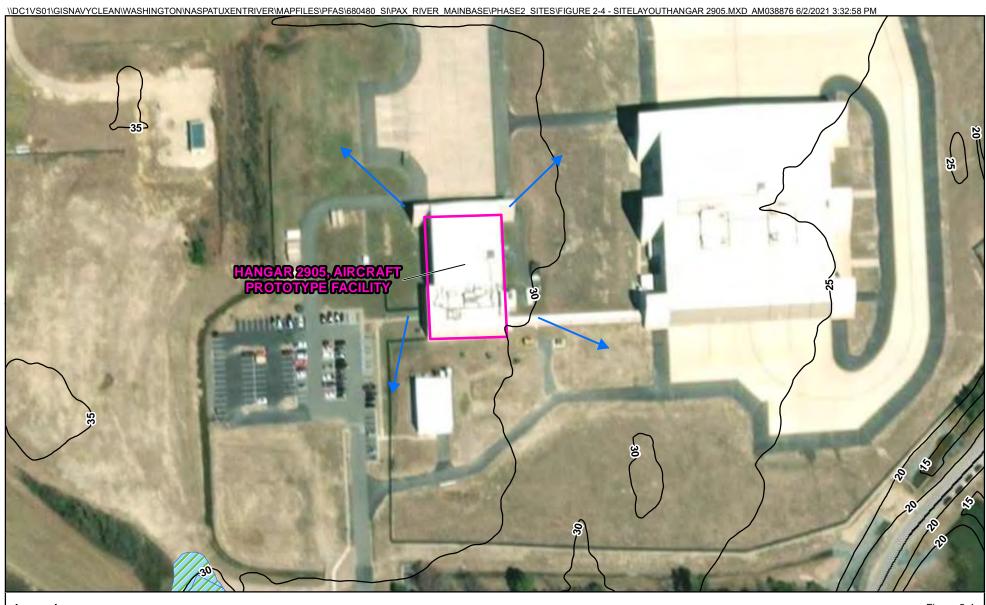
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As stated in a letter from the St. Mary's County Health Department, "...With the exception of Amish and Mennonite properties, the construction of shallow surface wells for drinking water has not been permitted in St. Mary's County since 1976" (correspondence dated December 1, 1998, from A. Rose, St. Mary's County Health Department to R. Tarr, NAS Patuxent River). There are no Amish or Mennonite properties with wells within one mile of the boundary of NAS Patuxent River.









#### Legend

Confirmed PFAS Release Area

→ Approximate Surface Water Flow Direction

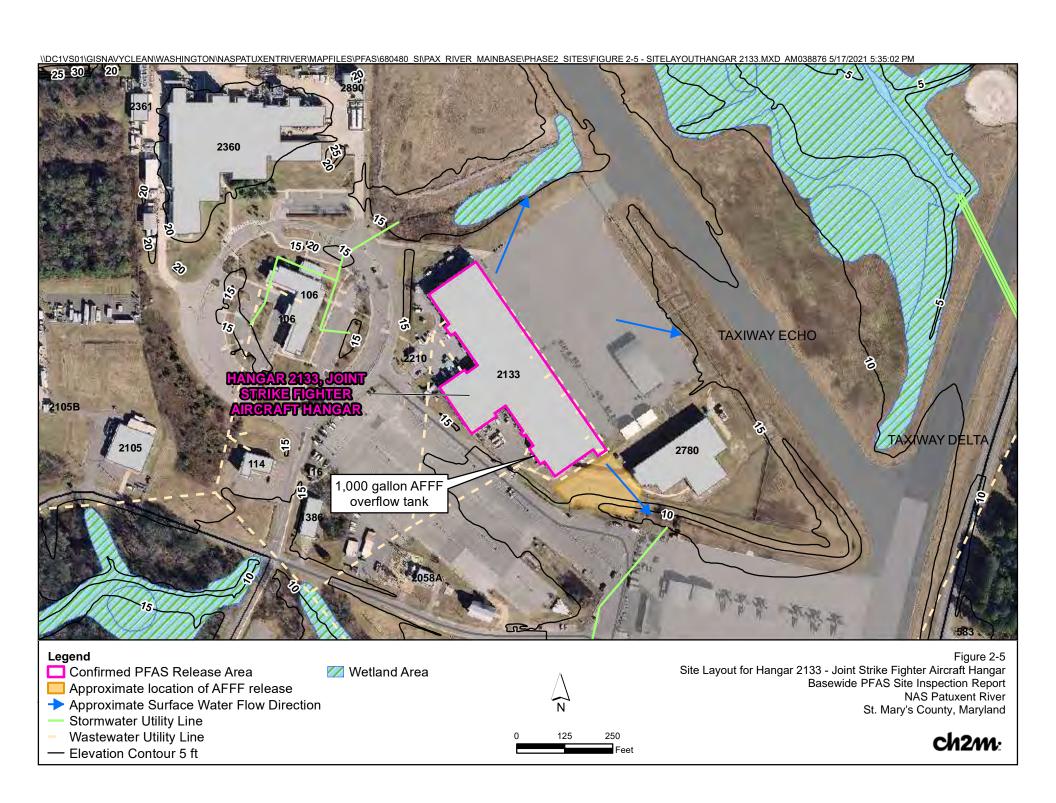
— Elevation Contour 5 ft

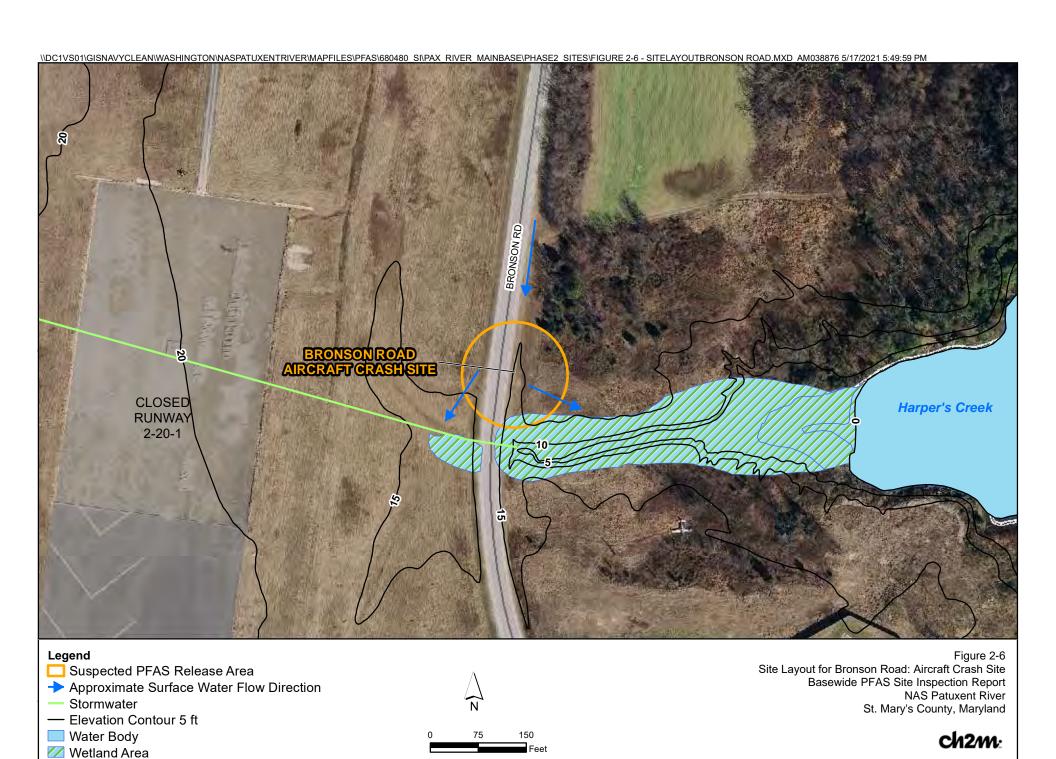
Wetland Area



Figure 2-4 Site Layout for Hangar 2905- Aircraft Prototype Facility Basewide PFAS Site Inspection Report NAS Patuxent River St. Mary's County, Maryland

Ch2m:





# Investigation Methodology

# 3.1 Objectives and Approach

The field activities discussed in this report were performed in general accordance with the SAP (CH2M, 2020). These activities were conducted in July and August 2020 at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road. The field investigation included the following activities:

- Installation of shallow temporary piezometers and co-located soil borings
- Co-located soil sampling (surface and subsurface)
- Grab groundwater sampling from temporary piezometers
- Water level surveys at the newly installed temporary piezometers
- Co-located surface water and sediment sampling at Hangar 2133

A summary of the technical approach for the SI field effort is provided below.

# 3.2 Site Preparation and Utility Location

Mobilization for the field efforts included procurement of necessary field equipment and initial transport to the site. Prior to the advancement of borings and installation of new temporary piezometers at each site, utilities within 10 feet of the proposed locations were marked by Inframap Corp. (Halethorpe, Maryland), a Maryland-licensed utility locator.

# 3.3 Soil Boring Advancement

For the purpose of collecting co-located surface and subsurface soil samples in addition to installing temporary piezometers for grab groundwater sampling, six borings were advanced at Buildings 215 and 217 on July 29 and 30, 2020, five borings were advanced at Hangar 2905 on July 27, 2020, six borings were advanced at Hangar 2133 on August 20, 2020, and two borings were advanced at Bronson Road on August 17 and 18, 2020. For the purpose of only collecting co-located surface and subsurface soil samples, three additional borings were advanced at Bronson Road on August 17 and 18, 2020. For the purpose of only installing temporary piezometers for grab groundwater sampling, one additional boring was advanced at Buildings 215 and 217 on August 18, 2020, two additional borings were advanced at Hangar 2905 on July 27, 2020, and five additional borings were advanced at Bronson Road on August 17 and 18, 2020. Soil boring locations at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road are shown on **Figures 3-1** through **3-4**, respectively.

A-Zone Environmental Services (Charles Town, West Virginia), a Maryland-licensed driller, provided direct-push technology (DPT) drilling services to advance the soil borings in all identified locations in accordance with the standard operating procedures (SOPs) included in the SAP (CH2M, 2020).

# 3.4 Soil Sampling

In July and August 2020, surface and subsurface soil samples were collected from six borings at Buildings 215 and 217, five borings at Hangar 2905, six borings at Hangar 2133, and five borings at Bronson Road. All soil samples were collected in accordance with the SOPs included in the SAP (CH2M, 2020). For the investigation, surface soil samples were defined as 0 to 6 inches below ground surface (bgs) and subsurface samples were defined as 3 to 4 feet bgs. After collection in sampling containers, and at the end of each day, the samples were packed on ice and shipped via overnight service to the laboratory for analysis. Soil samples were analyzed for the 18 PFAS listed in USEPA Drinking Water Method 537.1 using Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS) compliant with the DoD Quality Systems Manual (QSM) Version 5.3 Table B-15. Soil analytical results are discussed in detail in **Section 4**.

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# 3.5 Temporary Piezometer Installation

For the purpose of collecting grab groundwater samples in addition to measuring groundwater elevations, seven temporary piezometers were installed at Buildings 215 and 217, seven temporary piezometers were installed at Hangar 2905, six temporary piezometers were installed at Hangar 2133, and seven temporary piezometers were installed at Bronson Road. All temporary piezometers were installed to a depth of 15 feet bgs and constructed with a 10-foot screened interval to the total depth except for one of the seven temporary piezometers at Bronson Road, which was installed to a depth of 25 feet bgs and constructed with a 10-foot screened interval to the total depth. Grab groundwater sample locations at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road are shown on **Figures 3-1** through **3-4**, respectively.

A-Zone Environmental Services (Charles Town, West Virginia), a Maryland-licensed driller, provided DPT drilling services to install the temporary piezometers, which were constructed of 1.5-inch-diameter polyvinyl chloride (PVC) and installed across the water table in all but one identified location in accordance with the SOPs included in the SAP (CH2M, 2020) and State of Maryland construction standards. The temporary piezometer at PX-BR-ACS-WT07 was screened below the water table to get enough sample volume due to the poor water yield in this area. Temporary piezometer construction details are summarized in **Table 3-1**. After the completion of grab groundwater sampling and groundwater elevation monitoring efforts, the temporary piezometers were abandoned at Buildings 215 and 217 (August 17 and September 11, 2020), Hangar 2905 (August 17, 2020), Hangar 2133 (September 11 and October 22, 2020), and Bronson Road (September 11, 2020).

### 3.6 Groundwater Elevation Measurement

Groundwater elevation measurements were taken in July and August 2020 at all temporary piezometers at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road prior to grab groundwater sampling, as listed in **Table 3-1**. An electronic water-level indicator was used to measure the depth to water from the surveyed marking on the top of each PVC casing to the nearest 0.01 foot. Based on the measured groundwater elevations, groundwater contour maps were prepared for Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road, as presented on **Figures 3-1** through **3-4**. As shown, groundwater flow at Buildings 215 and 217 is predominantly to the east in the direction of the Chesapeake Bay, groundwater flow at Hangar 2905 is predominantly to the southeast in the direction of Pine Hill Run, groundwater flow at Hangar 2133 is predominately to the southeast in the direction of the Chesapeake Bay, and groundwater flow at Bronson Road is predominately to the northeast in the direction of Harper's Creek.

# 3.7 Groundwater Sampling

In July and August 2020, grab groundwater samples were collected from all temporary piezometers at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road. It should be noted that analytical results for grab groundwater samples collected from temporary piezometers exhibit uncertainty and variability as compared to analytical results for groundwater samples collected from permanent monitoring wells. Prior to sample collection, the temporary piezometers were purged to remove any stagnant water and to collect a representative sample from the aquifer using a peristaltic pump and disposable tubing. Water quality parameters, including pH in standard units, oxidation-reduction potential (ORP) in millivolts (mV), temperature in degrees Celsius (°C), specific conductance in millisiemens per centimeter (mS/cm), turbidity in nephelometric turbidity units (NTU), and dissolved oxygen in milligrams per liter (mg/L), were measured during the purging of each temporary piezometer using a YSI water quality meter and flow-through cell to prevent the purged groundwater from contacting the atmosphere during parameter measurement, although grab groundwater samples were collected without measuring water quality parameters at PX-H2133-WT02 and PX-BR-ACS-WT06 because these two piezometers were running dry during the purging effort. At all temporary piezometers other than PX-H2133-WT02 and PX-BR-ACS-WT06, purging continued for approximately 20 minutes with two sets of water quality readings collected 5 minutes apart, after which grab groundwater samples were collected directly into laboratory-provided sample

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bottles. The final set of water quality parameters recorded before sample collection at each temporary piezometer is presented in **Table 3-2**. Grab groundwater samples were collected in accordance with the SOPs included in the SAP (CH2M, 2020) and analyzed for the 18 PFAS listed in USEPA Drinking Water Method 537.1 using LC-MS/MS compliant with the DoD QSM Version 5.3 Table B-15. Groundwater analytical results are discussed in detail in **Section 4**.

# 3.8 Surface Water Sampling

In August 2020, two surface water samples (PX-H2133-SW01 and PX-H2133-SW02) were collected at Hangar 2133 from the locations shown on **Figure 3-3**. At each surface water sample location, a high density polyethylene bottle was secured to an extendable pole and lowered into the water to collect a representative surface water sample that was then transferred to a laboratory-prepared sample bottle. The surface water samples were analyzed for the 18 PFAS listed in USEPA Drinking Water Method 537.1 using LC-MS/MS compliant with the DoD QSM Version 5.3 Table B-15. Surface water analytical results are discussed in detail in **Section 4**.

# 3.9 Sediment Sampling

In August 2020, two sediment samples (PX-H2133-SD01 and PX-H2133-SD02) were collected at Hangar 2133 from the locations shown on **Figure 3-3**. At each sediment sample location, a representative sediment sample from 0 to 6 inches bgs was collected with a trowel directly into a laboratory-prepared sample bottle. The sediment samples were analyzed for the 18 PFAS listed in USEPA Drinking Water Method 537.1 using LC-MS/MS compliant with the DoD QSM Version 5.3 Table B-15. Sediment analytical results are discussed in detail in **Section 4**.

# 3.10 Surveying

Thoth Land Surveying Professionals (Walkersville, Maryland), a Maryland-licensed and registered surveyor, conducted a survey of the temporary piezometers installed during the SI field effort. The survey achieved vertical and horizontal control to an accuracy of ±0.01 foot and ±0.1 foot, respectively (**Appendix A**). Each temporary piezometer was surveyed at the top of the PVC casing (where marked) and at the ground surface. Vertical elevations were referenced to North American Vertical Datum of 1988 to remain consistent with the coordinate system and datum currently in use at NAS Patuxent River. Horizontal coordinates were referenced to the Maryland State Plane Coordinate System, North American Datum of 1983.

For surface water/sediment sample locations (Hangar 2133) and soil borings advanced for the purpose of only collecting co-located surface and subsurface soil samples (Bronson Road), horizontal coordinates were obtained using a Trimble® R1 global positioning system receiver and connected tablet.

# 3.11 Quality Assurance and Quality Control

Field quality assurance/quality control (QA/QC) samples were collected during the sampling program. These samples were obtained to:

- Ensure that disposable and reusable sampling equipment were free of analytes in question
- Evaluate field methodology
- Establish ambient field background conditions
- Evaluate whether cross-contamination occurred during sampling and/or shipping

Several types of field QA/QC samples that were collected and analyzed are defined as follows:

• Equipment Rinsate Blank (decontaminated equipment): Equipment blanks were collected at the frequency of one per site per day of sampling. These samples were obtained by running certified PFAS-free laboratory-grade deionized water over or through sample collection equipment after the decontamination procedures had been conducted. These samples, which were collected during soil and groundwater sampling, were used to determine whether decontamination procedures for reusable equipment were adequate.

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- Equipment Rinsate Blank (disposable equipment): Equipment blanks were collected at the frequency of one
  per lot. These samples were obtained by running certified PFAS-free laboratory-grade deionized water over or
  through unused sample collection equipment. These samples, which were collected during groundwater
  sampling only, were used to determine whether disposable, one-time-use equipment was free of the analytes
  in question prior to use.
- **Field Blank:** Field blanks were collected at the frequency of one per area. These samples were obtained by pouring the certified PFAS-free laboratory-provided blank water into unpreserved blank containers. These samples, which were collected during soil, groundwater, surface water, and sediment sampling, were used to assess the potential for field contamination.
- Field Duplicate Sample: Field duplicate samples were collected at the same time and under identical
  conditions as their respective associated field sample at the frequency of one per 10 field samples of similar
  matrix. These samples, which were collected during soil, groundwater, surface water, and sediment sampling,
  were used to evaluate the field and laboratory reproducibility of sample results and are one way to evaluate
  field methodology.

In addition to samples collected to monitor field QC, samples were also collected to monitor quality within the laboratory. These included the following:

- Matrix Spike: An aliquot of a matrix (e.g., groundwater) was spiked with known quantities of analytes of interest and subjected to the entire analytical procedure. By measuring the recovery of these spiked quantities, the appropriateness of the method for the matrix was demonstrated.
- Matrix Spike Duplicate: These samples were collected as second aliquots of the same matrix as the matrix spike to determine the precision of the method.

One matrix spike sample and one matrix spike duplicate sample were collected for every 20 environmental samples collected per site (or greater than or equal to 5 percent of the samples collected per site) per medium including field duplicates.

### 3.12 Decontamination Procedures

All decontamination activities were conducted in accordance with the SOPs included in the SAP (CH2M, 2020), and cross-contamination of PFAS was considered during decontamination between sites.

Non-disposable sampling equipment was decontaminated using the following solutions in this order:

- 1. Distilled water (laboratory-certified PFAS-free) and Liquinox solution
- 2. Distilled water (laboratory-certified PFAS-free) rinse 10 percent isopropanol and distilled water solution (laboratory-certified PFAS-free) and air-dried
- 3. Laboratory-grade deionized water (laboratory-certified PFAS-free)

Water generated during decontamination of non-disposable sampling equipment was collected and transferred to approved 55-gallon drums to await characterization and disposal.

Disposable sampling equipment and personal protective equipment, such as Masterflex tubing and nitrile gloves, were not decontaminated after use and instead were disposed as nonhazardous solid waste. After use, disposable equipment was placed in plastic contractor bags and disposed in an onsite trash dumpster.

Reusable heavy drilling equipment was decontaminated before and in between each borehole via thorough truck-side cleaning. Decontamination fluids were containerized into approved 55-gallon drums to await characterization and disposal. All heavy drilling equipment decontamination procedures were conducted in accordance with the SOPs included in the SAP (CH2M, 2020).

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# 3.13 Investigation-Derived Waste Management

During the SI field effort, generated investigation-derived waste (IDW) included soil cuttings, groundwater sampling purge-water, and decontamination rinse-water from all non-disposable sampling equipment and heavy drilling equipment. The IDW was containerized in approved 55-gallon drums that were properly labeled and stored at NAS Patuxent River. A total of two drums of solid IDW and four drums of aqueous IDW were generated during the field activities at NAS Patuxent River for all 16 PFAS AOIs requiring investigation.

Prior to disposal, CH2M field staff collected one composite sample from the aqueous IDW drums and one composite sample from the solid IDW drums. The IDW samples were analyzed for full Toxicity Characteristic Leaching Procedure analyses (volatile organic compounds, semivolatile organic compounds, pesticides, and inorganic constituents), ignitability, reactive cyanide, reactive sulfide, corrosivity, and PFAS. For the aqueous sample, PFAS analytical results for PFOA and PFOS were greater than the USEPA lifetime health advisory of 70 nanograms per liter (ng/L). Based on the overall analytical results, all IDW was characterized as nonhazardous, PFAS-containing, with notification of the PFAS results to the receiving facility. As such, solid IDW was disposed of as nonhazardous; aqueous IDW was first solidified and then disposed of with the solid IDW by Clearfield MMG at the Navy's approved disposal facility in Chesapeake, Virginia.

All IDW-management activities were conducted in accordance with the SOPs included in the SAP (CH2M, 2020). **Appendix B** provides an analytical summary for the IDW samples and includes all IDW handling and disposal information.

# 3.14 Data Quality Assessment

The data quality assessment (data validation procedure and review) was a multi-tiered approach. The process began with an internal laboratory review, continued with an independent review by a third-party validator, and ended with an overall review by the CH2M project chemistry team. A technical memorandum summarizing the data quality assessment is included as **Appendix C**.

As shown in **Appendix C**, the data set was deemed to be 100 percent complete. Therefore, the validation review demonstrated PFOA, PFOS, and PFBS data are suitable for use in the project decision-making process.

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BASEWIDE PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION REPORT – BUILDINGS 215 AND 217, HANGAR 2905, HANGAR 2133, BRONSON ROAD NAVAL AIR STATION PATUXENT RIVER, ST. MARY'S COUNTY, MARYLAND

Table 3-1. Temporary Piezometer Construction Details and Groundwater Elevations (July/August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Temporary Piezometer	Date Installed	Total Depth <sup>a</sup>	Ground Surface Elevation <sup>b</sup>	Top of Screen Depth <sup>a</sup>	Bottom of Screen Depth a	Top of Casing Elevation b	Depth to Water <sup>c</sup>	Groundwater Elevation <sup>b</sup>
Buildings 215 and 217	– Engine Test Area	•		•	·			
PX-ETA-WT01	7/29/2020	15	8.22	5	15	8.45	6.30 <sup>f</sup>	2.15
PX-ETA-WT02	7/29/2020	15	8.70	5	15	8.96	6.29 <sup>f</sup>	2.67
PX-ETA-WT03	7/30/2020	15	7.70	5	15	8.01	6.06 <sup>g</sup>	1.95
PX-ETA-WT04	7/29/2020	15	7.06	5	15	7.39	5.56 <sup>g</sup>	1.83
PX-ETA-WT05	7/30/2020	15	5.86	5	15	6.17	5.59 <sup>g</sup>	0.58
PX-ETA-WT06	7/30/2020	15	6.88	5	15	7.40	6.27 <sup>g</sup>	1.13
PX-ETA-WT07	8/18/2020	15	10.59	5	15	10.94	6.11 <sup>i</sup>	4.83
Hangar 2905 – Aircraft	Prototype Facility							
PX-H2905-WT01	7/27/2020	15	31.66	5	15	31.97	6.72 <sup>e</sup>	25.25
PX-H2905-WT02	7/27/2020	15	31.76	5	15	32.23	7.32 <sup>e</sup>	24.91
PX-H2905-WT03	7/27/2020	15	30.85	5	15	31.08	5.97 <sup>e</sup>	25.11
PX-H2905-WT04	7/27/2020	15	31.88	5	15	32.14	7.63 <sup>e</sup>	24.51
PX-H2905-WT05	7/27/2020	15	31.39	5	15	31.73	6.59 <sup>d,e</sup>	25.14
PX-H2905-WT06	7/27/2020	15	26.50	5	15	26.78	8.03 <sup>e</sup>	18.75
PX-H2905-WT07	7/27/2020	15	29.51	5	15	29.80	3.70 <sup>e</sup>	26.10
Hangar 2133 – Joint St	rike Fighter Aircraft	t Hangar						
PX-H2133-WT01	8/20/2020	15	15.56	5	15	15.91	4.43 <sup>k</sup>	11.48
PX-H2133-WT02	8/20/2020	15	16.66	5	15	16.91	14.24 <sup>k</sup>	2.67
PX-H2133-WT03	8/20/2020	15	15.26	5	15	16.11	5.46 <sup>k</sup>	10.65
PX-H2133-WT04	8/20/2020	15	15.67	5	15	16.12	6.62 <sup>k</sup>	9.50
PX-H2133-WT05	8/20/2020	15	15.69	5	15	16.04	7.63 <sup>k</sup>	8.41
PX-H2133-WT06	8/20/2020	15	13.03	5	15	13.63	4.32 <sup>k</sup>	9.31
Bronson Road: Aircraft	Crash Site							
PX-BR-ACS-WT01	8/17/2020	15	16.75	5	15	17.05	8.12 <sup>h</sup>	8.93
PX-BR-ACS-WT02	8/17/2020	15	16.69	5	15	16.99	11.65 <sup>i</sup>	5.34
PX-BR-ACS-WT03	8/18/2020	15	16.66	5	15	17.01	12.53 <sup>i</sup>	4.48
PX-BR-ACS-WT04	8/18/2020	15	15.30	5	15	15.55	10.66 <sup>i</sup>	4.89
PX-BR-ACS-WT05	8/17/2020	15	13.62	5	15	14.02	0.50 <sup>h</sup>	13.52
PX-BR-ACS-WT06	8/18/2020	15	14.21	5	15	14.56	7.06 <sup>j</sup>	7.50
PX-BR-ACS-WT07	8/18/2020	25	14.99	15	25	15.39	10.78 <sup>i</sup>	4.61

#### Notes:

- <sup>a</sup> feet below ground surface
- b feet above North American Vertical Datum of 1988
- <sup>c</sup> feet below top of casing elevation
- depth to water measurement collected after purging
- e depth to water measurement collected on July 27, 2020
- depth to water measurement collected on July 29, 2020

- depth to water measurement collected on July 30, 2020
- depth to water measurement collected on August 17, 2020
- depth to water measurement collected on August 18, 2020
- depth to water measurement collected on August 19, 2020
- depth to water measurement collected on August 20, 2020

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Table 3-2. Water Quality Parameters (July/August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Temporary Piezometer	Date Sampled	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)
Buildings 215 and	<b>217 – Engine</b> 1	Test Area					
PX-ETA-WT01	7/29/2020	26.2	5.85	22.32	above range	3.6	-7.1
PX-ETA-WT02	7/29/2020	26.1	5.80	0.354	above range	4.1	-7.6
PX-ETA-WT03	7/30/2020	24.2	5.87	0.381	117	4.5	23.8
PX-ETA-WT04	7/30/2020	25.0	6.31	0.852	52	3.6	-43.2
PX-ETA-WT05	7/30/2020	24.5	6.46	1.199	92	3.3	-41.2
PX-ETA-WT06	7/30/2020	24.5	6.18	0.170	57	4.1	28.2
PX-ETA-WT07	8/18/2020	26.0	5.39	0.256	above range	4.6	20.5
Hangar 2905 – Aire	craft Prototyp	e Facility					
PX-H2905-WT01	7/27/2020	29.1	5.91	0.006	103	7.8	122.0
PX-H2905-WT02	7/27/2020	25.3	5.40	0.001	above range	8.2	112.9
PX-H2905-WT03	7/27/2020	25.5	5.79	0.001	337	3.5	85.6
PX-H2905-WT04	7/27/2020	26.1	6.03	0.001	945	5.0	-27.2
PX-H2905-WT05	7/27/2020	32.2	7.30	0.011	746	4.4	21.5
PX-H2905-WT06	7/27/2020	24.3	6.48	0.013	above range	3.0	40.4
PX-H2905-WT07	7/27/2020	28.8	5.13	0.007	327	7.9	140.2
Hangar 2133 – Joir	nt Strike Fight	er Aircraft Hang	ar				
PX-H2133-WT01	8/20/2020	25.8	5.10	0.448	599	3.3	37.6
PX-H2133-WT02	8/20/2020	water quality	parameters no	ot collected at PX-I	H2133-WT02 (pie	ezometer runn	ing dry)
PX-H2133-WT03	8/20/2020	23.9	5.66	0.062	above range	3.4	6.8
PX-H2133-WT04	8/20/2020	22.9	5.39	0.050	above range	3.6	23.6
PX-H2133-WT05	8/20/2020	23.8	4.98	0.118	955	4.1	37.9
PX-H2133-WT06	8/20/2020	26.0	5.50	0.005	above range	2.9	0.1
Bronson Road: Aire	craft Crash Sit	e					
PX-BR-ACS-WT01	8/17/2020	23.4	5.54	0.103	398	4.1	74.6
PX-BR-ACS-WT02	8/18/2020	19.8	6.96	0.114	157	5.8	164.3
PX-BR-ACS-WT03	8/18/2020	19.9	5.96	0.004	142	5.2	61.9
PX-BR-ACS-WT04	8/18/2020	22.3	5.50	0.180	233	3.5	0.3
PX-BR-ACS-WT05	8/17/2020	23.4	5.73	0.076	161	1.0	50.3
PX-BR-ACS-WT06	8/19/2020	water quality	parameters no	t collected at PX-B	R-ACS-WT06 (pi	ezometer runr	ning dry)
PX-BR-ACS-WT07	8/18/2020	24.4	5.47	0.002	above range	2.6	29.3

#### Notes:

°C = degree(s) Celsius

mg/L = milligram(s) per liter

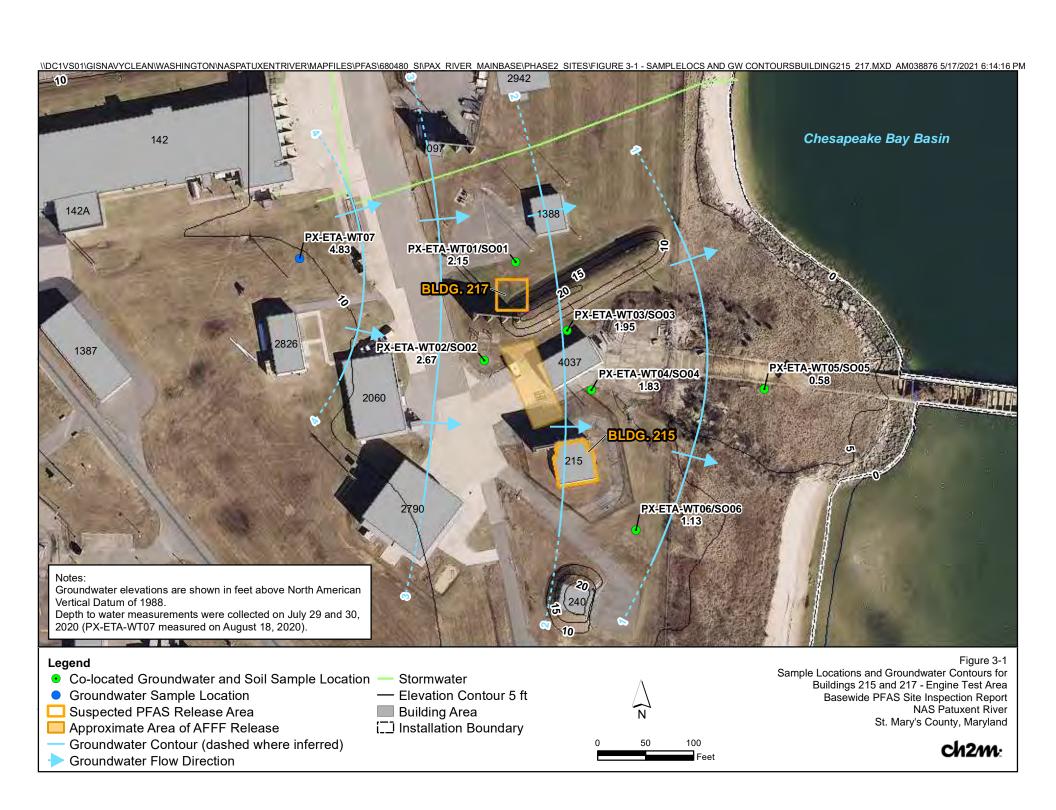
mS/cm = millisiemen(s) per centimeter

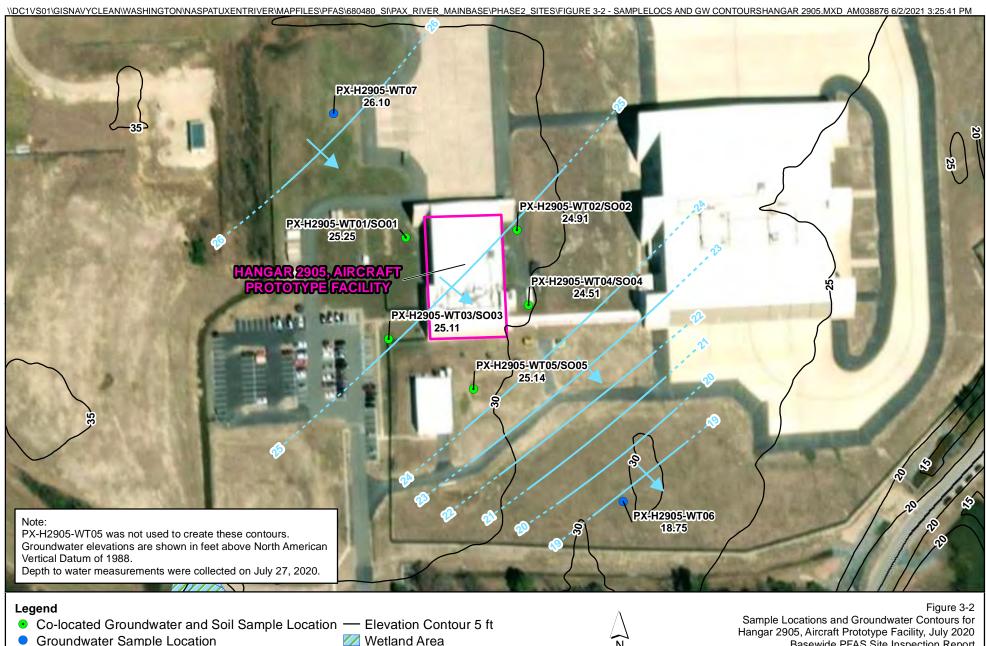
mV = millivolt(s)

NTU = nephelometric turbidity unit(s)

ORP = oxidation-reduction potential

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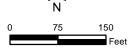
Groundwater Sample Location

Confirmed PFAS Release Area

Groundwater Contour (dashed where inferred)

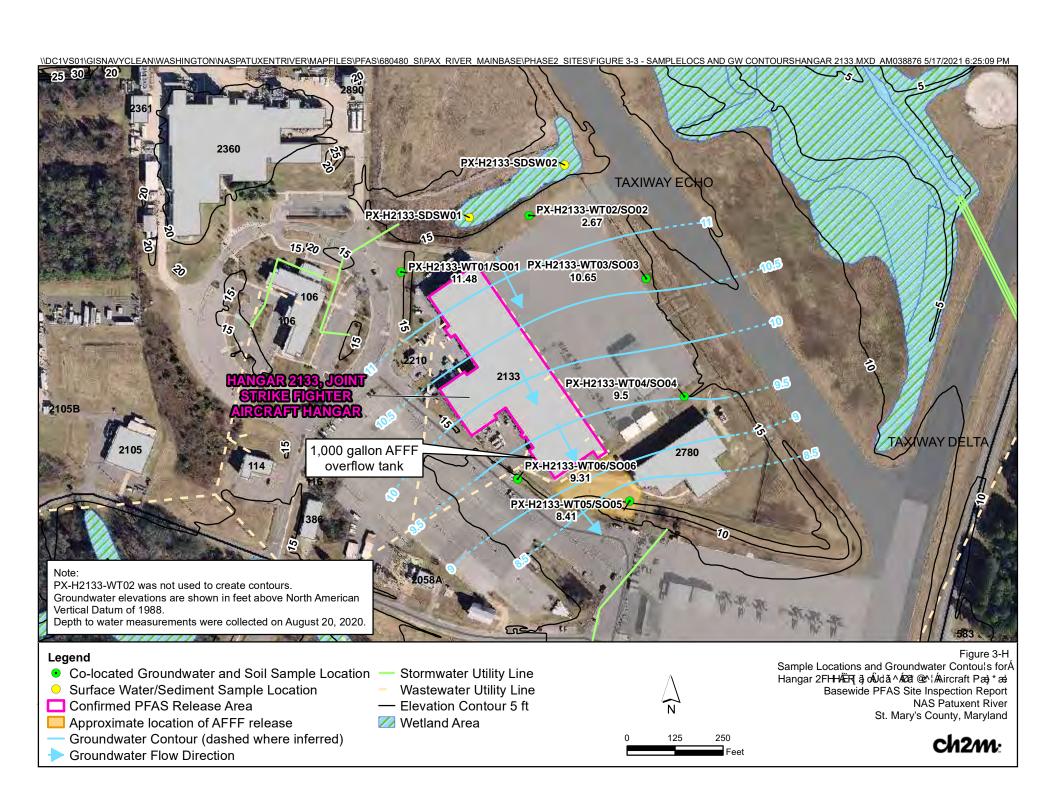
Groundwater Flow Direction

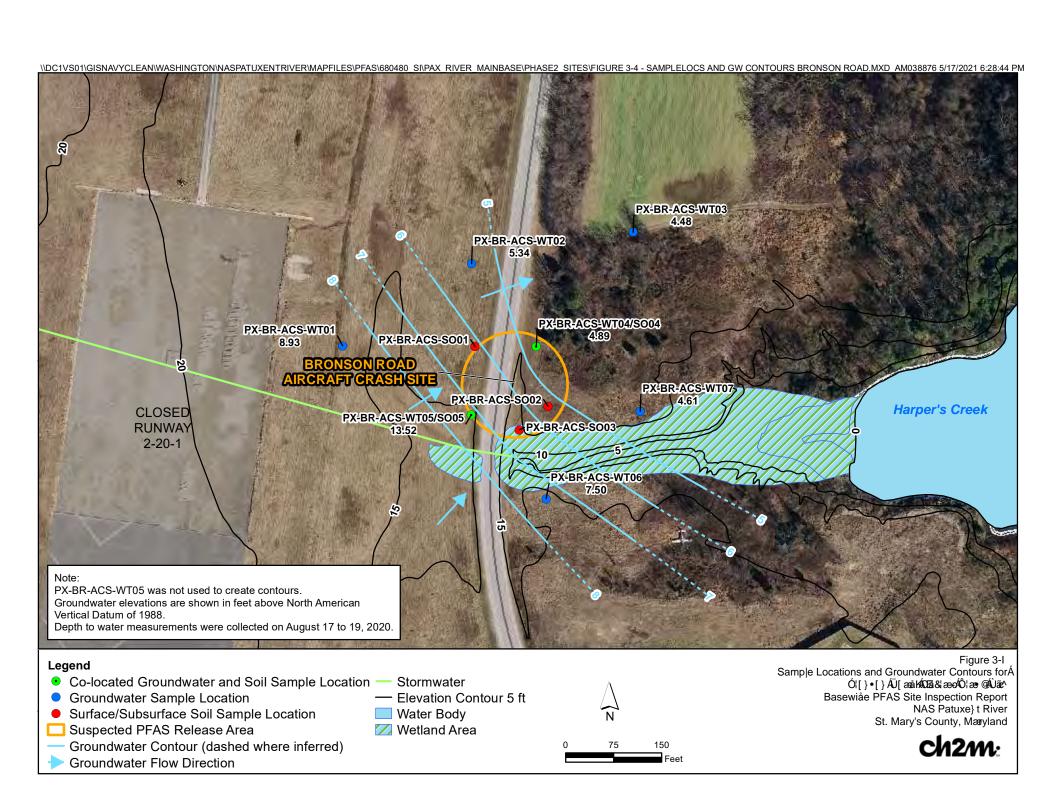




Imagery Source: Esri 2019

Basewide PFAS Site Inspection Report NAS Patuxent River St. Mary's County, Maryland





# Investigation Results

This section presents the results of the investigation described in **Section 3**.

Soil analytical data for PFOA and PFOS were screened against the PAL of 130 micrograms per kilogram (µg/kg) for each compound, and soil analytical data for PFBS were screened against the PAL of 1,900 μg/kg. Groundwater analytical data for PFOA and PFOS were screened against the PAL of 40 ng/L for each compound, and groundwater analytical data for PFBS were screened against the PAL of 600 ng/L. Surface water analytical data for PFOA and PFOS were screened against the PAL of 400 ng/L for each compound, and surface water analytical data for PFBS were screened against the PAL of 6,000 ng/L; for surface water, the groundwater PALs were multiplied by 10 to account for exposure to surface water, which would be much less than exposure to groundwater. Sediment analytical data for PFOA and PFOS were screened against the PAL of 1,300 µg/kg for each compound, and sediment analytical data for PFBS were screened against the PAL of 19,000 μg/kg; for sediment, the soil PALs were multiplied by 10 to account for exposure to sediment, which would be much less than exposure to soil. The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021). Where present, exceedances were identified for PFAS with PALs only (PFOA, PFOS, and PFBS). Soil, groundwater, surface water, and sediment analytical data were also obtained for 15 other PFAS that do not have screening criteria, and these results may be screened in the future if criteria are established.

Laboratory analytical results for soil and grab groundwater samples collected at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road are summarized in **Tables 4-1** and **4-2**, respectively. Laboratory analytical results for surface water and sediment samples collected at Hangar 2133 are summarized in **Tables 4-3** and **4-4**, respectively. **Tables 4-1** through **4-4** present data screened against the PALs for PFOA, PFOS, and PFBS; **Appendix D** presents data for all 18 PFAS analyzed, including PFOA, PFOS, and PFBS. **Figures 4-1** through **4-4** show PFOA, PFOS, and PFBS concentrations for each of the environmental sample locations at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road.

# 4.1 Soil

## 4.1.1 Soil Analytical Results for Buildings 215 and 217

Results of surface and subsurface soil samples collected from the six soil borings at Buildings 215 and 217 are presented on **Figure 4-1** and in **Table 4-1**. Analysis indicated the following:

- PFOA and PFOS were detected in site soil. PFBS was not detected in site soil.
- PFOA was detected at three surface soil sample locations, with estimated concentrations ranging from 1.19 J
  μg/kg at PX-ETA-SS02 to 2.98 J μg/kg at PX-ETA-SS04. PFOA was detected at three subsurface soil sample
  locations, with concentrations ranging from 1.48 J μg/kg (estimated) at PX-ETA-SB06 to 5.49 μg/kg at PX-ETA-SB04. None of the PFOA detections exceeded the PAL of 130 μg/kg.
- PFOS was detected at five surface soil sample locations, with concentrations ranging from 0.82 J  $\mu$ g/kg (estimated) at PX-ETA-SS01 to 17.32  $\mu$ g/kg at PX-ETA-SS04. PFOS was detected at one subsurface soil sample location (PX-ETA-SB06) at an estimated concentration of 1.08 J  $\mu$ g/kg. None of the PFOS detections exceeded the PAL of 130  $\mu$ g/kg.

## 4.1.2 Soil Analytical Results for Hangar 2905

Results of surface and subsurface soil samples collected from the five soil borings at Hangar 2905 are presented on **Figure 4-2** and in **Table 4-1**. Analysis indicated the following:

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- PFOA and PFOS were detected in site soil. PFBS was not detected in site soil.
- PFOA was not detected in surface soil. PFOA was detected at one subsurface soil sample location (PX-H2905-SB02) at an estimated concentration of 1.3 J μg/kg, which is below the PAL of 130 μg/kg.
- PFOS was detected at one surface soil sample location (PX-H2905-SS04) at an estimated concentration of 0.74 J μg/kg, which is below the PAL of 130 μg/kg. PFOS was not detected in subsurface soil.

### 4.1.3 Soil Analytical Results for Hangar 2133

Results of surface and subsurface soil samples collected from the six soil borings at Hangar 2133 are presented on **Figure 4-3** and in **Table 4-1**. Analysis indicated the following:

- PFOA and PFOS were detected in site soil. PFBS was not detected in site soil.
- PFOA was detected at four surface soil sample locations, with concentrations ranging from 1.12 J  $\mu$ g/kg (estimated) at PX-H2133-SS05 to 23.83  $\mu$ g/kg at PX-H2133-SS06, which are below the PAL of 130  $\mu$ g/kg. PFOA was not detected in subsurface soil.
- PFOS was detected at three surface soil sample locations, with concentrations ranging from 1.59 J  $\mu$ g/kg (estimated) at PX-H2133-SS03 to 14.85  $\mu$ g/kg at PX-H2133-SS02, which are below the PAL of 130  $\mu$ g/kg. PFOS was not detected in subsurface soil.

#### 4.1.4 Soil Analytical Results for Bronson Road

Results of surface and subsurface soil samples collected from the five soil borings at Bronson Road are presented on **Figure 4-4** and in **Table 4-1**. Analysis indicated the following:

- PFOA and PFOS were detected in site soil. PFBS was not detected in site soil.
- PFOA was detected at three surface soil sample locations, with estimated concentrations ranging from 0.89 J
  μg/kg at PX-BR-ACS-SS04 to 2.75 J μg/kg at PX-BR-ACS-SS05. PFOA was detected at one subsurface soil sample
  location (PX-BR-ACS-SB01) at an estimated concentration of 0.86 J μg/kg. None of the PFOA detections
  exceeded the PAL of 130 μg/kg.
- PFOS was detected at all five surface soil sample locations, with concentrations ranging from 1.08 J  $\mu$ g/kg (estimated) at PX-BR-ACS-SS02 to 137.57  $\mu$ g/kg at PX-BR-ACS-SS05. The surface soil sample result at PX-BR-ACS-SS05 exceeded the PAL of 130  $\mu$ g/kg. PFOS was detected at three subsurface soil sample locations, with concentrations ranging from 3.79 J  $\mu$ g/kg (estimated) at PX-BR-ACS-SB01 to 59.24  $\mu$ g/kg at PX-BR-ACS-SB05. None of the PFOS detections in subsurface soil exceeded the PAL.

### 4.2 Groundwater

### 4.2.1 Water Quality Parameters

Measurements of pH, ORP, temperature, specific conductance, turbidity, and dissolved oxygen were collected at each temporary piezometer following purging and immediately prior to sampling. The final water quality parameters recorded before sample collection at all four AOIs (Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road) are presented in **Table 3-2**.

Measured pH values were generally acidic at these four sites, ranging between 4.98 (PX-H2133-WT05) and 7.30 (PX-H2905-WT05). Measured ORP values, which provide an indication of the potential for redox conditions in groundwater, ranged between -43.2 mV (PX-ETA-WT04) and 164.3 mV (PX-BR-ACS-WT02); these values are indicative of primarily oxidizing conditions. Temperature readings ranged between 19.8°C (PX-BR-ACS-WT02) and 32.2°C (PX-H2905-WT05). Specific conductance values, which provide an indication of the concentration of total dissolved solids within groundwater, ranged between 0.001 mS/cm (three sample locations at Hangar 2905) and 22.32 mS/cm (PX-ETA-WT01); other than the maximum value, these values are indicative of freshwater

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conditions. Turbidity measurements, which provide an indication of the presence of suspended colloidal matter in groundwater, were wide-ranging from 52 NTU (PX-ETA-WT04) to above the range of the instrument (greater than 1,000 NTU) at multiple sample locations at the four sites. Measured dissolved oxygen values, which provide an indication of the oxidative state of the subsurface environment, ranged between 1 mg/L (PX-BR-ACS-WT05) and 8.2 mg/L (PX-H2905-WT02); these values are indicative of aerobic conditions.

### 4.2.2 Groundwater Analytical Results for Buildings 215 and 217

Results of groundwater samples collected from the seven temporary piezometers at Buildings 215 and 217 are presented on **Figure 4-1** and in **Table 4-2**. Analysis indicated the following:

- PFOA, PFOS, and PFBS were detected in site groundwater.
- PFOA was detected at all seven grab groundwater sample locations, with concentrations ranging from 1.88 J ng/L (estimated) at PX-ETA-WT07 to 347.71 ng/L at PX-ETA-WT05. PFOA detections at PX-ETA-WT04 and PX-ETA-WT05 exceeded the PAL of 40 ng/L.
- PFOS was detected at all seven grab groundwater sample locations, with concentrations ranging from 1.13 J ng/L (estimated) at PX-ETA-WT07 to 33.37 ng/L at PX-ETA-WT04. None of the PFOS detections exceeded the PAL of 40 ng/L.
- PFBS was detected at all seven grab groundwater sample locations, with concentrations ranging from 1.19 J ng/L (estimated) at PX-ETA-WT07 to 17.34 ng/L at PX-ETA-WT01. None of the PFBS detections exceeded the PAL of 600 ng/L.

### 4.2.3 Groundwater Analytical Results for Hangar 2905

Results of groundwater samples collected from the seven temporary piezometers at Hangar 2905 are presented on **Figure 4-2** and in **Table 4-2**. Analysis indicated the following:

- PFOA, PFOS, and PFBS were detected in site groundwater.
- PFOA was detected at all seven grab groundwater sample locations, with concentrations ranging from 11.92 ng/L at PX-H2905-WT07 to 71.18 J ng/L (estimated) at PX-H2905-WT04. PFOA detections at PX-H2905-WT04 and PX-H2905-WT06 exceeded the PAL of 40 ng/L.
- PFOS was detected at all seven grab groundwater sample locations, with concentrations ranging from 30.69 ng/L at PX-H2905-WT03 to 99.65 ng/L at PX-H2905-WT01. PFOS detections at PX-H2905-WT01, PX-H2905-WT02, PX-H2905-WT04, and PX-H2905-WT05 exceeded the PAL of 40 ng/L.
- PFBS was detected at all seven grab groundwater sample locations, with concentrations ranging from 2.52 J ng/L (estimated) at PX-H2905-WT02 to 13.39 ng/L at PX-H2905-WT06. None of the PFBS detections exceeded the PAL of 600 ng/L.

## 4.2.4 Groundwater Analytical Results for Hangar 2133

Results of groundwater samples collected from the six temporary piezometers at Hangar 2133 are presented on **Figure 4-3** and in **Table 4-2**. Analysis indicated the following:

- PFOA, PFOS, and PFBS were detected in site groundwater.
- PFOA was detected at all six grab groundwater sample locations, with concentrations ranging from 3.47 J ng/L (estimated) at PX-H2133-WT03 to 1,138.18 ng/L at PX-H2133-WT05. PFOA detections at PX-H2133-WT04, PX-H2133-WT05, and PX-H2133-WT06 exceeded the PAL of 40 ng/L.
- PFOS was detected at all six grab groundwater sample locations, with concentrations ranging from 6.48 ng/L at PX-H2133-WT02 to 135.83 J ng/L (estimated) at PX-H2133-WT04. The PFOS detection at PX-H2133-WT04 exceeded the PAL of 40 ng/L.

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 PFBS was detected at all six grab groundwater sample locations, with concentrations ranging from 1.12 J ng/L (estimated) at PX-H2133-WT03 to 60.8 ng/L at PX-H2133-WT05. None of the PFBS detections exceeded the PAL of 600 ng/L.

#### 4.2.5 Groundwater Analytical Results for Bronson Road

Results of groundwater samples collected from the seven temporary piezometers at Bronson Road are presented on **Figure 4-4** and in **Table 4-2**. Analysis indicated the following:

- PFOA, PFOS, and PFBS were detected in site groundwater.
- PFOA was detected at all seven grab groundwater sample locations, with concentrations ranging from 20.71 ng/L at PX-BR-ACS-WT03 to 117.12 ng/L at PX-BR-ACS-WT05. PFOA detections exceeded the PAL of 40 ng/L at four of the seven grab groundwater sample locations.
- PFOS was detected at all seven grab groundwater sample locations, with concentrations ranging from 63.31 ng/L at PX-BR-ACS-WT07 to 1,989.99 ng/L at PX-BR-ACS-WT05. PFOS detections exceeded the PAL of 40 ng/L at all seven grab groundwater sample locations.
- PFBS was detected at all seven grab groundwater sample locations, with concentrations ranging from 2.55 J
  ng/L (estimated) at PX-BR-ACS-WT02 to 24.04 ng/L at PX-BR-ACS-WT07. None of the PFBS detections
  exceeded the PAL of 600 ng/L.

#### 4.3 Surface Water

Results of surface water samples collected from the two surface water sample locations at Hangar 2133 are presented on **Figure 4-3** and in **Table 4-3**. Analysis indicated the following:

- PFOA, PFOS, and PFBS were detected in site surface water.
- PFOA was detected at both surface water sample locations, with concentrations of 41.19 ng/L at PX-H2133-SW01 and 25.45 ng/L at PX-H2133-SW02. PFOS was detected at both surface water sample locations, with concentrations of 7.53 ng/L at PX-H2133-SW01 and 10.2 ng/L at PX-H2133-SW02. PFBS was detected at both surface water sample locations, with estimated concentrations of 4.59 J ng/L at PX-H2133-SW01 and 2.77 J ng/L at PX-H2133-SW02. None of the PFOA, PFOS, and PFBS detections exceeded the corresponding PALs.

## 4.4 Sediment

Results of sediment samples collected from the two sediment sample locations at Hangar 2133 are presented on **Figure 4-3** and in **Table 4-4**. Analysis indicated the following:

- PFOA and PFOS were detected in site sediment. PFBS was not detected in site sediment.
- PFOA was detected at one sediment sample location (PX-H2133-SD01) at an estimated concentration of 2.36 J μg/kg. PFOS was detected at both sediment sample locations, with estimated concentrations of 3.07 J μg/kg at PX-H2133-SD01 and 8.14 J μg/kg at PX-H2133-SD02. None of the PFOA and PFOS detections exceeded the corresponding PALs.

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Table 4-1. Soil Analytical Data for PFOA, PFOS, and PFBS (July/August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Sample Location	Date Sampled	PFOA (μg/kg)	PFOS (μg/kg)	PFBS (μg/kg)
	t Action Limits (PALs) :	130 a	130 °	1,900 a
Buildings 215 and 217 -	- Engine Test Area			-
SURFACE SOIL	-			
PX-ETA-SS01	7/29/2020	2.15 U	0.82 J	1.08 U
PX-ETA-SS02	7/29/2020	1.19 J	0.84 J	1.03 U
PX-ETA-SS03	7/30/2020	1.35 J	0.91 J	1.07 U
PX-ETA-SS04	7/29/2020	2.98 J	17.32	1.03 U
PX-ETA-SS05	7/30/2020	2.15 U	0.99 J	1.08 U
PX-ETA-SS06	7/30/2020	2.55 U	2.55 U	1.27 U
SUBSURFACE SOIL				
PX-ETA-SB01	7/29/2020	2.25 U <sup>b</sup>	2.25 U <sup>b</sup>	1.12 U
PX-ETA-SB02	7/29/2020	2.52 U	2.52 U	1.26 U
PX-ETA-SB03	7/30/2020	1.73 J	2.44 U	1.22 U
PX-ETA-SB04	7/29/2020	5.49	2.14 U	1.07 U
PX-ETA-SB05	7/30/2020	2.41 U	2.41 U	1.2 U
PX-ETA-SB06	7/30/2020	1.48 J	1.08 J	1.16 U
Hangar 2905 – Aircraft	Prototype Facility			
SURFACE SOIL				
PX-H2905-SS01	7/27/2020	1.91 U	1.91 U	0.96 U
PX-H2905-SS02	7/27/2020	2.34 U	2.34 U	1.17 U
PX-H2905-SS03	7/27/2020	2.06 U	2.06 U	1.03 U
PX-H2905-SS04	7/27/2020	2.09 U	0.74 J	1.05 U
PX-H2905-SS05	7/27/2020	2.26 U <sup>b</sup>	2.26 U <sup>b</sup>	1.13 U <sup>b</sup>
SUBSURFACE SOIL				
PX-H2905-SB01	7/27/2020	2.13 U <sup>b</sup>	2.13 U <sup>b</sup>	1.06 U <sup>b</sup>
PX-H2905-SB02	7/27/2020	1.3 J	2.26 U	1.13 U
PX-H2905-SB03	7/27/2020	2.06 U	2.06 U	1.03 U
PX-H2905-SB04	7/27/2020	2.2 U	2.2 U	1.1 U
PX-H2905-SB05	7/27/2020	2.52 U	2.52 U	1.26 U
Hangar 2133 – Joint Str	ike Fighter Aircraft Hangar			
SURFACE SOIL				
PX-H2133-SS01	8/20/2020	2.34 U	2.34 U	1.17 U
PX-H2133-SS02	8/20/2020	2.66 J	14.85	1.2 U
PX-H2133-SS03	8/20/2020	2.27 U	1.59 J	1.14 U
PX-H2133-SS04	8/20/2020	2.04 J	2.35 U	1.18 U
PX-H2133-SS05	8/20/2020	1.12 J <sup>b</sup>	2.42 U <sup>b</sup>	1.21 U <sup>b</sup>
PX-H2133-SS06	8/20/2020	23.83	2.34 J	1.17 U

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BASEWIDE PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION REPORT – BUILDINGS 215 AND 217, HANGAR 2905, HANGAR 2133, BRONSON ROAD NAVAL AIR STATION PATUXENT RIVER, ST. MARY'S COUNTY, MARYLAND

Table 4-1. Soil Analytical Data for PFOA, PFOS, and PFBS (July/August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Sample	Sample Date PFOA Location Sampled (μg/kg)		PFOS	PFBS
-	<u> </u>		(μg/kg)	(μg/kg)
-	t Action Limits (PALs) :	130 <sup>a</sup>	130 ª	1,900 ª
Hangar 2133 – Joint Str	ike Fighter Aircraft Hangar	(continued)		
SUBSURFACE SOIL				
PX-H2133-SB01	8/20/2020	2.25 U	2.25 U	1.12 U
PX-H2133-SB02	8/20/2020	2.25 U	2.25 U	1.12 U
PX-H2133-SB03	8/20/2020	2.13 U	2.13 U	1.06 U
PX-H2133-SB04	8/20/2020	2.31 U	2.31 U	1.16 U
PX-H2133-SB05	8/20/2020	2.25 U	2.25 U	1.12 U
PX-H2133-SB06	8/20/2020	2.15 U	2.15 U	1.08 U
Bronson Road: Aircraft	Crash Site			
SURFACE SOIL				
PX-BR-ACS-SS01	8/17/2020	1.77 J	88.48	1.14 U
PX-BR-ACS-SS02	8/18/2020	2.52 U	1.08 J	1.26 U
PX-BR-ACS-SS03	8/18/2020	2.68 U	5.79 J	1.34 U
PX-BR-ACS-SS04	8/18/2020	0.89 J	26.14	1.23 U
PX-BR-ACS-SS05	8/17/2020	2.75 J	137.57	1.16 U
SUBSURFACE SOIL				
PX-BR-ACS-SB01	8/17/2020	0.86 J	3.79 J	1.14 U
PX-BR-ACS-SB02	8/18/2020	2.37 U	2.37 U	1.18 U
PX-BR-ACS-SB03	8/18/2020	2.47 U	30.21	1.23 U
PX-BR-ACS-SB04	8/18/2020	2.08 U	2.08 U	1.04 U
PX-BR-ACS-SB05	8/17/2020	2.41 U	59.24	1.2 U

## Notes:

## **Bolding indicates detection.**

## Shading and bolding indicate exceedance of screening value.

J = Analyte present. Reported value may or may not be accurate or precise.

U = Analyte not detected.

RI = Remedial Investigation

SI = Site Inspection

μg/kg = microgram(s) per kilogram

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The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

b Result from a field duplicate sample.

Table 4-2. Groundwater Analytical Data for PFOA, PFOS, and PFBS (July/August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Sample	Date	PFOA	PFOS	PFBS
Location	Sampled	(ng/L)	(ng/L)	(ng/L)
<u> </u>	ct Action Limits (PALs) :	<b>40</b> <sup>a</sup>	40 <sup>a</sup>	600 <sup>a</sup>
Buildings 215 and 217 – E	Ingine Test Area			
GRAB GROUNDWATER				
PX-ETA-WT01	7/29/2020	13.99	16.1	17.34
PX-ETA-WT02	7/29/2020	16.29	8.85	2.27 J
PX-ETA-WT03	7/30/2020	25.15	6.88	2.93 J
PX-ETA-WT04	7/30/2020	46.18	33.37	2.32 J
PX-ETA-WT05	7/30/2020	347.71	24.47	2.8 J
PX-ETA-WT06	7/30/2020	15.76	10.46	1.74 J
PX-ETA-WT07	8/18/2020	1.88 J	1.13 J	1.19 J
Hangar 2905 – Aircraft Pi	rototype Facility			
GRAB GROUNDWATER				
PX-H2905-WT01	7/27/2020	24.17	99.65	3.63 J
PX-H2905-WT02	7/27/2020	13.52 <sup>b</sup>	46.1 <sup>b</sup>	2.52 J <sup>b</sup>
PX-H2905-WT03	7/27/2020	34.01	30.69	12.52
PX-H2905-WT04	7/27/2020	71.18 J	59.1 J	7.61
PX-H2905-WT05	7/27/2020	28.54	85.18	3.49 J
PX-H2905-WT06	7/27/2020	69.77	34.61	13.39
PX-H2905-WT07	7/27/2020	11.92	38.09	2.54 J
Hangar 2133 – Joint Strik	e Fighter Aircraft Hango	ar		
GRAB GROUNDWATER				
PX-H2133-WT01	8/20/2020	36.58	10.11	6.07
PX-H2133-WT02	8/20/2020	7.94	6.48	30.32
PX-H2133-WT03	8/20/2020	3.47 J	6.63	1.12 J
PX-H2133-WT04	8/20/2020	205.56	135.83 J	17.67
PX-H2133-WT05	8/20/2020	1,138.18	29.44	60.8
PX-H2133-WT06	8/20/2020	201.81 <sup>b</sup>	12.8 <sup>b</sup>	4 J <sup>b</sup>
Bronson Road: Aircraft Cr	rash Site			
GRAB GROUNDWATER				
PX-BR-ACS-WT01	8/17/2020	62.12	799.32	4.49
PX-BR-ACS-WT02	8/18/2020	25.4	1,395.67	2.55 J
PX-BR-ACS-WT03	8/18/2020	20.71	113.57	3.03 J
PX-BR-ACS-WT04	8/18/2020	55.4 J	228.56	8.73
PX-BR-ACS-WT05	8/17/2020	117.12	1,989.99	12.35
PX-BR-ACS-WT06	8/19/2020	28.32	78.92	12.83
PX-BR-ACS-WT07	8/18/2020	42.33	63.31	24.04

## Notes:

## **Bolding indicates detection.**

## Shading and bolding indicate exceedance of screening value.

J = Analyte present. Reported value may or may not be accurate or precise.

RI = Remedial Investigation

SI = Site Inspection

ng/L = nanogram(s) per liter or parts per trillion

FES0518211125WDC 4-7

The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

b Result from a field duplicate sample.

BASEWIDE PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION REPORT – BUILDINGS 215 AND 217, HANGAR 2905, HANGAR 2133, BRONSON ROAD NAVAL AIR STATION PATUXENT RIVER, ST. MARY'S COUNTY, MARYLAND

## Table 4-3. Surface Water Analytical Data for PFOA, PFOS, and PFBS (August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Sample	Date	PFOA	PFOS	PFBS						
Location	Sampled	(ng/L)	(ng/L)	(ng/L)						
Projec	ct Action Limits (PALs) :	400 <sup>a,b</sup>	400 <sup>a,b</sup>	6,000 <sup>a,b</sup>						
langar 2133 – Joint Strike Fighter Aircraft Hangar										
SURFACE WATER										
PX-H2133-SW01	8/20/2020	41.19	7.53	4.59 J						
PX-H2133-SW02 8/20/2020		25.45	10.2	2.77 J						

## Notes:

## **Bolding indicates detection.**

J = Analyte present. Reported value may or may not be accurate or precise.

RI = Remedial Investigation

SAP = Sampling and Analysis Plan

SI = Site Inspection

ng/L = nanogram(s) per liter or parts per trillion

4-8 FES0518211125WDC

The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

b Per the SAP (CH2M, 2020), the PALs for surface water are one order of magnitude higher than the PALs for groundwater.

Table 4-4. Sediment Analytical Data for PFOA, PFOS, and PFBS (August 2020)

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Sample Location	Date Sampled	PFOA (μg/kg)	PFOS (μg/kg)	PFBS (μg/kg)					
-	Project Action Limits (PALs): 1,300 a,b 1,300 a,b 19,000 a,b angar 2133 – Joint Strike Fighter Aircraft Hangar								
SEDIMENT									
PX-H2133-SD01	8/20/2020	2.36 J	3.07 J	3.23 U					
PX-H2133-SD02	8/20/2020	10 U	8.14 J	5 U					

## Notes:

# **Bolding indicates detection.**

J = Analyte present. Reported value may or may not be accurate or precise.

U = Analyte not detected.

RI = Remedial Investigation

SAP = Sampling and Analysis Plan

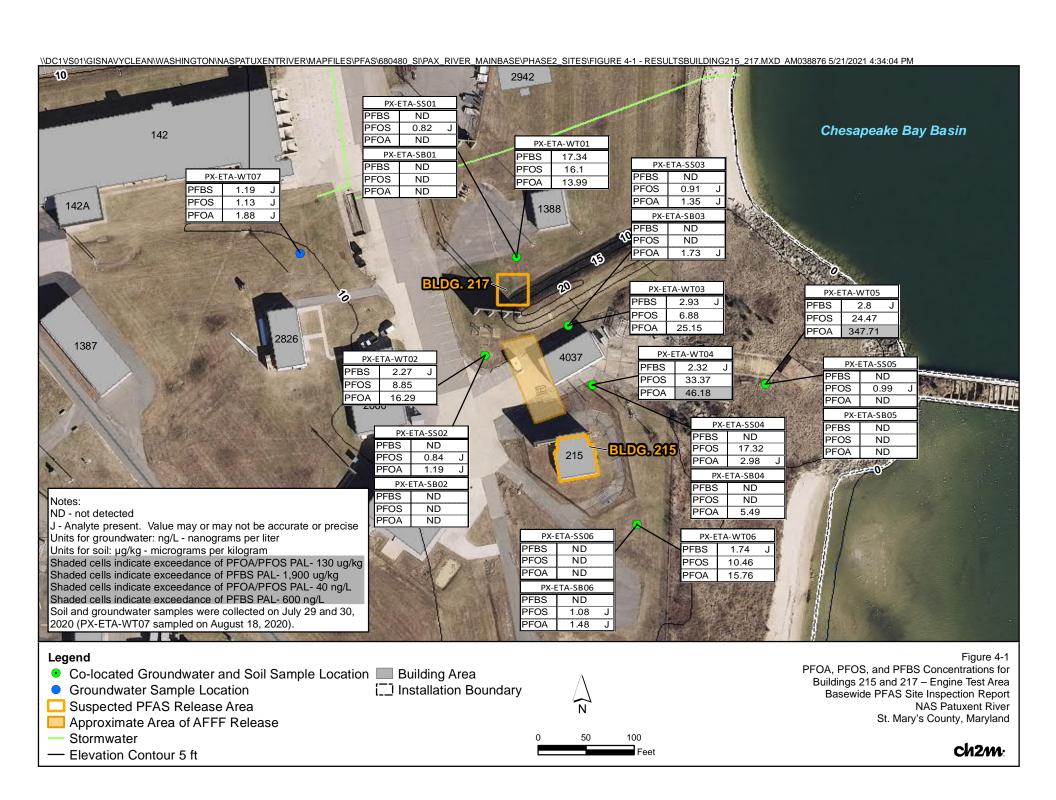
SI = Site Inspection

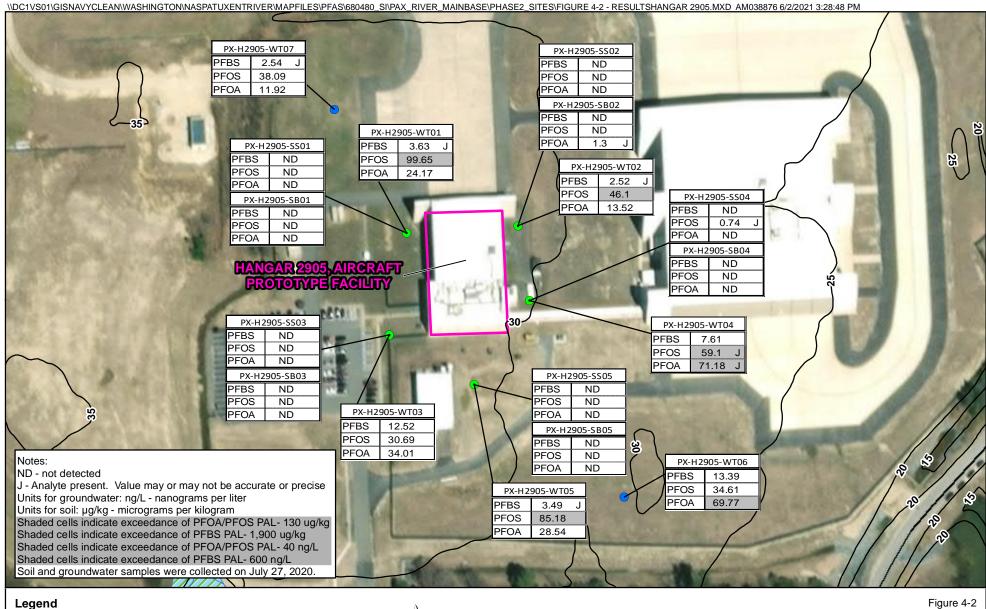
μg/kg = microgram(s) per kilogram

FES0518211125WDC 4-9

The PALs for PFOA and PFOS for this investigation align with screening values for moving a site from the SI phase to the RI phase included in the Assistant Secretary of Defense Memorandum issued on October 15, 2019 (DoD, 2019b). For PFBS, the PALs are based on the May 2021 USEPA Regional Screening Levels (USEPA, 2021).

b Per the SAP (CH2M, 2020), the PALs for sediment are one order of magnitude higher than the PALs for soil.





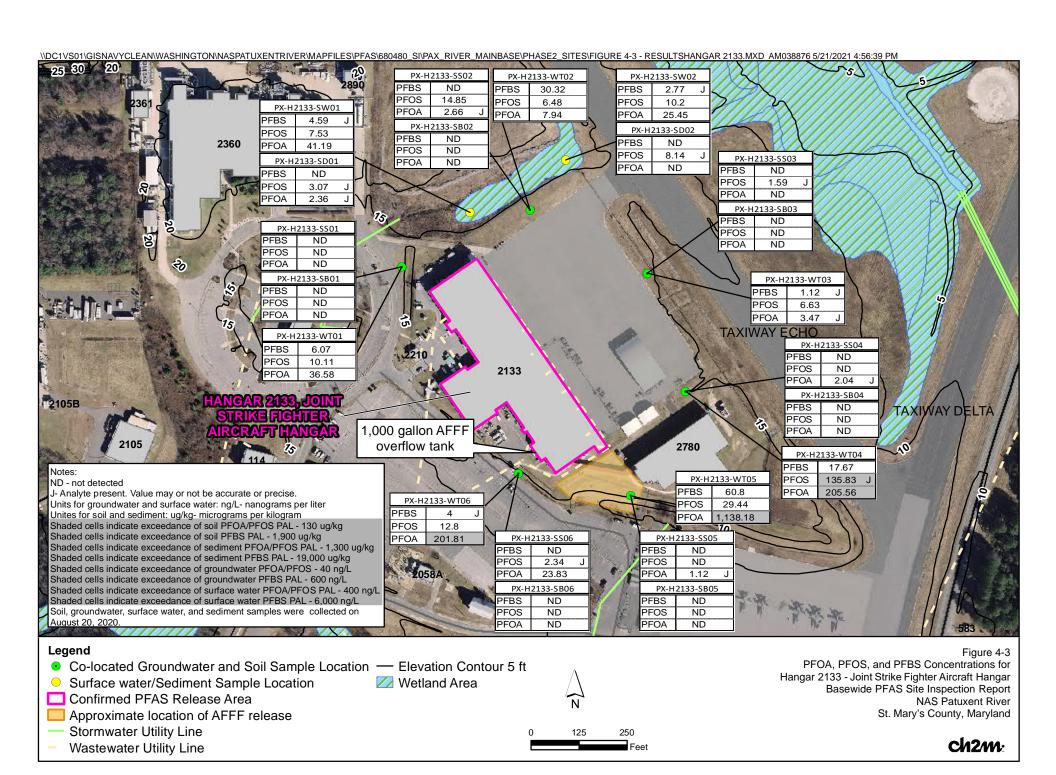
- Co-located Groundwater and Soil Sample Location
- Groundwater Sample Location
- Confirmed PFAS Release Area
- Elevation Contour 5 ft
- Wetland Area

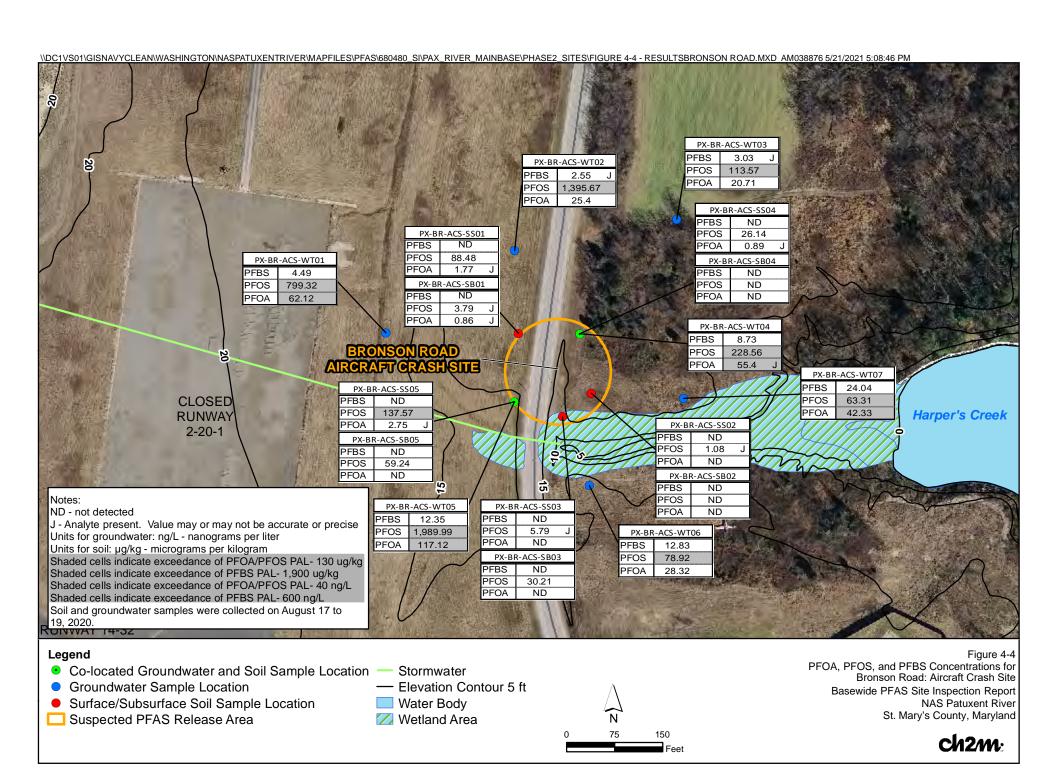


PFOA, PFOS, and PFBS Concentrations for Hangar 2905- Aircraft Prototype Facility, July 2020 Basewide PFAS Site Inspection Report NAS Patuxent River St. Mary's County, Maryland

Imagery Source: Esri 2019

Ch2m.





# Conclusions and Recommendations

**Table 5-1** summarizes the results of the PFAS SI conducted for Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road at NAS Patuxent River.

## Table 5-1. Conclusions of PFAS SI

Basewide PFAS Site Inspection Report NAS Patuxent River, St. Mary's County, Maryland

#### Objective

Determine whether PFAS (if present) were detected at concentrations that exceed the PALs for soil, groundwater, surface water, and sediment.

#### Buildings 215 and 217:

 PFOA and PFOS were detected in site soil; none of the detected concentrations exceeded the corresponding PALs. PFBS was not detected in site soil.

Results

 PFOA, PFOS, and PFBS were detected in site groundwater; detected concentrations of PFOA exceeded the corresponding PAL. Groundwater analytical results were for grab groundwater samples collected from temporary piezometers.

#### Hangar 2905:

- PFOA and PFOS were detected in site soil; none of the detected concentrations exceeded the corresponding PALs. PFBS was not detected in site soil.
- PFOA, PFOS, and PFBS were detected in site groundwater; detected concentrations of PFOA and PFOS exceeded the corresponding PALs. Groundwater analytical results were for grab groundwater samples collected from temporary piezometers.

### Hangar 2133:

- PFOA and PFOS were detected in site soil; none of the detected concentrations exceeded the corresponding PALs. PFBS was not detected in site soil.
- PFOA, PFOS, and PFBS were detected in site groundwater; detected concentrations of PFOA and PFOS exceeded the corresponding PALs. Groundwater analytical results were for grab groundwater samples collected from temporary piezometers.
- PFOA, PFOS, and PFBS were detected in site surface water; none of the detected concentrations exceeded the corresponding PALs.
- PFOA and PFOS were detected in site sediment; none of the detected concentrations exceeded the corresponding PALs. PFBS was not detected in site sediment.

## **Bronson Road:**

- PFOA and PFOS were detected in site soil; one detected concentration of PFOS exceeded the corresponding PAL. PFBS was not detected in site soil.
- PFOA, PFOS, and PFBS were detected in site groundwater; detected concentrations of PFOA and PFOS exceeded the corresponding PALs. Groundwater analytical results were for grab groundwater samples collected from temporary piezometers.

# Determine the potential for PFAS (if present) to migrate offsite.

## Buildings 215 and 217:

 Groundwater flow is predominantly to the east in the direction of the Chesapeake Bay, and there is the potential for migration of PFAS in that direction. There is no potential drinking water exposure because groundwater flow is not toward off-installation wells, the surficial aquifer at the installation is not used for drinking water on- or off-installation, and there are confining units isolating the aquifers used for drinking water.

## Hangar 2905:

 Groundwater flow is predominantly to the southeast in the direction of Pine Hill Run, and there is the potential for migration of PFAS in that direction, in addition to ponds south of the site. There is no potential drinking water exposure because groundwater flow is not toward off-installation wells, the surficial aquifer at the installation is not used for drinking water on- or off-installation, and there are confining units isolating the aquifers used for drinking water.

FES0518211125WDC 5-1

BASEWIDE PER- AND POLYFLUOROALKYL SUBSTANCES SITE INSPECTION REPORT – BUILDINGS 215 AND 217, HANGAR 2905, HANGAR 2133, BRONSON ROAD NAVAL AIR STATION PATUXENT RIVER, ST. MARY'S COUNTY, MARYLAND

#### Table 5-1. Conclusions of PFAS SI

Basewide PFAS Site Inspection Report

NAS Patuxent River, St. Mary's County, Maryland

Objective	Results
	Hangar 2133:
	<ul> <li>Groundwater flow is predominantly to the southeast in the direction of the Chesapeake Bay, and there is the potential for migration of PFAS in that direction. There is no potential drinking water exposure because groundwater flow is not toward off-installation wells, the surficial aquifer at the installation is not used for drinking water on- or off-installation, and there are confining units isolating the aquifers used for drinking water.</li> </ul>
	Bronson Road:
	<ul> <li>Groundwater flow is predominantly to the northeast in the direction of Harper'. Creek, and there is the potential for migration of PFAS in that direction. There is no potential drinking water exposure because groundwater flow is not toward off-installation wells, the surficial aquifer at the installation is not used for drinking water on- or off-installation, and there are confining units isolating the aquifers used for drinking water.</li> </ul>

The following actions are proposed as part of the recommended RIs at Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road:

- 1. Collect additional soil samples at each site to better define the extent of PFOA, PFOS, and PFBS in soil.
- 2. Install permanent monitoring wells at each site to better define the extent of PFOA, PFOS, and PFBS in groundwater. New monitoring wells will also provide additional groundwater elevation data, which will help to refine the groundwater flow direction estimates developed in the SI field investigation.
- 3. Consider the collection of surface water and sediment samples (if deemed necessary) to better define the extent of PFOA, PFOS, and PFBS at the sites.
- 4. Soil and groundwater samples will be analyzed for PFAS in accordance with Navy guidance, which will be updated as a new USEPA and DoD guidance and directives are issued.
- 5. After the collection of additional soil data, consider performing lysimeter testing to evaluate the potential for soil to leach to groundwater above unacceptable risk levels at each site.
- 6. Based on data collected during the RIs, develop the conceptual site model (CSM) for each site. Each CSM will incorporate information to fully define the fate and transport of PFAS at NAS Patuxent River.
- 7. Perform a quantitative human health risk assessment (HHRA) at each site. Each HHRA will evaluate potential risks to human health associated with exposure to PFAS detected in soil, groundwater, surface water, and sediment.
- 8. Perform an ecological risk screening (ERS) at each site. Each ERS will be conducted within the applicable DoD, Navy, and/or USEPA policy, guidance, or directives using the state-of-the-science toxicological information available and current at the time the RI report is prepared.

5-2 FES0518211125WDC

# References

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- U.S. Geological Survey (USGS). 2007. *Hydrogeology of the Piney Point-Nanjemoy, Aquia, and Upper Patapsco Aquifers, Naval Air Station Patuxent River and Webster Outlying Field, St. Mary's County, Maryland, 2000-06.* Scientific Investigation Report 2006-5266.

FES0518211125WDC 6-1

Appendix A Survey Data PROJECT: Survey Services Contract: CLEAN 9000 CTO-4304 NAVAL AIR STATION PATUXENT CALIFORNIA, MARYLAND Date: August 26, 2020

DATUM:
Horizontal: NAD83(2007)Maryland State Plane (U.S. Fee
Vertical: NAVD88 (U.S. Feet)

POINT NAME	NORTH	EAST	GR. ELEV.	PVC ELEV	DESC
PX-B102-WT01	224095.127	1475574.348	45.26	45.67	MW
PX-B102-WT02	224087.089		45.03		MW
PX-B102-WT03	223951.482		44.39		MW
PX-B102-WT04	223937.286		43.82		MW
PX-B102-WT05	223779.672		43.60		MW
PX-B102-WT06	224246.714	1475395.069	44.60		MW
PX-B1669-WT01	222217.802	1481753.282	18.74	18.97	MW
PX-B1669-WT02	222337.833		19.65		MW
PX-B1669-WT03	222344.078	1482151.905	19.36	19.53	MW
PX-B1669-WT04	222199.056	The second name of the second na	17.59		MW
PX-B1669-WT05	222212.383	1482189.358	18.23	18.48	MW
PX-B1669-WT06	222233.731	1482376.201	15.71	15.84	MW
PX-B1669-WT07	222475.083	1482388.837	14.93	15.18	MW
PX-ETA-WT01	218914.778	1484750.32	8.22	8.45	MW
PX-ETA-WT02	218812.016	The second secon	8.70		MW
PX-ETA-WT03	218843.145		7.70		MW
PX-ETA-WT04	218781.296	The second secon	7.06		MW
PX-ETA-WT05	218782.08		5.86		MW
PX-ETA-WT06	218635.327	1484875.492	6.88		MW
PX-ETA-WT07	218918.3816	1484525.406	10.59		747 A 17 A 17
DV LIDOOS MATOA	222452.005	1470404 50	24.66	24.07	In an a c
PX-H2905-WT01	222152.865		31.66		MW
PX-H2905-WT02	222164.029		31.76		MW
PX-H2905-WT03	221993.818		30.85		
PX-H2905-WT04	222047.002	1479675.968	31.88		MW
PX-H2905-WT05 PX-H2905-WT06	221915.588		31.39 26.50		MW
PX-H2905-WT07	221740.097 222346.408	1479824.116 1479371.711	29.51	26.78 29.80	MW

DESC.

# **GENERAL NOTES**

NUMBER NORTH EAST

- 1. DATUM:
- Horizontal: Quantico Base Datum NAD83/91Vertical: Quantico Base Datum NAVD88 (U.S. Feet)

229798.701 1477979.174 32.97 232642.289 1481735.738 15.57

Monitoring Wells were located RTK GPS for both horizontal and vertical locations per the NAVFAC liason based on accuracy requirements restricted access to sites.

I hereby Certify that this survey was conducted under my direct supervision and meets the accuracies required under this contract.

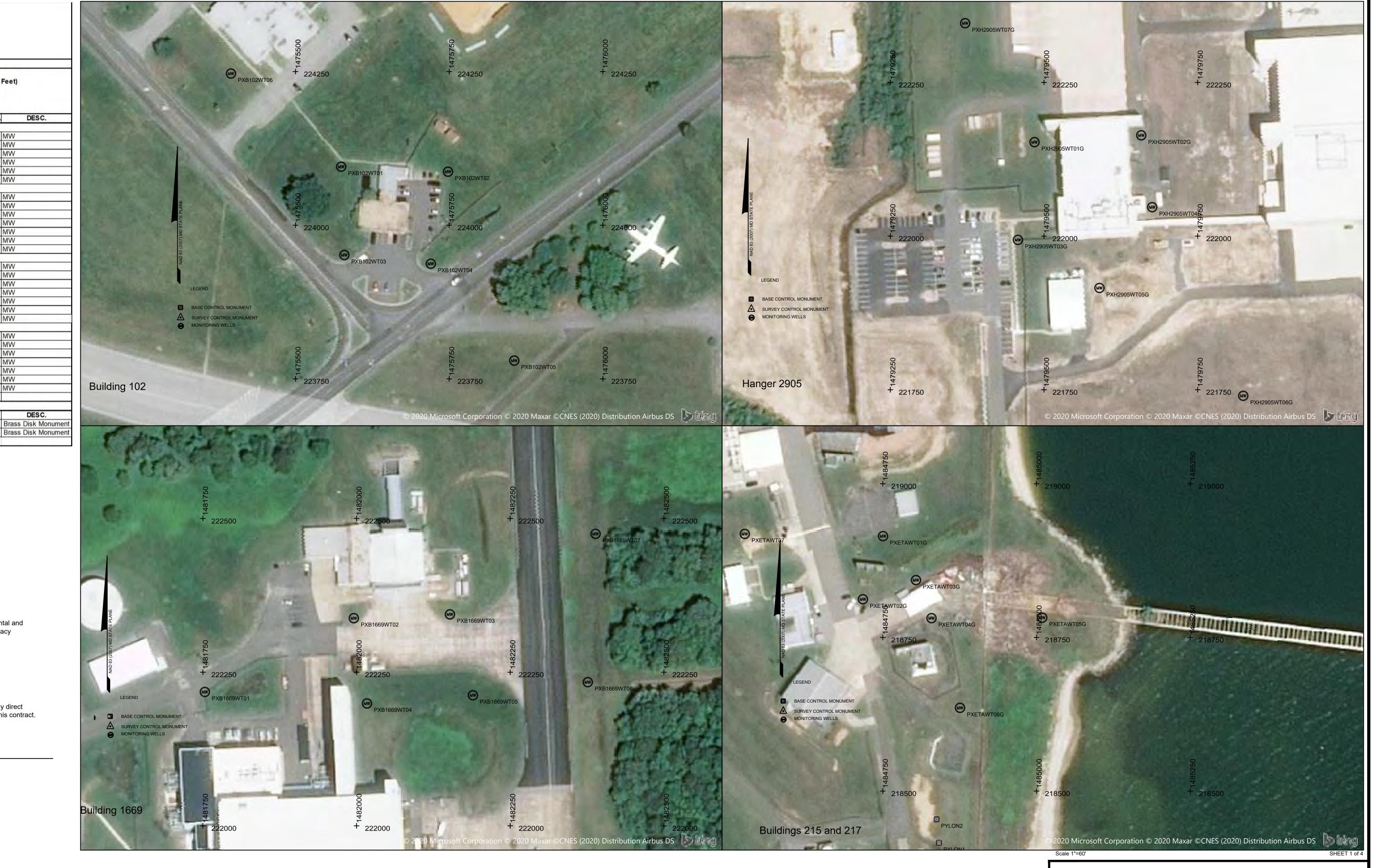
Thomas & Pendleton

Thomas Gregory Pendleton Maryland Professional Land Surveyor 21925





P) 202-652-0184 ◆ F) 202-330-5311 http://www.thothsurveying.com



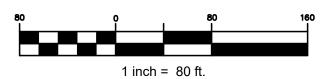
Hanger 2905, Building 1669, Building 102 and Buildings 215 and 217

Survey Services for Location of Piezometer CLEAN 9000 CTO-JU40

Naval Air Station Patuxant California, Maryland

FILENAME NSA\_UXO-02.dwg

REV: September 09, 2020 DATE: August 27, 2020



PROJECT: Survey Services Contract: CLEAN 9000 CTO-4304 NAVAL AIR STATION PATUXENT CALIFORNIA, MARYLAND Date: Sept 9, 2020, 2020

# DATUM: Horizontal: NAD83(2007)Maryland State Plane (U.S. Feet) Vertical: NAVD88 (U.S. Feet)

POINT NAME	NORTH	EAST	GR. ELEV. P	VC ELEV	DESC.
		A	1-11-11-11-11-1		
PXBRACSWT01	228760.5693	1479716.811	16.75	17.05	MW
PXBRACSWT02	228888.9942			16.99	MW
PXBRACSWT03	228937.9769		16.66	17.01	MW
PXBRACSWT04	228759.0199			15.55	MW
PXBRACSWT05	228652.2495			14.02	MW
PXBRACSWT06	228521.6126			14.56	MW
PXBRACSWT07	228657.7925			15.39	MW
PXH2133WT01	221971.4946	1483439.978	15.56	15.91	MW
PXH2133WT02	222119.3609		and the second s	16.91	MW
PXH2133WT03	221955.1899			16.11	MW
PXH2133WT04	221647.3468			16.12	MW
PXH2133WT05	221374.4666		217.677	16.04	MW
PXH2133WT06	221432.2786			13.63	MW
PXH2835WT01	224094.8216	1474608.405	45.28	45.68	MW
PXH2835WT02	223535.212	1473920.634		42.78	MW
PXH2835WT03	223481.212	1474040.594	40.00	40.95	MW
PXH2835WT04	223696.0789			41.17	MW
PXH2835WT05	223877.2208			44.85	MW
PXH2835WT06	223306.4742	12 15 N 11 11 C 12 A 17 A 17 A		47.48	MW
PXS41WT01	229629.736	1479508.871	20.11	20.51	MW
PXS41WT02	229488.4921	1479115.97		24.00	MW
PXS41WT03	229308.0289		1,000,000,000	27.46	MW
PXS41WT04	229237.6139			19.09	MW
PXS41WT05	229177.8764			27.06	MW
PXS41WT06	229030.4429			26.71	MW
PXS41WT07	228896.5128		23.97	24.32	MW
17.04171.5.			T 1 (C 3)		1414.4
am catadana e	Dauguruh Af	BASE CONTR	CALLED TO STORY OF THE STORY		Life Author
NUMBER	NORTH	EAST	ELEV		DESC.
SHOOP	229798.701	1477979.174			Brass Disk Monumer
BEACH	232642.289	1481735.738	15.57		Brass Disk Monumer

# GENERAL NOTES

- DATUM:
  Horizontal: Quantico Base Datum NAD83/91
  Vertical: Quantico Base Datum NAVD88 (U.S. Feet)
- Monitoring Wells were located RTK GPS for both horizontal and vertical locations per the NAVFAC liason based on accuracy requirements restricted access to sites.

I hereby Certify that this survey was conducted under my direct supervision and meets the accuracies required under this contract.

Thomas & Pendleton

Thomas Gregory Pendleton Maryland Professional Land Surveyor 21925





P) 202-652-0184 ◆ F) 202-330-5311 http://www.thothsurveying.com



Survey Services for Location of Piezometer
CLEAN 9000 CTO-JU40

Naval Air Station Patuxant California, Maryland

FILENAME
NSA\_UXO-02.dwg
DATE: September 09, 2020

Appendix B Investigation-Derived Waste Analytical Data, Waste Profiles, and Disposal Manifests



# **ANALYTICAL RESULTS**

## **PERFORMED BY**

**Pace Analytical Gulf Coast** 

7979 Innovation Park Dr. Baton Rouge, LA 70820 (225) 769-4900

**Report Date** 11/25/2020



Project PAX Basewide - CTO-4256

Deliver To

Juan Acaron CH2M Hill 3011 SW Williston Rd Gainesville, FL 32608 352-384-7002

**Additional Recipients** 

NONE









Project ID: PAX Basewide - CTO-4256 Report Date: 11/25/2020

# Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

## Common Abbreviations that may be Utilized in this Report

ND Indicates the result was Not Detected at the specified reporting limit

NO Indicates the sample did not ignite when preliminary test performed for EPA Method 1030

DO Indicates the result was Diluted Out

MI Indicates the result was subject to Matrix Interference
TNTC Indicates the result was Too Numerous To Count
SUBC Indicates the analysis was Sub-Contracted
FLD Indicates the analysis was performed in the Field

DL Detection Limit
LOD Limit of Detection
LOQ Limit of Quantitation

**RE** Re-analysis

**CF** HPLC or GC Confirmation

00:01 Reported as a time equivalent to 12:00 AM

#### Reporting Flags that may be Utilized in this Report

J or I Indicates the result is between the MDL and LOQ

J DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria

U Indicates the compound was analyzed for but not detected

B or V Indicates the analyte was detected in the associated Method Blank Indicates a non-compliant QC Result (See Q Flag Application Report)

Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
 Organics - The result is estimated because it exceeded the instrument calibration range

Metals - % diference for the serial dilution is > 10%
 Reporting Limits adjusted to meet risk-based limit.

P RPD between primary and confirmation result is greater than 40

**DL** Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature

Pace Gulf Coast Report 220102866



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

PAX-IDW01-102420-AQ

Collect Date 10/24/2020 13:25

LAB ID

22010286601

Receive Date

10/28/2020 09:47

Matrix Water

# EPA 1311/8260B

Prep Date 10/31/2020 10:00	<b>Prep Batch</b> 0 696144	Prep Method EPA 1311(TCLP)	Dilutio 100	. ,	sis Date 2020 06:53		By SMS	Analytical E	Batch
10/31/2020 10.00	090144	LFA ISTI(TCLF)	100	1 1/03/2	2020 00.53	1	SIVIS	090331	
CAS#	Parameter			Result	DL		LOD	LOQ	Units
75-35-4	1,1-Dichloroethene			0.050U	0.020		0.050	0.500	mg/L
107-06-2	1,2-Dichloroethane			0.050U	0.020		0.050	0.250	mg/L
78-93-3	2-Butanone			0.050U	0.020		0.050	0.500	mg/L
71-43-2	Benzene			0.050U	0.020		0.050	0.250	mg/L
56-23-5	Carbon tetrachloride			0.050U	0.025		0.050	0.250	mg/L
108-90-7	Chlorobenzene			0.050U	0.020		0.050	0.500	mg/L
67-66-3	Chloroform			0.050U	0.020		0.050	0.500	mg/L
127-18-4	Tetrachloroethene			0.050U	0.020		0.050	0.500	mg/L
79-01-6	Trichloroethene			0.050U	0.020		0.050	0.250	mg/L
75-01-4	Vinyl chloride			0.050U	0.020		0.050	0.100	mg/L
CAS#	Surrogate	Conc	. Spiked	Conc. Rec	;	Units	% Re	ecovery F	Rec Limits
460-00-4	4-Bromofluorobenzen	е	5	5.09	)	mg/L		102	62 - 130
1868-53-7	Dibromofluoromethan	е	5	5.43		mg/L		109	65 - 127
2037-26-5	Toluene d8		5	5.2	!	mg/L		104	71 - 134
17060-07-0	1,2-Dichloroethane-de	1	5	5.25	;	mg/L		105	62 - 127

# EPA 1311/8270D

Prep Date	Prep Batch	Prep Method	Dilution	Analys	is Date	Ву	Analytical Batch	
11/04/2020 06:45 696434		EPA 3510C	10	11/08/2020 13:24		DLB	696802	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
106-46-7	1,4-Dichlorobenzene			0.0500U	0.0250	0.0500	0.5000	mg/L
95-95-4	2,4,5-Trichlorophenol			0.0500U	0.0250	0.0500	0.5000	mg/L
88-06-2	2,4,6-Trichlorophenol			0.0500U	0.0250	0.0500	0.5000	mg/L
121-14-2	2,4-Dinitrotoluene			0.0500U	0.0250	0.0500	0.1000	mg/L
1319-77-3	Cresols			0.1000U	0.0500	0.1000	1.00	mg/L
118-74-1	Hexachlorobenzene			0.0500U	0.0250	0.0500	0.1000	mg/L
87-68-3	Hexachlorobutadiene			0.0500U	0.0250	0.0500	0.5000	mg/L
67-72-1	Hexachloroethane			0.0500U	0.0250	0.0500	0.5000	mg/L
1319-77-3MP	m,p-Cresol			0.0500U	0.0250	0.0500	0.5000	mg/L
98-95-3	Nitrobenzene			0.0500U	0.0250	0.0500	0.5000	mg/L
95-48-7	o-Cresol			0.0500U	0.0250	0.0500	0.5000	mg/L
87-86-5	Pentachlorophenol			0.0500U	0.0250	0.0500	0.5000	mg/L



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

PAX-IDW01-102420-AQ

Collect Date 10/24/2020 13:25

LAB ID 22

22010286601

Receive Date 10/28/2020 09:47 Matrix Water

# EPA 1311/8270D (Continued)

<b>Prep Date</b> 11/04/2020 06:45	Prep Batch 696434	Prep Method EPA 3510C	<b>Dilutio</b> 10	n Analysis 11/08/202			B <b>y</b> DLB	Analytical 696802	Batch
CAS#	Parameter			Result	DL	L	.OD	LO	Q Units
110-86-1	Pyridine			0.2500U	0.0750	0.2	500	0.500	0 mg/L
CAS#	Surrogate		Conc. Spiked	Conc. Rec		Units	% Re	covery	Rec Limits
4165-60-0	Nitrobenzene-d5		0.1250	Diluted Out		mg/L		0*	44 - 120
321-60-8	2-Fluorobiphenyl		0.1250	Diluted Out		mg/L		0*	44 - 119
1718-51-0	Terphenyl-d14		0.1250	Diluted Out		mg/L		0*	50 - 134
4165-62-2	Phenol-d5		0.25	Diluted Out		mg/L		0*	10 - 123
367-12-4	2-Fluorophenol		0.25	Diluted Out		mg/L		0*	19 - 119
118-79-6	2,4,6-Tribromophenol		0.25	Diluted Out		mg/L		0*	43 - 140

# EPA 1311/8081B

<b>Prep Date</b> 11/06/2020 13:00	<b>Prep Batch</b> 696723	Prep Method EPA 3510C	<b>Dilution</b> 1		llysis Date 07/2020 07:24	B M	<b>y</b> IFS	Analytical Bar 696912	tch
CAS#	Parameter		F	Result	DL	L	OD	LOQ	Units
57-74-9	Chlordane (Technical)		0.000	)500U	0.000250	0.000	500	0.00250	mg/L
72-20-8	Endrin		0.0000	)400U	0.0000200	0.0000	400	0.00100	mg/L
58-89-9	gamma-BHC (Lindane)		0.0000	)400U	0.0000100	0.0000	400	0.000500	mg/L
76-44-8	Heptachlor		0.0000	U0080	0.0000400	0.0000	008	0.000500	mg/L
1024-57-3	Heptachlor epoxide		0.0000	)400U	0.0000200	0.0000	400	0.000500	mg/L
72-43-5	Methoxychlor		0.000	)100U	0.0000500	0.000	100	0.000500	mg/L
8001-35-2	Toxaphene		0.000	)500U	0.000250	0.000	500	0.00250	mg/L
CAS#	Surrogate	(	Conc. Spiked	Conc	. Rec	Units	% R	ecovery R	ec Limits
877-09-8	Tetrachloro-m-xylene		0.0050		.0018	mg/L		36*	44 - 124
2051-24-3	Decachlorobiphenyl		0.0050		.0007	mg/L		13*	30 - 139

# EPA 1311/8151A

Prep Date 11/02/2020 0	9:30	Prep Batch 696203			Analytical Batc 696856	h			
CAS#	Para	meter		Res	ult	DL	LOD	LOQ	Units
93-72-1	2,4,5	5-TP (Silvex)		0.00250	OU	0.00100	0.00250	0.00500	mg/L



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

PAX-IDW01-102420-AQ

Collect Date 10/24/2020 13:25

LAB ID

22010286601

Receive Date

10/28/2020 09:47

Matrix Water

# EPA 1311/8151A (Continued)

Prep Date 11/02/2020 09:30	Prep Batch 696203	Prep Method EPA 1311/8151A (Continued)	Dilution 1	Analysis Da 11/09/2020	,	Analytical E 696856	Batch
<b>CAS#</b> 94-75-7	Parameter 2,4'-D		<b>Result</b> 0.00250U	<b>DL</b> 0.00100	<b>LOD</b> 0.00250	<b>LOQ</b> 0.00500	<b>Units</b> mg/L

 CAS#
 Surrogate
 Conc. Spiked
 Conc. Rec
 Units
 % Recovery
 Rec Limits

 19719-28-9
 DCAA
 0.02
 .0184
 mg/L
 92
 18 - 136

# EPA 1311/6020B

Prep Date 11/02/2020 07:45	<b>Prep Batch</b> 696199	Prep Method EPA 3010A	<b>Dilution</b> 10	•	<b>Analysis Date</b> 11/02/2020 15:56		Analytical Batch 696271	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
7440-38-2	Arsenic			0.050U	0.025	0.050	0.10	mg/L
7440-39-3	Barium			0.11	0.025	0.050	0.10	mg/L
7440-43-9	Cadmium			0.050U	0.025	0.050	0.10	mg/L
7440-47-3	Chromium			0.050U	0.025	0.050	0.10	mg/L
7439-92-1	Lead			0.050U	0.025	0.050	0.10	mg/L
7782-49-2	Selenium			0.050U	0.025	0.050	0.10	mg/L
7440-22-4	Silver			0.050U	0.025	0.050	0.10	mg/L

# EPA 1311/7470A

Prep Date		Prep Batch	Prep Method Dilution Analysis Date EPA 7470A 1 11/05/2020 14:55		By	Analytical Batch			
11/04/2020 13	5:00	696492	EPA 7470A	1	11/05/2020 14:55		LWZ	696635	
CAS#	Paramet	ter		1	Result	DL	LOD	LOQ	Units
7439-97-6	Mercury			0.	0020U	0.00043	0.0020	0.020	mg/L

# **EPA 1010A**

Prep Date NA	Prep Batch NA	<b>Prep Method</b> NA	Dilution 1	<b>Analysis Date</b> 11/11/2020 11:49		By Analytical Batch MOS 697083		
CAS#	Parameter			Result	DL	LOI	) LOQ	Units
000000-01-3	Flash point			>200	50	50	50	Deg F



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

PAX-IDW01-102420-AQ

**Collect Date** 10/24/2020 13:25 LAB ID

22010286601

**Receive Date** 

10/28/2020 09:47

Matrix Water

# **EPA 9012B**

<b>Prep Date</b> 10/29/2020 09:	<b>Prep Batch</b> 00 695802	<b>Prep Method</b> EPA 7.3.3.2 (1997)	Dilution 1	<b>Analysis Date</b> 10/30/2020 13:18		By MOS	Analytical Batch 695999	
CAS#	Parameter		Res	ult	DL	LOD	LOQ	Units
57-12-5R	Reactivity Cyanide		25	0U	250	250	250	mg/L

# **EPA 9034**

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date		Ву	<b>Analytical Batch</b>	
10/29/2020 09:0	0 695803	EPA 7.3.4.2 (1997)	1	10/30/2	2020 13:38	RYC	696047	
CAS#	Parameter		Res	ult	DL	LOD	LOQ	Units
18496-25-8R	Reactivity Sulfide		250	UC	250	250	250	mg/L

# SM 4500-H+ B/EPA 9040C

Prep Date	Prep Batch	<b>Prep Method</b>	Dilution	Analysis Date		Ву	<b>Analytical Batch</b>	
NA	NA	NA	1	10/29/2020 13	:11	SLL2	695930	
CAS#	Parameter			Result	DL	LO	D LOQ	Units

PAX-IDW01-102420-SO

**Collect Date** 10/24/2020 13:30 LAB ID

22010286602

Receive Date

10/28/2020 09:47

Matrix Solid

# EPA 1311/8260B

Prep Date 10/29/2020 15:00	<b>Prep Batch</b> 695926	Prep Method EPA 1311(TCLP)	<b>Dilution</b> 100	•	rsis Date /2020 01:34	By SMS	Analytical Batch 696531	
CAS#	Parameter		Re	esult	DL	LOD	LOQ	Units
75-35-4	1,1-Dichloroethene		0.0	)50U	0.020	0.050	0.500	mg/L
107-06-2	1,2-Dichloroethane		0.0	)50U	0.020	0.050	0.250	mg/L
78-93-3	2-Butanone		0.0	)50U	0.020	0.050	0.500	mg/L
71-43-2	Benzene		0.0	)50U	0.020	0.050	0.250	mg/L
56-23-5	Carbon tetrachloride		0.0	)50U	0.025	0.050	0.250	mg/L
108-90-7	Chlorobenzene		0.0	)50U	0.020	0.050	0.500	mg/L
67-66-3	Chloroform		0.0	)50U	0.020	0.050	0.500	mg/L
127-18-4	Tetrachloroethene		0.0	)50U	0.020	0.050	0.500	mg/L
79-01-6	Trichloroethene		0.0	)50U	0.020	0.050	0.250	mg/L



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

Receive Date 10/28/2020 09:47 Matrix Solid

# EPA 1311/8260B (Continued)

Prep Date 10/29/2020 15:00	Prep Batch 695926	Prep Method EPA 1311(TCLP)	<b>Dilutio</b> 100		<b>s Date</b> 020 01:34		By SMS	Analytic 696531	al Batch	
CAS#	Parameter			Result	DL		LOD	LC	Q	Units
75-01-4	Vinyl chloride			0.050U	0.020		0.050	0.1	00	mg/L
CAS#	Surrogate	Со	nc. Spiked	Conc. Rec		Units	% Re	covery	Rec Lii	mits
460-00-4	4-Bromofluorobenzen	e	5	4.72		mg/L		94	62 -	130
1868-53-7	Dibromofluoromethan	е	5	5.31		mg/L		106	65 -	127
2037-26-5	Toluene d8		5	5.1		mg/L		102	71 -	134
17060-07-0	1,2-Dichloroethane-d	4	5	5.11		mg/L		102	62 -	127

# EPA 1311/8270D

Prep Date 11/04/2020 06:45	<b>Prep Batch</b> 696434	Prep Method EPA 3510C	<b>Dilution</b> 1	Analysis Date 11/05/2020 10:37			By DLB	Analytica 696571	Il Batch
CAS#	Parameter			Result	ult DL		LOD		DQ Units
106-46-7	1,4-Dichlorobenzene			0.0050U	0.0025	0.	0050	0.05	500 mg/L
95-95-4	2,4,5-Trichlorophenol			0.0050U	0.0025		0050	0.05	0
88-06-2	2,4,6-Trichlorophenol			0.0050U	0.0025		0050	0.05	0
121-14-2	2,4-Dinitrotoluene			0.0050U	0.0025		0050	0.01	0
1319-77-3	Cresols			0.0100U	0.0050		0100	0.10	0
118-74-1	Hexachlorobenzene			0.0050U	0.0025	0.	0050	0.01	
87-68-3	Hexachlorobutadiene			0.0050U	0.0025	0.	0050	0.05	
67-72-1	Hexachloroethane			0.0050U	0.0025	0.	0050	0.05	
1319-77-3MP	m,p-Cresol			0.0050U	0.0025	0.	0050	0.05	
98-95-3	Nitrobenzene			0.0050U	0.0025	0.	0050	0.05	500 mg/L
95-48-7	o-Cresol			0.0050U	0.0025	0.	0050	0.05	500 mg/L
87-86-5	Pentachlorophenol			0.0050U	0.0025	0.	0050	0.05	500 mg/L
110-86-1	Pyridine			0.0250U	0.0075	0.	0250	0.05	500 mg/L
CAS#	Surrogate	C	onc. Spiked	Conc. Rec		Units	% R	ecovery	Rec Limits
4165-60-0	Nitrobenzene-d5		0.25	.196		mg/L		78	44 - 120
321-60-8	2-Fluorobiphenyl		0.25	.194		mg/L		78	44 - 119
1718-51-0	Terphenyl-d14		0.25	.177		mg/L		71	50 - 134
4165-62-2	Phenol-d5		0.50	.106		mg/L		21	10 - 123
367-12-4	2-Fluorophenol		0.50	.185		mg/L		37	19 - 119
118-79-6	2,4,6-Tribromopheno		0.50	.459		mg/L		92	43 - 140



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

Receive Date 10/28/2020 09:47 Matrix Solid

# EPA 1311/8081B

Prep Date 11/02/2020 06:3	<b>Prep Batch</b> 80 696194	Prep Method EPA 3510C	Dilution 1	<b>Analysis Date</b> 11/02/2020 17:28			B <b>y</b> MFS	Analytical E 696349	Batch
CAS#	Parameter		F	Result	DL		LOD	LOG	Units
57-74-9	Chlordane (Technical)		0.000	500U	0.000250	0.00	0500	0.00250	) mg/L
72-20-8	Endrin		0.0000	)400U	0.0000200	0.000	0400	0.00100	) mg/L
58-89-9	gamma-BHC (Lindane)		0.0000	)400U	0.0000100	0.000	0400	0.000500	) mg/L
76-44-8	Heptachlor		0.0000	U0080	0.0000400	0.000	0800	0.000500	) mg/L
1024-57-3	Heptachlor epoxide		0.0000	)400U	0.0000200	0.000	0400	0.000500	) mg/L
72-43-5	Methoxychlor		0.000	)100U	0.0000500	0.00	0100	0.000500	) mg/L
8001-35-2	Toxaphene		0.000	)500U	0.000250	0.00	0500	0.00250	) mg/L
CAS#	Surrogate	С	onc. Spiked	Conc	. Rec	Units	% R	ecovery	Rec Limits
877-09-8	Tetrachloro-m-xylene		0.0050		.004	mg/L		79	44 - 124
2051-24-3	Decachlorobiphenyl		0.0050		.0034	mg/L		68	30 - 139

# EPA 1311/8151A

Prep Date	Prep Ba	atch Prep Method	Dilution	Analysi	s Date		Ву	Analytica	l Batch
11/02/2020 09:	30 696203	EPA 1311/8151A	1	11/09/20	020 14:40		MFS	696856	
CAS#	Parameter		R	esult	DL		LOD	LO	Q Units
93-72-1	2,4,5-TP (Silvex)		0.00	250U (	0.00100	0.0	0250	0.0050	0 mg/L
94-75-7	2,4'-D		0.00	250U (	0.00100	0.0	0250	0.0050	0 mg/L
CAS#	Surrogate	Co	onc. Spiked	Conc. Rec		Units	% Re	ecovery	Rec Limits
19719-28-9	DCAA		0.02	.0228		mg/L		114	18 - 136

# EPA 1311/6020B

Prep Date	Prep Batch	Prep Method	Dilution	Analysi	s Date	Ву	Analytical Batch	
10/30/2020 14:45	696093	EPA 3010A	10	11/03/20	020 15:44	LWZ	696405	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
7440-38-2	Arsenic			0.050U	0.025	0.050	0.10	mg/L
7440-39-3	Barium			0.28	0.025	0.050	0.10	mg/L
7440-43-9	Cadmium			0.050U	0.025	0.050	0.10	mg/L
7440-47-3	Chromium			0.040J	0.025	0.050	0.10	mg/L
7439-92-1	Lead			0.050U	0.025	0.050	0.10	mg/L
7782-49-2	Selenium			0.050U	0.025	0.050	0.10	mg/L
7440-22-4	Silver			0.050U	0.025	0.050	0.10	mg/L



**Project ID:** PAX Basewide - CTO-4256 **Report Date:** 11/25/2020

# Sample Results

Receive Date 10/28/2020 09:47 Matrix Solid

# EPA 1311/7470A

Prep Date	Prep Batch	<b>Prep Method</b>	Dilution	Analy	sis Date	Ву	<b>Analytical Batch</b>	
10/30/2020 15:15	696094	EPA 7470A	1	11/04	/2020 12:47	BDP	696390	
CAS#	Parameter		R	esult	DL	LOD	LOQ	Units
7439-97-6	Mercury		0.00	010J	0.000070	0.00020	0.0020	mg/L

# EPA 1030

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date		•	Analytical Batch	
NA	NA	NA	1	11/12/2020 17	7:55	AJE 6	697206	
CAS#	Parameter			Result	DL	LOD	LOQ	Units
000000-01-7	Ignitable			NO	2	2	2	mm/sec

# **EPA 9012B**

Prep Date		Prep Batch	Prep Method	Dilution	Analy	sis Date	Ву	Analytical Bat	ch
10/29/2020 09	9:00	695800	EPA 7.3.3.2 (1997)	1	10/30	/2020 12:59	MOS	695998	
CAS#	Para	meter		Res	sult	DL	LOD	LOQ	Units
57-12-5R	Read	tivity Cyanide		25	50U	250	250	250	mg/kg

# **EPA 9034**

Prep Date 10/29/2020 09:0	<b>Prep Batch</b> 0 695801	<b>Prep Method</b> EPA 7.3.4.2 (1997)	<b>Dilution</b> 1		alysis Date 80/2020 10:15	<b>By</b> RYC	Analytical Bate 696046	ch
CAS#	Parameter		Res	ult	DL	LOD	LOQ	Units
18496-25-8R	Reactivity Sulfide		25	0U	250	250	250	mg/kg

# **EPA 9045D**

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	)	Ву	Analytical Batch	
NA	NA	NA	1	10/29/2020 14	:06	SLL2	695929	
CAS#	Parameter			Result	DL	LOI	D LOQ	Units
рН	рН			12.2	1.00	1.0	0 1.00	pH unit

Pace Analytical*	Chain		is a LEGAL	DOCUMEN	cal Requ						LAB US	E ONLY- A	HIX Wo			4380 - 0	CH2M Hill Construc	ctors
Company: GIZM / Jacobs			Billing Inf	ormation:								ALL	SHAL	PM:	EP	M		
ddress:											Contain	ner Presen	vative T					
eport To: Juan Acaron			Email To:	The same of the	2252	0	- br .	2.04	** Pr	reserva	tive Types:	(1) nitric aci	id, (2) sul	furic acid, (3	) hydroch	loric acid, (4) s	odium hydroxide, (5) zinc acetat	e,
ру То:			Site Colle	ction Info/	Address: PA	nejac	DEN C	N TYI				im bisulfate, ide, (D) TSP,				ane, (A) ascor	bic acid, (B) ammonium sulfate,	
stomer Project Name/Number			State:	County/C	itus Tin	ne Zone Co	I M	7				Analys				Lab Profile		
stomer Project Name/Number:	0				iver 1			K) ET									mple Receipt Checklist	
ione: 352-214-28 14	Site/Facility II	Baser	vide PF			e Monitori										Collec	y Seals Present/Intact y Signatures Present tor Signature Present s Intact	Y N NA
lected By (print):	Purchase Ord Quote #:				DW PWS I DW Locati											Correc	t Bottles cient Volume es Received on Ice	Y N NA Y N NA Y N NA
llected By (signature):	Turnaround D	Date Requir	ed:		Immediate	ly Packed	on Ice:									VOA - USDA R	Headspace Acceptable egulated Soils	Y N NA Y N NA
mple Disposal: Dispose as appropriate [ ] Return Archive: Hold:	[ ] 2 Day				[ ] Yes	ed (if appli	cable):		P+RU							Residu Cl Str Sample pH Str	pH Acceptable	Y N NA Y N NA Y N NA
Matrix Codes (Insert in Matrix bo roduct (P), Soil/Solid (SL), Oil (Ol	x below): Drinl L), Wipe (WP),	king Water Air (AR), Ti	(DW), Grou ssue (TS), B	nd Water ioassay (B)	(GW), Waste , Vapor (V),	ewater (W) Other (OT)	W),		721							Lead A	e Present cetate Strips:	I N NA
stomer Sample ID	Matrix *	Comp / Grab		ited (or ite Start)	Compos	site End	Res Cl	# of Ctns	三							Lab Sa	mple # / Comments:	
AX-IDUO1-102420-19	GW	Como	to/24/20		10/29/20	1325		4	×									
AX-IDWO-107420-00			14/24/20	1330	19/24/10	1330		2	X									-
		,																
															4			
		-										-		-				
												+		++	-			
									-					+				
											63							
tomer Remarks / Special Conditi	ons / Possible	Hazards:	Type of Ice	Used:	Wet B	lue Dr	y No	one		SHO	RT HOLDS	PRESENT	(<72 ho	urs): Y	N N/	Α.	Lab Sample Temperature In	nfo:
			Packing M	aterial Use	d:					Lab	Tracking #	1: 2	259	506	5		Temp Blank Received: Therm ID#: £3  Cooler 1 Temp Upon Rec	4
			Radchem :	sample(s) s	creened (<5	00 cpm):	Y N	NA			ples receiv	ved via: UPS C	Client	Courier	Pace	Courier	Cooler 1 Therm Corr. Fac Cooler 1 Corrected Temp	ctor:oC
nquished by/Company: (Signature)  Date/Time:  Received by/Company: (Signature)  Date/Time:  Date/Time:  Date/Time:				Date/Time	e:	1	MTJL able #:	LAB USE	ONLY	Comments: 7718940382								
inquished by/Company: (Signature)  Date/Time: Received by/Company: (Signature)		_	Date/Time	e:	- 1	cctnum:												
ed EX		10/	28/20	947	1:7	· long	& F	ACI			10/28/	20 094	17	emplate: relogin:			Trip Blank Received: Y HCL MeOH TSP	N NA Other
inquished by/Company: (Signatur	re)	Date	/Time:	9	Received by	/Company	: (Signat	ure)			Date/Time	e:		M: B:				Page:

# CTO-4256: PAX Basewide PFAS Project No 100142032 PFAS by DoD QSM 5.3 Table B-15

SD, SO Batch 20-1355 Package DP-20-1225

Submitted to: CH2M 5701 Cleveland Street Virginia Beach, VA 23462 USA

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061



# CTO-4256: PAX Basewide PFAS Project No 100142032 PFAS by DoD QSM 5.3 Table B-15

SD, SO Batch 20-1355 Package DP-20-1225

Submitted to:
CH2M
5701 Cleveland Street
Virginia Beach, VA 23462 USA

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Analyst Approval:

Digitally signed by Lauren Griffith Date: 2020.11.19

QC Chemist Approval:

Elly M Tetal

Digitally signed by Ellyn M. Fitch Date: 2020.11.24 12:17:06 -05'00'

Project Manager Approval:



Digitally signed by Jonathan Thorn
Date: 2020.11.24 13:03:50 -05'00'





Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PAX-IDW01-102420-SO						
Battelle ID		G1996-FS						
Sample Type		SA						
Collection Date		10/24/2020						
Extraction Date		11/04/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		7.55						
Matrix		SO						
Sample Size		1.80						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.79	2.22	5.56
PFHpA	375-85-9	1.67 U	G1996-FS(3)	10.000	11/18/2020	0.57	1.67	5.56
PFOA	335-67-1	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.68	2.22	5.56
PFNA	375-95-1	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.54	1.11	5.56
PFDA	335-76-2	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.51	1.11	5.56
PFUnA	2058-94-8	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.51	1.11	5.56
PFDoA	307-55-1	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.68	2.22	5.56
PFTrDA	72629-94-8	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.31	1.11	5.56
PFTeDA	376-06-7	2.78 U	G1996-FS(3)	10.000	11/18/2020	1.20	2.78	5.56
NMeFOSAA	2355-31-9	2.78 U	G1996-FS(3)	10.000	11/18/2020	1.13	2.78	5.56
NEtFOSAA	2991-50-6	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.83	2.22	5.56
PFBS	375-73-5	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.39	1.11	5.56
PFHxS	355-46-4	1.73 J	G1996-FS(3)	10.000	11/18/2020	0.90	2.22	5.56
PFOS	1763-23-1	40.43	G1996-FS(3)	10.000	11/18/2020	0.77	2.22	5.56
HFPO-DA	13252-13-6	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.71	2.22	5.56
Adona	919005-14-4	2.22 U	G1996-FS(3)	10.000	11/18/2020	0.92	2.22	5.56
11Cl-PF3OUdS	763051-92-9	1.67 U	G1996-FS(3)	10.000	11/18/2020	0.58	1.67	5.56
9CI-PF3ONS	756426-58-1	1.11 U	G1996-FS(3)	10.000	11/18/2020	0.53	1.11	5.56

Page 35 of 431 Cape Fear Analytical, LLC Page: Project #: 070 - 42 56 3306 Kitty Hawk Rd. Suite Chain of Custody and Analytical Request CFA Quote #: Wilmington, NC 28405 COC Number (1) CFA Work Order Number: Phone: (910) 795-0421 PO Number: Client Name: Phone #: 352 -214 - 2814 Sample Analysis Requested (5) (Fill in the number of containers for each test) Juan Acaron Project/Site Name: containers Fax #: PAX BIOCURLUPFAS SI --- Preservative Type (6) Address: PAX RIVER, MD Comments Collected by: Hamsh Grove Send Results To: Wan dearon@ jacins lin Note: extra sample is required for sample \*Date Collected Field Sample ID Total specific OC (Military) Filtered (3 Matrix 14 (mm-dd-yy) \* For composites indicate start and stop date time (hhmm) PX- H110-SB03-1020 10 NO 0/24/20 1993 DX- HI10-WT03-1020 1220 GW 2100 99 PAX - IDW 61-102420- A 0 1225 6 GW PAX-IDW01-102420-50 50 TAT Requested: Normal: X Rush: Specify: (Subject to Surcharge) Fax Results: No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4 Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards Sample Collection Time Zone Eastern Pacific Central Other Mountain Chain of Custody Signatures Sample Shipping and Delivery Details Relinquished By (Signed) Received by (signed) CFA PM: 10.27.20 930 10 16/20 00 1630 Method of Shipment: Date Shipped: Airbill #: Airbill #: 1.) Chain of Custody Number = Client Determined 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite For Lab Receiving Use Only 3.) Field Filtered: For liquid matrices, indicate with a- Y - for yes the sample was field filtered or- N - for sample was not field filtered. Custody Seal Intact? 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, MI.=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipc, U=Urine, F=Fecal, N=Nasal YES 5.) Sample Analysis Requested: Analytical method requested (i.e.8290B, 1668B) and number of containers provided for each (i.e.8290B - 3, 1668B - 1). Cooler Temp: 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank WHITE = LARORATORY

VFILLOW = FILF

PINK = CLIENT

# CTO-4256: PAX Basewide PFAS Project No 100142032 PFAS by DoD QSM 5.3 Table B-15

AQ, GW, SW Batch 20-1357 Package DP-20-1227

Submitted to:
CH2M
5701 Cleveland Street
Virginia Beach, VA 23462 USA

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061



# CTO-4256: PAX Basewide PFAS Project No 100142032 PFAS by DoD QSM 5.3 Table B-15

AQ, GW, SW Batch 20-1357 Package DP-20-1227

Submitted to:
CH2M
5701 Cleveland Street
Virginia Beach, VA 23462 USA

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Penine Schumity

Digitally signed by Denise

Schumitz

Date: 2020.11.20 16:09:11 -05'00'

Analyst Approval:

Digitally signed by Carla Devine

QC Chemist Approval:

Date: 2020.11.24 11:28:51 -05'00'

Project Manager Approval:



Digitally signed by Jonathan Thorn Date: 2020.11.24 11:49:09 -05'00'





Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PAX-IDW01-102420-AQ						
Battelle ID		G1995-FS						
Sample Type		SA						
Collection Date		10/24/2020						
Extraction Date		11/02/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		NA						
Matrix		GW						
Sample Size		0.255						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	234.87 D	G1995-FS-D(3)	5.000	11/20/2020	2.60	7.35	24.51
PFHpA	375-85-9	0.98 U	G1995-FS(0)	1.000	11/20/2020	0.25	0.98	4.90
PFOA	335-67-1	154.18 D	G1995-FS-D(3)	5.000	11/20/2020	2.50	7.35	24.51
PFNA	375-95-1	32.76 D	G1995-FS-D(3)	5.000	11/20/2020	1.52	4.90	24.51
PFDA	335-76-2	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.14	0.49	4.90
PFUnA	2058-94-8	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.22	0.49	4.90
PFDoA	307-55-1	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.19	0.49	4.90
PFTrDA	72629-94-8	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.15	0.49	4.90
PFTeDA	376-06-7	1.96 U	G1995-FS(0)	1.000	11/20/2020	0.72	1.96	4.90
NMeFOSAA	2355-31-9	0.98 U	G1995-FS(0)	1.000	11/20/2020	0.34	0.98	4.90
NEtFOSAA	2991-50-6	0.98 U	G1995-FS(0)	1.000	11/20/2020	0.49	0.98	4.90
PFBS	375-73-5	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.14	0.49	4.90
PFHxS	355-46-4	672.94 D	G1995-FS-D(3)	5.000	11/20/2020	0.54	1.96	24.51
PFOS	1763-23-1	1692.50 D	G1995-FS-D(5)	25.000	11/20/2020	10.78	24.51	122.55
HFPO-DA	13252-13-6	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.25	0.49	4.90
Adona	919005-14-4	0.98 U	G1995-FS(0)	1.000	11/20/2020	0.26	0.98	4.90
11Cl-PF3OUdS	763051-92-9	0.49 U	G1995-FS(0)	1.000	11/20/2020	0.23	0.49	4.90
9CI-PF3ONS	756426-58-1	0.98 U	G1995-FS(0)	1.000	11/20/2020	0.26	0.98	4.90

Page 34 of 549 Cape Fear Analytical, LLC Page: Project #: 070 - 42 56 3306 Kitty Hawk Rd. Suite Chain of Custody and Analytical Request CFA Quote #: Wilmington, NC 28405 COC Number (1) CFA Work Order Number: Phone: (910) 795-0421 PO Number: Client Name: Phone #: 352 -214 - 2814 Sample Analysis Requested (5) (Fill in the number of containers for each test) Juan Acaron Project/Site Name: containers Fax #: PAX BIOCURLUPFAS SI --- Preservative Type (6) Address: PAX RIVER, MD Comments Collected by: Hamsh Grove Send Results To: Wan dearon@ jacins lin Note: extra sample is required for sample \*Date Collected Field Sample ID Total specific OC (Military) Filtered (3 Matrix 14 (mm-dd-yy) \* For composites indicate start and stop date time (hhmm) PX- H110-SB03-1020 10 NO 0/24/20 1993 DX- HI10-WT03-1020 1220 GW 2100 99 PAX - IDW 61-102420- A 0 1225 6 GW PAX-IDW01-102420-50 50 TAT Requested: Normal: X Rush: Specify: (Subject to Surcharge) Fax Results: No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4 Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards Sample Collection Time Zone Eastern Pacific Central Other Mountain Chain of Custody Signatures Sample Shipping and Delivery Details Relinquished By (Signed) Received by (signed) CFA PM: 10.27.20 930 10 16/20 00 1630 Method of Shipment: Date Shipped: Airbill #: Airbill#: 1.) Chain of Custody Number = Client Determined 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite For Lab Receiving Use Only 3.) Field Filtered: For liquid matrices, indicate with a- Y - for yes the sample was field filtered or- N - for sample was not field filtered. Custody Seal Intact? 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, MI.=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipc, U=Urine, F=Fecal, N=Nasal YES 5.) Sample Analysis Requested: Analytical method requested (i.e.8290B, 1668B) and number of containers provided for each (i.e.8290B - 3, 1668B - 1). Cooler Temp: 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank WHITE = LARORATORY

VFILLOW = FILF

PINK = CLIENT



# **Waste Profile Form**

Applicant / Agent Information	on Ge	enerator Information							
Company Name:	Company Name:								
Address:	Address:								
City / State / Zip:	City / State / Zip:								
Contact:	Contact:								
Phone:	Phone:								
e-mail:	e-mail:								
	Project Description								
Site Name:									
Site Address:									
Source of Contamination: UST	AST Spill Historica	I / Other:							
Waste Generating Activity:									
	Waste Characterization								
Applicant must complete the following inform		•							
Common Waste Name:									
Type of Waste: Soil	Sludge Liquid Abso	orbents Other:							
Type of Contamination: Unused Petroleum Used Petroleum No Petroleum Other									
(list all conteminants & include type of pe	atroloum if anyla								
(list all contaminants & include type of pe	uoleum, ii any) .								
Flash Point Range:	pH Range:	Reactive: YES NO							
Quantity: Units:	Lab Analysis /	SDS Attached: YES NO							
	Generator Certification								
I hereby certify, based upon my diligent inquiry into the activities and processes generating the waste described on this form, that these materials are not classified as listed or characteristic hazardous waste as regulated by the Commonwealth of Virginia or the state of origin of this waste; that the materials do not contain 50.0 parts per million or more of polychlorinated biphenyls (PCB's); that the analytical results, completed <i>Waste Profile Form</i> and attached documentation are a representative, true, and accurate description of these materials; that no deliberate or willful omissions have been made in the preparation of this form; and that all known or suspect hazards have been disclosed herein. I further acknowledge that I am aware it is the duty of all persons to dispose of their solid waste in a legal manner (Va.Code ' 10.1-1418.1.A).									
Generator or Agent Signature / Date		enerator or Agent Printed Name							
If I am an agent signing on behalf of the generator, I have co	onfirmed with the generator that the information	on contained in this profile is accurate and complete.							
	For Facility Use Only								
Approved By:	Approval Code:								
Approval Date:	Comments:								



NAME

POST OFFICE BOX 1444 • CHESAPEAKE, VA 23327 PHONE: (757) 549-8448 • WWW.CLEARFIELDMMG.COM

**NAVFAC Environmental** 

NON-HAZARDOUS SHIPPING MANIFEST

301-757-4897

MANIFEST	NO.	

ADDRESS	DDRESS 22445 Peary Road, Bldg. 504		CITY/STATE		Patuxent River, MD		
SHIPMENT ORIGIN NAS Patuxent River & Webster Field			Annex C	ITY/STATE	Patuxent	River, MD	
AUTHORIZED AGENT	c/o Jacobs / CH2M	Hill	F	RM			
OTHER	HER PO # 148015204						
		WASTE CHAR	ACTERIZAT	ION			
WASTE NAME AND DESCRIPTION		PHYSICAL STATE					
IDW Groundwater (Contains PFAS > 70 ppt)					SOLID	LIQUID / SLUDGE X	
BULK LOAD WEIGHT / TONS		CONTAINERS	TYPE 55	Gallon Dri	um	QUANTITY 6	
2. IDW Soil Cuttings					SOLID X	LIQUID / SLUDGE	
BULK LOAD WEIGH	CONTAINERS	TYPE 55 Gallon Drum			QUANTITY 3		
Commonwealth of Virgin			ners have been	properly marke		azardous waste as regulated by the tree in proper condition for transport	
Generator /	Agent's Printed Name	1	M. A.	ignature		Date	
Transporter Name _	Clearfield MMG, Inc		PORTER TELEPHO	NE <b>7</b> 5	57-549-8448	TRUCK NO. 22	
	described above were received ivered to the designated facilit		Ale	to		12-15-20	
	i i		Transpo	rter's Signature		Date	
	-	FAC	ILITY				
	als described above were ty and received by me.	DESIGNATED FACILITY	Ch	esapeake F	acility, 3900 S	hannon Street	
Jahn La	Clair	1	11	22		12-15-20	
Pi	rinted Name		S	ignature		Date	

TELEPHONE

Appendix C Data Quality Assessment



Data Quality Assessment for Per- and Polyfluoroalkyl Substances Site Inspection at Buildings 215 and 217, Hangars 2905 and 2133, and Bronson Road, Naval Air Station Patuxent River, St. Mary's County, Maryland

DATE: April 30, 2021

#### 1.0 Introduction

Historical use of aqueous film-forming foam during fire and emergency response, testing, and training activities at Naval Air Station (NAS) Patuxent River has prompted the Department of the Navy (Navy) to conduct a per- and polyfluoroalkyl substances (PFAS) Site Inspection (SI) at the installation. The purpose of this technical memorandum is to present the results of the data validation process for the soil and water samples collected in July and August 2020 during the PFAS SI at Buildings 215 and 217, Hangars 2905 and 2133, and Bronson Road.

Soil and water samples were submitted to Battelle Laboratories for PFAS analysis by analytical method Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS) compliant with Department of Defense (DoD) Quality Systems Manual (QSM) Version 5.3 Table B-15 (DoD, 2020). The sample results were validated by Environmental Data Services, Inc. (EDS) for compliance with the analytical method requirements. Data validation reports for the following sample delivery groups (SDGs) were reviewed and summarized:

SDG
20-0862
20-0864
20-0895
20-0896
20-0968
20-0969
20-0979
20-0985
20-0986
20-0987
20-0989
20-0990
20-0996
20-1112

20-1118

The process for conducting this data quality assessment included a review of the data to assess the accuracy, precision, and completeness based on procedures described in the DoD guidance document *Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories Table B-15* (DoD, 2020), the project-specific sampling and analysis plan (SAP) for the PFAS SI (CH2M HILL, Inc. [CH2M], 2020), and professional judgment. The quality assurance

(QA)/quality control (QC) summary forms and data reports were reviewed, and the resulting findings are documented within each subsection that follows.

During the data validation by EDS, if QA/QC parameters were not within the acceptance limits, associated sample results were appended with a primary qualifying flag that indicated a possible anomaly with these data. The qualifying flags were applied during the data review and validation processes. This qualification also included the use of secondary qualifier flags. The secondary qualifiers provide the reasoning behind the assignment of a qualifier to these data. The definitions of the primary qualifiers are presented below. The secondary qualifiers are listed in **Attachment 1**.

## 2.0 Validation Flag Definitions

The following primary qualifiers were used to qualify the data:

[NULL]: **Detected.** The analyte was analyzed for and detected at the concentration shown.

[J]: **Estimated.** The reported result was an estimated value with an unknown bias.

[U]: **Undetected.** The analyte was not detected and was reported as less than the limit of detection (LOD) or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

[UJ]: **Detection limit estimated.** The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.

[R]: **Rejected.** The data are not useable.

[Exclude]: **Excluded.** Data were not used due to another value being more appropriate.

# 3.0 Quality Control Measures

The following list represents the QA/QC measures that were reviewed during the data quality evaluation procedure:

- **Holding Times:** The holding times are evaluated to verify that samples were extracted and analyzed within holding times.
- **Blank samples:** Method blank, equipment blank, and trip blank samples were provided for this project. Blank samples enable the reviewer to determine if an analyte may be attributed to sampling or laboratory procedures, rather than environmental contamination from site activities.
- **Surrogate Recoveries:** Surrogate compounds are added to each sample and the recoveries are used to monitor lab performance and possible matrix interference.
- Lab Control Sample (LCS)/Lab Control Sample Duplicate (LCSD): These samples are a "controlled matrix", laboratory reagent water, in which target compounds have been added prior to extraction/analysis. The recoveries serve as a monitor of the overall performance of each step during the analysis, including sample preparation.
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples: Spike recovery is used to evaluate potential matrix interferences, as well as accuracy. Precision information is also determined by calculating the reproducibility between the recoveries of each spiked parameter.
- **Field Duplicate/Triplicate Samples:** These samples are collected to determine precision between a native and its duplicates. This information can only be determined when target compounds are detected.
- Internal Standards: These are compounds added to the sample extracts prior to analysis. Their retention times and response are evaluated for method compliance. The internal standards are used in quantification of the target parameters and to monitor the instrument sensitivity and response for stability during analysis.

- **Initial Calibration:** The initial calibration ensures the instrument is capable of producing acceptable qualitative and quantitative data for the compounds of interest. Multiple standard solutions are analyzed to determine the response and linearity of the instrument over a varying concentration range.
- **Continuing Calibration:** The continuing calibration checks satisfactory performance of the instrument and its predicted response to the target compounds by analysis of a standard solution(s) at known concentrations.

## 4.0 Quality Control Review

The QA/QC parameters for all samples were within acceptable control limits with the exceptions listed below. A brief overview of the data evaluation follows:

#### 4.1 Holding Time

All holding time requirements were met.

#### 4.2 Recoveries – Surrogate, MS/MSD and LCS/LCSD

Surrogates, MS/MSD, and LCS/LCSD recoveries all met acceptance criteria with the exception of those listed below:

#### MS/MSD:

- Spiked sample PX-H2133-WT04-0820 exhibited low recoveries in the MS/MSD for perfluorohexanesulfonic acid (PFHxS) and perfluorooctane sulfonate (PFOS).

#### Surrogates:

- Various samples exhibited low recoveries in the surrogates over several SDGs.

Associated results were qualified as estimated unless otherwise noted. Affected data are summarized in **Attachment 2**.

## 4.3 Field Duplicate Precision

• Native sample PX-ETA-WT02-0720 and field duplicate PX-ETA-WT02P-0720 did not meet field duplicate precision criteria for perfluorohexanoic acid (PFHxA).

Associated results were qualified as estimated and are summarized in Attachment 2.

#### 4.4 Analytical Blanks

• Several target analytes were detected in method blanks in SDGs 20-0968, 20-0987, and 20-0862.

Associated data were qualified as non-detect (U) due to blank contamination. Affected data are summarized in **Attachment 2**.

#### 4.5 Calibration

All calibration acceptance criteria were met.

#### 4.6 Serial Dilution

All serial dilution acceptance criteria were met.

#### 4.7 Reporting Limits Evaluation

Laboratory detection limits (DLs), LODs, and limits of quantitation (LOQs) were evaluated and compared to the project limits and were found to be within an acceptable range.

#### 5.0 PARCC

**Precision** is defined as the agreement between duplicate results and was estimated by comparing duplicate MS recoveries and field duplicate sample results. The precision between the native and field duplicate sample results was mostly within acceptable criteria indicating that the sample matrix did not significantly interfere with the overall analytical process.

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. For organic analyses, each sample was spiked with surrogate compounds. Additionally, an MS/MSD and LCS were spiked with a known parameter concentration before preparation. Internal standards also provide a measure of accuracy. Internal standards, surrogates, and MS/MSD provide a measure of the matrix effects on the analytical accuracy. The LCS demonstrates accuracy of the method and the laboratory's ability to meet the method criteria. Accuracy is also assessed by calibration responses. Potential biases and trends were evaluated by first determining whether a QA/QC exceedance may indicate a potential bias or trend. If so, then the exceedance was examined to determine whether the bias or trend was significant enough to warrant rejection of data. Spike recoveries were mostly within the method acceptance limits, except where noted, indicating possible matrix interference.

**Representativeness** is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition (e.g., nature and extent of contamination). Representativeness is a subjective parameter and is used to evaluate the efficacy of the sample planning design. In terms of data quality, representativeness was assured because the sampling team followed approved standard operating procedures (SOPs) for sample collection and handling, and the laboratory followed approved SOPs for sample handling, preparation, and analysis. All field samples were collected and analyzed as proposed in the SAP.

Completeness is defined as the percentage of measurements that are judged to be valid; validity being defined by the data quality objectives (DQOs). Therefore, completeness is calculated as the number of analytically sound results that are available for use compared to the total number of measurements made. The National Functional Guidelines data validation guidance designates all results except those R-qualified as "rejected" to be available for use as analytically sound results. The R-qualifier is the only qualifier that negatively affects a data point's availability. The data set is 100% complete and the completeness goal of 95% was exceeded.

**Comparability** is another qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are sample collection and handling techniques, sample matrix, and analytical methods. In this case, because approved SOPs were used for sample collection and handling, common sample matrices were evaluated, and EPA SW-846 methods were utilized, the data user may express confidence in that fact that this data set is comparable to others of acceptable data quality. Comparability is controlled by the other PARCC parameters, because data sets can be compared with confidence only when precision and accuracy are known. Precision and accuracy were demonstrated to be acceptable, and the data user may be confident that this data set is comparable to others of high data quality.

The recalculation of the laboratory quantitation was performed at a 10% frequency as per the statement of work with no anomalies found. The assumptions made about the PARCC were proper and correct. No error in judgment was found during this review of the data validation reports, which are included in **Attachment 3**.

#### 6.0 Conclusion

A review of the analytical data submitted for the July and August 2020 PFAS SI sampling events for Buildings 215 and 217, Hangars 2905 and 2133, and Bronson Road has been completed. The validation review demonstrated that the analytical systems were generally in control and all of the data results can be used in the project decision making process.

# 7.0 References

CH2M HILL. 2020. Basewide Per- and Polyfluoroalkyl Substances Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland. April.

Department of Defense (DoD). 2020. Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories Table B-15. May.

Attachment 1 Secondary Data Qualifier Codes Attachment 1. Secondary Data Qualifier, or Validation Reason, Codes

Secondary Data Qualifier	Description
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
ССН	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
GBL	Grinding Blank Contamination
GBSH	Ground Blank Spike/LCS – High Recovery
GBSL	Ground Blank Spike/LCS – Low Recovery
НТ	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	lon ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery

Attachment 1. Secondary Data Qualifier, or Validation Reason, Codes

Secondary Data Qualifier	Description
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
ОТ	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune

Attachment 2 Assigned Qualifiers

# Attachment 2. Assigned Qualifiers

Sample ID	Sample Type	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Primary Qualifier	Units	Secondary Qualifier
PX-BR-ACS-EB01-081720-SO	EB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.27	J	0.38	U	NG_L	MBL
PX-BR-ACS-EB01-081820-GW	EB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.17	J	0.39	U	NG_L	MBL
PX-BR-ACS-EB01-081820-SO	EB	PFAS_QSM5.3	Perfluorobutanesulfonic acid (PFBS)	0.16	J	0.47	U	NG_L	MBL
PX-BR-ACS-EB01-081820-SO	EB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.18	J	0.38	U	NG_L	MBL
PX-BR-ACS-FB01-081820	FB	PFAS_QSM5.3	Perfluorobutanesulfonic acid (PFBS)	0.15	J	0.49	U	NG_L	MBL
PX-BR-ACS-FB01-081820	FB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.18	J	0.39	U	NG_L	MBL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorohexanoic Acid (PFHxA)	80.12		80.12	J	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluoroheptanoic acid (PFHpA)	29.64		29.64	J	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorooctanoic acid (PFOA)	55.4		55.4	J	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorononanoic acid (PFNA)	14.63		14.63	J	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorodecanoic Acid (PFDA)	0.19	J	0.19	J	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluoroundecanoic Acid (PFUnA)	0.5	U	0.5	UJ	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorododecanoic Acid (PFDoA)	0.5	U	0.5	UJ	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	2	U	2	UJ	NG_L	SSL
PX-BR-ACS-WT04-0820	REG	PFAS_QSM5.3	Perfluoro-2-methyl-3-oxahexanoic acid (HFPO-DA)	0.5	U	0.5	UJ	NG_L	SSL
PX-BR-ACS-WT07-0820	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	2	U	2	UJ	NG_L	SSL
PX-ETA-EB01-081820-GW	EB	PFAS_QSM5.3	Perfluorobutanesulfonic acid (PFBS)	0.15	J	0.47	U	NG_L	MBL
PX-ETA-EB01-081820-GW	EB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.17	J	0.38	U	NG_L	MBL
PX-ETA-FB01-081820	FB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.17	J	0.38	U	NG_L	MBL
PX-ETA-SB06-0304	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	2.89	U	2.89	UJ	NG_G	SSL
PX-ETA-WT01-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.94	U	0.94	UJ	NG_L	SSL

Attachment 2. Assigned Qualifiers

Sample ID	Sample Type	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Primary Qualifier	Units	Secondary Qualifier
PX-ETA-WT01-0720	REG	PFAS_QSM5.3	N-Ethyl Perfluorooctane- sulfonamidoacetic Acid (EtFOSAA)	0.94	U	0.94	UJ	NG_L	SSL
PX-ETA-WT01-0720	REG	PFAS_QSM5.3	Perfluorododecanoic Acid (PFDoA)	0.47	U	0.47	UJ	NG_L	SSL
PX-ETA-WT01-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-ETA-WT02-0720	REG	PFAS_QSM5.3	Perfluorohexanoic Acid (PFHxA)	9.92		9.92	J	NG_L	FD
PX-ETA-WT02-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.96	U	1.96	UJ	NG_L	SSL
PX-ETA-WT02P-0720	FD	PFAS_QSM5.3	Perfluorohexanoic Acid (PFHxA)	7.62		7.62	J	NG_L	FD
PX-ETA-WT02P-0720	FD	PFAS_QSM5.3	Perfluorododecanoic Acid (PFDoA)	0.47	U	0.47	UJ	NG_L	SSL
PX-ETA-WT02P-0720	FD	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-H2133-EB01-082020-GW	EB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.38	U	NG_L	MBL
PX-H2133-FB01-082020	FB	PFAS_QSM5.3	Perfluorobutanesulfonic acid (PFBS)	0.15	J	0.47	U	NG_L	MBL
PX-H2133-FB01-082020	FB	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.38	U	NG_L	MBL
PX-H2133-SW01-0820	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-H2133-SW01P-0820	FD	PFAS_QSM5.3	Perfluorododecanoic Acid (PFDoA)	0.22	J	0.22	J	NG_L	SSL
PX-H2133-SW01P-0820	FD	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.96	U	1.96	UJ	NG_L	SSL
PX-H2133-WT02-0820	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	2	U	2	UJ	NG_L	SSL
PX-H2133-WT03-0820	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	2.08	U	2.08	UJ	NG_L	SSL
PX-H2133-WT04-0820	REG	PFAS_QSM5.3	Perfluorohexanesulfonic acid (PFHxS)	179.57	D	179.57	J	NG_L	MSL
PX-H2133-WT04-0820	REG	PFAS_QSM5.3	Perfluorooctane Sulfonate (PFOS)	135.83	D	135.83	J	NG_L	MSL
PX-H2133-WT06P-0820	FD	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-H2905-WT02-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.93	U	0.93	UJ	NG_L	SSL

# Attachment 2. Assigned Qualifiers

Sample ID	Sample Type	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Primary Qualifier	Units	Secondary Qualifier
PX-H2905-WT02-0720	REG	PFAS_QSM5.3	N-Ethyl Perfluorooctane- sulfonamidoacetic Acid (EtFOSAA)	0.93	U	0.93	UJ	NG_L	SSL
PX-H2905-WT02-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.85	U	1.85	UJ	NG_L	SSL
PX-H2905-WT02P-0720	FD	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT02P-0720	FD	PFAS_QSM5.3	N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT02P-0720	FD	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.92	U	1.92	UJ	NG_L	SSL
PX-H2905-WT03-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	Perfluoro-2-methyl-3-oxahexanoic acid (HFPO-DA)	0.48	U	0.48	UJ	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	Perfluorooctane Sulfonate (PFOS)	59.1		59.1	J	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctanesulfon- amidoacetic Acid (MeFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	N-Ethyl Perfluorooctane- sulfonamidoacetic Acid (EtFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	Perfluorooctanoic acid (PFOA)	71.18		71.18	J	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	Perfluorodecanoic Acid (PFDA)	0.21	J	0.21	J	NG_L	SSL
PX-H2905-WT04-0720	REG	PFAS_QSM5.3	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.38	J	0.96	U	NG_L	MBL
PX-H2905-WT05-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT05-0720	REG	PFAS_QSM5.3	Perfluoroheptanoic acid (PFHpA)	15		15	J	NG_L	SSL
PX-H2905-WT05-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.92	U	1.92	UJ	NG_L	SSL

# Attachment 2. Assigned Qualifiers

Sample ID	Sample Type	Analytical Method	Parameter	Lab Result	Lab Qual	Final Result	Primary Qualifier	Units	Secondary Qualifier
PX-H2905-WT06-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.94	U	0.94	UJ	NG_L	SSL
PX-H2905-WT06-0720	REG	PFAS_QSM5.3	N-Ethyl Perfluorooctane- sulfonamidoacetic Acid (EtFOSAA)	0.94	U	0.94	UJ	NG_L	SSL
PX-H2905-WT06-0720	REG	PFAS_QSM5.3	Perfluorododecanoic Acid (PFDoA)	0.47	U	0.47	UJ	NG_L	SSL
PX-H2905-WT06-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.89	U	1.89	UJ	NG_L	SSL
PX-H2905-WT07-0720	REG	PFAS_QSM5.3	N-Methyl Perfluorooctane- sulfonamidoacetic Acid (MeFOSAA)	0.96	U	0.96	UJ	NG_L	SSL
PX-H2905-WT07-0720	REG	PFAS_QSM5.3	Perfluorotetradecanoic Acid (PFTeDA)	1.92	U	1.92	UJ	NG_L	SSL

Attachment 3
Data Validation Reports



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0862

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date: September 28, 2020

	PFAS								
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix						
1	PX-B102-EB01-072820-GW	H7717-FS	Water						
2	PX-H2905-WT05-0720	H7718-FS	Water						
3	PX-H2905-WT06-0720	H7719-FS	Water						
4	PX-H2905-WT07-0720	H7720-FS	Water						
5	PX-H2905-WT01-0720	H7721-FS	Water						
6	PX-H2905-WT02-0720	H7722-FS	Water						
7	PX-H2905-WT02P-0720	H7723-FS	Water						
8	PX-H2905-WT04-0720	H7724-FS	Water						
8MS	PX-H2905-WT04-0720MS	H7725-FSMS	Water						
8MSD	PX-H2905-WT04-0720MSD	H7726-FSMSD	Water						
9	PX-H2905-FB01-072720	H7727-FS	Water						
10	PX-H2905-EB01-072720-GW	H7728-FS	Water						
11	PX-H2905-WT03-0720	H7729-FS	Water						
12	PX-H2905-EB01-072720-SO	H7744-FS	Water						

A Stage 2B/4 data validation was performed on the analytical data for eight water samples, three aqueous equipment blank samples, and one aqueous field blank sample collected on July 27, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

All samples were extracted within 14 days for water samples and analyzed within 28 days.

#### LC/MS Tuning

All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
LC33 IB	Adona	0.30	U	8

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-B102-EB01-072820-GW	None - ND	2		
PX-H2905-FB01-072720	None - ND	X	14	1-
PX-H2905-EB01-072720-GW	None - ND		-	
PX-H2905-EB01-072720-SO	None - ND		-	9

#### Surrogate Spike Recoveries

• Several samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds. These compounds were qualified as estimated (J/UJ) in each sample. Please refer to the Surrogate Form 2s at the end of the DVR for specific recoveries and qualifications.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RDP	Qualifier
8	PFHxA	531%/0%/200	None - 4X Rule Applies

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

## **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

• The samples were analyzed at several dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

## Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-H2905-WT02-0720 ng/L	PX-H2905-WT02P-0720 ng/L	RPD	Qualifier
PFHxA	13.82	14.99	8%	None
PFHpA	7.17	7.74	8%	
PFOA	13.15	13.52	3%	
PFNA	2.46	2.43	1%	
PFDA	0.46U	0.14	NC	
PFBS	1.99	2.52	24%	
PFHxS	21.80	21.88	0%	
PFOS	41.73	46.10	10%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-B102-EB01-072820-GW						
Battelle ID		H7717-FS						
Sample Type		SA						
Collection Date		07/28/2020						
Extraction Date		08/04/2020						
Analytical Instrumen	it	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.44 U	H7717-FS(0)	1.000	8/20/2020	0.51	1.44	4.81
PFHpA	375-85-9	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.25	0.96	4.81
PFOA	335-67-1	1.44 U	H7717-FS(0)	1.000	8/20/2020	0.49	1.44	4.81
PFNA	375-95-1	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.30	0.96	4.81
PFDA	335-76-2	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H7717-FS(0)	1.000	8/20/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0,96 U	H7717-FS(0)	1.000	8/20/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.48	0.96	4.81
PFBS	375-73-5	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFHxS	355-46-4	0.38 U	H7717-FS(0)	1.000	8/20/2020	0.11	0.38	4.81
PFOS	1763-23-1	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.26	0.96	4.81
11Cl-PF3OUdS	763051-92-9	0.48 U	H7717-FS(0)	1.000	8/20/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 U	H7717-FS(0)	1.000	8/20/2020	0.26	0.96	4.81



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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT05-0720							
Battelle ID		H7718-FS							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.260							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	25.99	H7718-FS(0)	1.000	8/20/2020	0.51	1.44	4.81	
PFHpA	375-85-9	15.00 🗂	H7718-FS(0)	1.000	8/20/2020	0.25	0.96	4.81	SSL
PFOA	335-67-1	28.54	H7718-FS(0)	1.000	8/20/2020	0.49	1.44	4.81	
PFNA	375-95-1	4.84	H7718-FS(0)	1.000	8/20/2020	0.30	0.96	4.81	
PFDA	335-76-2	0.46 J	H7718-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 U	H7718-FS(0)	1.000	8/20/2020	0.21	0.48	4.81	
PFDoA	307-55-1	0.48 U	H7718-FS(0)	1.000	8/20/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 U	H7718-FS(0)	1.000	8/20/2020	0.14	0.48	4.81	-
PFTeDA	376-06-7	1.92 ゲ ルゴ	H7718-FS(0)	1.000	8/20/2020	0.70	1.92	4.81	SSL
NMeFOSAA	2355-31-9	0.96リルノ	H7718-FS(0)	1.000	8/20/2020	0.34	0.96	4.81	55L
NEtFOSAA	2991-50-6	0.96 U	H7718-FS(0)	1.000	8/20/2020	0.48	0.96	4.81	
PFBS	375-73-5	3.49 J	H7718-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFHxS	355-46-4	31.45	H7718-FS(0)	1.000	8/20/2020	0.11	0.38	4.81	
PFOS	1763-23-1	85.18	H7718-FS(0)	1.000	8/20/2020	0.42	0.96	4.81	
HFPO-DA	13252-13-6	0.48 U	H7718-FS(0)	1.000	8/20/2020	0.24	0.48	4.81	
Adona	919005-14-4	0.96 U	H7718-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	
11CI-PF3OUdS	763051-92-9	0.48 U	H7718-FS(0)	1.000	8/20/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 U	H7718-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT05-0720

 Battelle ID
 H7718-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	59	H7718-FS(0)	8/20/2020	
13C4-PFHpA	45 Ŋ	H7718-FS(0)	8/20/2020	
13C8-PFOA	65	H7718-FS(0)	8/20/2020	
13C9-PFNA	58	H7718-FS(0)	8/20/2020	
13C6-PFDA	64	H7718-FS(0)	8/20/2020	
13C7-PFUnA	57	H7718-FS(0)	8/20/2020	
13C2-PFDoA	50	H7718-FS(0)	8/20/2020	
13C2-PFTeDA	40 N	H7718-FS(0)	8/20/2020	
d3-MeFOSAA	48 <b>n</b>	H7718-FS(0)	8/20/2020	
d5-EtFOSAA	59	H7718-FS(0)	8/20/2020	
13C3-PFBS	76	H7718-FS(0)	8/20/2020	
13C3-PFHxS	67	H7718-FS(0)	8/20/2020	
13C8-PFOS	67	H7718-FS(0)	8/20/2020	
13C3-HFPO-DA	52	H7718-FS(0)	8/20/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT06-0720							
Battelle ID		H7719-FS							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	113.83	H7719-FS(0)	1.000	8/20/2020	0.50	1.42	4.72	
PFHpA	375-85-9	51.02	H7719-FS(0)	1.000	8/20/2020	0.25	0.94	4.72	
PFOA	335-67-1	69.77	H7719-FS(0)	1.000	8/20/2020	0.48	1.42	4.72	
PFNA	375-95-1	4.84	H7719-FS(0)	1.000	8/20/2020	0.29	0.94	4.72	
PFDA	335-76-2	0.78 J	H7719-FS(0)	1.000	8/20/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	0.47 U	H7719-FS(0)	1.000	8/20/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.47 リ レブ	H7719-FS(0)	1.000	8/20/2020	0.18	0.47	4.72	551
PFTrDA	72629-94-8	0.47 U	H7719-FS(0)	1.000	8/20/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89 火 レブ	H7719-FS(0)	1.000	8/20/2020	0.69	1.89	4.72	554
NMeFOSAA	2355-31-9	0.94 は 以ブ	H7719-FS(0)	1.000	8/20/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94 Jr 4 J	H7719-FS(0)	1.000	8/20/2020	0.47	0.94	4.72	<b>1</b>
PFBS	375-73-5	13.39	H7719-FS(0)	1.000	8/20/2020	0.13	0.47	4.72	
PFHxS	355-46-4	47.24	H7719-FS(0)	1.000	8/20/2020	0.10	0.38	4.72	
PFOS	1763-23-1	34.61	H7719-FS(0)	1.000	8/20/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	1.22 J	H7719-FS(0)	1.000	8/20/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H7719-FS(0)	1.000	8/20/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H7719-FS(0)	1.000	8/20/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H7719-FS(0)	1.000	8/20/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT06-0720

 Battelle ID
 H7719-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

		Analysis			
Surrogate Recoveries (%)	Recovery	Extract ID	Date		
13C5-PFHxA	67	H7719-FS(0)	8/20/2020		
13C4-PFHpA	82	H7719-FS(0)	8/20/2020		
13C8-PFOA	83	H7719-FS(0)	8/20/2020		
13C9-PFNA	78	H7719-FS(0)	8/20/2020		
13C6-PFDA	78	H7719-FS(0)	8/20/2020		
13C7-PFUnA	67	H7719-FS(0)	8/20/2020		
13C2-PFDoA	41 N	H7719-FS(0)	8/20/2020		
13C2-PFTeDA	11 1	H7719-FS(0)	8/20/2020		
d3-MeFOSAA	32 N	H7719-FS(0)	8/20/2020		
d5-EtFOSAA	33 N	H7719-FS(0)	8/20/2020		
13C3-PFBS	79	H7719-FS(0)	8/20/2020		
13C3-PFHxS	94	H7719-FS(0)	8/20/2020		
13C8-PFOS	73	H7719-FS(0)	8/20/2020		
13G3-HFPO-DA	63	H7719-FS(0)	8/20/2020		



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT07-0720							
Battelle ID		H7720-FS							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.260							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	12.23	H7720-FS(0)	1.000	8/20/2020	0.51	1.44	4.81	
PFHpA	375-85-9	6.15	H7720-FS(0)	1.000	8/20/2020	0.25	0.96	4.81	
PFOA	335-67-1	11.92	H7720-FS(0)	1.000	8/20/2020	0.49	1.44	4.81	
PFNA	375-95-1	1.54 J	H7720-FS(0)	1.000	8/20/2020	0.30	0.96	4.81	
PFDA	335-76-2	0.55 J	H7720-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 U	H7720-FS(0)	1.000	8/20/2020	0.21	0.48	4.81	
PFDoA	307-55-1	0.48 U	H7720-FS(0)	1.000	8/20/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 U	H7720-FS(0)	1.000	8/20/2020	0.14	0.48	4.81	3
PFTeDA	376-06-7	1.92 y UJ	H7720-FS(0)	1.000	8/20/2020	0.70	1.92	4.81	55 2
NMeFOSAA	2355-31-9	0.96 JV UJ	H7720-FS(0)	1.000	8/20/2020	0.34	0.96	4.81	55L
NEtFOSAA	2991-50-6	0.96 U	H7720-FS(0)	1.000	8/20/2020	0.48	0.96	4.81	
PFBS	375-73-5	2.54 J	H7720-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFHxS	355-46-4	25.77	H7720-FS(0)	1.000	8/20/2020	0.11	0.38	4.81	
PFOS	1763-23-1	38.09	H7720-FS(0)	1.000	8/20/2020	0.42	0.96	4.81	
HFPO-DA	13252-13-6	0.48 U	H7720-FS(0)	1.000	8/20/2020	0.24	0.48	4.81	
Adona	919005-14-4	0.96 U	H7720-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	
11CI-PF3OUdS	763051-92-9	0.48 U	H7720-FS(0)	1.000	8/20/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 U	H7720-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT07-0720

 Battelle ID
 H7720-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	60	H7720-FS(0)	8/20/2020	
13C4-PFHpA	58	H7720-FS(0)	8/20/2020	
13C8-PFOA	57	H7720-FS(0)	8/20/2020	
13C9-PFNA	58	H7720-FS(0)	8/20/2020	
13C6-PFDA	54	H7720-FS(0)	8/20/2020	
13C7-PFUnA	59	H7720-FS(0)	8/20/2020	
13C2-PFDoA	51	H7720-FS(0)	8/20/2020	
13C2-PFTeDA	31 N	H7720-FS(0)	8/20/2020	
d3-MeFOSAA	47 N	H7720-FS(0)	8/20/2020	
d5-EtFOSAA	52	H7720-FS(0)	8/20/2020	
13C3-PFBS	71	H7720-FS(0)	8/20/2020	
13C3-PFHxS	68	H7720-FS(0)	8/20/2020	
13C8-PFOS	59	H7720-FS(0)	8/20/2020	
13C3-HFPO-DA	55	H7720-FS(0)	8/20/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT01-0720						
Battelle ID		H7721-F\$						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		08/04/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	23.06	H7721-FS(0)	1.000	8/20/2020	0.51	1.44	4.81
PFHpA	375-85-9	12.69	H7721-FS(0)	1.000	8/20/2020	0.25	0.96	4.81
PFOA	335-67-1	24.17	H7721-FS(0)	1.000	8/20/2020	0.49	1.44	4.81
PFNA	375-95-1	5.00	H7721-FS(0)	1.000	8/20/2020	0.30	0.96	4.81
PFDA	335-76-2	0.20 J	H7721-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.48 U	H7721-FS(0)	1.000	8/20/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H7721-FS(0)	1.000	8/20/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H7721-FS(0)	1.000	8/20/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H7721-FS(0)	1.000	8/20/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 U	H7721-FS(0)	1.000	8/20/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H7721-FS(0)	1.000	8/20/2020	0.48	0.96	4.81
PFBS	375-73-5	3.63 J	H7721-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFHxS	355-46-4	38.21	H7721-FS(0)	1.000	8/20/2020	0.11	0.38	4.81
PFOS	1763-23-1	99.65	H7721-FS-D(3)	5.000	8/20/2020	2.12	4.81	24.04
HFPO-DA	13252-13-6	0.48 U	H7721-FS(0)	1.000	8/20/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H7721-FS(0)	1.000	8/20/2020	0.26	0.96	4.81
11CI-PF3OUdS	763051-92-9	0.48 U	H7721-FS(0)	1.000	8/20/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 U	H7721-FS(0)	1.000	8/20/2020	0.26	0.96	4.81



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2905-WT02-0720							
Battelle ID		H7722-FS							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.270							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	13.82	H7722-FS(0)	1.000	8/20/2020	0.49	1.39	4.63	
PFHpA	375-85-9	7.17	H7722-FS(0)	1.000	8/20/2020	0.24	0.93	4.63	
PFOA	335-67-1	13.15	H7722-FS(0)	1.000	8/20/2020	0.47	1.39	4.63	
PFNA	375-95-1	2.46 J	H7722-FS(0)	1.000	8/20/2020	0.29	0.93	4.63	
PFDA	335-76-2	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.13	0.46	4.63	
PFUnA	2058-94-8	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85 ば して	H7722-FS(0)	1.000	8/20/2020	0.68	1.85	4.63	554
NMeFOSAA	2355-31-9	0.93 レ リブ	H7722-FS(0)	1.000	8/20/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93 ルレゴ	H7722-FS(0)	1.000	8/20/2020	0.46	0.93	4.63	4
PFBS	375-73-5	1.99 J	H7722-FS(0)	1.000	8/20/2020	0.13	0.46	4.63	
PFHxS	355-46-4	21.80	H7722-FS(0)	1.000	8/20/2020	0.10	0.37	4.63	
PFOS	1763-23-1	41.73	H7722-FS(0)	1.000	8/20/2020	0.41	0.93	4.63	
HFPO-DA	13252-13-6	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.23	0.46	4.63	
Adona	919005-14-4	0.93 U	H7722-FS(0)	1.000	8/20/2020	0.25	0.93	4.63	
11CI-PF3OUdS	763051-92-9	0.46 U	H7722-FS(0)	1.000	8/20/2020	0.21	0.46	4.63	
								4 40	

0.93 U

H7722-FS(0)

8/20/2020

0.25

0.93

4.63

1.000

9CI-PF3ONS

756426-58-1

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT02-0720

 Battelle ID
 H7722-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

•			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	66	H7722-FS(0)	8/20/2020	
13C4-PFHpA	65	H7722-FS(0)	8/20/2020	
L3C8-PFOA	64	H7722-FS(0)	8/20/2020	
ISC9-PFNA	63	H7722-FS(0)	8/20/2020	
L3C6-PFDA	61	H7722-FS(0)	8/20/2020	
367-PFUnA	60	H7722-FS(0)	8/20/2020	
3C2-PFDoA	51	H7722-FS(0)	8/20/2020	
3C2-PFTeDA	36 N	H7722-FS(0)	8/20/2020	
3-MeFOSAA	49 🖪	H7722-FS(0)	8/20/2020	
IS-EtFOSAA	49 N	H7722-FS(0)	8/20/2020	
3C3-PFBS	74	H7722-FS(0)	8/20/2020	
I3C3-PFHxS	67	H7722-FS(0)	8/20/2020	
3C8-PFOS	67	H7722-FS(0)	8/20/2020	
13C3-HFPO-DA	64	H7722-FS(0)	8/20/2020	
FIRST CONTRACTOR				



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2905-WT02P-0720							
Battelle ID		H7723-FS							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrumer	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.260							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	-00
PFHxA	307-24-4	14.99	H7723-FS(0)	1.000	8/20/2020	0.51	1.44	4.81	
PFHpA	375-85-9	7.74	H7723-FS(0)	1.000	8/20/2020	0.25	0.96	4.81	
PFOA	335-67-1	13.52	H7723-FS(0)	1.000	8/20/2020	0.49	1.44	4.81	
PFNA	375-95-1	2.43 J	H7723-FS(0)	1.000	8/20/2020	0.30	0.96	4.81	
PFDA	335-76-2	0.14 J	H7723-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 U	H7723-FS(0)	1.000	8/20/2020	0.21	0.48	4.81	
PFDoA	307-55-1	0.48 U	H7723-FS(0)	1.000	8/20/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 U	H7723-FS(0)	1.000	8/20/2020	0.14	0.48	4.81	
PFTeDA	376-06-7	1.92 なく	H7723-FS(0)	1.000	8/20/2020	0.70	1.92	4.81	55
NMeFOSAA	2355-31-9	0.96 ル レブ	H7723-FS(0)	1.000	8/20/2020	0.34	0.96	4.81	
NEtFOSAA	2991-50-6	0.96 かり	H7723-FS(0)	1.000	8/20/2020	0.48	0.96	4.81	1
PFBS	375-73-5	2.52 J	H7723-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
PFHxS	355-46-4	21.88	H7723-FS(0)	1.000	8/20/2020	0.11	0.38	4.81	
PFOS	1763-23-1	46.10	H7723-FS(0)	1.000	8/20/2020	0.42	0.96	4.81	
HFPO-DA	13252-13-6	0.48 U	H7723-FS(0)	1.000	8/20/2020	0.24	0.48	4.81	
Adona	919005-14-4	0.96 U	H7723-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	
11CI-PF3OUdS	763051-92-9	0.48 U	H7723-FS(0)	1.000	8/20/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 U	H7723-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT02P-0720

 Battelle ID
 H7723-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	80	H7723-FS(0)	8/20/2020	
13C4-PFHpA	78	H7723-FS(0)	8/20/2020	
13C8-PFOA	79	H7723-FS(0)	8/20/2020	
13C9-PFNA	76	H7723-FS(0)	8/20/2020	
13C6-PFDA	74	H7723-FS(0)	8/20/2020	
13C7-PFUnA	63	H7723-FS(0)	8/20/2020	
13C2-PFDoA	56	H7723-FS(0)	8/20/2020	
13C2-PFTeDA	34 📫	H7723-FS(0)	8/20/2020	
d3-MeFOSAA	44 1	H7723-FS(0)	8/20/2020	
d5-EtFOSAA	47 N	H7723-FS(0)	8/20/2020	
13C3-PFBS	93	H7723-FS(0)	8/20/2020	
13C3-PFHxS	84	H7723-FS(0)	8/20/2020	
13C8-PFOS	75	H7723-FS(0)	8/20/2020	
13C3-HFPO-DA	78	H7723-FS(0)	8/20/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Sample Type Collection Date 07/27/2020 Extraction Date 08/04/2020 Analytical Instrument Sciex 5500 LC/MS/MS  Midstrive NA Midstrive Sample Size 0.260 Size Unit-Basis L CAS No. Result (ng/L) Extract ID DF Date DL LOD  LOQ  PFHxA 307-24-4 1014.80 0 H7724-F5-D(3) 12.500 8/20/2020 0.25 0.96 4.81 PFPDA 375-85-9 73.89 H7724-F5(0) 1.000 8/20/2020 0.25 0.96 4.81 PPDA 335-76-2 0.21	Client ID		PX-H2905-WT04-0720							
Collection Date 07/27/2020   Collection Date 08/04/2020   Collection Date	Battelie ID		H7724-FS							
Extraction Date Analytical Instrument Sciex 5500 LC/Ms/Ms  % Moisture NA Matrix Sample Size 0.260 Size Unit-Basis Analyte CAS No. Result (ng/L) Extract ID DF Date DL LOD LOQ  PFHxA 307-24-4 1014.80 0 H7724-F5(0) 1.000 8/20/2020 0.35 0.96 4.81 PFDA 375-95-1 335-67-1 71.18 1 H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-62 0.21 1 H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-62 0.21 1 H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-63-1 0.48 U H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81 PFDA 307-55-1 0.48 U H7724-F5(0) 1.000 8/20/2020 0.10 0.10 0.10 0.10 0.10 0.10 0.10	Sample Type		SA							
Analytical Instrument  % Moisture  NA  Matrix  W  Sciex 5500 LC/MS/MS  % Moisture  NA  Matrix  W  Sample Size  0.260  Size Unit-Basis  L  Analyte  CAS No.  Result (ng/L)  FFHXA  307-24-4  1014.80 f  H7724-F5-D(3)  12.500  8/20/2020  6.37  18.03  60.10  PFHpA  375-85-9  73.89  H7724-F5(0)  1.000  8/20/2020  0.49  1.44  4.81  SSL  PFDA  335-67-1  71.18 f  H7724-F5(0)  1.000  8/20/2020  0.49  1.44  4.81  SSL  PFDA  335-76-2  0.21 f  H7724-F5(0)  1.000  8/20/2020  0.30  0.96  4.81  SSL  PFDA  335-76-2  0.21 f  H7724-F5(0)  1.000  8/20/2020  0.13  0.48  4.81  PFDA  2058-94-8  0.48 U  H7724-F5(0)  1.000  8/20/2020  0.10  0.14  0.48  4.81  PFTDA  72629-94-8  0.48 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTDA  72629-94-8  0.48 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTDA  736-6-7  1.92 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTEDA  376-06-7  1.92 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTEDA  376-06-7  1.92 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTEDA  376-06-7  1.92 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTEDA  376-06-7  1.92 U  H7724-F5(0)  1.000  8/20/2020  0.14  0.48  4.81  PFTEDA  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.13  0.48  4.81  PFTESS  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.11  0.38  4.81  PFTESS  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.11  0.38  4.81  PFTESS  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.11  0.38  4.81  PFTESS  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.11  0.38  4.81  PFTESS  1.763-23-1  1.7724-F5(0)  1.000  8/20/2020  0.11  0.38  4.81  PFTESS  375-73-5  7.61  H7724-F5(0)  1.000  8/20/2020  0.24  0.48  4.81  PFTESS  1.55  Addona  919005-14-4  0.48  H7724-F5(0)  1.000  8/20/2020  0.22  0.48  4.81  M6  11C-PF3OUdS  763051-92-9  0.48 U  H7724-F5(0)  1.000  8/20/2020  0.22  0.48  4.81  AB  AB  AB  AB  AB  AB  AB  AB  AB  A	Collection Date		07/27/2020							
Matrix  Matrix	Extraction Date		08/04/2020							
Matrix Sample Size  0.260  Size Unit-Basis CAS No.  Result (ng/L)  Fixtract ID  DF  Date  DL  LOD  LOQ  PPHAA  307-24-4  1014.80 0 H7724-F5(0) 1.000 8/20/2020 6.37 18.03 60.10  PPHAA  375-85-9  73.89 H7724-F5(0) 1.000 8/20/2020 0.25 0.96 4.81  PPFOA  375-95-1  4.38 J H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81  PPFDA  375-95-1  4.38 J H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81  PPFDA  335-76-2  0.21 J H7724-F5(0) 1.000 8/20/2020 0.31 0.48 4.81  PPFDA  307-35-1  0.48 U H7724-F5(0) 1.000 8/20/2020 0.31 0.48 4.81  PPFDA  307-35-1  0.48 U H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81  PPFTDA  7629-94-8  0.48 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81  PPFTDA  77629-94-8  0.48 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81  PPFTDA  77606-7  1.92 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81  PPFEDA  376-06-7  1.92 U H7724-F5(0) 1.000 8/20/2020 0.34 0.96 4.81  NMeFOSAA  2991-50-6  0.96 U H7724-F5(0) 1.000 8/20/2020 0.34 0.96 4.81  SSU  PPERS  375-73-5  7.61 H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81  PPFINA  355-46-4  28.10 H7724-F5(0) 1.000 8/20/2020 0.11 0.38 4.81  PPFOS  1763-23-1  59.10 J H7724-F5(0) 1.000 8/20/2020 0.11 0.38 4.81  PPFOS  1763-23-1  59.10 J H7724-F5(0) 1.000 8/20/2020 0.12 0.48 4.81  PPOS  1161-PF30UdS  763051-92-9  0.48 U H7724-F5(0) 1.000 8/20/2020 0.24 0.48 4.81  PRES  375-73-5  7.61 H7724-F5(0) 1.000 8/20/2020 0.11 0.38 4.81  PPFOS  1763-23-1  59.10 J H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81  SSU  Addona  919005-14-4  0.48 U H7724-F5(0) 1.000 8/20/2020 0.22 0.44 4.81  PRES  1161-PF30UdS  763051-92-9  0.48 U H7724-F5(0) 1.000 8/20/2020 0.22 0.44 4.81	Analytical Instrumer	nt	Sciex 5500 LC/MS/MS							
Sample Size    Cas No.   Result (ng/L)   Extract   D   DF   Date   DL   LOD   LOQ	% Moisture		NA							
CAS No.   Result (ng/L)   Extract ID   DF   Date   DL   LOD   LOQ	Matrix		W							
Analyte CAS No. Result (ng/L) Extract ID DF Date DL LOD LOQ  PPHAA 307-24-4  1014.80 0 H7724-FS-D(3) 12.500 8/20/2020 6.37 18.03 60.10  PPHAA 375-85-9 73.89 H7724-FS(0) 1.000 8/20/2020 0.25 0.96 4.81  PPFOA 335-67-1 71.18 1 H7724-FS(0) 1.000 8/20/2020 0.49 1.44 4.81 SSL  PPFOA 375-95-1 4.38 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81  PPFOA 335-76-2 0.21 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81  PPFOA 335-76-2 0.21 J H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81  PPFOA 335-56-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81  PPFTOA 376-06-7 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81  PPFTOA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  PPFEDA 375-33-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81  PPFEDA 375-33-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PPFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81	Sample Size		0.260							
PFHXA 307-24-4 1014.80 0 H7724-F5-D(3) 12.500 8/20/2020 6.37 18.03 60.10 PFHpA 375-85-9 73.89 H7724-F5(0) 1.000 8/20/2020 0.25 0.96 4.81 PFOA 335-67-1 71.18 H7724-F5(0) 1.000 8/20/2020 0.49 1.44 4.81 SSL PFNA 375-95-1 4.38 J H7724-F5(0) 1.000 8/20/2020 0.30 0.96 4.81 PFNA 335-76-2 0.21 J H7724-F5(0) 1.000 8/20/2020 0.31 0.48 4.81 SSL PFUNA 2058-94-8 0.48 U H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81 PFTDA 307-55-1 0.48 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTDA 72629-94-8 0.48 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTDA 376-06-7 1.92 U H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTDA 376-06-7 1.92 U H7724-F5(0) 1.000 8/20/2020 0.34 0.96 4.81 SSL PFNBS 375-73-5 7.61 H7724-F5(0) 1.000 8/20/2020 0.48 0.96 4.81 SSL PFNBS 375-73-5 7.61 H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.13 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.14 0.48 4.81 PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 28.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.44 0.96 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.44 0.48 4.81 SSL PPNBS 355-46-4 38.10 H7724-F5(0) 1.000 8/20/2020 0.42 0.96 4.81 SSL PPNBS 355-46-4 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 355-44 3	Size Unit-Basis		L			Analysis				
PFHDA 375-85-9 73.89 H7724-FS(0) 1.000 8/20/2020 0.25 0.96 4.81 PFOA 335-67-1 71.18 H7724-FS(0) 1.000 8/20/2020 0.49 1.44 4.81 SSL PFNA 375-95-1 4.38 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-76-2 0.21 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81 PFUA 2058-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81 PFTDA 307-55-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81 PFTDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.18 0.48 4.81 PFTDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81 PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SSL PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SSL PFTEDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SSL PFTEDS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 PFTOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 PFTOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFTOD 1825-13-6 0.48 J J H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20/20/20/20/20/20/20/20/20/20/20/	Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHDA 375-85-9 73.89 H7724-FS(0) 1.000 8/20/2020 0.25 0.96 4.81 PFOA 335-67-1 71.18 H7724-FS(0) 1.000 8/20/2020 0.49 1.44 4.81 SSL PFNA 375-95-1 4.38 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-76-2 0.21 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81 PFUA 2058-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81 PFTDA 307-55-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81 PFTDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.18 0.48 4.81 PFTDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81 PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SSL PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SSL PFTEDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SSL PFTEDS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 PFTOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 PFTOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFTOD 1825-13-6 0.48 J J H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20/20 0.25 0.26 0.96 4.81 PFTOD 3/20/20/20/20/20/20/20/20/20/20/20/20/20/	DELLYA	307-24-4	1014 80 d	H7724-FS-D(3)	12 500	8/20/2020	6.37	18.03	60.10	
PFOA 335-67-1 71.18 H7724-FS(0) 1.000 8/20/2020 0.49 1.44 4.81 55 L PFNA 375-95-1 4.38 J H7724-FS(0) 1.000 8/20/2020 0.30 0.96 4.81 PFDA 335-76-2 0.21 J H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 SS L PFUNA 2058-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 PPTDA 376-05-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81 PPTDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81 PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81 PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81 PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SS L PPTDA 255-31-9 0.96 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS L PPTDA 376-06-1 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PPTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 SS L PTDA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.22 0.24 0.48 4.81 SS L PTDA 375-7										
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PFDA 335-76-2										
PFUNA 2058-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.21 0.48 4.81 PFDOA 307-55-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.18 0.48 4.81 PFTrDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81 PFTeDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81 NM6FOSAA 2355-31-9 0.96 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 NETFOSAA 2991-50-6 0.96 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 PFBS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 PFHXS 355-46-4 28.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 PFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 PFO-DA 919005-14-4 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 PFO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81										SSL
PFDOA 307-55-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.18 0.48 4.81  PFTrDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81  PFTeDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81  NM6FOSAA 2355-31-9 0.96 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  NETFOSAA 2991-50-6 0.96 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81  PFBS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81  PFHXS 355-46-4 28.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81  PFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81  PFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  PFOS 1763-23-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81				, ,						
PFTrDA 72629-94-8 0.48 U H7724-FS(0) 1.000 8/20/2020 0.14 0.48 4.81  PFTeDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81  NM6FOSAA 2355-31-9 0.96 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81  NETFOSAA 2991-50-6 0.96 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81  PFBS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81  PFHxS 355-46-4 28.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81  PFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81  PFOS 1763-23-1 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  NAGONA 919005-14-4 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81  NAGONA 919005-14-4 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81  NAGONA 919005-14-4 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81  NAGONA 919005-192-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81								0.48	4.81	
PFTEDA 376-06-7 1.92 U H7724-FS(0) 1.000 8/20/2020 0.70 1.92 4.81  NMMEFOSAA 2355-31-9 0.96 U H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 SS(0)  NETFOSAA 2991-50-6 0.96 U H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 SS(0)  PFBS 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81  PFHXS 355-46-4 28.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81  PFOS 1763-23-1 59.10 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SS(0)  HFPO-DA 13252-13-6 0.48 U H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81  Adona 919005-14-4 0.48 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 MB  11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81					1.000		0.14	0.48	4.81	
NMEFOSAA 2355-31-9 0.96 V 1 H7724-FS(0) 1.000 8/20/2020 0.34 0.96 4.81 550 NETFOSAA 2991-50-6 0.96 V 1 H7724-FS(0) 1.000 8/20/2020 0.48 0.96 4.81 550 NETFOSAA 2991-50-6 1.000 8/20/2020 0.13 0.48 4.81 SECOND 1.000 8/20/2020 0.13 0.48 4.81 NETFOSA 375-73-5 7.61 H7724-FS(0) 1.000 8/20/2020 0.13 0.48 4.81 NETFOSA 1763-23-1 28.10 H7724-FS(0) 1.000 8/20/2020 0.11 0.38 4.81 NETFOSA 13252-13-6 0.48 V 1 H7724-FS(0) 1.000 8/20/2020 0.42 0.96 4.81 SECOND 1.000 8/20/2020 0.24 0.48 4.81 SECOND 1.000 8/20/2020 0.24 0.48 4.81 SECOND 1.000 8/20/2020 0.24 0.48 4.81 NETFOSA 11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81 NETFOSA 1.000 8/20/2020 0.22 0.48 4.81			1,92 U		1.000		0.70	1.92	4.81	
NEtFOSAA       2991-50-6       0.96       1.00       8/20/2020       0.48       0.96       4.81       5.5         PFBS       375-73-5       7.61       H7724-FS(0)       1.000       8/20/2020       0.13       0.48       4.81         PFHxS       355-46-4       28.10       H7724-FS(0)       1.000       8/20/2020       0.11       0.38       4.81         PFOS       1763-23-1       59.10       H7724-FS(0)       1.000       8/20/2020       0.42       0.96       4.81       55         HFPO-DA       13252-13-6       0.48       4.81       H7724-FS(0)       1.000       8/20/2020       0.24       0.48       4.81       55         Adona       919005-14-4       0.48       H7724-FS(0)       1.000       8/20/2020       0.26       0.96       4.81       MB         11CI-PF3OUdS       763051-92-9       0.48       H7724-FS(0)       1.000       8/20/2020       0.22       0.48       4.81	NMeFOSAA		0.96 U u		1.000	8/20/2020	0.34	0.96	4.81	SSL
PFBS         375-73-5         7.61         H7724-FS(0)         1.000         8/20/2020         0.13         0.48         4.81           PFHxS         355-46-4         28.10         H7724-FS(0)         1.000         8/20/2020         0.11         0.38         4.81           PFOS         1763-23-1         59.10         T         H7724-FS(0)         1.000         8/20/2020         0.42         0.96         4.81         55           HFPO-DA         13252-13-6         0.48 ½         H7724-FS(0)         1.000         8/20/2020         0.24         0.48         4.81         55           Adona         919005-14-4         0.48 ½         H7724-FS(0)         1.000         8/20/2020         0.26         0.96         4.81         MB           11CI-PF3OUdS         763051-92-9         0.48 ½         H7724-FS(0)         1.000         8/20/2020         0.22         0.48         4.81	NEtFOSAA	2991-50-6			1.000	8/20/2020	0.48	0.96	4.81	SSL
PFOS         1763-23-1         59.10         H7724-FS(0)         1.000         8/20/2020         0.42         0.96         4.81         5.5           HFPO-DA         13252-13-6         0.48 ½ ½ H7724-FS(0)         1.000         8/20/2020         0.24         0.48         4.81         5.5           Adona         919005-14-4         0.38 ½ ¼ H7724-FS(0)         1.000         8/20/2020         0.26         0.96         4.81         MB           11CI-PF3OUdS         763051-92-9         0.48 ¼ H7724-FS(0)         1.000         8/20/2020         0.22         0.48         4.81	PFBS	375-73-5	7.61	H7724-FS(0)	1.000	8/20/2020	0.13	0.48	4.81	
HFPO-DA 13252-13-6 0.48 ¼ ¼ H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 5 5 Adona 919005-14-4 0.38 ¼ ¼ H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 MB 11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81	PFHxS	355-46-4	28.10	H7724-FS(0)	1.000	8/20/2020	0.11	0.38	4.81	_
HFPO-DA 13252-13-6 0.48 ½ ½ H7724-FS(0) 1.000 8/20/2020 0.24 0.48 4.81 55  Adona 919005-14-4 0.48 ½ ½ H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81 MB  11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81	PFOS	1763-23-1	59.10 👅	H7724-FS(0)	1.000	8/20/2020	0.42	0.96	4.81	550
11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81	HFPO-DA	13252-13-6	0.48 ½ W		1.000	8/20/2020	0.24	0.48	4.81	556
11CI-PF3OUdS 763051-92-9 0.48 U H7724-FS(0) 1.000 8/20/2020 0.22 0.48 4.81	Adona	919005-14-4	0.96 0.38 U	H7724-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	MBL
9CI-PF3ONS 756426-58-1 0.96 U H7724-FS(0) 1.000 8/20/2020 0.26 0.96 4.81	11CI-PF3OUdS	763051-92-9			1.000	8/20/2020	0.22	0.48	4.81	
	9CI-PF3ONS	756426-58-1	0.96 U	H7724-FS(0)	1.000	8/20/2020	0.26	0.96	4.81	

# **BATTELLE**It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2905-WT04-0720

 Battelle ID
 H7724-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	92 🏮	H7724-FS-D(3)	8/20/2020	
13C4-PFHpA	67	H7724-FS(0)	8/20/2020	
13C8-PFOA	44 🕅	H7724-FS(0)	8/20/2020	
13C9-PFNA	57	H7724-FS(0)	8/20/2020	
13C6-PFDA	43 N	H7724-FS(0)	8/20/2020	
13C7-PFUnA	186 N	H7724-FS(0)	8/20/2020	
13C2-PFDoA	149	H7724-FS(0)	8/20/2020	
13C2-PFTeDA	136	H7724-FS(0)	8/20/2020	
d3-MeFOSAA	17 N	H7724-FS(0)	8/20/2020	
d5-EtFOSAA	24 N	H7724-FS(0)	8/20/2020	
13C3-PFBS	63	H7724-FS(0)	8/20/2020	
13C3-PFHxS	52	H7724-FS(0)	8/20/2020	
13C8-PFOS	45 N	H7724-FS(0)	8/20/2020	
13C3-HFPO-DA	36 N	H7724-FS(0)	8/20/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2905-FB01-072720

Battelle ID H7727-FS SA Sample Type 07/27/2020 Collection Date 08/04/2020 **Extraction Date** Analytical Instrument Sciex 5500 LC/MS/MS NA % Moisture W Matrix 0.260 Sample Size

	L			Analysis			
CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
307-24-4	1.44 U	H7727-FS(0)	1.000	8/20/2020	0.51	1.44	4.81
375-85-9	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.25	0.96	4.81
335-67-1	1.44 U	H7727-FS(0)	1.000	8/20/2020	0.49	1.44	4.81
375-95-1	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.30	0.96	4.81
335-76-2	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
2058-94-8	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.21	0.48	4.81
307-55-1	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.18	0.48	4.81
72629-94-8	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.14	0.48	4.81
376-06-7	1.92 U	H7727-FS(0)	1.000	8/20/2020	0.70	1.92	4.81
2355-31-9	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.34	0.96	4.81
2991-50-6	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.48	0.96	4.81
375-73-5	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
355-46-4	0.38 U	H7727-FS(0)	1.000	8/20/2020	0.11	0.38	4.81
1763-23-1	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.42	0.96	4.81
13252-13-6	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.24	0.48	4.81
919005-14-4	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.26	0.96	4.81
763051-92-9	0.48 U	H7727-FS(0)	1.000	8/20/2020	0.22	0.48	4.81
756426-58-1	0.96 U	H7727-FS(0)	1.000	8/20/2020	0.26	0.96	4.81
	307-24-4 375-85-9 335-67-1 375-95-1 335-76-2 2058-94-8 307-55-1 72629-94-8 376-06-7 2355-31-9 2991-50-6 375-73-5 355-46-4 1763-23-1 13252-13-6 919005-14-4 763051-92-9	307-24-4 375-85-9 0.96 U 335-67-1 1.44 U 375-95-1 0.96 U 335-76-2 0.48 U 2058-94-8 0.48 U 307-55-1 0.48 U 72629-94-8 0.48 U 376-06-7 1.92 U 2355-31-9 0.96 U 2991-50-6 0.96 U 375-73-5 0.48 U 355-46-4 0.38 U 1763-23-1 0.96 U 13252-13-6 0.48 U 919005-14-4 0.96 U 763051-92-9 0.48 U	307-24-4  1.44 U H7727-FS(0) 375-85-9  0.96 U H7727-FS(0) 335-67-1  1.44 U H7727-FS(0) 335-76-2  0.96 U H7727-FS(0) 335-76-2  0.48 U H7727-FS(0) 307-55-1  0.48 U H7727-FS(0) 307-55-1  0.48 U H7727-FS(0) 72629-94-8  0.48 U H7727-FS(0) 376-06-7  1.92 U H7727-FS(0) 2355-31-9  0.96 U H7727-FS(0) 2991-50-6  0.96 U H7727-FS(0) 375-73-5  0.48 U H7727-FS(0) 375-73-6  0.96 U H7727-FS(0) 13252-13-6  0.48 U H7727-FS(0)	307-24-4       1.44 U H7727-FS(0) 1.000         375-85-9       0.96 U H7727-FS(0) 1.000         335-67-1       1.44 U H7727-FS(0) 1.000         375-95-1       0.96 U H7727-FS(0) 1.000         335-76-2       0.48 U H7727-FS(0) 1.000         2058-94-8       0.48 U H7727-FS(0) 1.000         307-55-1       0.48 U H7727-FS(0) 1.000         72629-94-8       0.48 U H7727-FS(0) 1.000         376-06-7       1.92 U H7727-FS(0) 1.000         2355-31-9       0.96 U H7727-FS(0) 1.000         2991-50-6       0.96 U H7727-FS(0) 1.000         375-73-5       0.48 U H7727-FS(0) 1.000         355-46-4       0.38 U H7727-FS(0) 1.000         13252-13-6       0.48 U H7727-FS(0) 1.000         919005-14-4       0.96 U H7727-FS(0) 1.000         763051-92-9       0.48 U H7727-FS(0) 1.000	CAS No.         Result (ng/L)         Extract ID         DF         Date           307-24-4         1.44 U         H7727-FS(0)         1.000         8/20/2020           375-85-9         0.96 U         H7727-FS(0)         1.000         8/20/2020           335-67-1         1.44 U         H7727-FS(0)         1.000         8/20/2020           335-76-2         0.96 U         H7727-FS(0)         1.000         8/20/2020           335-76-2         0.48 U         H7727-FS(0)         1.000         8/20/2020           2058-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020           307-55-1         0.48 U         H7727-FS(0)         1.000         8/20/2020           72629-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020           376-06-7         1.92 U         H7727-FS(0)         1.000         8/20/2020           2355-31-9         0.96 U         H7727-FS(0)         1.000         8/20/2020           2991-50-6         0.96 U         H7727-FS(0)         1.000         8/20/2020           375-73-5         0.48 U         H7727-FS(0)         1.000         8/20/2020           355-46-4         0.38 U         H7727-FS(0)         1.000	CAS No.         Result (ng/L)         Extract ID         DF         Date         DL           307-24-4         1.44 U         H7727-FS(0)         1.000         8/20/2020         0.51           375-85-9         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.25           335-67-1         1.44 U         H7727-FS(0)         1.000         8/20/2020         0.49           375-95-1         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.30           335-76-2         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.13           2058-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.21           307-55-1         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.18           72629-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.14           376-06-7         1.92 U         H7727-FS(0)         1.000         8/20/2020         0.70           2355-31-9         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.34           2991-50-6         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.48	CAS No.         Result (ng/L)         Extract ID         DF         Date         DL         LOD           307-24-4         1.44 U         H7727-FS(0)         1.000         8/20/2020         0.51         1.44           375-85-9         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.25         0.96           335-67-1         1.44 U         H7727-FS(0)         1.000         8/20/2020         0.49         1.44           375-95-1         0.96 U         H7727-FS(0)         1.000         8/20/2020         0.30         0.96           335-76-2         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.21         0.48           2058-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.21         0.48           307-55-1         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.13         0.48           72629-94-8         0.48 U         H7727-FS(0)         1.000         8/20/2020         0.14         0.48           376-06-7         1.92 U         H7727-FS(0)         1.000         8/20/2020         0.70         1.92           2355-31-9         0.96 U         H7727-FS(0)         1.000         8/2

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-EB01-072720-GW						
Battelle ID		H7728-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		08/04/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.44 U	H7728-FS(0)	1.000	8/20/2020	0.51	1.44	4.81
PFHpA	375-85-9	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.25	0.96	4.81
PFOA	335-67-1	1.44 U	H7728-FS(0)	1.000	8/20/2020	0.49	1.44	4.81
PFNA	375-95-1	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.30	0.96	4.81
PFDA	335-76-2	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H7728-FS(0)	1.000	8/20/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.48	0.96	4.81
PFBS	375-73-5	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.13	0.48	4.81
PFHxS	355-46-4	0.38 U	H7728-FS(0)	1.000	8/20/2020	0.11	0.38	4.81
PFOS	1763-23-1	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.26	0.96	4.81
11CI-PF3OUdS	763051-92-9	0.48 U	H7728-FS(0)	1.000	8/20/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 U	H7728-FS(0)	1.000	8/20/2020	0.26	0.96	4.81



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT03-0720							
Battelle ID		H7729-F\$							
Sample Type		SA							
Collection Date		07/27/2020							
Extraction Date		08/04/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
DELLA	307-24-4	58.46	H7729-FS(0)	1.000	8/20/2020	0.50	1.42	4.72	
PFHxA	375-85-9	23.66	H7729-FS(0)	1.000	8/20/2020	0.25	0.94	4.72	
PFOA	335-67-1	34.01	H7729-FS(0)	1.000	8/20/2020	0.48	1.42	4.72	
		2.02 J	H7729-FS(0)	1.000	8/20/2020	0.48	0.94	4.72	
PFDA PFDA	<b>375-95-1</b> 335-76-2	0.47 U	H7729-FS(0)	1.000	8/20/2020	0.13	0.47	4.72	
		0.47 U	H7729-FS(0)	1.000	8/20/2020	0.13	0.47	4.72	
PFUnA	<b>2058-94-8</b> 307-55-1	0.47 U	H7729-FS(0)	1.000	8/20/2020	0.18	0.47	4.72	
PFDoA		0.47 U	H7729-FS(0)	1.000	8/20/2020	0.14	0.47	4.72	
PFTrDA PFTeDA	<b>72629-94-8</b> 376-06-7		H7729-FS(0)	1.000	8/20/2020	0.69	1.89	4.72	SSL
NMeFOSAA	2355-31-9	1.89 <b>ル</b> ムブ 0.94 U	H7729-FS(0)	1.000	8/20/2020	0.33	0.94	4.72	ے ر
	2991-50-6	0.94 U	H7729-FS(0)	1.000	8/20/2020	0.47	0.94	4.72	
NEtFOSAA PFBS	375-73-5	12.52	H7729-FS(0)	1.000	8/20/2020	0.13	0.47	4.72	
	355-46-4	86.07	H7729-FS(0)	1.000	8/20/2020	0.10	0.38	4.72	
PFHxS PFOS	1763-23-1	30,69	H7729-FS(0)	1.000	8/20/2020	0.10	0.94	4.72	
		0.47 U	H7729-FS(0)	1.000	8/20/2020	0.42	0.47	4.72	
HFPO-DA	13252-13-6	0.47 U	H7729-FS(0)	1.000	8/20/2020	0.25	0.47	4.72	
Adona	919005-14-4	0.94 U	H7729-FS(0)	1.000	8/20/2020	0.23	0.47	4.72	
11CI-PF3OUdS	763051-92-9					0.25	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H7729-FS(0)	1.000	8/20/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

 Battelle ID
 H7729-FS

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	77	H7729-FS(0)	8/20/2020	
13C4-PFHpA	78	H7729-FS(0)	8/20/2020	
13C8-PFOA	76	H7729-FS(0)	8/20/2020	
13C9-PFNA	75	H7729-FS(0)	8/20/2020	
13C6-PFDA	71	H7729-FS(0)	8/20/2020	
13C7-PFUnA	70	H7729-FS(0)	8/20/2020	
13C2-PFDoA	62	H7729-FS(0)	8/20/2020	
13C2-PFTeDA	49 🏚	H7729-FS(0)	8/20/2020	
d3-MeFOSAA	64	H7729-FS(0)	8/20/2020	
d5-EtFOSAA	71	H7729-FS(0)	8/20/2020	
13C3-PFBS	81	H7729-FS(0)	8/20/2020	
13C3-PFHxS	74	H7729-FS(0)	8/20/2020	
13C8-PFOS	73	H7729-FS(0)	8/20/2020	
13C3-HFPO-DA	72	H7729-FS(0)	8/20/2020	

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2905-EB01-072720-SO						
Battelle ID		H7744-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		08/04/2020						
Analytical Instrumer	nt	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.255						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.47 U	H7744-FS(0)	1.000	8/20/2020	0.52	1.47	4.90
PFHpA	375-85-9	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.25	0.98	4.90
PFOA	335-67-1	1.47 U	H7744-FS(0)	1.000	8/20/2020	0.50	1.47	4.90
PFNA	375-95-1	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.30	0.98	4.90
PFDA	335-76-2	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.14	0.49	4.90
PFUnA	2058-94-8	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.22	0.49	4.90
PFDoA	307-55-1	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.19	0.49	4.90
PFTrDA	72629-94-8	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.15	0.49	4.90
PFTeDA	376-06-7	1.96 U	H7744-FS(0)	1.000	8/20/2020	0.72	1.96	4.90
NMeFOSAA	2355-31-9	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.34	0.98	4.90
NEtFOSAA	2991-50-6	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.49	0.98	4.90
PFBS	375-73-5	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.14	0.49	4.90
PFHxS	355-46-4	0.39 U	H7744-FS(0)	1.000	8/20/2020	0.11	0.39	4.90
PFOS	1763-23-1	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.43	0.98	4.90
HFPO-DA	13252-13-6	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.25	0.49	4.90
Adona	919005-14-4	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.26	0.98	4.90
11CI-PF3OUdS	763051-92-9	0.49 U	H7744-FS(0)	1.000	8/20/2020	0.23	0.49	4.90
9CI-PF3ONS	756426-58-1	0.98 U	H7744-FS(0)	1.000	8/20/2020	0.26	0.98	4.90



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client:

CH2M HILL, Inc., Gainesville, Florida

SDG:

20-0864

Laboratory:

Battelle Norwell Operations, Norwell, Massachusetts

Site:

NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date:

September 28, 2020

PFAS						
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix			
1	PX-H2905-SS05-000H	H7730-FS	Soil			
2	PX-H2905-SS05P-000H	H7731-FS	Soil			
3	PX-H2905-SB05-0304	H7732-FS	Soil			
4	PX-H2905-SS01-000H	H7733-FS	Soil			
5	PX-H2905-SB01-0304	H7734-FS	Soil			
6	PX-H2905-SB01P-0304	H7735-FS	Soil			
7	PX-H2905-SS02-000H	H7736-FS	Soil			
8	PX-H2905-SB02-0304	H7737-FS	Soil			
9	PX-H2905-SS04-000H	H7738-FS	Soil			
9MS	PX-H2905-SS04-000HMS	H7739-FSMS	Soil			
9MSD	PX-H2905-SS04-000HMSD	H7740-FSMSD	Soil			
10	PX-H2905-SB04-0304	H7741-FS	Soil			
11	PX-H2905-SS03-000H	H7742-FS	Soil			
12	PX-H2905-SB03-0304	H7743-FS	Soil			

A Stage 2B/4 data validation was performed on the analytical data for twelve soil samples collected on July 27, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis PFAS Method References
Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

#### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes. There were no qualifications.

#### Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

• All samples were extracted within 14 days for soil samples and analyzed within 28 days.

## **LC/MS Tuning**

• All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

#### Continuing Calibration

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks were free of contamination.

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-H2905-EB01-072720-SO	None - ND	E G	Things - y	

## Surrogate Spike Recoveries

All samples exhibited acceptable surrogate %R values.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

## **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

## **Compound Quantitation**

• All criteria were met.

## Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was acceptable.

PX-H2905-SS05-000H ng/g	PX-H2905-SS05P-000H ng/g	RPD	Qualifier
ND	ND	CF (\$ FEE)	
	,	ng/g ng/g	ng/g ng/g RPD

Compound	PX-H2905-SB01-0304 ng/g	PX-H2905-SB01P-0304 ng/g	RPD	Qualifier
None	ND	ND	-	542

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver

Nancy Weaver Senior Chemist Dated: 10/2/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SS05-000H						
Battelle ID		H7730-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		4.11						
Matrix		so						
Sample Size		1.89						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.75	2.12	5.29
PFHpA	375-85-9	1.59 U	H7730-FS(3)	10.000	8/15/2020	0.54	1.59	5.29
PFOA	335-67-1	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.65	2.12	5.29
PFNA	375-95-1	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.52	1.06	5.29
PFDA	335-76-2	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.49	1.06	5.29
PFUnA	2058-94-8	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.49	1.06	5.29
PFDoA	307-55-1	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.65	2.12	5.29
PFTrDA	72629-94-8	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.30	1.06	5.29
PFTeDA	376-06-7	2.65 U	H7730-FS(3)	10.000	8/15/2020	1.14	2.65	5.29
NMeFOSAA	2355-31-9	2.65 U	H7730-F5(3)	10.000	8/15/2020	1.08	2.65	5.29
NEtFOSAA	2991-50-6	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.79	2.12	5.29
PFBS	375-73-5	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.37	1.06	5.29
PFHxS	355-46-4	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.86	2.12	5.29
PFOS	1763-23-1	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.73	2.12	5.29
HFPO-DA	13252-13-6	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.68	2.12	5.29
Adona	919005-14-4	2.12 U	H7730-FS(3)	10.000	8/15/2020	0.88	2.12	5.29
11CI-PF3OUdS	763051-92-9	1.59 U	H7730-FS(3)	10.000	8/15/2020	0.55	1.59	5.29
9CI-PF3ONS	756426-58-1	1.06 U	H7730-FS(3)	10.000	8/15/2020	0.51	1.06	5.29



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2905-SS05P-000H						
Battelle ID		H7731-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		4.95						
Matrix		SO						
Sample Size		1.77						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.80	2.26	5.65
PFHpA	375-85-9	1.69 U	H7731-FS(3)	10.000	8/15/2020	0.58	1.69	5.65
PFOA	335-67-1	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.69	2.26	5.65
PFNA	375-95-1	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.55	1.13	5.65
PFDA	335-76-2	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.52	1.13	5.65
PFUnA	2058-94-8	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.52	1.13	5.65
PFDoA	307-55-1	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.69	2.26	5.65
PFTrDA	72629-94-8	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.32	1.13	5.65
PFTeDA	376-06-7	2.82 U	H7731-FS(3)	10.000	8/15/2020	1.22	2.82	5.65
NMeFOSAA	2355-31-9	2.82 U	H7731-FS(3)	10.000	8/15/2020	1.15	2.82	5.65
NEtFOSAA	2991-50-6	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.85	2.26	5.65
PFBS	375-73-5	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.40	1.13	5.65
PFHxS	355-46-4	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.92	2.26	5.65
PFOS	1763-23-1	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.78	2.26	5.65
HFPO-DA	13252-13-6	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.72	2.26	5.65
Adona	919005-14-4	2.26 U	H7731-FS(3)	10.000	8/15/2020	0.94	2.26	5.65
11CI-PF3OUdS	763051-92-9	1.69 U	H7731-FS(3)	10.000	8/15/2020	0.59	1.69	5.65
9CI-PF3ONS	756426-58-1	1.13 U	H7731-FS(3)	10.000	8/15/2020	0.54	1.13	5.65

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

2991-50-6

375-73-5

355-46-4

1763-23-1

13252-13-6

919005-14-4

763051-92-9

756426-58-1

Project No.: 100142032

Client ID

H7732-FS Battelle ID SA Sample Type Collection Date 07/27/2020 07/31/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument 15.27 % Moisture SO Matrix 1.59 Sample Size Analysis Size Unit-Basis Result (ng/g\_Dry) Extract ID DF Date DL LOD LOQ Analyte CAS No. 10.000 8/15/2020 0.89 2.52 6.29 2.52 U H7732-FS(3) **PFHxA** 307-24-4 1.89 6.29 1.89 U H7732-FS(3) 10.000 8/15/2020 0.64 PFHpA 375-85-9 2.52 U 10,000 8/15/2020 0.77 2.52 6.29 **PFOA** 335-67-1 H7732-FS(3) 8/15/2020 1.26 6.29 10.000 0.62 PFNA 375-95-1 1.26 U H7732-FS(3) 1.26 6.29 1.26 U H7732-FS(3) 10.000 8/15/2020 0.58 PFDA 335-76-2 10.000 8/15/2020 0.58 1.26 6.29 1,26 U H7732-FS(3) **PFUnA** 2058-94-8 2.52 6.29 **PFDoA** 307-55-1 2.52 U H7732-FS(3) 10.000 8/15/2020 0.77 6.29 10.000 8/15/2020 0.35 1.26 1.26 U H7732-FS(3) PFTrDA 72629-94-8 6.29 3.14 376-06-7 3.14 U H7732-FS(3) 10.000 8/15/2020 1.36 **PFTeDA** 3.14 U 10.000 8/15/2020 1.28 3.14 6.29 2355-31-9 H7732-FS(3) **NMeFOSAA** 

2.52 U

1.26 U

2.52 U

2.52 U

2.52 U

2.52 U

1.89 U

1.26 U

PX-H2905-SB05-0304

H7732-FS(3)

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**NEtFOSAA** 

**PFBS** 

**PFHxS** 

PFOS

Adona

HFPO-DA

11CI-PF3OUdS

9CI-PF3ONS

2.52

1.26

2.52

2.52

2.52

2,52

1.89

1.26

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0.44

1.02

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1.04

0.65

0.60

6.29

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Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2905-SS01-000H						
Battelle ID		H7733-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		3.85						
Matrix		so						
Sample Size		2.09						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.68	1.91	4.78
PFHpA	375-85-9	1.44 U	H7733-FS(3)	10.000	8/15/2020	0.49	1.44	4.78
PFOA	335-67-1	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.58	1.91	4.78
PFNA	375-95-1	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.47	0.96	4.78
PFDA	335-76-2	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.44	0.96	4.78
PFUnA	2058-94-8	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.44	0.96	4.78
PFDoA	307-55-1	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.58	1.91	4.78
PFTrDA	72629-94-8	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.27	0.96	4.78
PFTeDA	376-06-7	2.39 U	H7733-FS(3)	10.000	8/15/2020	1.03	2.39	4.78
NMeFOSAA	2355-31-9	2.39 U	H7733-FS(3)	10.000	8/15/2020	0.98	2.39	4.78
NEtFOSAA	2991-50-6	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.72	1.91	4.78
PFBS	375-73-5	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.33	0.96	4.78
PFHxS	355-46-4	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.78	1.91	4.78
PFOS	1763-23-1	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.66	1.91	4.78
HFPO-DA	13252-13-6	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.61	1.91	4.78
Adona	919005-14-4	1.91 U	H7733-FS(3)	10.000	8/15/2020	0.79	1.91	4.78
11CI-PF3OUdS	763051-92-9	1.44 U	H7733-FS(3)	10.000	8/15/2020	0.50	1.44	4.78
9CI-PF3ONS	756426-58-1	0.96 U	H7733-FS(3)	10.000	8/15/2020	0.46	0.96	4.78



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SB01-0304						
Battelle ID		H7734-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		6.53						
Matrix		so						
Sample Size		1.90						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
	_							
PFHxA	307-24-4	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.75	2.11	5.26
PFHpA	375-85-9	1.58 U	H7734-FS(3)	10.000	8/15/2020	0.54	1.58	5.26
PFOA	335-67-1	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.64	2.11	5.26
PFNA	375-95-1	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.52	1.05	5.26
PFDA	335-76-2	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.48	1.05	5.26
PFUnA	2058-94-8	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.48	1.05	5.26
PFDoA	307-55-1	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.64	2.11	5.26
PFTrDA	72629-94-8	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.29	1.05	5.26
PFTeDA	376-06-7	2.63 U	H7734-FS(3)	10.000	8/15/2020	1.14	2.63	5.26
NMeFOSAA	2355-31-9	2.63 U	H7734-FS(3)	10.000	8/15/2020	1.07	2.63	5.26
NEtFOSAA	2991-50-6	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.79	2.11	5.26
PFBS	375-73-5	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.37	1.05	5.26
PFHxS	355-46-4	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.85	2.11	5.26
PFOS	1763-23-1	2.11 U	H7734-F5(3)	10.000	8/15/2020	0.73	2.11	5.26
HFPO-DA	13252-13-6	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.67	2.11	5.26
Adona	919005-14-4	2.11 U	H7734-FS(3)	10.000	8/15/2020	0.87	2.11	5.26
11CI-PF3OUdS	763051-92-9	1.58 U	H7734-FS(3)	10.000	8/15/2020	0.55	1.58	5.26
9CI-PF3ONS	756426-58-1	1.05 U	H7734-FS(3)	10.000	8/15/2020	0.51	1.05	5.26



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2905-SB01P-0304						
Battelle ID		H7735-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrumen	nt	Sciex 5500 LC/MS/MS						
% Moisture		11.62						
Matrix		so						
Sample Size		1.88						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
***************************************								
PFHxA	307-24-4	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.76	2.13	5.32
PFHpA	375-85-9	1.60 U	H7735-FS(3)	10.000	8/15/2020	0.54	1.60	5.32
PFOA	335-67-1	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.65	2.13	5.32
PFNA	375-95-1	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.52	1.06	5.32
PFDA	335-76-2	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.49	1.06	5.32
PFUnA	2058-94-8	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.49	1.06	5.32
PFDoA	307-55-1	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.65	2.13	5.32
PFTrDA	72629-94-8	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.30	1.06	5.32
PFTeDA	376-06-7	2.66 U	H7735-FS(3)	10.000	8/15/2020	1.15	2.66	5.32
NMeFOSAA	2355-31-9	2.66 U	H7735-F5(3)	10.000	8/15/2020	1.09	2.66	5.32
NEtFOSAA	2991-50-6	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.80	2.13	5.32
PFBS	375-73-5	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.37	1.06	5.32
PFHxS	355-46-4	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.86	2.13	5.32
PFOS	1763-23-1	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.73	2.13	5.32
HFPO-DA	13252-13-6	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.68	2.13	5.32
Adona	919005-14-4	2.13 U	H7735-FS(3)	10.000	8/15/2020	0.88	2.13	5.32
11CI-PF3OUdS	763051-92-9	1.60 U	H7735-FS(3)	10.000	8/15/2020	0.55	1.60	5.32
9CI-PF3ONS	756426-58-1	1.06 U	H7735-FS(3)	10.000	8/15/2020	0.51	1.06	5.32



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2905-SS02-000H						
Battelle ID		H7736-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		6.83						
Matrix		so						
Sample Size		1.71						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
•								
PFHxA	307-24-4	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.83	2.34	5.85
PFHpA	375-85-9	1.75 U	H7736-FS(3)	10.000	8/15/2020	0.60	1.75	5.85
PFOA	335-67-1	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.71	2.34	5.85
PFNA	375-95-1	1.17 U	H7736-FS(3)	10.000	8/15/2020	0.57	1.17	5.85
PFDA	335-76-2	1.17 U	H7736-FS(3)	10.000	8/15/2020	0.54	1.17	5.85
PFUnA	2058-94-8	1.17 U	H7736-FS(3)	10.000	8/15/2020	0.54	1.17	5.85
PFDoA	307-55-1	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.71	2.34	5.85
PFTrDA	72629-94-8	1,17 U	H7736-FS(3)	10.000	8/15/2020	0.33	1.17	5.85
PFTeDA	376-06-7	2.92 U	H7736-FS(3)	10.000	8/15/2020	1.26	2.92	5.85
NMeFOSAA	2355-31-9	2.92 U	H7736-FS(3)	10.000	8/15/2020	1.19	2.92	5.85
NEtFOSAA	2991-50-6	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.88	2.34	5.85
PFBS	375-73-5	1.17 U	H7736-FS(3)	10.000	8/15/2020	0.41	1.17	5.85
PFHxS	355-46-4	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.95	2.34	5.85
PFOS	1763-23-1	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.81	2.34	5.85
HFPO-DA	13252-13-6	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.75	2.34	5.85
Adona	919005-14-4	2.34 U	H7736-FS(3)	10.000	8/15/2020	0.97	2.34	5.85
11CI-PF3OUdS	763051-92-9	1.75 U	H7736-FS(3)	10.000	8/15/2020	0.61	1.75	5.85
9CI-PF3ONS	756426-58-1	1.17 U	H7736-FS(3)	10.000	8/15/2020	0.56	1.17	5.85



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SB02-0304						
Battelle ID		H7737-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrumer	nt	Sciex 5500 LC/MS/MS						
% Moisture		9.07						
Matrix		SO						
Sample Size		1.77						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
					- / /			
PFHxA	307-24-4	2.82 J	H7737-FS(5)	10.000	8/20/2020	0.80	2.26	5.65
PFHpA	375-85-9	5.91	H7737-FS(5)	10.000	8/20/2020	0.58	1.69	5.65
PFOA	335-67-1	1.30 J	H7737-FS(5)	10.000	8/20/2020	0.69	2.26	5.65
PFNA	375-95-1	1.13 U	H7737-FS(5)	10.000	8/20/2020	0.55	1.13	5.65
PFDA	335-76-2	0.56 J	H7737-FS(5)	10.000	8/20/2020	0.52	1.13	5.65
PFUnA	2058-94-8	1.13 U	H7737-FS(5)	10.000	8/20/2020	0.52	1.13	5.65
PFDoA	307-55-1	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.69	2.26	5.65
PFTrDA	72629-94-8	1.13 U	H7737-FS(5)	10,000	8/20/2020	0.32	1.13	5.65
PFTeDA	376-06-7	2.82 U	H7737-FS(5)	10.000	8/20/2020	1.22	2.82	5.65
NMeFOSAA	2355-31-9	2.82 U	H7737-FS(5)	10.000	8/20/2020	1.15	2.82	5.65
NEtFOSAA	2991-50-6	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.85	2.26	5.65
PFBS	375-73-5	1.13 U	H7737-FS(5)	10.000	8/20/2020	0.40	1.13	5.65
PFHxS	355-46-4	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.92	2.26	5.65
PFOS	1763-23-1	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.78	2.26	5.65
HFPO-DA	13252-13-6	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.72	2.26	5.65
Adona	919005-14-4	2.26 U	H7737-FS(5)	10.000	8/20/2020	0.94	2.26	5.65
11CI-PF3OUdS	763051-92-9	1.69 U	H7737-FS(5)	10.000	8/20/2020	0.59	1.69	5.65
9CI-PF3ONS	756426-58-1	1.13 U	H7737-FS(5)	10.000	8/20/2020	0.54	1.13	5.65



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SS04-000H						
Battelle ID		H7738-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		5.48						
Matrix		SO						
Sample Size		1.91						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.74	2.09	5.24
PFHpA	375-85-9	0.92 J	H7738-FS(5)	10.000	8/19/2020	0.53	1.57	5.24
PFOA	335-67-1	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.64	2.09	5.24
PFNA	375-95-1	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.51	1.05	5.24
PFDA	335-76-2	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.48	1.05	5.24
PFUnA	2058-94-8	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.48	1.05	5.24
PFDoA	307-55-1	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.64	2.09	5.24
PFTrDA	72629-94-8	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.29	1.05	5.24
PFTeDA	376-06-7	2.62 U	H7738-FS(5)	10.000	8/19/2020	1.13	2.62	5.24
NMeFOSAA	2355-31-9	2.62 U	H7738-FS(5)	10.000	8/19/2020	1.07	2.62	5.24
NEtFOSAA	2991-50-6	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.79	2.09	5.24
PFBS	375-73-5	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.37	1.05	5.24
PFHxS	355-46-4	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.85	2.09	5.24
PFOS	1763-23-1	0.74 J	H7738-FS(5)	10.000	8/19/2020	0.72	2.09	5.24
HFPO-DA	13252-13-6	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.67	2.09	5.24
Adona	919005-14-4	2.09 U	H7738-FS(5)	10.000	8/19/2020	0.87	2.09	5.24
11CI-PF3OUdS	763051-92-9	1.57 U	H7738-FS(5)	10.000	8/19/2020	0.54	1.57	5.24
9CI-PF3ONS	756426-58-1	1.05 U	H7738-FS(5)	10.000	8/19/2020	0.50	1.05	5.24

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SB04-0304						
Battelle ID		H7741-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		13.67						
Matrix		SO						
Sample Size		1.82						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.78	2.20	5.49
PFHpA	375-85-9	1.65 U	H7741-FS(5)	10.000	8/19/2020	0.56	1.65	5.49
PFOA	335-67-1	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.67	2.20	5.49
PFNA	375-95-1	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.54	1.10	5.49
PFDA	335-76-2	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.51	1.10	5.49
PFUnA	2058-94-8	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.51	1.10	5.49
PFDoA	307-55-1	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.67	2.20	5.49
PFTrDA	72629-94-8	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.31	1.10	5.49
PFTeDA	376-06-7	2.75 U	H7741-FS(5)	10.000	8/19/2020	1.19	2.75	5.49
NMeFOSAA	2355-31-9	2.75 U	H7741-F5(5)	10.000	8/19/2020	1.12	2.75	5.49
NEtFOSAA	2991-50-6	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.82	2.20	5.49
PFBS	375-73-5	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.38	1.10	5.49
PFHxS	355-46-4	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.89	2.20	5.49
PFOS	1763-23-1	2,20 U	H7741-FS(5)	10.000	8/19/2020	0.76	2.20	5.49
HFPO-DA	13252-13-6	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.70	2.20	5.49
Adona	919005-14-4	2.20 U	H7741-FS(5)	10.000	8/19/2020	0.91	2.20	5.49
11CI-PF3OUdS	763051-92-9	1.65 U	H7741-FS(5)	10.000	8/19/2020	0.57	1.65	5.49
9CI-PF3ONS	756426-58-1	1.10 U	H7741-FS(5)	10.000	8/19/2020	0.53	1.10	5.49



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SS03-000H						
Battelle ID		H7742-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		3.73						
Matrix		so		*:				
Sample Size		1.94						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.73	2.06	5.15
PFHpA	375-85-9	1.55 U	H7742-FS(5)	10.000	8/19/2020	0.53	1.55	5.15
PFOA	335-67-1	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.63	2.06	5.15
PFNA	375-95-1	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.51	1.03	5.15
PFDA	335-76-2	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.47	1.03	5.15
PFUnA	2058-94-8	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.47	1.03	5.15
PFDoA	307-55-1	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.63	2.06	5.15
PFTrDA	72629-94-8	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.29	1.03	5.15
PFTeDA	376-06-7	2.58 U	H7742-FS(5)	10.000	8/19/2020	1.11	2.58	5.15
NMeFOSAA	2355-31-9	2.58 U	H7742-FS(5)	10.000	8/19/2020	1.05	2.58	5.15
NEtFOSAA	2991-50-6	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.77	2.06	5.15
PFBS	375-73-5	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.36	1.03	5.15
PFHxS	355-46-4	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.84	2.06	5.15
PFOS	1763-23-1	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.71	2.06	5.15
HFPO-DA	13252-13-6	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.66	2.06	5.15
Adona	919005-14-4	2.06 U	H7742-FS(5)	10.000	8/19/2020	0.86	2.06	5.15
11CI-PF3OUdS	763051-92-9	1.55 U	H7742-FS(5)	10.000	8/19/2020	0.54	1.55	5.15
9CI-PF3ONS	756426-58-1	1.03 U	H7742-FS(5)	10.000	8/19/2020	0.49	1.03	5.15



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-SB03-0304						
Battelle ID		H7743-FS						
Sample Type		SA						
Collection Date		07/27/2020						
Extraction Date		07/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		3.90						
Matrix		SO						
Sample Size		1.94						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.73	2.06	5.15
PFHpA	375-85-9	1.55 U	H7743-FS(5)	10.000	8/19/2020	0.53	1.55	5.15
PFOA	335-67-1	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.63	2.06	5.15
PFNA	375-95-1	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.51	1.03	5.15
PFDA	335-76-2	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.47	1.03	5.15
PFUnA	2058-94-8	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.47	1.03	5.15
PFDoA	307-55-1	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.63	2.06	5.15
PFTrDA	72629-94-8	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.29	1.03	5.15
PFTeDA	376-06-7	2.58 U	H7743-FS(5)	10.000	8/19/2020	1.11	2.58	5.15
NMeFOSAA	2355-31-9	2.58 U	H7743-FS(5)	10.000	8/19/2020	1.05	2.58	5.15
NEtFOSAA	2991-50-6	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.77	2.06	5.15
PFBS	375-73-5	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.36	1.03	5.15
PFHxS	355-46-4	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.84	2.06	5.15
PFOS	1763-23-1	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.71	2.06	5.15
HFPO-DA	13252-13-6	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.66	2.06	5.15
Adona	919005-14-4	2.06 U	H7743-FS(5)	10.000	8/19/2020	0.86	2.06	5.15
11CI-PF3OUdS	763051-92-9	1.55 U	H7743-FS(5)	10.000	8/19/2020	0.54	1.55	5.15
9CI-PF3ONS	756426-58-1	1.03 U	H7743-FS(5)	10.000	8/19/2020	0.49	1.03	5.15



## DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0895

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date: September 29, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-ETA-EB01-073020-SO	H8019-FS	Water
2	PX-ETA-WT05-0720	H8027-FS	Water
3	PX-ETA-FB01-072920	H8028-FS	Water
4	PX-ETA-EB01-072920-GW	H8029-FS	Water
5	PX-ETA-WT01-0720	H8030-FS	Water
6	PX-ETA-WT02-0720	H8031-FS	Water
7	PX-ETA-WT02P-0720	H8032-FS	Water
8	PX-ETA-WT04-0720	H8033-FS	Water
8MS	PX-ETA-WT04-0720MS	H8034-FSMS	Water
8MSD	PX-ETA-WT04-0720MSD	H8035-FSMSD	Water
9	PX-ETA-WT06-0720	H8036-FS	Water
10	PX-ETA-WT03-0720	H8037-FS	Water

A Stage 2B/4 data validation was performed on the analytical data for seven water samples, two aqueous equipment blank samples, and one aqueous field blank sample collected on July 29-30, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

#### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

• All samples were extracted within 14 days for water samples and analyzed within 28 days.

## **LC/MS Tuning**

• All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

#### Continuing Calibration

• All percent recovery (%R) criteria were met.

#### **Method Blank**

• The method blanks were free of contamination.

#### Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-ETA-EB01-073020-SO	None - ND	-	-	
PX-ETA-FB01-072920	None - ND	120	2	-
PX-ETA-EB01-072920-GW	None - ND	- 5 1		

#### Surrogate Spike Recoveries

• Several samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds. These compounds were qualified as estimated (J/UJ) in each sample. Please refer to the Surrogate Form 2s at the end of the DVR for specific recoveries and qualifications.

#### Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

## Internal Standard (IS) Area Performance

All internal standards met response and retention time (RT) criteria.

## **Target Compound Identification**

All mass spectra and quantitation criteria were met.

### **Compound Quantitation**

The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

## Field Duplicate Sample Precision

Field duplicate results are summarized below. The precision was unacceptable for PFHxA. These results were qualified as estimated (J).

Compound	PX-ETA-WT02-0720 ng/L	PX-ETA-WT02P-0720 ng/L	RPD	Qualifier
PFHxA	9.92	7.62	26%	J
PFHpA	4.46	3.81	16%	None
PFOA	16.29	13.65	18%	
PFNA	1.31	1.17	11%	
PFDA	0.17	0.20	16%	
PFBS	2.27	1.80	23%	
PFHxS	5.61	5.58	1%	
PFOS	8.85	8.33	6%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver

Senior Chemist

Dated: 10/2/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-EB01-073020-SO						
Battelle ID		H8019-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/04/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		ι			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	⁻ DL	LOD	LOQ
PFHxA	307-24-4	1.44 U	H8019-FS(0)	1.000	8/22/2020	0.51	1.44	4.81
PFHpA	375-85-9	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.25	0.96	4.81
PFOA	335-67-1	1.44 U	H8019-FS(0)	1.000	8/22/2020	0.49	1.44	4.81
PFNA	375-95-1	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.30	0.96	4.81
PFDA	335-76-2	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H8019-FS(0)	1.000	8/22/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.48	0.96	4.81
PFBS	375-73-5	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFHxS	355-46-4	0.38 U	H8019-FS(0)	1.000	8/22/2020	0.11	0.38	4.81
PFOS	1763-23-1	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.26	0.96	4.81
11CI-PF3OUdS	763051-92-9	0.48 U	H8019-FS(0)	1.000	8/22/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 U	H8019-FS(0)	1.000	8/22/2020	0.26	0.96	4.81



Project Name: CTO-4256: PAX Basewide PFAS

1763-23-1

13252-13-6

919005-14-4

763051-92-9

756426-58-1

Project No.: 100142032

Client ID

LOQ

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0.93

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Battelle ID		H8027-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/04/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.270						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	
PFHxA	307-24-4	19.92	H8027-FS(0)	1.000	8/22/2020	0.49	1.39	
PFHpA	375-85-9	8.50	H8027-FS(0)	1.000	8/22/2020	0.24	0.93	
PFOA	335-67-1	347.71 💋	H8027-FS-D(3)	5.000	8/22/2020	2.36	6.94	
PFNA	375-95-1	3.54 J	H8027-FS(0)	1.000	8/22/2020	0.29	0.93	
PFDA	335-76-2	3.74 J	H8027-FS(0)	1.000	8/22/2020	0.13	0.46	
PFUnA	2058-94-8	0.84 J	H8027-FS(0)	1.000	8/22/2020	0.20	0.46	
PFDoA	307-55-1	0.46 U	H8027-FS(0)	1.000	8/22/2020	0.18	0.46	
PFTrDA	72629-94-8	0.46 U	H8027-FS(0)	1.000	8/22/2020	0.14	0.46	
PFTeDA	376-06-7	1.85 U	H8027-FS(0)	1.000	8/22/2020	0.68	1.85	
NMeFOSAA	2355-31-9	0.93 U	H8027-FS(0)	1.000	8/22/2020	0.32	0.93	
NEtFOSAA	2991-50-6	0.93 U	H8027-FS(0)	1.000	8/22/2020	0.46	0.93	
PFBS	375-73-5	2.80 J	H8027-FS(0)	1.000	8/22/2020	0.13	0.46	
PFHxS	355-46-4	21.51	H8027-FS(0)	1.000	8/22/2020	0.10	0.37	

24.47

0.46 U

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0.46 U

0.93 U

PX-ETA-WT05-0720

H8027-FS(0)

H8027-FS(0)

H8027-FS(0)

H8027-FS(0)

H8027-FS(0)

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8/22/2020

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8/22/2020

8/22/2020

8/22/2020

PFOS

Adona

HFPO-DA

11CI-PF3OUdS 9CI-PF3ONS



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-FB01-072920

 Battelle ID
 H8028-FS

 Sample Type
 SA

 Collection Date
 07/29/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

 % Moisture
 NA

 Matrix
 W

 Sample Size
 0.240

Size Unit-Basis

L Analysis

Applies CAS No. Bookle (ag // ) Fytract ID DE Date

SIZE OTHE-Dasis		<u> </u>	ration y sis					
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.56 U	H8028-FS(0)	1.000	8/22/2020	0.55	1.56	5.21
PFHpA	375-85-9	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.27	1.04	5.21
PFOA	335-67-1	1.56 U	H8028-FS(0)	1.000	8/22/2020	0.53	1.56	5.21
PFNA	375-95-1	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.32	1.04	5.21
PFDA	335-76-2	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.15	0.52	5.21
PFUnA	2058-94-8	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.23	0.52	5.21
PFDoA	307-55-1	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.20	0.52	5.21
PFTrDA	72629-94-8	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.16	0.52	5.21
PFTeDA	376-06-7	2.08 U	H8028-FS(0)	1.000	8/22/2020	0.76	2.08	5.21
NMeFOSAA	2355-31-9	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.36	1.04	5.21
NEtFOSAA	2991-50-6	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.52	1.04	5.21
PFBS	375-73-5	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.15	0.52	5.21
PFHxS	355-46-4	0.42 U	H8028-FS(0)	1.000	8/22/2020	0.11	0.42	5.21
PFOS	1763-23-1	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.46	1.04	5.21
HFPO-DA	13252-13-6	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.26	0.52	5.21
Adona	919005-14-4	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.28	1.04	5.21
11CI-PF3OUdS	763051-92-9	0.52 U	H8028-FS(0)	1.000	8/22/2020	0.24	0.52	5.21
9CI-PF3ONS	756426-58-1	1.04 U	H8028-FS(0)	1.000	8/22/2020	0.28	1.04	5.21



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-ETA-EB01-072920-GW						
Battelle ID		H8029-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/04/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.250						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.50 U	H8029-F5(0)	1.000	8/22/2020	0.53	1.50	5.00
PFHpA	375-85-9	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.26	1.00	5.00
PFOA	335-67-1	1.50 U	H8029-FS(0)	1.000	8/22/2020	0.51	1.50	5.00
PFNA	375-95-1	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.31	1.00	5.00
PFDA	335-76-2	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.14	0.50	5.00
PFUnA	2058-94-8	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.22	0.50	5.00
PFDoA	307-55-1	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.19	0.50	5.00
PFTrDA	72629-94-8	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.15	0.50	5.00
PFTeDA	376-06-7	2.00 U	H8029-FS(0)	1.000	8/22/2020	0.73	2.00	5.00
NMeFOSAA	2355-31-9	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.35	1.00	5.00
NEtFOSAA	2991-50-6	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.50	1.00	5.00
PFBS	375-73-5	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.14	0.50	5.00
PFHxS	355-46-4	0.40 U	H8029-FS(0)	1.000	8/22/2020	0.11	0.40	5.00
PFOS	1763-23-1	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.44	1.00	5.00
HFPO-DA	13252-13-6	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.25	0.50	5.00
Adona	919005-14-4	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.27	1.00	5.00
11CI-PF3OUdS	763051-92-9	0.50 U	H8029-FS(0)	1.000	8/22/2020	0.23	0.50	5.00
9CI-PF3ONS	756426-58-1	1.00 U	H8029-FS(0)	1.000	8/22/2020	0.27	1.00	5.00



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-WT01-0720							
Battelle ID		H8030-FS							
Sample Type		SA							
Collection Date		07/29/2020							
Extraction Date		08/04/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	18.32	H8030-FS(0)	1.000	8/22/2020	0.50	1.42	4.72	
PFHpA	375-85-9	4.76	H8030-FS(0)	1.000	8/22/2020	0.25	0.94	4.72	
PFOA	335-67-1	13.99	H8030-FS(0)	1.000	8/22/2020	0.48	1.42	4.72	
PFNA	375-95-1	0.94 J	H8030-FS(0)	1.000	8/22/2020	0.29	0.94	4.72	
PFDA	335-76-2	0.47 U	H8030-FS(0)	1.000	8/22/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	0.47 U	H8030-FS(0)	1.000	8/22/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.47 y u J	H8030-FS(0)	1.000	8/22/2020	0.18	0.47	4.72	SS
PFTrDA	72629-94-8	0.47 U	H8030-FS(0)	1.000	8/22/2020	0.14	0.47_	4.72	
PFTeDA	376-06-7	1.89 ルルブ	H8030-FS(0)	1.000	8/22/2020	0.69	1.89	4.72	55
NMeFOSAA	2355-31-9	0.94 火 ルブ	H8030-FS(0)	1.000	8/22/2020	0.33	0.94	4.72	53
NEtFOSAA	2991-50-6	0.94 は ひて	H8030-FS(0)	1.000	8/22/2020	0.47	0.94	4.72	53
PFBS	375-73-5	17.34	H8030-FS(0)	1.000	8/22/2020	0.13	0.47	4.72	
PFHxS	355-46-4	65.93	H8030-FS(0)	1.000	8/22/2020	0.10	0.38	4.72	
PFOS	1763-23-1	16.10	H8030-FS(0)	1.000	8/22/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.47 U	H8030-FS(0)	1.000	8/22/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H8030-FS(0)	1.000	8/22/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H8030-FS(0)	1.000	8/22/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H8030-FS(0)	1.000	8/22/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-WT01-0720

 Battelle ID
 H8030-FS

 Sample Type
 SA

 Collection Date
 07/29/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	73	H8030-FS(0)	8/22/2020	
13C4-PFHpA	78	H8030-FS(0)	8/22/2020	
13C8-PFOA	71	H8030-FS(0)	8/22/2020	
13C9-PFNA	65	H8030-FS(0)	8/22/2020	
13C6-PFDA	68	H8030-FS(0)	8/22/2020	
13C7-PFUnA	57	H8030-FS(0)	8/22/2020	
13C2-PFDoA	38 №	H8030-FS(0)	8/22/2020	
13C2-PFTeDA	12 1	H8030-FS(0)	8/22/2020	
d3-MeFOSAA	38 I <mark>l</mark>	H8030-FS(0)	8/22/2020	
d5-EtFOSAA	38	H8030-FS(0)	8/22/2020	
13C3-PFBS	94	H8030-FS(0)	8/22/2020	
13C3-PFHxS	89	H8030-FS(0)	8/22/2020	
13C8-PFOS	71	H8030-FS(0)	8/22/2020	
13C3-HFPO-DA	66	H8030-FS(0)	8/22/2020	

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS



Client ID		PX-ETA-WT02-0720
Battelle ID		H8031-FS
Sample Type		SA
Collection Date		07/29/2020
Extraction Date		08/04/2020
Analytical Instrument		Sciex 5500 LC/MS/MS
% Moisture		NA
Matrix		W
Sample Size		0.255
Size Unit-Basis		L
Analyte	CAS No.	Result (ng/L)

Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	9.92 🔰	H8031-FS(0)	1.000	8/22/2020	0.52	1.47	4.90	Fo
PFHpA	375-85-9	4.46 J	H8031-FS(0)	1.000	8/22/2020	0.25	0.98	4.90	
PFOA	335-67-1	16.29	H8031-FS(0)	1.000	8/22/2020	0.50	1.47	4.90	
PFNA	375-95-1	1.31 J	H8031-FS(0)	1.000	8/22/2020	0.30	0.98	4.90	
PFDA	335-76-2	0.17 J	H8031-FS(0)	1.000	8/22/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	0.49 U	H8031-FS(0)	1.000	8/22/2020	0.22	0.49	4.90	
PFDoA	307-55-1	0.49 U	H8031-FS(0)	1.000	8/22/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.49 U	H8031-FS(0)	1.000	8/22/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.96 <b>y</b> u J	H8031-FS(0)	1.000	8/22/2020	0.72	1.96	4.90	SSL
NMeFOSAA	2355-31-9	0.98 U	H8031-FS(0)	1.000	8/22/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.98 U	H8031-FS(0)	1.000	8/22/2020	0.49	0.98	4.90	
PFBS	375-73-5	2.27 J	H8031-FS(0)	1.000	8/22/2020	0.14	0.49	4.90	
PFHxS	355-46-4	5.61	H8031-FS(0)	1.000	8/22/2020	0.11	0.39	4.90	
PFOS	1763-23-1	8.85	H8031-FS(0)	1.000	8/22/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6	0.49 U	H8031-FS(0)	1.000	8/22/2020	0.25	0.49	4.90	
Adona	919005-14-4	0.98 U	H8031-FS(0)	1.000	8/22/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.49 U	H8031-FS(0)	1.000	8/22/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1	0.98 U	H8031-FS(0)	1.000	8/22/2020	0.26	0.98	4.90	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-WT02-0720

 Battelle ID
 H8031-FS

 Sample Type
 SA

 Collection Date
 07/29/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	69	H8031-FS(0)	8/22/2020	
13C4-PFHpA	75	H8031-FS(0)	8/22/2020	
13C8-PFOA	69	H8031-FS(0)	8/22/2020	
19C9-PFNA	70	H8031-FS(0)	8/22/2020	
13C6-PFDA	70	H8031-FS(0)	8/22/2020	
13C7-PFUnA	71	H8031-FS(0)	8/22/2020	
13C2-PFDoA	61	H8031-FS(0)	8/22/2020	
13C2-PFTeDA	38 Ŋ	H8031-FS(0)	8/22/2020	
d3-MeFOSAA	68	H8031-FS(0)	8/22/2020	
d5-EtFOSAA	81	H8031-FS(0)	8/22/2020	
13C3-PFBS	84	H8031-FS(0)	8/22/2020	
13C3-PFHxS	83	H8031-FS(0)	8/22/2020	
13C8-PFOS	73	H8031-FS(0)	8/22/2020	
13C3-HFPO-DA	64	H8031-FS(0)	8/22/2020	

## It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-ETA-WT02P-0720							
Battelle ID		H8032-FS							
Sample Type		SA							
Collection Date		07/29/2020							
Extraction Date		08/04/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
		7.62 🗸	110033 55(0)	1.000	0 (22 (2020	0.50	1 42	4.72	<b>C</b> =
PFHxA	307-24-4		H8032-FS(0)	1.000	8/23/2020	0.50	1.42	4.72	f D
PFHpA	375-85-9	3.81 J	H8032-FS(0)	1.000	8/23/2020	0.25	0.94	4.72	
PFOA	335-67-1	13.65	H8032-FS(0)	1.000	8/23/2020	0.48	1.42	4.72	
PFNA	375-95-1	1.17 J	H8032-FS(0)	1.000	8/23/2020	0.29	0.94	4.72	
PFDA	335-76-2	0.20 J	H8032-FS(0)	1.000	8/23/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	0.47 U	H8032-FS(0)	1.000	8/23/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.47 yr uj	H8032-FS(0)	1.000	8/23/2020	0.18	0.47	4.72	ک ک
PFTrDA	72629-94-8	0.47 U	H8032-FS(0)	1.000	8/23/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89ルルブ	H8032-FS(0)	1.000	8/23/2020	0.69	1.89	4.72	55
NMeFOSAA	2355-31-9	0.94 U	H8032-FS(0)	1.000	8/23/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94 U	H8032-FS(0)	1.000	8/23/2020	0.47	0.94	4.72	
PFBS	375-73-5	1.80 J	H8032-F5(0)	1.000	8/23/2020	0.13	0.47	4.72	
PFHxS	355-46-4	5.58	H8032-FS(0)	1.000	8/23/2020	0.10	0.38	4.72	
PFOS	1763-23-1	8.33	H8032-F5(0)	1.000	8/23/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.47 U	H8032-FS(0)	1.000	8/23/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H8032-FS(0)	1.000	8/23/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H8032-FS(0)	1.000	8/23/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H8032-FS(0)	1.000	8/23/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-WT02P-0720

 Battelle ID
 H8032-FS

 Sample Type
 SA

 Collection Date
 07/29/2020

 Extraction Date
 08/04/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

		Analysis		
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
13C5-PFHxA	71	H8032-FS(0)	8/23/2020	
13C4-PFHpA	78	H8032-FS(0)	8/23/2020	
I3C8-PFOA	73	H8032-FS(0)	8/23/2020	
L3C9-PFNA	71	H8032-FS(0)	8/23/2020	
3C6-PFDA	64	H8032-FS(0)	8/23/2020	
3C7-PFUnA	60	H8032-FS(0)	8/23/2020	
3C2-PFDoA	46 N	H8032-FS(0)	8/23/2020	
3C2-PFTeDA	26 N	H8032-FS(0)	8/23/2020	
3-MeFOSAA	56	H8032-FS(0)	8/23/2020	
5-EtFOSAA	56	H8032-FS(0)	8/23/2020	
3C3-PFBS	83	H8032-FS(0)	8/23/2020	
3C3-PFH <sub>X</sub> S	77	H8032-FS(0)	8/23/2020	
3C8-PFOS	68	H8032-FS(0)	8/23/2020	
3C3+HFPO-DA	67	H8032-FS(0)	8/23/2020	

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-ETA-WT04-0720						
Battelle ID		H8033-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/04/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
( <del></del>								
PFHxA	307-24-4	13.53	H8033-FS(0)	1.000	8/22/2020	0.51	1.44	4.81
PFHpA	375-85-9	8.64	H8033-FS(0)	1.000	8/22/2020	0.25	0.96	4.81
PFOA	335-67-1	46.18	H8033-FS(0)	1.000	8/22/2020	0.49	1.44	4.81
PFNA	375-95-1	11.04	H8033-FS(0)	1.000	8/22/2020	0.30	0.96	4.81
PFDA	335-76-2	15.20	H8033-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.54 J	H8033-FS(0)	1.000	8/22/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H8033-FS(0)	1.000	8/22/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H8033-FS(0)	1.000	8/22/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H8033-FS(0)	1.000	8/22/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 U	H8033-FS(0)	1.000	8/22/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H8033-FS(0)	1.000	8/22/2020	0.48	0.96	4.81
PFBS	375-73-5	2.32 J	H8033-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFHxS	355-46-4	13.13	H8033-FS(0)	1.000	8/22/2020	0.11	0.38	4.81
PFOS	1763-23-1	33.37	H8033-FS(0)	1.000	8/22/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 U	H8033-FS(0)	1.000	8/22/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H8033-FS(0)	1.000	8/22/2020	0.26	0.96	4.81

0.48 U

0.96 U



H8033-FS(0)

H8033-FS(0)

1.000

1.000

8/22/2020

8/22/2020

0.22

0.26

0.48

0.96

4.81

4.81

11CI-PF3OUdS

9CI-PF3ONS

763051-92-9

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-ETA-WT06-0720						
Battelle ID		H8036-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/04/2020						
Analytical Instrumen	t	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
7								
PFHxA	307-24-4	5.38	H8036-FS(0)	1.000	8/22/2020	0.51	1.44	4.81
PFHpA	375-85-9	4.18 J	H8036-FS(0)	1.000	8/22/2020	0.25	0.96	4.81
PFOA	335-67-1	15.76	H8036-FS(0)	1.000	8/22/2020	0.49	1.44	4.81
PFNA	375-95-1	3.24 J	H8036-FS(0)	1.000	8/22/2020	0.30	0.96	4.81
PFDA	335-76-2	0.97 J	H8036-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.38 J	H8036-FS(0)	1.000	8/22/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 U	H8036-FS(0)	1.000	8/22/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 U	H8036-FS(0)	1.000	8/22/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1.92 U	H8036-FS(0)	1.000	8/22/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 U	H8036-FS(0)	1.000	8/22/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 U	H8036-FS(0)	1.000	8/22/2020	0.48	0.96	4.81
PFBS	375-73-5	1.74 J	H8036-FS(0)	1.000	8/22/2020	0.13	0.48	4.81
PFHxS	355-46-4	5.90	H8036-FS(0)	1.000	8/22/2020	0.11	0.38	4.81
PFOS	1763-23-1	10.46	H8036-FS(0)	1.000	8/22/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 U	H8036-FS(0)	1.000	8/22/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 U	H8036-FS(0)	1.000	8/22/2020	0.26	0.96	4.81
11CI-PF3OUdS	763051-92-9	0.48 U	H8036-FS(0)	1.000	8/22/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 U	H8036-FS(0)	1.000	8/22/2020	0.26	0.96	4.81

Analyzed by: Griffith, Lauren Printed: 8/26/2020

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# It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-ETA-WT03-0720						
Battelle ID		H8037-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/04/2020						
Analytical Instrumer	nt	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.255						
Size Unit-Basis		Ĺ			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	8.93	H8037-FS(0)	1.000	8/22/2020	0.52	1.47	4.90
PFHpA	375-85-9	6.51	H8037-FS(0)	1.000	8/22/2020	0.25	0.98	4.90
PFOA	335-67-1	25.15	H8037-FS(0)	1.000	8/22/2020	0.50	1.47	4.90
PFNA	375-95-1	1.17 J	H8037-FS(0)	1.000	8/22/2020	0.30	0.98	4.90
PFDA	335-76-2	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.14	0.49	4.90
PFUnA	2058-94-8	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.22	0.49	4.90
PFDoA	307-55-1	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.19	0.49	4.90
PFTrDA	72629-94-8	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.15	0.49	4.90
PFTeDA	376-06-7	1.96 U	H8037-FS(0)	1.000	8/22/2020	0.72	1.96	4.90
NMeFOSAA	2355-31-9	0.98 U	H8037-FS(0)	1.000	8/22/2020	0.34	0.98	4.90
NEtFOSAA	2991-50-6	0.98 U	H8037-FS(0)	1.000	8/22/2020	0.49	0.98	4.90
PFBS	375-73-5	2.93 J	H8037-FS(0)	1.000	8/22/2020	0.14	0.49	4.90
PFHxS	355-46-4	10.17	H8037-FS(0)	1.000	8/22/2020	0.11	0.39	4.90
PFOS	1763-23-1	6.88	H8037-FS(0)	1.000	8/22/2020	0.43	0.98	4.90
HFPO-DA	13252-13-6	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.25	0.49	4.90
Adona	919005-14-4	0.98 U	H8037-FS(0)	1.000	8/22/2020	0.26	0.98	4.90
11CI-PF3OUdS	763051-92-9	0.49 U	H8037-FS(0)	1.000	8/22/2020	0.23	0.49	4.90
9CI-PF3ONS	756426-58-1	0.98 U	H8037-FS(0)	1.000	8/22/2020	0.26	0.98	4.90



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0896

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date: September 29, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-ETA-SS01-000H	H8010-FS	Soil
2	PX-ETA-SB01-0304	H8011-FS	Soil
3	PX-ETA-SB01P-0304	H8012-FS	Soil
4	PX-ETA-SS02-000H	H8013-FS	Soil
5	PX-ETA-SB02-0304	H8014-FS	Soil
6	PX-ETA-SS04-000H	H8015-FS	Soil
7	PX-ETA-SB04-0304	H8016-FS	Soil
8	PX-ETA-SS06-000H	H8017-FS	Soil
9	PX-ETA-SB06-0304	H8018-FS	Soil
10	PX-ETA-SS03-000H	H8020-FS	Soil
10MS	PX-ETA-SS03-000HMS	H8021-FSMS	Soil
10MSD	PX-ETA-SS03-000HMSD	H8022-FSMSD	Soil
11	PX-ETA-SB03-0304	H8023-FS	Soil
12	PX-ETA-SS05-000H	H8024-FS	Soil
13	PX-ETA-SS05P-000H	H8025-FS	Soil
14	PX-ETA-SB05-0304	H8026-FS	Soil

A Stage 2B/4 data validation was performed on the analytical data for fourteen soil samples collected on July 29-30, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River,

Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- · and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

# Per- and Polyfluoroalkyl Substances (PFAS)

### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

All samples were extracted within 14 days for soil samples and analyzed within 28 days.

### LC/MS Tuning

All criteria were met.

### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

# Continuing Calibration

• All percent recovery (%R) criteria were met.

### Method Blank

• The method blanks were free of contamination.

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-ETA-EB01-073020-SO	None - ND			

# Surrogate Spike Recoveries

• All samples exhibited acceptable surrogate percent recoveries (%R) except for the following.

EDS Sample	Surrogate	%R	Qualifier
9	PFTeDA	46%	UI

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

# Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

• All criteria were met.

# Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was acceptable.

Compound ng/g ng/g RPD	Qualifier
None ND ND -	14

PFOS 0.99 2.02U NC None

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver Senior Chemist Dated: 10/2/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
Х	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SS01-000H						
Battelle ID		H8010-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/07/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		4.36						
Matrix		SO						
Sample Size		1.86						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.76	2.15	5.38
PFHpA	375-85-9	1.61 U	H8010-FS(3)	10.000	8/20/2020	0.55	1.61	5.38
PFOA	335-67-1	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.66	2.15	5.38
PFNA	375-95-1	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.53	1.08	5.38
PFDA	335-76-2	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.49	1.08	5.38
PFUnA	2058-94-8	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.49	1.08	5.38
PFDoA	307-55-1	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.66	2.15	5.38
PFTrDA	72629-94-8	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.30	1.08	5.38
PFTeDA	376-06-7	2.69 U	H8010-FS(3)	10.000	8/20/2020	1.16	2.69	5.38
NMeFOSAA	2355-31-9	2,69 U	H8010-FS(3)	10.000	8/20/2020	1.10	2.69	5.38
NEtFOSAA	2991-50-6	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.81	2.15	5.38
PFBS	375-73-5	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.38	1.08	5.38
PFHxS	355-46-4	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.87	2.15	5.38
PFOS	1763-23-1	0.82 J	H8010-FS(3)	10.000	8/20/2020	0.74	2.15	5.38
HFPO-DA	13252-13-6	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.69	2.15	5.38
Adona	919005-14-4	2.15 U	H8010-FS(3)	10.000	8/20/2020	0.89	2.15	5.38
11CI-PF3OUdS	763051-92-9	1.61 U	H8010-FS(3)	10.000	8/20/2020	0.56	1.61	5.38
9CI-PF3ONS	756426-58-1	1.08 U	H8010-FS(3)	10.000	8/20/2020	0.52	1.08	5.38

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

2

Client ID		PX-ETA-SB01-0304						
Battelle ID		H8011-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/07/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		15.41						
Matrix		SO						
Sample Size		1.79						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.79	2.23	5.59
PFHpA	375-85-9	1.68 U	H8011-FS(3)	10.000	8/20/2020	0.57	1.68	5.59
PFOA	335-67-1	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.68	2.23	5.59
PFNA	375-95-1	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.55	1.12	5.59
PFDA	335-76-2	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.51	1.12	5.59
PFUnA	2058-94-8	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.51	1.12	5.59
PFDoA	307-55-1	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.68	2.23	5.59
PFTrDA	72629-94-8	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.31	1.12	5.59
PFTeDA	376-06-7	2.79 U	H8011-FS(3)	10.000	8/20/2020	1.21	2.79	5.59
NMeFOSAA	2355-31-9	2.79 U	H8011-FS(3)	10.000	8/20/2020	1.14	2.79	5.59
NEtFOSAA	2991-50-6	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.84	2.23	5.59
PFBS	375-73-5	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.39	1.12	5.59
PFHxS	355-46-4	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.91	2.23	5.59
PFOS	1763-23-1	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.77	2.23	5.59
HFPO-DA	13252-13-6	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.72	2.23	5.59
Adona	919005-14-4	2.23 U	H8011-FS(3)	10.000	8/20/2020	0.93	2.23	5.59
11CI-PF3OUdS	763051-92-9	1.68 U	H8011-FS(3)	10.000	8/20/2020	0.58	1.68	5.59
9CI-PF3ONS	756426-58-1	1.12 U	H8011-FS(3)	10.000	8/20/2020	0.54	1.12	5.59



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SB01P-0304						
Battelle ID		H8012-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		16.36						
Matrix		SO						
Sample Size		1.78						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.80	2.25	5.62
PFHpA	375-85-9	1.69 U	H8012-FS(3)	10.000	8/20/2020	0.57	1.69	5.62
PFOA	335-67-1	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.69	2.25	5.62
PFNA	375-95-1	1.12 U	H8012-FS(3)	10,000	8/20/2020	0.55	1.12	5.62
PFDA	335-76-2	1.12 U	H8012-FS(3)	10.000	8/20/2020	0.52	1.12	5.62
PFUnA	2058-94-8	1.12 U	H8012-FS(3)	10.000	8/20/2020	0.52	1.12	5.62
PFDoA	307-55-1	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.69	2.25	5.62
PFTrDA	72629-94-8	1.12 U	H8012-FS(3)	10.000	8/20/2020	0.31	1.12	5.62
PFTeDA	376-06-7	2.81 U	H8012-FS(3)	10.000	8/20/2020	1.21	2.81	5.62
NMeFOSAA	2355-31-9	2,81 U	H8012-FS(3)	10.000	8/20/2020	1.15	2.81	5.62
NEtFOSAA	2991-50-6	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.84	2.25	5.62
PFBS	375-73-5	1.12 U	H8012-FS(3)	10.000	8/20/2020	0.39	1.12	5.62
PFHxS	355-46-4	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.91	2.25	5.62
PFOS	1763-23-1	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.78	2.25	5.62
HFPO-DA	13252-13-6	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.72	2.25	5.62
Adona	919005-14-4	2.25 U	H8012-FS(3)	10.000	8/20/2020	0.93	2.25	5.62
11CI-PF3OUdS	763051-92-9	1.69 U	H8012-FS(3)	10.000	8/20/2020	0.58	1.69	5.62
9CI-PF3ONS	756426-58-1	1.12 U	H8012-FS(3)	10.000	8/20/2020	0.54	1.12	5.62



Analyte

**PFHxS** 

PFOS

Adona

HFPO-DA

11CI-PF3OUdS

9CI-PF3ONS

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-ETA-SS02-000H
CHERTID	FA-LIA-3302-0001

H8013-FS Battelle ID SA Sample Type **Collection Date** 07/29/2020 08/07/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument 3.55 % Moisture SO Matrix 1.95 Sample Size Size Unit-Basis

CAS No.

355-46-4

1763-23-1

13252-13-6

919005-14-4

763051-92-9 **756426-58-1** 

0.73 2.05 5.13 2.05 U 10.000 8/20/2020 **PFHxA** 307-24-4 H8013-FS(3) 5.13 1.54 U 10.000 8/20/2020 0.52 1.54 PFHpA 375-85-9 H8013-FS(3) 10.000 8/20/2020 0.63 2.05 5.13 **PFOA** 335-67-1 1.19 J H8013-FS(3) 5.13 1.03 PFNA 375-95-1 1.03 U H8013-FS(3) 10.000 8/20/2020 0.50 8/20/2020 0.47 1.03 5.13 1.03 U H8013-FS(3) 10.000 PFDA 335-76-2 5.13 8/20/2020 0.47 1.03 **PFUnA** 2058-94-8 1.03 U H8013-FS(3) 10,000 2.05 U H8013-FS(3) 10.000 8/20/2020 0.63 2.05 5.13 **PFDoA** 307-55-1 5.13 8/20/2020 0.29 1.03 PFTrDA 72629-94-8 1.03 U H8013-FS(3) 10,000 5.13 2.56 U H8013-FS(3) 10.000 8/20/2020 1.11 2.56 **PFTeDA** 376-06-7 8/20/2020 1.05 2.56 5.13 2.56 U H8013-FS(3) 10.000 **NMeFOSAA** 2355-31-9 5.13 **NEtFOSAA** 2991-50-6 2.05 U H8013-FS(3) 10.000 8/20/2020 0.77 2.05 1.03 5.13 1.03 U H8013-FS(3) 10.000 8/20/2020 0.36 **PFBS** 375-73-5

2.05 U

0.84 J

2.05 U

2.05 U

1.54 U

1.03 U

Extract ID

H8013-FS(3)

H8013-FS(3)

H8013-FS(3)

H8013-FS(3)

H8013-FS(3)

H8013-FS(3)

Result (ng/g\_Dry)

Analyzed by: Griffith, Lauren
Printed: 8/26/2020

**Analysis** 

Date

8/20/2020

8/20/2020

8/20/2020

8/20/2020

8/20/2020

8/20/2020

DL

0.83

0.71

0.66

0.85

0.53

0.49

LOD

2.05

2.05

2.05 2.05

1.54

1.03

LOQ

5.13

5.13

5.13

5.13

5.13

5.13

DF

10.000

10.000

10.000

10.000

10.000

10.000



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SB02-0304						
Battelle ID		H8014-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		14.75						
Matrix		SO						
Sample Size		1.59						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.52 U	H8014-FS(3)	10.000	8/20/2020	0.89	2.52	6.29
PFHpA	375-85-9	1.89 U	H8014-FS(3)	10.000	8/20/2020	0.64	1.89	6.29
PFOA	335-67-1	2.52 U	H8014-FS(3)	10,000	8/20/2020	0.77	2.52	6.29
PFNA	375-95-1	1.26 U	H8014-FS(3)	10.000	8/20/2020	0.62	1.26	6.29
PFDA	335-76-2	1.26 U	H8014-FS(3)	10.000	8/20/2020	0.58	1.26	6.29
PFUnA	2058-94-8	1.26 U	H8014-FS(3)	10.000	8/20/2020	0.58	1.26	6.29
PFDoA	307-55-1	2.52 U	H8014-FS(3)	10.000	8/20/2020	0.77	2.52	6.29
PFTrDA	72629-94-8	1,26 U	H8014-FS(3)	10.000	8/20/2020	0.35	1.26	6.29
PFTeDA	376-06-7	3.14 U	H8014-FS(3)	10.000	8/20/2020	1.36	3.14	6.29
NMeFOSAA	2355-31-9	3.14 U	H8014-FS(3)	10.000	8/20/2020	1.28	3.14	6.29
NEtFOSAA	2991-50-6	2.52 U	H8014-FS(3)	10.000	8/20/2020	0.94	2.52	6.29
PFBS	375-73-5	1.26 U	H8014-FS(3)	10.000	8/20/2020	0.44	1.26	6.29
PFHxS	355-46-4	2.52 U	H8014-FS(3)	10.000	8/20/2020	1.02	2.52	6.29
PFOS	1763-23-1	2.52 U	H8014-FS(3)	10.000	8/20/2020	0.87	2.52	6.29
HFPO-DA	13252-13-6	2.52 U	H8014-FS(3)	10.000	8/20/2020	0.81	2.52	6.29
Adona	919005-14-4	2.52 U	H8014-FS(3)	10.000	8/20/2020	1.04	2.52	6.29
11Cl-PF3OUdS	763051-92-9	1.89 ∪	H8014-FS(3)	10.000	8/20/2020	0.65	1.89	6.29
9CI-PF3ONS	756426-58-1	1.26 U	H8014-FS(3)	10.000	8/20/2020	0.60	1.26	6.29

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SS04-000H							
Battelle ID		H8015-FS							
Sample Type		SA							
Collection Date		07/29/2020							
Extraction Date		08/07/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		4.80							
Matrix		SO							
Sample Size		1.95							
Size Unit-Basis		g			Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	2.05 U	H8015-FS(3)	10.000	8/20/2020	0.73	2.05	5.13	
PFHpA	375-85-9	0.82 J	H8015-FS(3)	10.000	8/20/2020	0.52	1.54	5.13	
PFOA	335-67-1	2.98 J	H8015-FS(3)	10.000	8/20/2020	0.63	2.05	5.13	
PFNA	375-95-1	4.50 J	H8015-FS(3)	10.000	8/20/2020	0.50	1.03	5.13	
PFDA	335-76-2	14.12	H8015-FS(3)	10.000	8/20/2020	0.47	1.03	5.13	
PFUnA	2058-94-8	1.34 J	H8015-FS(3)	10.000	8/20/2020	0.47	1.03	5.13	
PFDoA	307-55-1	2.05 U	H8015-FS(3)	10.000	8/20/2020	0.63	2.05	5.13	
PFTrDA	72629-94-8	1.03 U	H8015-FS(3)	10.000	8/20/2020	0.29	1.03	5.13	
PFTeDA	376-06-7	2.56 U	H8015-FS(3)	10.000	8/20/2020	1.11	2.56	5.13	
NMeFOSAA	2355-31-9	2.56 U	H8015-FS(3)	10.000	8/20/2020	1.05	2.56	5.13	
NEtFOSAA	2991-50-6	2.12 J	H8015-FS(3)	10.000	8/20/2020	0.77	2.05	5.13	
PFBS	375-73-5	1.03 U	H8015-FS(3)	10.000	8/20/2020	0.36	1.03	5.13	
PFHxS	355-46-4	2.05 U	H8015-FS(3)	10.000	8/20/2020	0.83	2.05	5.13	
PFOS	1763-23-1	17.32	H8015-FS(3)	10.000	8/20/2020	0.71	2.05	5.13	
HFPO-DA	13252-13-6	2.05 U	H8015-FS(3)	10.000	8/20/2020	0.66	2.05	5.13	
Adona	919005-14-4	2.05 U	H8015-FS(3)	10.000	8/20/2020	0.85	2.05	5.13	
11Cl-PF3OUdS	763051-92-9	1.54 U	H8015-FS(3)	10.000	8/20/2020	0.53	1.54	5.13	
9CI-PF3ONS	756426-58-1	1.03 U	H8015-FS(3)	10.000	8/20/2020	0.49	1.03	5.13	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SB04-0304						
Battelle ID		H8016-FS						
Sample Type		SA						
Collection Date		07/29/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		10.20						
Matrix		SO						
Sample Size		1.87						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.76	2.14	5.35
PFHpA	375-85-9	1.60 U	H8016-FS(3)	10.000	8/20/2020	0.55	1.60	5.35
PFOA	335-67-1	5.49	H8016-FS(3)	10.000	8/20/2020	0.65	2.14	5.35
PFNA	375-95-1	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.52	1.07	5.35
PFDA	335-76-2	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.49	1.07	5.35
PFUnA	2058-94-8	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.49	1.07	5.35
PFDoA	307-55-1	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.65	2.14	5.35
PFTrDA	72629-94-8	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.30	1.07	5.35
PFTeDA	376-06-7	2.67 U	H8016-FS(3)	10.000	8/20/2020	1.16	2.67	5.35
NMeFOSAA	2355-31-9	2.67 U	H8016-FS(3)	10.000	8/20/2020	1.09	2.67	5.35
NEtFOSAA	2991-50-6	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.80	2.14	5.35
PFBS	375-73-5	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.37	1.07	5.35
PFHxS	355-46-4	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.87	2.14	5.35
PFOS	1763-23-1	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.74	2.14	5.35
HFPO-DA	13252-13-6	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.68	2.14	5.35
Adona	919005-14-4	2.14 U	H8016-FS(3)	10.000	8/20/2020	0.89	2.14	5.35
11CI-PF3OUdS	763051-92-9	1.60 U	H8016-FS(3)	10.000	8/20/2020	0.56	1.60	5.35
9CI-PF3ONS	756426-58-1	1.07 U	H8016-FS(3)	10.000	8/20/2020	0.51	1.07	5.35



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-ETA-SS06-000H						
Battelle ID		H8017-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		15.90						
Matrix		so						
Sample Size		1.57						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.90	2.55	6.37
PFHpA	375-85-9	1.91 U	H8017-FS(3)	10.000	8/21/2020	0.65	1.91	6.37
PFOA	335-67-1	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.78	2.55	6.37
PFNA	375-95-1	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.62	1.27	6.37
PFDA	335-76-2	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.59	1.27	6.37
PFUnA	2058-94-8	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.59	1.27	6.37
PFDoA	307-55-1	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.78	2.55	6.37
PFTrDA	72629-94-8	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.36	1.27	6.37
PFTeDA	376-06-7	3.18 U	H8017-FS(3)	10.000	8/21/2020	1.38	3.18	6.37
NMeFOSAA	2355-31-9	3.18 U	H8017-FS(3)	10.000	8/21/2020	1.30	3.18	6.37
NEtFOSAA	2991-50-6	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.96	2.55	6.37
PFBS	375-73-5	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.45	1.27	6.37
PFHxS	355-46-4	2.55 U	H8017-FS(3)	10.000	8/21/2020	1.03	2.55	6.37
PFOS	1763-23-1	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.88	2.55	6.37
HFPO-DA	13252-13-6	2.55 U	H8017-FS(3)	10.000	8/21/2020	0.82	2.55	6.37
Adona	919005-14-4	2.55 U	H8017-FS(3)	10.000	8/21/2020	1.06	2.55	6.37
11Cl-PF3OUdS	763051-92-9	1.91 U	H8017-FS(3)	10.000	8/21/2020	0.66	1.91	6.37
9CI-PF3ONS	756426-58-1	1.27 U	H8017-FS(3)	10.000	8/21/2020	0.61	1.27	6.37

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-SB06-0304 H8018-FS Battelle ID SA Sample Type Collection Date 07/30/2020 **Extraction Date** 08/07/2020 Sciex 5500 LC/MS/MS Analytical Instrument % Moisture 5.30 Matrix SQ 1.73 Sample Size Analysis Size Unit-Basis Result (ng/g\_Dry) Extract ID DF Date DL LOD LOQ Analyte CAS No. 2.31 U 0.82 5.78 10.000 8/20/2020 2.31 **PFHxA** 307-24-4 H8018-FS(3) 375-85-9 1.73 U 10.000 8/20/2020 0.59 1.73 5.78 **PFHpA** H8018-FS(3) 1.48 J 10.000 8/20/2020 0.71 2.31 5.78 **PFOA** 335-67-1 H8018-FS(3) 1.16 5.78 PFNA 375-95-1 1.16 U H8018-FS(3) 10.000 8/20/2020 0.57 8/20/2020 1.16 5.78 335-76-2 1.16 U H8018-FS(3) 10.000 0.53 PFDA 1.16 U 10.000 8/20/2020 0.53 1.16 5.78 **PFUnA** 2058-94-8 H8018-FS(3) 307-55-1 2.31 U H8018-FS(3) 10.000 8/20/2020 0.71 2.31 5.78 **PFDoA** 5.78 10.000 8/20/2020 0.32 1.16 PFTrDA 72629-94-8 1.16 U H8018-FS(3) SSL 5.78 376-06-7 2.89 W U J H8018-FS(3) 10.000 8/20/2020 1.25 2.89 **PFTeDA** 2.89 5.78 2355-31-9 2.89 U H8018-FS(3) 10.000 8/20/2020 1.18 **NMeFOSAA NEtFOSAA** 2991-50-6 2.31 U H8018-FS(3) 10.000 8/20/2020 0.87 2.31 5.78 8/20/2020 1.16 5.78 375-73-5 1.16 U H8018-FS(3) 10.000 0.40 PFBS 5.78 2.31 **PFHxS** 355-46-4 2.31 U H8018-FS(3) 10.000 8/20/2020 0.94 1.08 J H8018-FS(3) 10.000 8/20/2020 0,80 2.31 5.78 **PFOS** 1763-23-1 5.78 HFPO-DA 13252-13-6 2.31 U H8018-FS(3) 10.000 8/20/2020 0.74 2.31 2.31 5.78 919005-14-4 2.31 U H8018-FS(3) 10.000 8/20/2020 0.96 Adona 5.78 1.73 U H8018-FS(3) 10.000 8/20/2020 0.60 1.73 11CI-PF3OUdS 763051-92-9

1.16 U

Analyzed by: Griffith, Lauren Printed: 8/26/2020

H8018-FS(3)

10.000

8/20/2020

0.55

1.16

5.78

9CI-PF3ONS

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-ETA-SB06-0304

 Battelle ID
 H8018-FS

 Sample Type
 SA

 Collection Date
 07/30/2020

 Extraction Date
 08/07/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

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,			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	83	H8018-FS(3)	8/20/2020	
13C4-PFHpA	85	H8018-FS(3)	8/20/2020	
13C8-PFOA	84	H8018-FS(3)	8/20/2020	
13C9-PFNA	80	H8018-FS(3)	8/20/2020	
13C6-PFDA	79	H8018-FS(3)	8/20/2020	
13C7-PFUnA	73	H8018-FS(3)	8/20/2020	
13C2-PFDoA	62	H8018-FS(3)	8/20/2020	
13C2-PFTeDA	46 N	H8018-FS(3)	8/20/2020	
d3-MeFOSAA	54	H8018-FS(3)	8/20/2020	
d5-EtFOSAA	58	H8018-FS(3)	8/20/2020	
13C3-PFBS	91	H8018-FS(3)	8/20/2020	
13C3-PFHxS	88	H8018-FS(3)	8/20/2020	
13C8-PFOS	88	H8018-FS(3)	8/20/2020	
13C3-HFPO-DA	81	H8018-FS(3)	8/20/2020	
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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SS03-000H						
Battelle ID		H8020-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrument	t	Sciex 5500 LC/MS/MS						
% Moisture		4.80						
Matrix		SO						
Sample Size		1.87						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.76	2.14	5.35
PFHpA	375-85-9	1.60 U	H8020-FS(3)	10.000	8/20/2020	0.55	1.60	5.35
PFOA	335-67-1	1.35 J	H8020-FS(3)	10.000	8/20/2020	0.65	2.14	5.35
PFNA	375-95-1	1.07 U	H8020-FS(3)	10.000	8/20/2020	0.52	1.07	5.35
PFDA	335-76-2	1.07 U	H8020-FS(3)	10.000	8/20/2020	0.49	1.07	5.35
PFUnA	2058-94-8	1.07 U	H8020-FS(3)	10.000	8/20/2020	0.49	1.07	5.35
PFDoA	307-55-1	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.65	2.14	5.35
PFTrDA	72629-94-8	1.07 U	H8020-FS(3)	10.000	8/20/2020	0.30	1.07	5.35
PFTeDA	376-06-7	2.67 U	H8020-FS(3)	10.000	8/20/2020	1.16	2.67	5.35
NMeFOSAA	2355-31-9	2.67 U	H8020-FS(3)	10.000	8/20/2020	1.09	2.67	5.35
NEtFOSAA	2991-50-6	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.80	2.14	5.35
PFBS	375-73-5	1,07 U	H8020-FS(3)	10.000	8/20/2020	0.37	1.07	5.35
PFHxS	355-46-4	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.87	2.14	5.35
PFOS	1763-23-1	0.91 J	H8020-FS(3)	10.000	8/20/2020	0.74	2.14	5.35
HFPO-DA	13252-13-6	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.68	2.14	5.35
Adona	919005-14-4	2.14 U	H8020-FS(3)	10.000	8/20/2020	0.89	2.14	5.35
11CI-PF3OUdS	763051-92-9	1.60 U	H8020-FS(3)	10.000	8/20/2020	0.56	1.60	5.35
9CI-PF3ONS	756426-58-1	1.07 U	H8020-FS(3)	10.000	8/20/2020	0.51	1.07	5.35



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SB03-0304						
Battelle ID		H8023-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		17.35						
Matrix		SO						
Sample Size		1.64						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.87	2.44	6.10
PFHpA	375-85-9	1.83 U	H8023-FS(5)	10.000	8/24/2020	0.62	1.83	6.10
PFOA	335-67-1	1.73 J	H8023-FS(5)	10.000	8/24/2020	0.74	2.44	6.10
PFNA	375-95-1	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.60	1.22	6.10
PFDA	335-76-2	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.56	1.22	6.10
PFUnA	2058-94-8	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.56	1.22	6.10
PFDoA	307-55-1	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.74	2.44	6.10
PFTrDA	72629-94-8	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.34	1.22	6.10
PFTeDA	376-06-7	3.05 U	H8023-FS(5)	10.000	8/24/2020	1.32	3.05	6.10
NMeFOSAA	2355-31-9	3.05 U	H8023-FS(5)	10.000	8/24/2020	1.24	3.05	6.10
NEtFOSAA	2991-50-6	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.91	2.44	6.10
PFBS	375-73-5	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.43	1.22	6.10
PFHxS	355-46-4	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.99	2.44	6.10
PFOS	1763-23-1	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.84	2.44	6.10
HFPO-DA	13252-13-6	2.44 U	H8023-FS(5)	10.000	8/24/2020	0.78	2.44	6.10
Adona	919005-14-4	2.44 U	H8023-FS(5)	10.000	8/24/2020	1.01	2.44	6.10
11CI-PF3OUdS	763051-92-9	1.83 U	H8023-FS(5)	10.000	8/24/2020	0.63	1.83	6.10
9CI-PF3ONS	756426-58-1	1.22 U	H8023-FS(5)	10.000	8/24/2020	0.59	1.22	6.10



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SS05-000H						
Battelle ID		H8024-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		9.08						
Matrix		so						
Sample Size		1.86						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.76	2.15	5.38
PFHpA	375-85-9	1.61 U	H8024-FS(3)	10.000	8/20/2020	0.55	1.61	5.38
PFOA	335-67-1	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.66	2.15	5.38
PFNA	375-95-1	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.53	1.08	5.38
PFDA	335-76-2	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.49	1.08	5.38
PFUnA	2058-94-8	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.49	1.08	5.38
PFDoA	307-55-1	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.66	2.15	5.38
PFTrDA	72629-94-8	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.30	1.08	5.38
PFTeDA	376-06-7	2.69 U	H8024-FS(3)	10.000	8/20/2020	1.16	2.69	5.38
NMeFOSAA	2355-31-9	2.69 U	H8024-FS(3)	10.000	8/20/2020	1.10	2.69	5.38
NEtFOSAA	2991-50-6	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.81	2.15	5.38
PFBS	375-73-5	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.38	1.08	5.38
PFHxS	355-46-4	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.87	2.15	5.38
PFOS	1763-23-1	0.99 J	H8024-FS(3)	10.000	8/20/2020	0.74	2.15	5.38
HFPO-DA	13252-13-6	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.69	2.15	5.38
Adona	919005-14-4	2.15 U	H8024-FS(3)	10.000	8/20/2020	0.89	2.15	5.38
11CI-PF3OUdS	763051-92-9	1.61 U	H8024-FS(3)	10.000	8/20/2020	0.56	1.61	5.38
9CI-PF3ONS	756426-58-1	1.08 U	H8024-FS(3)	10.000	8/20/2020	0.52	1.08	5.38

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-SS05P-000H						
Battelle ID		H8025-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		4.16						
Matrix		so						
Sample Size		1.98						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.72	2.02	5.05
PFHpA	375-85-9	1.52 U	H8025-FS(5)	10.000	8/24/2020	0.52	1.52	5.05
PFOA	335-67-1	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.62	2.02	5.05
PFNA	375-95-1	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.49	1.01	5.05
PFDA	335-76-2	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.46	1.01	5.05
PFUnA	2058-94-8	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.46	1.01	5.05
PFDoA	307-55-1	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.62	2.02	5.05
PFTrDA	72629-94-8	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.28	1.01	5.05
PFTeDA	376-06-7	2.53 U	H8025-FS(5)	10.000	8/24/2020	1.09	2.53	5.05
NMeFOSAA	2355-31-9	2.53 U	H8025-FS(5)	10.000	8/24/2020	1.03	2.53	5.05
NEtFOSAA	2991-50-6	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.76	2.02	5.05
PFBS	375-73-5	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.35	1.01	5.05
PFHxS	355-46-4	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.82	2.02	5.05
PFOS	1763-23-1	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.70	2.02	5.05
HFPO-DA	13252-13-6	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.65	2.02	5.05
Adona	919005-14-4	2.02 U	H8025-FS(5)	10.000	8/24/2020	0.84	2.02	5.05
11CI-PF3OUdS	763051-92-9	1.52 U	H8025-FS(5)	10.000	8/24/2020	0.53	1.52	5.05
9CI-PF3ONS	756426-58-1	1.01 U	H8025-FS(5)	10.000	8/24/2020	0.48	1.01	5.05



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-ETA-SB05-0304						
Battelle ID		H8026-FS						
Sample Type		SA						
Collection Date		07/30/2020						
Extraction Date		08/07/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		11.03						
Matrix		so						
Sample Size		1.66						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
				10.000	0/00/2020	0.00	2.44	C 02
PFHxA	307-24-4	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.86	2.41	6.02
PFHpA	375-85-9	1.81 U	H8026-FS(3)	10.000	8/20/2020	0.61	1.81	6.02
PFOA	335-67-1	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.73	2.41	6.02
PFNA	375-95-1	1.20 U	H8026-FS(3)	10.000	8/20/2020	0.59	1.20	6.02
PFDA	335-76-2	1.20 U	H8026-FS(3)	10.000	8/20/2020	0.55	1.20	6.02
PFUnA	2058-94-8	1.20 U	H8026-F5(3)	10.000	8/20/2020	0.55	1.20	6.02
PFDoA	307-55-1	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.73	2.41	6.02
PFTrDA	72629-94-8	1.20 U	H8026-FS(3)	10.000	8/20/2020	0.34	1.20	6.02
PFTeDA	376-06-7	3.01 U	H8026-FS(3)	10.000	8/20/2020	1.30	3.01	6.02
NMeFOSAA	2355-31-9	3.01 U	H8026-FS(3)	10.000	8/20/2020	1.23	3.01	6.02
NEtFOSAA	2991-50-6	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.90	2.41	6.02
PFBS	375-73-5	1.20 U	H8026-FS(3)	10.000	8/20/2020	0.42	1.20	6.02
PFHxS	355-46-4	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.98	2.41	6.02
PFOS	1763-23-1	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.83	2.41	6.02
HFPO-DA	13252-13-6	2.41 U	H8026-FS(3)	10.000	8/20/2020	0.77	2.41	6.02
Adona	919005-14-4	2.41 U	H8026-FS(3)	10.000	8/20/2020	1.00	2.41	6.02
11CI-PF3OUdS	763051-92-9	1.81 U	H8026-FS(3)	10.000	8/20/2020	0.63	1.81	6.02

H8026-FS(3)

1.20 U

8/20/2020

10.000

0.58

1.20

6.02

9CI-PF3ONS

756426-58-1



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0968

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 27, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-BR-ACS-WT'05-0820	H8569-FS	Water
2	PX-BR-ACS-WT01-0820	H8570-FS	Water
3	PX-BR-ACS-EB01-081720-SO	H8571-FS	Water
4	PX-BR-ACS-WT02-0820	H8574-FS	Water
5	PX-BR-ACS-WT02P-0820	H8575-FS	Water
6	PX-BR-ACS-WT03-0820	H8582-FS	Water
7	PX-BR-ACS-WT04-0820	H8583-FS	Water
7MS	PX-BR-ACS-WT04-0820MS	H8584-FSMS	Water
7MSD	PX-BR-ACS-WT04-0820MSD	H8585-FSMSD	Water
8	PX-BR-ACS-WT07-0820	H8586-FS	Water
9	PX-BR-ACS-EB01-081820-SO	H8587-FS	Water
10	PX-BR-ACS-FB01-081820	H8588-FS	Water
11	PX-BR-ACS-EB01-081820-GW	H8589-FS	Water
12	PX-ETA-WT07-0820	H8590-FS	Water
13	PX-ETA-FB01-081820	H8591-FS	Water
14	PX-ETA-EB01-081820-GW	H8592-FS	Water

A Stage 2B/4 data validation was performed on the analytical data for eight water samples, four aqueous equipment blank samples, and two aqueous field blank samples collected on August 17-18, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River,

Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Per- and Polyfluoroalkyl Substances (PFAS)

### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

• All samples were extracted within 14 days for water samples and analyzed within 28 days.

### LC/MS Tuning

All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## **Continuing Calibration**

• All percent recovery (%R) criteria were met.

### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PB 08/28/20	PFBS	0.16	U	9, 10, 14
	PFHxS	0.17	U	3, 9, 10, 11, 13, 14

# Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-BR-ACS-EB01-081720-SO	None - ND		1 2 2 5 1	8
PX-BR-ACS-EB01-081820-SO	None - ND			141
PX-BR-ACS-FB01-081820	None - ND		74,	e -
PX-BR-ACS-EB01-081820-GW	None - ND		1 23-6	+
PX-ETA-FB01-081820	None - ND			4
PX-ETA-EB01-081820-GW	None - ND		4.24	1

### Surrogate Spike Recoveries

• Several samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds. These compounds were qualified as estimated (J/UJ) in each sample. Please refer to the Surrogate Form 2s at the end of the DVR for specific recoveries and qualifications.

### Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RDP	Qualifier
7	PFTrDA	OK/194%/39	None - Samples ND
	PFHxS	848%/830%/OK	None - 4X Rule Applies
	PFOS	882%/745%/OK	None - 4X Rule Applies

# Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

- The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.
- Two samples were re-extracted outside of holding times in SDG 20-1112. Use the original analysis results for reporting purposes.

# Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-BR-ACS-WT02-0820 ng/L	PX-BR-ACS-WT02P-0820 ng/L	RPD	Qualifier
PFHxA	25.69	26.62	4%	None
PFHpA	10.24	10.21	0%	
PFOA	25.40	23.93	6%	
PFNA	26.35	25.06	5%	
PFDA	0.32	0.30	6%	
PFBS	2.55	2.55	0%	
PFHxS	189.22	165.26	14%	
PFOS	1395.67	1157.47	19%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Dated: 10/31/20

Nancy Weaver
Senior Chemist

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT05-0820						
Battelle ID		H8569-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/28/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.275						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
***								
PFHxA	307-24-4	147.67 🏮	H8569-FS-D(3)	5.000	9/12/2020	2.41	6.82	22.73
PFHpA	375-85-9	53.66	H8569-FS(0)	1.000	9/12/2020	0.24	0.91	4.55
PFOA	335-67-1	117.12 Ø	H8569-FS-D(3)	5.000	9/12/2020	2.32	6.82	22.73
PFNA	375-95-1	47.92	H8569-FS(0)	1.000	9/12/2020	0.28	0.91	4.55
PFDA	335-76-2	0.33 J	H8569-FS(0)	1.000	9/12/2020	0.13	0.45	4.55
PFUnA	2058-94-8	0.45 U	H8569-FS(0)	1.000	9/12/2020	0.20	0.45	4.55
PFDoA	307-55-1	0.45 U	H8569-FS(0)	1.000	9/12/2020	0.17	0.45	4.55
PFTrDA	72629-94-8	0.45 U	H8569-FS(0)	1.000	9/12/2020	0.14	0.45	4.55
PFTeDA	376-06-7	1.82 U	H8569-FS(0)	1.000	9/12/2020	0.66	1.82	4.55
NMeFOSAA	2355-31-9	0.91 U	H8569-FS(0)	1.000	9/12/2020	0.32	0.91	4.55
NEtFOSAA	2991-50-6	0.91 U	H8569-FS(0)	1.000	9/12/2020	0.45	0.91	4.55
PFBS	375-73-5	12.35	H8569-FS(0)	1.000	9/12/2020	0.13	0.45	4.55
PFHxS	355-46-4	1083.71 <b>p</b>	H8569-FS-D(7)	62.500	9/15/2020	6.25	22.73	284.09
PFOS	1763-23-1	1989.99	H8569-FS-D(7)	62.500	9/15/2020	25.00	56.82	284.09
HFPO-DA	13252-13-6	0.45 U	H8569-FS(0)	1.000	9/12/2020	0.23	0.45	4.55
Adona	919005-14-4	0.91 U	H8569-FS(0)	1.000	9/12/2020	0.25	0.91	4.55
11CI-PF3OUdS	763051-92-9	0.45 U	H8569-FS(0)	1.000	9/12/2020	0.21	0.45	4.55
9CI-PF3ONS	756426-58-1	0.91 U	H8569-FS(0)	1.000	9/12/2020	0.25	0.91	4.55



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Battelle ID H8570-FS Sample Type SA **Collection Date** 08/17/2020 **Extraction Date** 08/28/2020 Analytical Instrument Sciex 5500 LC/MS/MS % Moisture NA WATER Matrix Sample Size 0.280 Size Unit-Basis

**Analysis** Analyte CAS No. Result (ng/L) Extract ID DF Date DL LOD LOQ **PFHxA** 307-24-4 64.78 H8570-FS(0) 1.000 9/12/2020 0.47 1.34 4.46 PFHpA 375-85-9 58.19 H8570-FS(0) 1.000 9/12/2020 0.23 0.89 4.46 PFOA 335-67-1 62.12 9/12/2020 H8570-FS(0) 1.000 0.46 1.34 4.46 PFNA 44.40 9/12/2020 375-95-1 H8570-FS(0) 1.000 0.28 0.89 4.46 PFDA 335-76-2 4.13 J H8570-FS(0) 1.000 9/12/2020 0.13 0.45 4.46 **PFUnA** 2058-94-8 0.39 J H8570-FS(0) 1.000 9/12/2020 0.45 4.46 0.20 0.45 U **PFDoA** 307-55-1 H8570-FS(0) 1.000 9/12/2020 0.17 0.45 4.46 **PFTrDA** 72629-94-8 0.45 U H8570-FS(0) 1.000 9/12/2020 0.13 0.45 4.46 1.79 U 9/12/2020 **PFTeDA** 376-06-7 H8570-FS(0) 1.000 0.65 1.79 4.46 **NMeFOSAA** 2355-31-9 0.89 U H8570-FS(0) 1.000 9/12/2020 0.31 0.89 4.46 0.89 U 9/12/2020 **NEtFOSAA** 2991-50-6 H8570-FS(0) 1.000 0.45 0.89 4.46 PFBS 375-73-5 4.49 H8570-FS(0) 1.000 9/12/2020 0.13 0.45 4.46 9/12/2020 **PFHxS** 355-46-4 174.46 P H8570-FS-D(3) 5.000 0.49 1.79 22.32 799.32 9/14/2020 22.32 PFOS 1763-23-1 H8570-PS-D(5) 25.000 9.82 111.61 HFPO-DA 13252-13-6 0.45 U H8570-FS(0) 1.000 9/12/2020 0.22 0.45 4.46 0.89 U 9/12/2020 Adona 919005-14-4 H8570-FS(0) 1.000 0.24 0.89 4.46 11CI-PF3OUdS 763051-92-9 0.45 U H8570-FS(0) 1.000 9/12/2020 0.21 0.45 4.46 0.89 U 0.89 4.46 9CI-PF3ONS 756426-58-1 H8570-FS(0) 1.000 9/12/2020 0.24



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-EB01-0817	<sup>20-50</sup>							
Battelle ID		Н8	571-FS							
Sample Type			5A							
Collection Date		08/17	7/2020							
Extraction Date		08/28	3/2020							
Analytical Instrument	t	Sciex 5500 LC/N	/IS/MS							
% Moisture			NA							
Matrix		\	VATER							
Sample Size			0.265							
Size Unit-Basis			Ł			Analysis				
Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4		1.42 U	H8571-FS(0)	1.000	9/12/2020	0.50	1.42	4.72	
PFHpA	375-85-9		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
PFOA	335-67-1		1.42 U	H8571-FS(0)	1.000	9/12/2020	0.48	1.42	4.72	
PFNA	375-95-1		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.29	0.94	4.72	
PFDA	335-76-2		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	
PFUnA	2058-94-8		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.21	0.47	4.72	
PFDoA	307-55-1		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.14	0.47	4.72	
PFTeDA	376-06-7		1.89 U	H8571-FS(0)	1.000	9/12/2020	0.69	1.89	4.72	
NMeFOSAA	2355-31-9		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.47	0.94	4.72	
PFBS	375-73-5		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	
PFHxS	355-46-4	0.38	0.27 + L	H8571-FS(0)	1.000	9/12/2020	0.10	0.38	4.72	MBL
PFOS	1763-23-1		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.24	0.47	4.72	
Adona	919005-14-4		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9		0.47 U	H8571-FS(0)	1.000	9/12/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1		0.94 U	H8571-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT02-0820						
Battelle ID		H8574-FS						
Sample Type		SA						
Collection Date		08/18/2020						
Extraction Date		08/28/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.255						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	25.69	H8574-FS(0)	1.000	9/12/2020	0.52	1.47	4.90
PFHpA	375-85-9	10.24	H8574-FS(0)	1.000	9/12/2020	0.25	0.98	4.90
PFOA	335-67-1	25.40	H8574-FS(0)	1.000	9/12/2020	0.50	1.47	4.90
PFNA	375-95-1	26.35	H8574-FS(0)	1.000	9/12/2020	0.30	0.98	4.90
PFDA	335-76-2	0.32 J	H8574-FS(0)	1.000	9/12/2020	0.14	0.49	4.90
PFUnA	2058-94-8	0.49 U	H8574-FS(0)	1.000	9/12/2020	0.22	0.49	4.90
PFDoA	307-55-1	0.49 U	H8574-FS(0)	1.000	9/12/2020	0.19	0.49	4.90
PFTrDA	72629-94-8	0.49 U	H8574-FS(0)	1.000	9/12/2020	0.15	0.49	4.90
PFTeDA	376-06-7	1.96 U	H8574-FS(0)	1.000	9/12/2020	0.72	1.96	4.90
NMeFOSAA	2355-31-9	0.98 U	H8574-FS(0)	1.000	9/12/2020	0.34	0.98	4.90
NEtFOSAA	2991-50-6	0.98 U	H8574-FS(0)	1.000	9/12/2020	0.49	0.98	4.90
PFBS	375-73-5	2.55 J	H8574-FS(0)	1.000	9/12/2020	0.14	0.49	4.90
PFHxS	355-46-4	189.22 <b>(</b> )	H8574-FS-D(5)	12.500	9/12/2020	1.35	4.90	61.27
PFOS	1763-23-1	1395.67	H8574-FS-D(7)	62.500	9/14/2020	26.96	61.27	306.37
HFPO-DA	13252-13-6	0.49 U	H8574-FS(0)	1.000	9/12/2020	0.25	0.49	4.90
Adona	919005-14-4	0.98 U	H8574-FS(0)	1.000	9/12/2020	0.26	0.98	4.90
11CI-PF3OUdS	763051-92-9	0.49 U	H8574-FS(0)	1.000	9/12/2020	0.23	0.49	4.90
9CI-PF3ONS	756426-58-1	0.98 U	H8574-FS(0)	1.000	9/12/2020	0.26	0.98	4.90



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-BR-ACS-WT02P-0820						
Battelle ID		H8575-FS						
Sample Type		SA						
Collection Date		08/18/2020						
Extraction Date		08/28/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.270						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	26.62	H8575-FS(0)	1.000	9/12/2020	0.49	1.39	4.63
PFHpA	375-85-9	10.21	H8575-FS(0)	1.000	9/12/2020	0.24	0.93	4.63
PFOA	335-67-1	23.93	H8575-FS(0)	1.000	9/12/2020	0.47	1.39	4.63
PFNA	375-95-1	25.06	H8575-FS(0)	1.000	9/12/2020	0.29	0.93	4.63
PFDA	335-76-2	0.30 J	H8575-FS(0)	1.000	9/12/2020	0.13	0.46	4.63
PFUnA	2058-94-8	0.46 U	H8575-FS(0)	1.000	9/12/2020	0.20	0.46	4.63
PFDoA	307-55-1	0.46 U	H8575-FS(0)	1.000	9/12/2020	0.18	0.46	4.63
PFTrDA	72629-94-8	0.46 U	H8575-FS(0)	1.000	9/12/2020	0.14	0.46	4.63
PFTeDA	376-06-7	1.85 U	H8575-FS(0)	1.000	9/12/2020	0.68	1.85	4.63
NMeFOSAA	2355-31-9	0.93 U	H8575-FS(0)	1.000	9/12/2020	0.32	0.93	4.63
NEtFOSAA	2991-50-6	0.93 U	H8575-FS(0)	1.000	9/12/2020	0.46	0.93	4.63
PFBS	375-73-5	2.55 J	H8575-FS(0)	1.000	9/12/2020	0.13	0.46	4.63
PFHxS	355-46-4	165.26 🖟	H8575-FS-D(5)	12.500	9/12/2020	1.27	4.63	57.87
PFOS	1763-23-1	1157.47	H8575-FS-D(7)	62.500	9/14/2020	25.46	57.87	289.35
HFPO-DA	13252-13-6	0.46 U	H8575-FS(0)	1.000	9/12/2020	0.23	0.46	4.63
Adona	919005-14-4	0.93 U	HB575-FS(0)	1.000	9/12/2020	0.25	0.93	4.63
11CI-PF3OUdS	763051-92-9	0.46 U	H8575-FS(0)	1.000	9/12/2020	0.21	0.46	4.63
					- 4 4			4.55

0.93 U

H8575-FS(0)

1.000

9/12/2020

0.25

0.93

4.63

9CI-PF3ONS

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-BR-ACS-WT03-0820						
Battelle ID		H8582-F5						
Sample Type		SA						
Collection Date		08/18/2020						
Extraction Date		08/28/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.245						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
11.								
PFHxA	307-24-4	14.45	H8582-FS(0)	1.000	9/12/2020	0.54	1.53	5.10
PFHpA	375-85-9	4.61 J	H8582-FS(0)	1.000	9/12/2020	0.27	1.02	5.10
PFOA	335-67-1	20.71	H8582-FS(0)	1.000	9/12/2020	0.52	1.53	5.10
PFNA	375-95-1	1.02 U	H8582-FS(0)	1.000	9/12/2020	0.32	1.02	5.10
PFDA	335-76-2	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.14	0.51	5.10
PFUnA	2058-94-8	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.22	0.51	5.10
PFDoA	307-55-1	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.19	0.51	5.10
PFTrDA	72629-94-8	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.15	0.51	5.10
PFTeDA	376-06-7	2.04 U	H8582-FS(0)	1.000	9/12/2020	0.74	2.04	5.10
NMeFOSAA	2355-31-9	1.02 U	H8582-FS(0)	1.000	9/12/2020	0.36	1.02	5.10
NEtFOSAA	2991-50-6	1.02 U	H8582-FS(0)	1.000	9/12/2020	0.51	1.02	5.10
PFBS	375-73-5	3.03 J	H8582-FS(0)	1.000	9/12/2020	0.14	0.51	5.10
PFHxS	355-46-4	89.48 🛭	H8582-FS-D(3)	5.000	9/14/2020	0.56	2.04	25.51
PFOS	1763-23-1	113.57 0	H8582-FS-D(3)	5.000	9/14/2020	2.24	5.10	25.51
HFPO-DA	13252-13-6	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.26	0.51	5.10
Adona	919005-14-4	1.02 U	H8582-FS(0)	1.000	9/12/2020	0.28	1.02	5.10
11CI-PF3OUdS	763051-92-9	0.51 U	H8582-FS(0)	1.000	9/12/2020	0.23	0.51	5.10
9CI-PF3ONS	756426-58-1	1.02 U	H8582-FS(0)	1.000	9/12/2020	0.28	1.02	5.10



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT04-0820							
Battelle ID		H8583-FS							
Sample Type		SA							
Collection Date		08/18/2020							
Extraction Date		08/28/2020							
Analytical Instrumen	t	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	-2-
									=#1 
PFHxA	307-24-4	80.12 ブ	H8583-FS(0)	1.000	9/12/2020	0.53	1.50	5.00	SSL
PFHpA	375-85-9	29.64 🕤	H8583-FS(0)	1.000	9/12/2020	0.26	1.00	5.00	- 1
PFOA	335-67-1	55.40 🦵	H8583-FS(0)	1.000	9/12/2020	0.51	1.50	5.00	
PFNA	375-95-1	14.63 J	H8583-FS(0)	1.000	9/12/2020	0.31	1.00	5.00	- 1
PFDA	335-76-2	0.19 レ ブ	H8583-FS(0)	1.000	9/12/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.50 Jr W	T H8583-FS(0)	1.000	9/12/2020	0.22	0.50	5.00	
PFDoA	307-55-1	0.50 もい	T H8583-FS(0)	1.000	9/12/2020	0.19	0.50	5.00	1
PFTrDA	72629-94-8	0.50 U	H8583-FS(0)	1.000	9/12/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 18 1	<b>ブ</b> H8583-F5(0)	1.000	9/12/2020	0.73	2.00	5.00	551
NMeFOSAA	2355-31-9	1.00 U	H8583-FS(0)	1.000	9/12/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 U	H8583-FS(0)	1.000	9/12/2020	0.50	1.00	5.00	
PFBS	375-73-5	8.73	H8583-FS(0)	1.000	9/12/2020	0.14	0.50	5.00	
PFHxS	355-46-4	209.16 <b>p</b>	H8583-FS-D(3)	5.000	9/12/2020	0.55	2.00	25.00	
PFOS	1763-23-1	228.56 🏚	H8583-FS-D(3)	5.000	9/12/2020	2.20	5.00	25.00	
HFPO-DA	13252-13-6	ما طل 0.50		1.000	9/12/2020	0.25	0.50	5.00	55
Adona	919005-14-4	1.00 U	H8583-FS(0)	1.000	9/12/2020	0.27	1.00	5.00	
11CI-PF3OUdS	763051-92-9	0.50 U	H8583-FS(0)	1.000	9/12/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1.00 U	H8583-FS(0)	1.000	9/12/2020	0.27	1.00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-BR-ACS-WT04-0820

 Battelle ID
 H8583-FS

 Sample Type
 SA

 Collection Date
 08/18/2020

 Extraction Date
 08/28/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

Surrogate Recoveries (%)	Analysis			
	Recovery	Extract ID	Date	
13C5-PFHxA	32 N	H8583-FS(0)	9/12/2020	
13C4-PFHpA	32 N	H8583-FS(0)	9/12/2020	
13C8-PFOA	31 N	H8583-FS(0)	9/12/2020	
13C9-PFNA	29 N	H8583-FS(0)	9/12/2020	
13C6-PFDA	29 N	H8583-FS(0)	9/12/2020	
13C7-PFUnA	32 N	H8583-FS(0)	9/12/2020	
13C2-PFDoA	31 N	H8583-FS(0)	9/12/2020	
13C2-PFTeDA	29 N	H8583-FS(0)	9/12/2020	
d3-MeFOSAA	81 P	H8583-FS-D(3)	9/12/2020	
d5-EtFOSAA	87 🏚	H8583-FS-D(3)	9/12/2020	
13C3-PFBS	86 🏚	H8583-FS-D(3)	9/12/2020	
13C3-PFHxS	87 🏚	H8583-FS-D(3)	9/12/2020	
13C8-PFOS	81 💆	H8583-F5-D(3)	9/12/2020	
13C3-HFPG-DA	30 N	H8583-FS(0)	9/12/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT07-0820							
Battelle ID		H8586-FS							
Sample Type		SA							
Collection Date		08/18/2020							
Extraction Date		08/28/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	131.17 🗗	H8586-FS-D(3)	5.000	9/12/2020	2.65	7.50	25.00	
PFHpA	375-85-9	37.27	H8586-FS(0)	1.000	9/12/2020	0.26	1.00	5.00	
PFOA	335-67-1	42.33	H8586-FS(0)	1.000	9/12/2020	0.51	1.50	5.00	
PFNA	375-95-1	1.28 J	H8586-FS(0)	1.000	9/12/2020	0.31	1.00	5.00	
PFDA	335-76-2	0.5D U	H8586-FS(0)	1.000	9/12/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.50 U	H8586-FS(0)	1.000	9/12/2020	0.22	0.50	5.00	
PFDoA	307-55-1	0.50 U	H8586-FS(0)	1.000	9/12/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8	0.51 J	H8586-FS(0)	1.000	9/12/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 b UJ	H8586-FS(0)	1.000	9/12/2020	0.73	2.00	5.00	550
NMeFOSAA	2355-31-9	1.00 U	H8586-FS(0)	1.000	9/12/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 U	H8586-FS(0)	1.000	9/12/2020	0.50	1.00	5.00	
PFBS	375-73-5	24.04	H8586-FS(0)	1.000	9/12/2020	0.14	0.50	5.00	
PFHxS	355-46-4	681.20 <b>p</b>	H8586-FS-D(5)	25.000	9/14/2020	2.75	10.00	125.00	
PFOS	1763-23-1	63.31	H8586-FS(0)	1.000	9/12/2020	0.44	1.00	5.00	
HFPO-DA	13252-13-6	0.50 U	H8586-FS(0)	1.000	9/12/2020	0.25	0.50	5.00	
Adona	919005-14-4	1.00 U	H8586-FS(0)	1.000	9/12/2020	0.27	1.00	5.00	
11Cl-PF3OUdS	763051-92-9	0.25 J	H8586-FS(0)	1.000	9/12/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1.00 U	H8586-FS(0)	1.000	9/12/2020	0.27	1.00	5.00	



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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-BR-ACS-WT07-0820
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 Battelle ID
 H8586-FS

 Sample Type
 SA

 Collection Date
 08/18/2020

 Extraction Date
 08/28/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
13C5-PFHxA	100 🏚	H8586-FS-D(3)	9/12/2020	
13C4-PFHpA	83	H8586-FS(0)	9/12/2020	
13C8-PFOA	93	H8586-FS(0)	9/12/2020	
13C9-PFNA	90	H8586-FS(0)	9/12/2020	
13C6-PFDA	87	H8586-FS(0)	9/12/2020	
13C7-PFUnA	89	H8586-FS(0)	9/12/2020	
13C2-PFDoA	69	H8586-FS(0)	9/12/2020	
13C2-PFTeDA	30 N	H8586-FS(0)	9/12/2020	
d3-MeFOSAA	85	H8586-FS(0)	9/12/2020	
d5-EtFOSAA	107	H8586-FS(0)	9/12/2020	
13C3-PFBS	83	H8586-FS(0)	9/12/2020	
13C3-PFHxS	108 0	H8586-FS-D(5)	9/14/2020	
13C8-PFOS	96	H8586-FS(0)	9/12/2020	
13C3-HFPO-DA	79	H8586-FS(0)	9/12/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Collection Date	Client ID		PX-BR-ACS-EB01-0818	20-50							
Collection Date 08/18/2020 Extraction Date 08/28/2020 Analytical Instrument Sciex 5500 LC/Ms/Ms  **Moisture**  **NA  **Matrix**  **WATER  **Sample Size  **Size Unit-Basis  **L  **Analyte**  **CAS No.  **Result (ng/L)  **PFHXA**  **307-24-4  **PFHA**  **307-24-4  **PFHA**  **375-85-9  **9.93 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.48  **1.42  **4.72  **PFNA  **375-95-1  **1.004  **1.000  **9/12/2020  **0.48  **1.42  **4.72  **PFNA  **375-95-1  **1.004  **1.000  **9/12/2020  **0.48  **1.42  **4.72  **PFNA  **375-95-1  **0.047 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.13  **0.47  **4.72  **PFUNA  **2058-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.21  **0.47  **4.72  **PFTDA  **2629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.21  **0.47  **4.72  **PFTDA  **72629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.21  **0.47  **4.72  **PFTDA  **72629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.14  **0.47  **4.72  **PFTDA  **72629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.14  **0.47  **4.72  **PFTDA  **375-93-5  **0.94 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.14  **0.47  **4.72  **PFTDA  **72629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.14  **0.47  **4.72  **PFTDA  **72629-94-8  **0.47 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **0.94  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **0.94  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **0.94  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.42  **0.44  **0.47  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **0.94  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **0.47  **4.72  **PFPSS  **375-73-5  **0.43 U  **H8587-FS(0)  **1.000  **9/12/2020  **0.47  **	Battelle ID		H8!	587-FS							
Extraction Date	Sample Type			SA							
Analytical Instrument	Collection Date		08/18	/2020							
% Moisture         NA           Matrix         WATER           Sample Size         0.265           Size Unit-Basis         L         Analysis           Analyte         CAS No.         Result (ng/L)         Extract ID         DF         Date         DL         LOD         LOQ           PFHXA         307-24-4         1.42 U         H8587-FS(0)         1.000         9/12/2020         0.50         1.42         4.72           PFHAPA         375-85-9         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.25         0.94         4.72           PFOA         335-67-1         1.42 U         H8587-FS(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDA         375-95-1         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDA         335-66-2         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDOA         307-55-1         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.21         0.47         4.72           PFTODA         76269-94-8         0.47 U	Extraction Date		08/28	/2020							
Matrix         WATER           Sample Size         0.265           Size Unit-Basis         L         Analysis           Analyte         CAS No.         Result (ng/L)         Extract ID         DF         Date         DL         LOD         LOQ           PFHXA         307-24-4         1.42 U         H8587-F5(0)         1.000         9/12/2020         0.50         1.42         4.72           PFHAA         375-95-9         0.94 U         H8587-F5(0)         1.000         9/12/2020         0.25         0.94         4.72           PFNA         375-95-1         0.94 U         H8587-F5(0)         1.000         9/12/2020         0.25         0.94         4.72           PFDA         335-76-2         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.29         0.94         4.72           PFUA         2058-94-8         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.21         0.47         4.72           PFLDA         307-55-1         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.18         0.47         4.72           PFTDA         72629-94-8         0.47 U         H8587-F5(0)         1.000         9/12/2020	Analytical Instrumer	nt	Sciex 5500 LC/N	15/MS							
Sample Size         0.265           Size Unit-Basis         L         Analysis         Analysis           Analyte         CAS No.         Result (ng/L)         Extract ID         DF         Date         DL         LOD         LOQ           PFHxA         307-24-4         1.42 U         H8587-FS(0)         1.000         9/12/2020         0.50         1.42         4.72           PFHpA         375-85-9         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.25         0.94         4.72           PFNA         335-67-1         1.42 U         H8587-FS(0)         1.000         9/12/2020         0.25         0.94         4.72           PFNA         375-95-1         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDA         335-76-2         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.21         0.47         4.72           PFUA         2058-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.11         0.47         4.72           PFTDA         72629-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.18         0	% Moisture			NA							
CAS No.   Result (ng/L)   Extract ID   DF   Date   DL   LOD   LOQ	Matrix		٧	VATER							
Analyte         CAS No.         Result (ng/L)         Extract ID         DF         Date         DL         LOD         LOQ           PFHxA         307-24-4         1.42 U         H8587-F5(0)         1.000         9/12/2020         0.50         1.42         4.72           PFHpA         375-85-9         0.94 U         H8587-F5(0)         1.000         9/12/2020         0.25         0.94         4.72           PFOA         335-67-1         1.42 U         H8587-F5(0)         1.000         9/12/2020         0.48         1.42         4.72           PFDA         375-95-1         0.94 U         H8587-F5(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDA         335-76-2         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.21         0.47         4.72           PFDA         307-55-1         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.13         0.47         4.72           PFTDA         72629-94-8         0.47 U         H8587-F5(0)         1.000         9/12/2020         0.18         0.47         4.72           PFTDA         72629-94-8         0.47 U         H8587-F5(0)         1.000         9/12/2	Sample Size			0.265							
PFHXA 307-24-4 1.42 U H8587-FS(0) 1.000 9/12/2020 0.50 1.42 4.72 PFHpA 375-85-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOA 335-67-1 1.42 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFNA 375-95-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.29 0.94 4.72 PFDA 335-76-2 0.47 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFUnA 2058-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 U H8587-FS(0) 1.000 9/12/2020 0.21 0.47 4.72 PFTDA 72629-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.14 0.47 4.72 PFTDA 376-06-7 1.89 U H8587-FS(0) 1.000 9/12/2020 0.14 0.47 4.72 PFTDA 376-06-7 1.89 U H8587-FS(0) 1.000 9/12/2020 0.69 1.89 4.72 NMEFOSAA 2355-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72 PFBS 375-73-5 0.94 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFBS 375-73-5 0.94 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFBS 355-46-4 0.38 0.94 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFDOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.10 0.38 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PPOS 1763-23-1 0.94 U	Size Unit-Basis			L			Analysis				
PFHpA 375-85-9 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOA 335-67-1 1.42 U H8587-F5(0) 1.000 9/12/2020 0.48 1.42 4.72 PFNA 375-95-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.29 0.94 4.72 PFDA 335-76-2 0.47 U H8587-F5(0) 1.000 9/12/2020 0.29 0.94 4.72 PFUNA 2058-94-8 0.47 U H8587-F5(0) 1.000 9/12/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 U H8587-F5(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTPDA 72629-94-8 0.47 U H8587-F5(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTeDA 376-06-7 1.89 U H8587-F5(0) 1.000 9/12/2020 0.69 1.89 4.72 PFTeDA 376-06-7 1.89 U H8587-F5(0) 1.000 9/12/2020 0.69 1.89 4.72 NMeFOSAA 2355-31-9 0.94 U H8587-F5(0) 1.000 9/12/2020 0.33 0.94 4.72 PFBS 375-73-5 0.47 0.94 U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFHxS 355-46-4 0.3 8 0.18 ≠ U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72	Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHpA 375-85-9 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOA 335-67-1 1.42 U H8587-F5(0) 1.000 9/12/2020 0.48 1.42 4.72 PFNA 375-95-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.29 0.94 4.72 PFDA 335-76-2 0.47 U H8587-F5(0) 1.000 9/12/2020 0.29 0.94 4.72 PFUNA 2058-94-8 0.47 U H8587-F5(0) 1.000 9/12/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 U H8587-F5(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTPDA 72629-94-8 0.47 U H8587-F5(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTeDA 376-06-7 1.89 U H8587-F5(0) 1.000 9/12/2020 0.69 1.89 4.72 PFTeDA 376-06-7 1.89 U H8587-F5(0) 1.000 9/12/2020 0.69 1.89 4.72 NMeFOSAA 2355-31-9 0.94 U H8587-F5(0) 1.000 9/12/2020 0.33 0.94 4.72 PFBS 375-73-5 0.47 0.94 U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFHxS 355-46-4 0.3 8 0.18 ≠ U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-F5(0) 1.000 9/12/2020 0.25 0.94 4.72	DELLUA	207-24-4		1 42 11	H8587-FS(0)	1 000	9/12/2020	0.50	1 42	4 72	
PFOA 335-67-1 1.42 U H8587-FS(0) 1.000 9/12/2020 0.48 1.42 4.72 PFNA 375-95-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.29 0.94 4.72 PFDA 335-76-2 0.47 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFUNA 2058-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 U H8587-FS(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 U H8587-FS(0) 1.000 9/12/2020 0.14 0.47 4.72 PFTEDA 3255-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72 NMEFOSAA 2355-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72 NETFOSAA 2991-50-6 0.47 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFHXS 375-46-4 0.38 0.18 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.10 0.38 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.24 0.47 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72											
PFNA         375-95-1         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.29         0.94         4.72           PFDA         335-76-2         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.13         0.47         4.72           PFUnA         2058-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.21         0.47         4.72           PFDOA         307-55-1         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.18         0.47         4.72           PFTrDA         72629-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.14         0.47         4.72           PFTeDA         376-06-7         1.89 U         H8587-FS(0)         1.000         9/12/2020         0.69         1.89         4.72           NMeFOSAA         2355-31-9         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.47         0.94         4.72           PFBS         375-73-5         0.14 U         H8587-FS(0)         1.000         9/12/2020         0.13         0.47         4.72           PFOS         1763-23-1         0.94 U         H8587-FS(0)         1.000	•										
PFDA 335-76-2 0.47 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFUnA 2058-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 U H8587-FS(0) 1.000 9/12/2020 0.18 0.47 4.72 PFTrDA 72629-94-8 0.47 U H8587-FS(0) 1.000 9/12/2020 0.14 0.47 4.72 PFTeDA 376-06-7 1.89 U H8587-FS(0) 1.000 9/12/2020 0.69 1.89 4.72 NM6FOSAA 2355-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72 NEtFOSAA 2991-50-6 0.94 U H8587-FS(0) 1.000 9/12/2020 0.47 0.94 4.72 PFBS 375-73-5 0.18 U H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72 PFHxS 355-46-4 0.38 0.18 U H8587-FS(0) 1.000 9/12/2020 0.10 0.38 4.72 PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72 HFPO-DA 13252-13-6 0.47 U H8587-FS(0) 1.000 9/12/2020 0.24 0.47 4.72 Adona 919005-14-4 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72 11CI-PF3OUdS 763051-92-9 0.47 U H8587-FS(0) 1.000 9/12/2020 0.22 0.47 4.72											
PFUNA         2058-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.21         0.47         4.72           PFDOA         307-55-1         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.18         0.47         4.72           PFTrDA         72629-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.14         0.47         4.72           PFTeDA         376-06-7         1.89 U         H8587-FS(0)         1.000         9/12/2020         0.69         1.89         4.72           NMeFOSAA         2355-31-9         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.33         0.94         4.72           NEtFOSAA         2991-50-6         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.47         0.94         4.72           PFBS         375-73-5         0.47 0.16 V         H8587-FS(0)         1.000         9/12/2020         0.13         0.47         4.72           PFHxS         355-46-4         0.38 0.18 V         H8587-FS(0)         1.000         9/12/2020         0.10 0.38         4.72           HFPO-DA         13252-13-6         0.47 U         H8587-FS(0)         1.000											
PFDOA         307-55-1         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.18         0.47 U         4.72           PFTrDA         72629-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.14 0.47 0.47         4.72           PFTeDA         376-06-7         1.89 U         H8587-FS(0)         1.000         9/12/2020         0.69 1.89 0.47         4.72           NMeFOSAA         2355-31-9         0.94 U         H8587-FS(0)         1.000 9/12/2020         0.33 0.94 0.47         4.72           NEtFOSAA         2991-50-6         0.94 U         H8587-FS(0)         1.000 9/12/2020         0.47 0.94 0.47         4.72           PFBS         375-73-5         0.47 0.16 M.H. H8587-FS(0)         1.000 9/12/2020         9/12/2020 0.13 0.47 0.47         4.72 0.47           PFOS         1763-23-1         0.94 U         H8587-FS(0)         1.000 9/12/2020 0.42 0.94 0.47         4.72 0.94 0.47           HFPO-DA         13252-13-6         0.47 U         H8587-FS(0)         1.000 9/12/2020 0.25 0.94 0.47         0.47 0.47           Adona         91905-14-4         0.94 U H8587-FS(0)         1.000 9/12/2020 0.22 0.47 0.47         0.47 0.47           1CI-PF3OUdS         763051-92-9         0.47 U H8587-FS(0)         1.000 9/12/2020 0											
PFTrDA         72629-94-8         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.14         0.47         4.72           PFTeDA         376-06-7         1.89 U         H8587-FS(0)         1.000         9/12/2020         0.69         1.89         4.72           NMeFOSAA         2355-31-9         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.33         0.94         4.72           NEtFOSAA         2991-50-6         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.47         0.94         4.72           PFBS         375-73-5         6.47         0.167 M         H8587-FS(0)         1.000         9/12/2020         0.13         0.47         4.72         M           PFHxS         355-46-4         0.38         0.18 M         H8587-FS(0)         1.000         9/12/2020         0.10         0.38         4.72         M           PFOS         1763-23-1         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.42         0.94         4.72           HFPO-DA         13252-13-6         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.24         0.47         4.72           Adona         919005										4.72	
PFTeDA 376-06-7 1.89 U H8587-FS(0) 1.000 9/12/2020 0.69 1.89 4.72  NMeFOSAA 2355-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72  NEtFOSAA 2991-50-6 0.94 U H8587-FS(0) 1.000 9/12/2020 0.47 0.94 4.72  PFBS 375-73-5 0.16 V H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72  PFHxS 355-46-4 0.38 0.18 V H8587-FS(0) 1.000 9/12/2020 0.10 0.38 4.72  PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72  HFPO-DA 13252-13-6 0.47 U H8587-FS(0) 1.000 9/12/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 U H8587-FS(0) 1.000 9/12/2020 0.22 0.47 4.72				0.47 U			9/12/2020	0.14	0.47	4.72	
NMeFOSAA 2355-31-9 0.94 U H8587-FS(0) 1.000 9/12/2020 0.33 0.94 4.72  NEtFOSAA 2991-50-6 0.94 U H8587-FS(0) 1.000 9/12/2020 0.47 0.94 4.72  PFBS 375-73-5 0.16 V H8587-FS(0) 1.000 9/12/2020 0.13 0.47 4.72  PFHxS 355-46-4 0.3 8 0.18 V H8587-FS(0) 1.000 9/12/2020 0.10 0.38 4.72  PFOS 1763-23-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.42 0.94 4.72  HFPO-DA 13252-13-6 0.47 U H8587-FS(0) 1.000 9/12/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 U H8587-FS(0) 1.000 9/12/2020 0.22 0.47 4.72								0.69	1.89	4.72	
NEtFOSAA       2991-50-6       0.94 U       H8587-FS(0)       1.000       9/12/2020       0.47       0.94       4.72         PFBS       375-73-5       6.47       0.16 F W       H8587-FS(0)       1.000       9/12/2020       0.13       0.47       4.72       MP         PFHxS       355-46-4       0.38       0.18 F W       H8587-FS(0)       1.000       9/12/2020       0.10       0.38       4.72       MP         PFOS       1763-23-1       0.94 U       H8587-FS(0)       1.000       9/12/2020       0.42       0.94       4.72         HFPO-DA       13252-13-6       0.47 U       H8587-FS(0)       1.000       9/12/2020       0.24       0.47       4.72         Adona       91905-14-4       0.94 U       H8587-FS(0)       1.000       9/12/2020       0.25       0.94       4.72         11CI-PF3OUdS       763051-92-9       0.47 U       H8587-FS(0)       1.000       9/12/2020       0.22       0.47       4.72				0.94 U	H8587-FS(0)	1.000	9/12/2020	0.33	0.94	4.72	
PFHxS     355-46-4     0.38     0.18 F U     H8587-FS(0)     1.000     9/12/2020     0.10     0.38     4.72       PFOS     1763-23-1     0.94 U     H8587-FS(0)     1.000     9/12/2020     0.42     0.94     4.72       HFPO-DA     13252-13-6     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.24     0.47     4.72       Adona     919005-14-4     0.94 U     H8587-FS(0)     1.000     9/12/2020     0.25     0.94     4.72       11CI-PF3OUdS     763051-92-9     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.22     0.47     4.72	NEtFOSAA			0.94 U	H8587-FS(0)	1.000	9/12/2020	0.47	0.94	4.72	
PFHxS     355-46-4     0.38     0.18 F U     H8587-FS(0)     1.000     9/12/2020     0.10     0.38     4.72     M       PFOS     1763-23-1     0.94 U     H8587-FS(0)     1.000     9/12/2020     0.42     0.94     4.72       HFPO-DA     13252-13-6     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.24     0.47     4.72       Adona     919005-14-4     0.94 U     H8587-FS(0)     1.000     9/12/2020     0.25     0.94     4.72       11CI-PF3OUdS     763051-92-9     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.22     0.47     4.72	PFBS	375-73-5	6.47	0.16 P V	H8587-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	MB
PFOS         1763-23-1         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.42         0.94         4.72           HFPO-DA         13252-13-6         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.24         0.47         4.72           Adona         919005-14-4         0.94 U         H8587-FS(0)         1.000         9/12/2020         0.25         0.94         4.72           11CI-PF3OUdS         763051-92-9         0.47 U         H8587-FS(0)         1.000         9/12/2020         0.22         0.47         4.72		355-46-4	038	0.18 × U	H8587-FS(0)	1.000	9/12/2020	0.10	0.38	4.72	MB
HFPO-DA     13252-13-6     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.24     0.47 U     4.72       Adona     919005-14-4     0.94 U     H8587-FS(0)     1.000     9/12/2020     0.25     0.94     4.72       11CI-PF3OUdS     763051-92-9     0.47 U     H8587-FS(0)     1.000     9/12/2020     0.22     0.47     4.72	PFOS				H8587-FS(0)	1.000	9/12/2020	0.42	0.94	4.72	
11CI-PF3OUdS 763051-92-9 0.47 U H8587-FS(0) 1.000 9/12/2020 0.22 0.47 4.72	HFPO-DA	13252-13-6		0.47 U	H8587-FS(0)	1.000	9/12/2020	0.24	0.47	4.72	
11CI-PF3OUdS 763051-92-9 0.47 U H8587-FS(0) 1.000 9/12/2020 0.22 0.47 4.72	Adona	919005-14-4		0.94 U	H8587-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
9CI-PF3ONS 756426-58-1 0.94 U H8587-FS(0) 1.000 9/12/2020 0.25 0.94 4.72	11CI-PF3OUdS	763051-92-9		0.47 U	H8587-FS(0)	1.000	9/12/2020	0.22	0.47	4.72	
	9CI-PF3ONS	756426-58-1		0.94 U	H8587-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-BR-ACS-FB01-0	81820							
Battelle ID		H85	88-FS							
Sample Type			SA							
Collection Date		08/18	/2020							
Extraction Date		08/28	/2020							
Analytical Instrume	ent	Sciex 5500 LC/N	IS/MS							
% Moisture			NA							
Matrix		W	/ATER							
Sample Size			0.255							
Size Unit-Basis			L			Analysis				
Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
:#										
PFHxA	307-24-4		1.47 U	H8588-FS(0)	1.000	9/12/2020	0.52	1.47	4.90	
PFHpA	375-85-9		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.25	0.98	4.90	
PFOA	335-67-1		1.47 U	H8588-FS(0)	1.000	9/12/2020	0.50	1.47	4.90	
PFNA	375-95-1		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.30	0.98	4.90	
PFDA	335-76-2		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.14	0.49	4.90	
PFUnA	2058-94-8		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.22	0.49	4.90	
PFDoA	307-55-1		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.15	0.49	4.90	
PFTeDA	376-06-7		1.96 U	H8588-FS(0)	1.000	9/12/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.49	0.98	4.90	
PFBS	375-73-5	0.49	0.15 / U	H8588-FS(0)	1.000	9/12/2020	0.14	0.49	4.90	MBL
PFHxS	355-46-4	0.39	0.18-1 U	H8588-FS(0)	1.000	9/12/2020	0.11	0.39	4.90	MBL
PFOS	1763-23-1		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.25	0.49	4.90	
Adona	919005-14-4		0.98 U	H8588-F5(0)	1.000	9/12/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9		0.49 U	H8588-FS(0)	1.000	9/12/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1		0.98 U	H8588-FS(0)	1.000	9/12/2020	0.26	0.98	4.90	



Project Name: CTO-4256: PAX Basewide PFAS

		PX-BR-ACS-EB01-081820-							
Client ID		GW							
Battelle ID		H8589-F5							
Sample Type		SA							
Collection Date		08/18/2020							
Extraction Date		08/28/2020							
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.255							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	1.47 (	J H8589-FS(0)	1.000	9/12/2020	0.52	1.47	4.90	
PFHpA	375-85-9	0.98 (		1.000	9/12/2020	0.25	0.98	4.90	
PFOA	335-67-1	1.47		1.000	9/12/2020	0.50	1.47	4.90	
PFNA	375-95-1	0.98 (		1.000	9/12/2020	0.30	0.98	4.90	
PFDA	335-76-2	0.49 (		1.000	9/12/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	0.49 (		1.000	9/12/2020	0.22	0.49	4.90	
PFDoA	307-55-1	0.49 (	J H8589-FS(0)	1.000	9/12/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.49 (	J H8589-FS(0)	1.000	9/12/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.96 (	J H8589-FS(0)	1.000	9/12/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9	0.98 (	J H8589-F5(0)	1.000	9/12/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.98 (	J H8589-FS(0)	1.000	9/12/2020	0.49	0.98	4.90	
PFBS	375-73-5	0.49 (	J H8589-FS(0)	1.000	9/12/2020	0.14	0.49	4.90	
PFHxS	355-46-4	0.39 0.17	H8589-FS(0)	1.000	9/12/2020	0.11	0.39	4.90	MBL
PFOS	1763-23-1	0.98 (	J H8589-FS(0)	1.000	9/12/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6	0.49 (	J H8589-FS(0)	1.000	9/12/2020	0.25	0.49	4.90	
Adona	919005-14-4	0.98 (	H8589-FS(0)	1.000	9/12/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.49 (	J H8589-FS(0)	1.000	9/12/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1	0.98 (	J H8589-₹S(0)	1.000	9/12/2020	0.26	0.98	4.90	

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-ETA-WT07-0820

H8590-FS Battelle ID SA Sample Type 08/18/2020 Collection Date 08/28/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument NA % Moisture WATER Matrix 0.270 Sample Size

Sample Size		0.270						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.15 J	H8590-FS(0)	1.000	9/12/2020	0.49	1.39	4.63
PFHpA	375-85-9	0.75 J	H8590-FS(0)	1.000	9/12/2020	0.24	0.93	4.63
PFOA	335-67-1	1.88 J	H8590-FS(0)	1.000	9/12/2020	0.47	1.39	4.63
PFNA	375-95-1	0.93 U	H8590-FS(0)	1.000	9/12/2020	0.29	0.93	4.63
PFDA	335-76-2	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.13	0.46	4.63
PFUnA	2058-94-8	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.20	0.46	4.63
PFDoA	307-55-1	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.18	0.46	4.63
PFTrDA	72629-94-8	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.14	0.46	4.63
PFTeDA	376-06-7	1.85 U	H8590-FS(0)	1.000	9/12/2020	0.68	1.85	4.63
NMeFOSAA	2355-31-9	0.93 U	H8590-FS(0)	1.000	9/12/2020	0.32	0.93	4.63
NEtFOSAA	2991-50-6	0.93 U	H8590-FS(0)	1.000	9/12/2020	0.46	0.93	4.63
PFBS	375-73-5	1.19 J	H8590-FS(0)	1.000	9/12/2020	0.13	0.46	4.63
PFHxS	355-46-4	1.67 J	H8590-FS(0)	1.000	9/12/2020	0.10	0.37	4.63
PFOS	1763-23-1	1.13 J	H8590-FS(0)	1.000	9/12/2020	0.41	0.93	4.63
HFPO-DA	13252-13-6	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.23	0.46	4.63
Adona	919005-14-4	0.93 U	H8590-FS(0)	1.000	9/12/2020	0.25	0.93	4.63
11CI-PF3OUdS	763051-92-9	0.46 U	H8590-FS(0)	1.000	9/12/2020	0.21	0.46	4.63
9CI-PF3ONS	756426-58-1	0.93 U	H8590-FS(0)	1.000	9/12/2020	0.25	0.93	4.63

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-FB01-08	31820								
Battelle ID		Н85	91-FS								
Sample Type			SA								
Collection Date		08/18/	/2020								
Extraction Date		08/28/	/2020								
Analytical Instrument		Sciex 5500 LC/M	IS/MS								
% Moisture			NA								
Matrix		W	ATER								
Sample Size		1	0.265								
Size Unit-Basis			L			Analysis					
Analyte	CAS No.	Result (	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_	
								4.45	4.72		
PFHxA	307-24-4		1.42 U	H8591-FS(0)	1.000	9/12/2020	0.50	1.42	4.72		
PFHpA	375-85-9		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.25	0.94	4.72		
PFOA	335-67-1		1.42 U	H8591-FS(0)	1.000	9/12/2020	0.48	1.42	4.72		
PFNA	375-95-1		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.29	0.94	4.72		
PFDA	335-76-2		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.13	0.47	4.72		
PFUnA	2058-94-8		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.21	0.47	4.72		
PFDoA	307-55-1		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.18	0.47	4.72		
PFTrDA	72629- <del>94</del> -8		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.14	0.47	4.72		
PFTeDA	376-06-7		1.89 U	H8591-FS(0)	1.000	9/12/2020	0.69	1.89	4.72		
NMeFOSAA	2355-31-9		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.33	0.94	4.72		
NEtFOSAA	2991-50-6		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.47	0.94	4.72		
PFBS	375-73-5		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.13	0.47	4.72		
PFHxS	355-46-4	J. 3 8	0.17 / W	H8591-FS(0)	1.000	9/12/2020	0.10	0.38	4.72	MBL	
PFOS	1763-23-1		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.42	0.94	4.72		
HFPO-DA	13252-13-6		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.24	0.47	4.72		
Adona	919005-14-4		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.25	0.94	4.72		
11CI-PF3OUdS	763051-92-9		0.47 U	H8591-FS(0)	1.000	9/12/2020	0.22	0.47	4.72		
9CI-PF3ONS	756426-58-1		0.94 U	H8591-FS(0)	1.000	9/12/2020	0.25	0.94	4.72		



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-ETA-EB01-08182	.0-GW							
Battelle ID		Н85	592-FS							
Sample Type			SA							
Collection Date		08/18	/2020							
Extraction Date		08/28	/2020							
Analytical Instrumen	t	Sciex 5500 LC/N	15/MS							
% Moisture			NA							
Matrix		٧	VATER							
Sample Size			0.265							
Size Unit-Basis			L			Analysis				
Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
					4 000	0 /4 2 /2020	0.50	1.42	4.72	
PFHxA	307-24-4		1.42 U	H8592-FS(0)	1.000	9/12/2020	0.50	1.42	4.72	
PFHpA	375-85-9		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
PFOA	335-67-1		1.42 U	H8592-FS(0)	1.000	9/12/2020	0.48	1.42	4.72	
PFNA	375-95-1		0.94 U	H8592-F5(0)	1.000	9/12/2020	0.29	0.94	4.72	
PFDA	335-76-2		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	
PFUnA	2058-94-8		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.21	0.47	4.72	
PFDoA	307-55-1		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.14	0.47	4.72	
PFTeDA	376-06-7		1.89 U	H8592-FS(0)	1.000	9/12/2020	0.69	1.89	4.72	
NMeFOSAA	2355-31-9		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.47	0.94	4.72	
PFBS	375-73-5	0.47	0.15 Y U	H8592-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	MBL
PFHxS	355-46-4	0.38	0.17 & U	H8592-FS(0)	1.000	9/12/2020	0.10	0.38	4.72	MBL
PFOS	1763-23-1		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.24	0.47	4.72	
Adona	919005-14-4		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9		0.47 U	H8592-FS(0)	1.000	9/12/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1		0.94 U	H8592-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	

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# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0969

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 27, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-BR-ACS-SS01-000H	H8563-FS	Soil
2	PX-BR-ACS-SB01-0304	H8564-FS	Soil
3	PX-BR-ACS-SB01P-0304	H8565-FS	Soil
4	PX-BR-ACS-SS05-000H	H8566-FS	Soil
5	PX-BR-ACS-SS05P-000H	H8567-FS	Soil
6	PX-BR-ACS-SB05-0304	H8568-FS	Soil
7	PX-BR-ACS-SS04-000H	H8572-FS	Soil
8	PX-BR-ACS-SB04-0304	H8573-FS	Soil
9	PX-BR-ACS-SS03-000H	H8576-FS	Soil
9MS	PX-BR-ACS-SS03-000HMS	H8577-FSMS	Soil
9MSD	PX-BR-ACS-SS03-000HMSD	H8578-FSMSD	Soil
10	PX-BR-ACS-SB03-0304	H8579-FS	Soil
11	PX-BR-ACS-SS02-000H	H8580-FS	Soil
12	PX-BR-ACS-SB02-0304	H8581-FS	Soil

A Stage 2B/4 data validation was performed on the analytical data for twelve soil samples collected on August 17-18, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

## Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes. There were no qualifications.

### Per- and Polyfluoroalkyl Substances (PFAS)

### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

All samples were extracted within 14 days for soil samples and analyzed within 28 days.

## **LC/MS Tuning**

All criteria were met.

### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## Continuing Calibration

• All percent recovery (%R) criteria were met.

### Method Blank

• The method blanks were free of contamination.

### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-BR-ACS-EB01-081720-SO	None - ND			
PX-BR-ACS-EB01-081820-SO	None - ND	1 2 2	4.5	- W
PX-BR-ACS-FB01-081820	None - ND		1 2 2	

## Surrogate Spike Recoveries

All criteria were met.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

All criteria were met.

# Field Duplicate Sample Precision

Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-BR-ACS-SB01-0304 ng/g	PX-BR-ACS-SB01P-0304 ng/g	RPD	Qualifier
PFHpA	0.65	1.69U	NC	None
PFOA	0.86	0.77	11%	1
PFHxS	7.25	6.11	17%	
PFOS	3.79	2.01	61%	None - <5X LOQ

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver

Senior Chemist

Dated: 10 31 20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-SS01-000H							
Battelle ID		H8563-FS							
Sample Type		SA							
Collection Date		08/17/2020							
Extraction Date		08/25/2020							
Analytical Instrumen	it	Sciex 5500 LC/MS/MS							
% Moisture		19.27							
Matrix		SOIL							
Sample Size		1.75							
Size Unit-Basis		g			Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	0.96 J	H8563-=S(3)	10.000	9/10/2020	0.81	2.29	5.71	
PFHpA	375-85-9	0.75 J	H8563-FS(3)	10.000	9/10/2020	0.58	1.71	5.71	
PFOA	335-67-1	1.77 J	H8563-=S(3)	10.000	9/10/2020	0.70	2.29	5.71	
PFNA	375-95-1	1.87 J	H8563-FS(3)	10.000	9/10/2020	0.56	1.14	5.71	
PFDA	335-76-2	1.14 U	H8563-=S(3)	10.000	9/10/2020	0.53	1.14	5.71	
PFUnA	2058-94-8	1.14 U	H8563-FS(3)	10.000	9/10/2020	0.53	1.14	5.71	
PFDoA	307-55-1	2.29 U	H8563-=S(3)	10.000	9/10/2020	0.70	2.29	5.71	
PFTrDA	72629-94-8	1,14 U	H8563-FS(3)	10.000	9/10/2020	0.32	1.14	5.71	
PFTeDA	376-06-7	2.86 U	H8563-=S(3)	10.000	9/10/2020	1.23	2.86	5.71	
NMeFOSAA	2355-31-9	2.86 U	H8563-FS(3)	10.000	9/10/2020	1.17	2.86	5.71	
NEtFOSAA	2991-50-6	2.29 U	H8563-FS(3)	10.000	9/10/2020	0.86	2.29	5.71	
PFBS	375-73-5	1.14 U	H8563-FS(3)	10.000	9/10/2020	0.40	1.14	5.71	
PFHxS	355-46-4	6.53	H8563-=S(3)	10.000	9/10/2020	0.93	2.29	5.71	
PFOS	1763-23-1	88.48	H8563-FS(3)	10.000	9/10/2020	0.79	2.29	5.71	
HFPO-DA	13252-13-6	2.29 U	H8563-FS(3)	10.000	9/10/2020	0.73	2.29	5.71	
Adona	919005-14-4	2.29 U	H8563-FS(3)	10.000	9/10/2020	0.95	2.29	5.71	
11CI-PF3OUdS	763051-92-9	1.71 U	H8563-FS(3)	10.000	9/10/2020	0.59	1.71	5.71	
9CI-PF3ONS	756426-58-1	1.14 U	H8563-FS(3)	10.000	9/10/2020	0.55	1.14	5.71	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-BR-ACS-SB01-0304						
Battelle ID		H8564-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/25/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		12.76						
Matrix		SOIL						
Sample Size		1.76						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.27 U	H8564-=S(3)	10.000	9/10/2020	0.81	2.27	5.68
PFHpA	375-85-9	0.65 J	H8564-FS(3)	10.000	9/10/2020	0.58	1.70	5.68
PFOA	335-67-1	0.86 J	H8564-FS(3)	10.000	9/10/2020	0.69	2.27	5.68
PFNA	375-95-1	1.14 U	H8564-FS(3)	10.000	9/10/2020	0.56	1.14	5.68
PFDA	335-76-2	1.14 U	H8564-=S(3)	10.000	9/10/2020	0.52	1.14	5.68
PFUnA	2058-94-8	1.14 U	H8564-FS(3)	10.000	9/10/2020	0.52	1.14	5.68
PFDoA	307-55-1	2.27 U	H8564-FS(3)	10.000	9/10/2020	0.69	2.27	5.68
PFTrDA	72629-94-8	1.14 U	H8564-FS(3)	10.000	9/10/2020	0.32	1.14	5.68
PFTeDA	376-06-7	2.84 U	H8564-FS(3)	10.000	9/10/2020	1.23	2.84	5.68
NMeFOSAA	2355-31-9	2.84 U	H8564-FS(3)	10.000	9/10/2020	1.16	2.84	5.68
NEtFOSAA	2991-50-6	2.27 U	H8564-FS(3)	10.000	9/10/2020	0.85	2.27	5.68
PFBS	375-73-5	1.14 U	H8564-FS(3)	10.000	9/10/2020	0.40	1.14	5.68
PFHxS	355-46-4	7.25	H8564-FS(3)	10.000	9/10/2020	0.92	2.27	5.68
PFOS	1763-23-1	3.79 J	H8564-FS(3)	10.000	9/10/2020	0.78	2.27	5.68
HFPO-DA	13252-13-6	2.27 U	H8564-FS(3)	10.000	9/10/2020	0.73	2.27	5.68
Adona	919005-14-4	2.27 U	H8564-FS(3)	10.000	9/10/2020	0.94	2.27	5.68
11CI-PF3OUdS	763051-92-9	1.70 U	H8564-FS(3)	10.000	9/10/2020	0.59	1.70	5.68
9CI-PF3ONS	756426-58-1	1.14 U	H8564-FS(3)	10.000	9/10/2020	0.55	1.14	5.68



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-BR-ACS-SB01P-0304						
Battelle ID		H8565-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/25/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		14.27						
Matrix		SOIL						
Sample Size		1.77						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.26 U	H8565-FS(3)	10.000	9/10/2020	0.80	2.26	5.65
PFHpA	375-85-9	1.69 U	H8565-FS(3)	10.000	9/10/2020	0.58	1.69	5.65
PFOA	335-67-1	0.77 J	H8565-FS(3)	10.000	9/10/2020	0.69	2.26	5.65
PFNA	375-95-1	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.55	1.13	5.65
PFDA	335-76-2	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.52	1.13	5.65
PFUnA	2058-94-8	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.52	1.13	5.65
PFDoA	307-55-1	2.26 U	H8565-FS(3)	10.000	9/10/2020	0.69	2.26	5.65
PFTrDA	72629-94-8	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.32	1.13	5.65
PFTeDA	376-06-7	2.82 U	H8565-FS(3)	10.000	9/10/2020	1.22	2.82	5.65
NMeFOSAA	2355-31-9	2.82 U	H8565-FS(3)	10.000	9/10/2020	1.15	2.82	5.65
NEtFOSAA	2991-50-6	2.26 U	H8565-FS(3)	10.000	9/10/2020	0.85	2.26	5.65
PFBS	375-73-5	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.40	1.13	5.65
PFHxS	355-46-4	6.11	H8565-FS(3)	10.000	9/10/2020	0.92	2.26	5.65
PFOS	1763-23-1	2.01 J	H8565-FS(3)	10.000	9/10/2020	0.78	2.26	5.65
HFPO-DA	13252-13-6	2.26 U	H8565-FS(3)	10.000	9/10/2020	0.72	2.26	5.65
Adona	919005-14-4	2.26 U	H8565-FS(3)	10.000	9/10/2020	0.94	2.26	5.65
11CI-PF3OUdS	763051-92-9	1.69 U	H8565-FS(3)	10.000	9/10/2020	0.59	1.69	5.65
9CI-PF3ONS	756426-58-1	1.13 U	H8565-FS(3)	10.000	9/10/2020	0.54	1.13	5.65



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-BR-ACS-SS05-000H						
Battelle ID		H8566-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/25/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		16.27						
Matrix		SOIL						
Sample Size		1.73						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.02 J	H8566-=S(3)	10.000	9/10/2020	0.82	2.31	5.78
PFHpA	375-85-9	1.00 J	H8566-FS(3)	10.000	9/10/2020	0.59	1.73	5.78
PFOA	335-67-1	2.75 J	H8566-=S(3)	10.000	9/10/2020	0.71	2.31	5.78
PFNA	375-95-1	1.98 J	H8566-=S(3)	10.000	9/10/2020	0.57	1.16	5.78
PFDA	335-76-2	1.16 U	H8566-=S(3)	10.000	9/10/2020	0.53	1.16	5.78
PFUnA	2058-94-8	1.16 U	H8566-FS(3)	10.000	9/10/2020	0.53	1.16	5.78
PFDoA	307-55-1	2.31 U	H8566-=S(3)	10.000	9/10/2020	0.71	2.31	5.78
PFTrDA	72629-94-8	1.16 U	H8566-FS(3)	10.000	9/10/2020	0.32	1.16	5.78
PFTeDA	376-06-7	2.89 U	H8566-FS(3)	10.000	9/10/2020	1.25	2.89	5.78
NMeFOSAA	2355-31-9	2,89 U	H8566-FS(3)	10.000	9/10/2020	1.18	2.89	5.78
NEtFOSAA	2991-50-6	2.31 U	H8566-FS(3)	10.000	9/10/2020	0.87	2.31	5.78
PFBS	375-73-5	1.16 U	H8566-FS(3)	10.000	9/10/2020	0.40	1.16	5.78
PFHxS	355-46-4	11.01	H8566-FS(3)	10.000	9/10/2020	0.94	2.31	5.78
PFOS	1763-23-1	137.57	H8566-FS(3)	10.000	9/10/2020	0.80	2.31	5.78
HFPO-DA	13252-13-6	2.31 U	H8566-FS(3)	10.000	9/10/2020	0.74	2.31	5.78
Adona	919005-14-4	2.31 U	H8566-FS(3)	10.000	9/10/2020	0.96	2.31	5.78
11CI-PF3OUdS	763051-92-9	1.73 U	H8566-FS(3)	10.000	9/10/2020	0.60	1.73	5.78
9CI-PF3ONS	756426-58-1	1.16 U	H8566-FS(3)	10.000	9/10/2020	0.55	1.16	5.78



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-BR-ACS-SS05P-000H						
Battelle ID		H8567-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/25/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		15.72						
Matrix		SOIL						
Sample Size		1.79						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.86 J	H8567-FS(3)	10.000	9/10/2020	0.79	2.23	5.59
PFHpA	375-85-9	0.99 J	H8567-FS(3)	10.000	9/10/2020	0.57	1.68	5.59
PFOA	335-67-1	2.35 J	H8567-FS(3)	10.000	9/10/2020	0.68	2.23	5.59
PFNA	375-95-1	1.69 J	H8567-FS(3)	10.000	9/10/2020	0.55	1.12	5.59
PFDA	335-76-2	1.12 U	H8567-FS(3)	10.000	9/10/2020	0.51	1.12	5.59
PFUnA	2058-94-8	1.12 U	H8567-F5(3)	10.000	9/10/2020	0.51	1.12	5.59
PFDoA	307-55-1	2.23 U	H8567-FS(3)	10.000	9/10/2020	0.68	2.23	5.59
PFTrDA	72629-94-8	1,12 U	H8567-FS(3)	10.000	9/10/2020	0.31	1.12	5.59
PFTeDA	376-06-7	2.79 U	H8567-=S(3)	10.000	9/10/2020	1.21	2.79	5.59
NMeFOSAA	2355-31-9	2.79 U	H8567-FS(3)	10.000	9/10/2020	1.14	2.79	5.59
NEtFOSAA	2991-50-6	2.23 U	H8567-=S(3)	10.000	9/10/2020	0.84	2.23	5.59
PFBS	375-73-5	1.12 U	H8567-FS(3)	10.000	9/10/2020	0.39	1.12	5.59
PFHxS	355-46-4	9.70	H8567-FS(3)	10.000	9/10/2020	0.91	2.23	5.59
PFOS	1763-23-1	123.77	H8567-FS(3)	10.000	9/10/2020	0.77	2.23	5.59
HFPO-DA	13252-13-6	2.23 U	H8567-FS(3)	10.000	9/10/2020	0.72	2.23	5.59
Adona	919005-14-4	2.23 U	H8567-FS(3)	10.000	9/10/2020	0.93	2.23	5.59
11CI-PF3OUdS	763051-92-9	1.68 U	H8567-FS(3)	10.000	9/10/2020	0.58	1.68	5.59
9CI-PF3ONS	756426-58-1	1.12 U	H8567-FS(3)	10.000	9/10/2020	0.54	1.12	5.59



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-BR-ACS-SB05-0304						
Battelle ID		H8568-FS						
Sample Type		SA						
Collection Date		08/17/2020						
Extraction Date		08/25/2020						
Analytical Instrume	nt	Sciex 5500 LC/MS/MS						
% Moisture		16.18						
Matrix		SOIL						
Sample Size		1.66						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.41 U	H8568-FS(3)	10.000	9/10/2020	0.86	2.41	6.02
PFHpA	375-85-9	1.81 U	H8568-FS(3)	10.000	9/10/2020	0.61	1.81	6.02
PFOA	335-67-1	2.41 U	H8568-FS(3)	10.000	9/10/2020	0.73	2.41	6.02
PFNA	375-95-1	1.20 U	H8568-FS(3)	10.000	9/10/2020	0.59	1.20	6.02
PFDA	335-76-2	1.20 ∪	H8568-FS(3)	10.000	9/10/2020	0.55	1.20	6.02
PFUnA	2058-94-8	1.20 U	H8568-FS(3)	10.000	9/10/2020	0.55	1.20	6.02
PFDoA	307-55-1	2.41 U	H8568-FS(3)	10.000	9/10/2020	0.73	2.41	6.02
PFTrDA	72629-94-8	1.20 U	H8568-FS(3)	10.000	9/10/2020	0.34	1.20	6.02
PFTeDA	376-06-7	3.01 U	H8568-FS(3)	10.000	9/10/2020	1.30	3.01	6.02
NMeFOSAA	2355-31-9	3.01 U	H8568-FS(3)	10.000	9/10/2020	1.23	3.01	6.02
NEtFOSAA	2991-50-6	2.41 U	H8568-FS(3)	10.000	9/10/2020	0.90	2.41	6.02
PFBS	375-73-5	1.20 U	H8568-FS(3)	10.000	9/10/2020	0.42	1.20	6.02
PFHxS	355-46-4	1.35 J	H8568-FS(3)	10.000	9/10/2020	0.98	2.41	6.02
PFOS	1763-23-1	59.24	H8568-FS(3)	10.000	9/10/2020	0.83	2.41	6.02
HFPO-DA	13252-13-6	2.41 U	H8568-FS(3)	10.000	9/10/2020	0.77	2.41	6.02
Adona	919005-14-4	2.41 U	H8568-FS(3)	10.000	9/10/2020	1.00	2.41	6.02
11CI-PF3OUdS	763051-92-9	1.81 U	H8568-FS(3)	10.000	9/10/2020	0.63	1.81	6.02
9CI-PF3ONS	756426-58-1	1.20 U	H8568-FS(3)	10.000	9/10/2020	0.58	1.20	6.02

### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-BR-ACS-SS04-000H						
Battelle ID		H8572-FS						
Sample Type		SA						
Collection Date		08/18/2020						
Extraction Date		08/25/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		14.51						
Matrix		SOIL						
Sample Size		1.62						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.47 U	H8572-FS(3)	10.000	9/10/2020	0.88	2.47	6.17
PFHpA	375-85-9	1.85 U	H8572-FS(3)	10.000	9/10/2020	0.63	1.85	6.17
PFOA	335-67-1	0.89 J	H8572-FS(3)	10.000	9/10/2020	0.75	2.47	6.17
PFNA	375-95-1	1.46 J	H8572-FS(3)	10.000	9/10/2020	0.60	1.23	6.17
PFDA	335-76-2	1.23 U	H8572-FS(3)	10.000	9/10/2020	0.57	1.23	6.17
PFUnA	2058-94-8	1.23 U	H8572-FS(3)	10.000	9/10/2020	0.57	1.23	6.17
PFDoA	307-55-1	2.47 U	H8572-FS(3)	10.000	9/10/2020	0.75	2.47	6.17
PFTrDA	72629-94-8	1.23 U	H8572-FS(3)	10,000	9/10/2020	0.35	1.23	6.17
PFTeDA	376-06-7	3.09 U	H8572-FS(3)	10.000	9/10/2020	1.33	3.09	6.17
NMeFOSAA	2355-31-9	3.09 U	H8572-FS(3)	10.000	9/10/2020	1.26	3.09	6.17
NEtFOSAA	2991-50-6	2.47 U	H8572-FS(3)	10.000	9/10/2020	0.93	2.47	6.17
PFBS	375-73-5	1,23 U	H8572-FS(3)	10.000	9/10/2020	0.43	1.23	6.17
PFHxS	355-46-4	2.47 U	H8572-FS(3)	10.000	9/10/2020	1.00	2.47	6.17
PFOS	1763-23-1	26.14	H8572-F5(3)	10.000	9/10/2020	0.85	2.47	6.17
HFPO-DA	13252-13-6	2.47 U	H8572-FS(3)	10.000	9/10/2020	0.79	2.47	6.17
Adona	919005-14-4	2.47 U	H8572-FS(3)	10.000	9/10/2020	1.02	2.47	6.17
11CI-PF3OUdS	763051-92-9	1.85 U	H8572-FS(3)	10.000	9/10/2020	0.64	1.85	6.17
9CI-PF3ONS	756426-58-1	1.23 U	H8572-FS(3)	10.000	9/10/2020	0.59	1.23	6.17



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-BR-ACS-SB04-0304						
Battelle ID		H8573-FS						
Sample Type		SA						
Collection Date		08/18/2020						
Extraction Date		08/25/2020						
Analytical Instrument	t	Sciex 5500 LC/MS/MS						
% Moisture		10.86						
Matrix		SOIL						
Sample Size		1.92						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.08 U	H8573-FS(3)	10.000	9/10/2020	0.74	2.08	5.21
PFHpA	375-85-9	1.56 U	H8573-FS(3)	10.000	9/10/2020	0.53	1.56	5.21
PFOA	335-67-1	2.08 U	H8573-FS(3)	10.000	9/10/2020	0.64	2.08	5.21
PFNA	375-95-1	1.04 U	H8573-FS(3)	10.000	9/10/2020	0.51	1.04	5.21
PFDA	335-76-2	1.04 U	H8573-FS(3)	10.000	9/10/2020	0.48	1.04	5.21
PFUnA	2058-94-8	1.04 U	H8573-PS(3)	10.000	9/10/2020	0.48	1.04	5.21
PFDoA	307-55-1	2.08 U	H8573-FS(3)	10.000	9/10/2020	0.64	2.08	5.21
PFTrDA	72629-94-8	1.04 U	H8573-PS(3)	10.000	9/10/2020	0.29	1.04	5.21
PFTeDA	376-06-7	2.60 U	H8573-FS(3)	10.000	9/10/2020	1.13	2.60	5.21
NMeFOSAA	2355-31-9	2.60 U	H8573-PS(3)	10.000	9/10/2020	1.06	2.60	5.21
NEtFOSAA	2991-50-6	2.08 U	H8573-FS(3)	10.000	9/10/2020	0.78	2.08	5.21
PFBS	375-73-5	1.04 U	H8573-PS(3)	10.000	9/10/2020	0.36	1.04	5.21
PFHxS	355-46-4	4.38 J	H8573-FS(3)	10.000	9/10/2020	0.84	2.08	5.21
PFOS	1763-23-1	2.08 U	H8573-PS(3)	10.000	9/10/2020	0.72	2.08	5.21
HFPO-DA	13252-13-6	2.08 U	H8573-FS(3)	10.000	9/10/2020	0.67	2.08	5.21
Adona	919005-14-4	2.08 U	H8573-PS(3)	10.000	9/10/2020	0.86	2.08	5.21
11CI-PF3OUdS	763051-92-9	1.56 U	H8573-FS(3)	10.000	9/10/2020	0.54	1.56	5.21
9CI-PF3ONS	756426-58-1	1.04 U	H8573-PS(3)	10.000	9/10/2020	0.50	1.04	5.21

### BATTELLE it can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-SS03-000H							
Battelle ID		H8576-FS							
Sample Type		SA							
Collection Date		08/18/2020							
Extraction Date		08/25/2020							
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		20.10							
Matrix		SOIL							
Sample Size		1.49							
Size Unit-Basis		g			Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	2.68 U	H8576-FS(3)	10.000	9/10/2020	0.95	2.68	6.71	
PFHpA	375-85-9	2.01 U	H8576-FS(3)	10.000	9/10/2020	0.68	2.01	6.71	
PFOA	335-67-1	2.68 U	H8576-F5(3)	10.000	9/10/2020	0.82	2.68	6.71	
PFNA	375-95-1	1.34 U	H8576-F5(3)	10.000	9/10/2020	0.66	1.34	6.71	
PFDA	335-76-2	1.34 U	H8576-F5(3)	10.000	9/10/2020	0.62	1.34	6.71	
PFUnA	2058-94-8	1.34 U	H8576-F5(3)	10.000	9/10/2020	0.62	1.34	6.71	
PFDoA	307-55-1	2.68 U	H8576-F5(3)	10.000	9/10/2020	0.82	2.68	6.71	
PFTrDA	72629-94-8	1.34 U	H8576-F5(3)	10.000	9/10/2020	0.38	1.34	6.71	
PFTeDA	376-06-7	3.36 U	H8576-F5(3)	10.000	9/10/2020	1.45	3.36	6.71	
NMeFOSAA	2355-31-9	3.36 U	H8576-F5(3)	10.000	9/10/2020	1.37	3.36	6.71	
NEtFOSAA	2991-50-6	2.68 U	H8576-FS(3)	10.000	9/10/2020	1.01	2.68	6.71	
PFBS	375-73-5	1.34 U	H8576-FS(3)	10.000	9/10/2020	0.47	1.34	6.71	
PFHxS	355-46-4	2.68 ∪	H8576-FS(3)	10.000	9/10/2020	1.09	2.68	6.71	
PFOS	1763-23-1	5.79 J	H8576-F5(3)	10.000	9/10/2020	0.93	2.68	6.71	
HFPO-DA	13252-13-6	2.68 U	H8576-FS(3)	10.000	9/10/2020	0.86	2.68	6.71	
Adona	919005-14-4	2.68 U	H8576-FS(3)	10.000	9/10/2020	1.11	2.68	6.71	
11CI-PF3OUdS	763051-92-9	2.01 U	H8576-FS(3)	10.000	9/10/2020	0.70	2.01	6.71	
9CI-PF3ONS	756426-58-1	1.34 U	H8576-FS(3)	10.000	9/10/2020	0.64	1.34	6.71	

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### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-BR-ACS-SB03-0304 H8579-FS Battelle ID SA Sample Type Collection Date 08/18/2020 08/25/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument 13.21 % Moisture SOIL Matrix 1.62 Sample Size Analysis Size Unit-Basis Result (ng/g\_Dry) Extract ID DF Date DL LOD LOQ Analyte CAS No. 9/10/2020 0.88 2.47 6.17 2.47 U H8579-FS(3) 10.000 **PFHxA** 307-24-4 9/10/2020 1.85 6.17 1.85 U H8579-PS(3) 10.000 0.63 375-85-9 **PFHpA** 2.47 U H8579-FS(3) 10.000 9/10/2020 0.75 2.47 6.17 **PFOA** 335-67-1 9/10/2020 1.23 6.17 10.000 0.60 **PFNA** 375-95-1 1.23 U H8579-PS(3) 1.23 1.23 U H8579-FS(3) 10.000 9/10/2020 0.57 6.17 335-76-2 PFDA 9/10/2020 0.57 1.23 6.17 1.23 U H8579-PS(3) 10.000 **PFUnA** 2058-94-8 2.47 6.17 307-55-1 2.47 U H8579-FS(3) 10.000 9/10/2020 0.75 **PFDoA** 9/10/2020 0.35 1.23 6.17 1.23 U H8579-PS(3) 10.000 PFTrDA 72629-94-8 9/10/2020 3.09 6.17 376-06-7 3.09 U H8579-FS(3) 10.000 1.33 **PFTeDA** 3.09 U 10.000 9/10/2020 1.26 3.09 6.17 2355-31-9 H8579-PS(3) **NMeFOSAA** 9/10/2020 0.93 2.47 6.17 **NEtFOSAA** 2991-50-6 2.47 U H8579-FS(3) 10.000 1.23 1.23 U 10.000 9/10/2020 0.43 6.17 H8579-PS(3) PFBS 375-73-5 9/10/2020 1.00 2.47 6.17 2.47 U 10.000 **PFHxS** 355-46-4 H8579-FS(3) 2.47 1763-23-1 30.21 H8579-P5(3) 10.000 9/10/2020 0.85 6.17 PFOS 2.47 U 10.000 9/10/2020 0.79 2.47 6.17 HFPO-DA 13252-13-6 H8579-FS(3) 9/10/2020 1.02 2.47 6.17 2.47 U H8579-PS(3) 10.000 919005-14-4 Adona 1.85 U 10.000 9/10/2020 0.64 1.85 6.17 H8579-FS(3) 11CI-PF3OUdS 763051-92-9

1.23 U

H8579-PS(3)

9/10/2020

10.000

0.59

1.23

6.17

9CI-PF3ONS

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-SS02-000H						
Battelle ID		H8580-FS						
Sample Type		5A						
Collection Date		08/18/2020						
Extraction Date		08/25/2020						
Analytical Instrumen	t	Sciex 5500 LC/MS/MS						
% Moisture		19.56						
Matrix		SOIL						
Sample Size		1.59						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.52 U	H8580-FS(3)	10.000	9/10/2020	0.89	2.52	6.29
PFHpA	375-85-9	1.89 U	H8580-FS(3)	10.000	9/10/2020	0.64	1.89	6.29
PFOA	335-67-1	2.52 U	H8580-FS(3)	10.000	9/10/2020	0.77	2.52	6.29
PFNA	375-95-1	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.62	1.26	6.29
PFDA	335-76-2	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.58	1.26	6.29
PFUnA	2058-94-8	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.58	1.26	6.29
PFDoA	307-55-1	2.52 U	H8580-FS(3)	10.000	9/10/2020	0.77	2.52	6.29
PFTrDA	72629-94-8	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.35	1.26	6.29
PFTeDA	376-06-7	3.14 U	H8580-FS(3)	10.000	9/10/2020	1.36	3.14	6.29
NMeFOSAA	2355-31-9	3.14 U	H8580-F5(3)	10.000	9/10/2020	1.28	3.14	6.29
NEtFOSAA	2991-50-6	2.52 U	H8580-FS(3)	10.000	9/10/2020	0.94	2.52	6.29
PFBS	375-73-5	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.44	1.26	6.29
PFHxS	355-46-4	2.52 U	H8580-F5(3)	10.000	9/10/2020	1.02	2.52	6.29
PFOS	1763-23-1	1.08 J	H8580-FS(3)	10.000	9/10/2020	0.87	2.52	6.29
HFPO-DA	13252-13-6	2.52 U	H8580-FS(3)	10.000	9/10/2020	0.81	2.52	6.29
Adona	919005-14-4	2.52 U	H8580-FS(3)	10.000	9/10/2020	1.04	2.52	6.29
11CI-PF3OUdS	763051-92-9	1.89 U	H8580-FS(3)	10.000	9/10/2020	0.65	1.89	6.29
9CI-PF3ONS	756426-58-1	1.26 U	H8580-FS(3)	10.000	9/10/2020	0.60	1.26	6.29

12



Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

	PX-BR-ACS-SB02-0304						
	H8581-FS						
	SA						
	08/18/2020						
	08/25/2020						
t	Sciex 5500 LC/MS/MS						
	13.10						
	SOIL						
	1.69						
	g			Analysis			
CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
307-24-4	2.37 U	H8581-FS(3)	10.000				5.92
375-85-9	1.78 U	H8581-PS(3)					5.92
335-67-1	2.37 U	H8581-FS(3)					5.92
375-95-1	1.18 U	H8581-PS(3)	10.000	9/10/2020	0.58	1.18	5.92
335-76-2	1.18 U	H8581-FS(3)	10.000	9/10/2020			5.92
2058-94-8	1.18 U	H8581-PS(3)	10.000	9/10/2020			5.92
307-55-1	2.37 U	H8581-FS(3)	10.000	9/10/2020			5.92
72629-94-8	1.18 U	H8581-FS(3)	10.000	9/10/2020	0.33		5.92
376-06-7	2.96 U	H8581-FS(3)	10.000	9/10/2020	1.28		5.92
2355-31-9	2,96 U	H8581-FS(3)	10.000	9/10/2020	1.21		5.92
2991-50-6	2.37 U	H8581-FS(3)	10.000	9/10/2020	0.89		5.92
375-73-5	1.18 U	H8581-FS(3)	10.000	9/10/2020	0.41	1.18	5.92
355-46-4	2.37 U	H8581-FS(3)	10.000	9/10/2020	0.96	2.37	5.92
1763-23-1	2.37 U	H8581-FS(3)	10.000	9/10/2020	0.82	2.37	5.92
13252-13-6	2.37 U	H8581-FS(3)	10.000	9/10/2020	0.76	2.37	5.92
919005-14-4	2.37 U	H8581-FS(3)	10.000	9/10/2020	0.98	2.37	5.92
763051-92-9	1.78 U	H8581-FS(3)	10.000	9/10/2020	0.62	1.78	5.92
	1.18 U	LIGEON FC/21	10.000	9/10/2020	0.57	1.18	5.92
	CAS No.  307-24-4 375-85-9 335-67-1 375-95-1 335-76-2 2058-94-8 307-55-1 72629-94-8 376-06-7 2355-31-9 2991-50-6 375-73-5 355-46-4 1763-23-1 13252-13-6 919005-14-4	H8581-FS SA 08/18/2020 08/25/2020 t Sciex 5500 LC/MS/MS 13.10 SOIL 1.69 g CAS No. Result (ng/g_Dry)  307-24-4 2.37 U 375-85-9 1.78 U 335-67-1 2.37 U 375-95-1 1.18 U 335-76-2 1.18 U 2058-94-8 1.18 U 307-55-1 2.37 U 72629-94-8 1.18 U 376-06-7 2.96 U 2955-31-9 2991-50-6 2.37 U 375-73-5 1.18 U	H8581-FS SA 08/18/2020 08/25/2020 Sciex 5500 LC/MS/MS 13.10 SOIL 1.69 g CAS No. Result (ng/g_Dry) Extract ID  307-24-4 2.37 U H8581-FS(3) 375-85-9 1.78 U H8581-FS(3) 335-67-1 2.37 U H8581-FS(3) 335-76-2 1.18 U H8581-FS(3) 335-76-2 1.18 U H8581-FS(3) 307-55-1 1.18 U H8581-FS(3) 307-55-1 2.37 U H8581-FS(3) 307-55-1 1.18 U H8581-FS(3) 307-55-1 2.37 U H8581-FS(3) 307-55-1 2.37 U H8581-FS(3) 307-55-1 2.37 U H8581-FS(3) 375-31-9 2.96 U H8581-FS(3) 375-73-5 1.18 U H8581-FS(3)	H8581-FS SA 08/18/2020 08/25/2020 t Sciex 5500 LC/MS/MS 13.10 SOIL 1.69 8 CAS No. Result (ng/g_Dry) Extract ID DF  307-24-4 2.37 U H8581-FS(3) 10.000 375-85-9 1.78 U H8581-FS(3) 10.000 375-95-1 2.37 U H8581-FS(3) 10.000 335-67-2 1.18 U H8581-FS(3) 10.000 2058-94-8 1.18 U H8581-FS(3) 10.000 307-55-1 2.37 U H8581-FS(3) 10.000 2058-94-8 1.18 U H8581-FS(3) 10.000 307-55-1 2.37 U H8581-FS(3) 10.000 375-06-7 2.96 U H8581-FS(3) 10.000 375-35-5 1.18 U H8581-FS(3) 10.000 375-73-5 2.96 U H8581-FS(3) 10.000 375-73-5 1.18 U H8581-FS(3) 10.000 375-73-5 1.18 U H8581-FS(3) 10.000 375-32-1 2.37 U H8581-FS(3) 10.000 375-32-1 2.37 U H8581-FS(3) 10.000 1763-23-1 2.37 U H8581-FS(3) 10.000 1763-23-1 2.37 U H8581-FS(3) 10.000 1763051-92-9 1.78 U H8581-FS(3) 10.000	H8581-FS SA 08/18/2020 08/25/2020 tt Sciex 5500 LC/MS/MS 13.10 SOIL 1.69 g Analysis Date 1.69 1 Date 1.69 1 Date 1.69 1 Date 1.78 U H8581-FS(3) 10.000 9/10/2020 375-85-9 1.78 U H8581-FS(3) 10.000 9/10/2020 375-95-1 1.18 U H8581-FS(3) 10.000 9/10/2020 335-67-2 1.18 U H8581-FS(3) 10.000 9/10/2020 335-62 1.18 U H8581-FS(3) 10.000 9/10/2020 307-55-1 2.37 U H8581-FS(3) 10.000 9/10/2020 307-55-1 2.37 U H8581-FS(3) 10.000 9/10/2020 307-55-1 2.37 U H8581-FS(3) 10.000 9/10/2020 375-06-7 2.96 U H8581-FS(3) 10.000 9/10/2020 376-06-7 2.96 U H8581-FS(3) 10.000 9/10/2020 375-31-9 2.96 U H8581-FS(3) 10.000 9/10/2020 2991-50-6 2.37 U H8581-FS(3) 10.000 9/10/2020 375-73-5 1.18 U H8581-FS(3) 10.000 9/10/2020 375-	H8581-FS SA 08/18/2020 08/25/2020 t Sciex 5500 LC/MS/MS 13.10 SOIL 1.69 B CAS No. Result (ng/g_Dry) Extract ID DF Date DL  307-24-4 2.37 U H8581-FS(3) 10.000 9/10/2020 0.84 375-85-9 1.78 U H8581-FS(3) 10.000 9/10/2020 0.60 335-67-1 2.37 U H8581-FS(3) 10.000 9/10/2020 0.72 375-95-1 1.18 U H8581-FS(3) 10.000 9/10/2020 0.58 335-76-2 1.18 U H8581-FS(3) 10.000 9/10/2020 0.54 2058-94-8 1.18 U H8581-FS(3) 10.000 9/10/2020 0.54 307-55-1 2.37 U H8581-FS(3) 10.000 9/10/2020 0.33 376-06-7 2.96 U H8581-FS(3) 10.000 9/10/2020 0.33 376-06-7 2.96 U H8581-FS(3) 10.000 9/10/2020 0.33 376-06-7 2.96 U H8581-FS(3) 10.000 9/10/2020 0.22 2355-31-9 2.96 U H8581-FS(3) 10.000 9/10/2020 0.89 375-73-5 1.18 U H8581-FS(3) 10.000 9/10/2020 0.89 375-73-5 1.18 U H8581-FS(3) 10.000 9/10/2020 0.96 1763-23-1 2.37 U H8581-FS(3) 10.000 9/10/2020 0.96	H8581-F5 SA 08/18/2020 08/25/2020 t Sciex 5500 LC/Ms/Ms 13.10 SOIL 1.69 Result (ng/g_Dry) Extract ID DF Date DL LOD  307-24-4 2.37 U H8581-F5(3) 10.000 9/10/2020 0.60 1.78 335-67-1 2.37 U H8581-F5(3) 10.000 9/10/2020 0.72 2.37 375-95-1 1.18 U H8581-F5(3) 10.000 9/10/2020 0.58 1.18 335-76-2 1.18 U H8581-F5(3) 10.000 9/10/2020 0.54 1.18 2058-94-8 1.18 U H8581-F5(3) 10.000 9/10/2020 0.54 1.18 307-55-1 2.37 U H8581-F5(3) 10.000 9/10/2020 0.62 2.37 375-73-5 1.18 U H8581-F5(3) 10.000 9/10/2020 0.89 2.37 375-73-5 1.18 U H8581-F5(3) 10.000 9/10/2020 0.89 2.37 375-73-5 1.18 U H8581-F5(3) 10.000 9/10/2020 0.82 2.37 13252-13-6 2.37 U H8581-F5(3) 10.000 9/10/2020 0.98 2.37



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0979

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date: September 29, 2020

PFAS							
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix				
1	PX-B1669-WT07-0720	H7705-FS1	Water				
2	PX-B1669-WT02P-0720	H7709-FS1	Water				
3	PX-H2905-WT06-0720	H7719-FS1	Water				
4	PX-H2905-WT07-0720	H7720-FS1	Water				

A Stage 2B/4 data validation was performed on the analytical data for four water samples collected on July 27-28, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Per- and Polyfluoroalkyl Substances (PFAS)

### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

• All samples were extracted at 27-28 days which is outside of the 14 days for water samples criteria. All results were qualified as estimated (J/UJ) in all samples.

## LC/MS Tuning

All criteria were met.

## **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## **Continuing Calibration**

• All percent recovery (%R) criteria were met.

### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
LC33 IB	PFHxS	0.12	None	All Associated >5X

## Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-B1669-FB01-072820	None - ND		*	
PX-B1669-EB01-072820-GW	None - ND	-		
PX-H2905-FB01-072720	None - ND	1.		140
PX-H2905-EB01-072720-GW	None - ND			

# Surrogate Spike Recoveries

• All samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds, however, all results were already qualified due to holding times and no further action was required.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

MS/MSD samples were not analyzed.

## Internal Standard (IS) Area Performance

All internal standards met response and retention time (RT) criteria.

## **Target Compound Identification**

All mass spectra and quantitation criteria were met.

## Compound Quantitation

All samples were originally analyzed in SDGs 20-0861 and 20-0862 with low surrogate recoveries. The samples were re-extracted outside of holding times and reanalyzed in this data package. The original analysis results should be used for reporting purposes.

## Field Duplicate Sample Precision

Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Senior Chemist

Mancy Weaver Dated: 10/2/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-B1669-WT07-0720								4
Battelle ID		H7705-FS1							Joligin	
Sample Type		SA							Ide AN	10
Collection Date		07/28/2020							Cald.	
Extraction Date		08/24/2020					1		0 1	
Analytical Instrument		Sciex 5500 LC/MS/MS								
% Moisture		NA								
Matrix		W				/				
Sample Size		0.265								
Size Unit-Basis		L				Analysis				
Analyte	CAS No.	Result (ng/L)		Extract ID	DF	Date	DL	LOD	LOQ	_
					/					
PFHxA	307-24-4	4.51 J	J	H7705-FS1(0)	1.000	8/25/2020	0.50	1.42	4.72	_H7
PFHpA	375-85-9	2.48 J	1	H7705-FS1(0)	1.000	8/25/2020	0.25	0.94	4.72	1
PFOA	335-67-1	6.41 T		H7705-FS1(0)	1.000	8/25/2020	0.48	1.42	4.72	
PFNA	375-95-1	1.60 J		H7705-FS1(0)	1.000	8/25/2020	0.29	0.94	4.72	
PFDA	335-76-2	0.54 J	r	H7705-FS1(0)	1.000	8/25/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	0.47	TW	H7705-FS1(0)	1.000	8/25/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.47	TW	H7705-FS1(0)	1.000	8/25/2020	0.18	0.47	4.72	_
PFTrDA	72629-94-8	0.27 J	1/5	H7705-FS1(0)	1.000	8/25/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89	T Wy	H7705-FS1(0)	1.000	8/25/2020	0.69	1.89	4.72	
NMeFOSAA	2355-31-9	0.94	T	H7705-FS1(0)	1.000	8/25/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94	T 👃	H7705-FS1(0)	1.000	8/25/2020	0.47	0.94	4.72	
PFBS	375-73-5	1.25 J	「フ	H7705-FS1(0)	1.000	8/25/2020	0.13	0.47	4.72	2
PFHxS	355-46-4	8.75 1		H7705-FS1(0)	1.000	8/25/2020	0.10	0.38	4.72	
PFOS	1763-23-1	23.17 1		H7705-FS1(0)	1.000	8/25/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.47 L	TUJ	H7705-FS1(0)	1.000	8/25/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 (		H7705-FS1(0)	1.000	8/25/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 \	Т	H7705-FS1(0)	1.000	8/25/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 t	T	H7705-FS1(0)	1.000	8/25/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-B1669-WT07-0720

 Battelle ID
 H7705-FS1

 Sample Type
 SA

 Collection Date
 07/28/2020

 Extraction Date
 08/24/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Milalysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	65	H7705-FS1(0)	8/25/2020	
13C4-PFHpA	68	H7705-FS1(0)	8/25/2020	
13C8-PFOA	66	H7705-FS1(0)	8/25/2020	
13C9-PFNA	61	H7705-FS1(0)	8/25/2020	
13C6-PFDA	66	H7705-FS1(0)	8/25/2020	
13C7-PFUnA	63	H7705-FS1(0)	8/25/2020	
13C2-PFDoA	48 1	H7705-FS1(0)	8/25/2020	
13C2-PFTeDA	21 1	H7705-FS1(0)	8/25/2020	
d3-MeFOSAA	46 1	H7705-FS1(0)	8/25/2020	
d5-EtFOSAA	58	H7705-FS1(0)	8/25/2020	
13C3-PFBS	75	H7705-FS1(0)	8/25/2020	
13C3-PFHxS	75	H7705-FS1(0)	8/25/2020	
13C8-PFOS	65	H7705-FS1(0)	8/25/2020	
13C3-HFPO-DA	57	H7705-FS1(0)	8/25/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Sample Type Collection Date 07/28/2020 Extraction Date 08/24/2020 Analytical Instrument 5	Client ID		PX-B1669-WT02P-0720							
### Sciex 5500 LC/MS/MS  ### Moisture    Matrix   Matrix	Battelle ID		H7709-FS1					1 11	als.	nl
### Sciex 5500 LC/MS/MS  ### Moisture    Matrix   Matrix	Sample Type		SA					/ 1	Jan N	
### Sciex 5500 LC/MS/MS  ### Moisture    Matrix   Matrix	Collection Date		07/28/2020						Mr.	
Matrix  Matrix	Extraction Date		08/24/2020						0	
Matrix Sample Size Size Unit-Basis Analyte CAS No. Result (ng/L) Extract ID DF Date DL LOD LOQ  PFHxA  307-24-4  87.68 T H7709-FS1(0) 1.000 8/25/2020 0.50 1.42 4.72 PFHpA 375-85-9 131.79 TD PFOA 335-67-1 95.52 TD H7709-FS1-0(3) 5.000 8/25/2020 0.50 1.42 4.72 23.58 PFNA 375-95-1 64.30 T H7709-FS1-0(3) 5.000 8/25/2020 0.24 1.708 23.58 PFNA 375-95-1 64.30 T H7709-FS1(0) 1.000 8/25/2020 0.29 0.94 4.72 PFDA 335-76-2 3.86 JT H7709-FS1(0) 1.000 8/25/2020 0.21 0.47 4.72 PFUNA 2058-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.21 0.47 4.72 PFTDA 72629-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFHxS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFHxS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFBS 375-73-5 1.37 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFBS 375-73-5 3	Analytical Instrument	t	Sciex 5500 LC/MS/MS							
Sample Size  Size Unit-Basis Analyte  CAS No.  Result (ng/L)  Extract ID  DF  Date  DL  LOD  LOQ  PFHxA  307-24-4  87.68 T  H7709-FS1(0)  1.000  8/25/2020  1.23  4.72  23.58  PFOA  335-67-1  95.52 T  H7709-FS1-D(3)  5.000  8/25/2020  1.23  4.72  23.58  PFNA  375-98-1  64.30 T  H7709-FS1(0)  1.000  8/25/2020  1.23  4.72  23.58  PFNA  375-95-1  64.30 T  H7709-FS1(0)  1.000  8/25/2020  0.29  0.94  4.72  PFDA  335-76-2  3.86 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  4.72  PFDA  307-55-1  0.47 UT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  4.72  PFTDA  72629-94-8  0.47 UT  H7709-FS1(0)  1.000  8/25/2020  0.18  0.47  4.72  PFTEDA  376-06-7  1.89 UT  H7709-FS1(0)  1.000  8/25/2020  0.18  0.47  4.72  PFTEDA  376-06-7  1.89 UT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  4.72  PFTEDA  376-06-7  1.89 UT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  4.72  PFTEDA  376-06-7  1.89 UT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  4.72  PFTEDA  376-06-7  1.89 UT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  4.72  PFTEBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.13  0.47  0.94  4.72  PFBS  375-73-5  1.37 JT  H7709-FS1(0)  1.000  8/25/2020  0.14  0.47  0.94  0.94  0.94  0.94  0.94  0.94  0.94  0.94  0.94  0.94  0.94  0	% Moisture		NA							
Size Unit-Basis	Matrix		W							
Analyte CAS No. Result (ng/L) Extract ID DF Date DL LOQ  PFHXA 307-24-4 87.68 T H7709-FS1(0) 1.000 8/25/2020 0.50 1.42 4.72 PFHpA 375-85-9 131.79 TD H7709-FS1-D(3) 5.000 8/25/2020 1.23 4.72 23.58 PFDA 335-67-1 95.52 TD H7709-FS1-D(3) 5.000 8/25/2020 2.41 7.08 23.58 PFNA 375-95-1 64.30 T H7709-FS1(0) 1.000 8/25/2020 0.29 0.94 4.72 PFDA 335-76-2 3.86 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFDA 307-55-1 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.21 0.47 4.72 PFTDA 307-55-1 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.19 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.19 0.94 4.72 NREFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFBS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFBS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFBOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFBOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 NAMD AND AND AND AND AND AND AND AND AND AN	Sample Size		0.265							
PFHXA 307-24-4 87.68 T	Size Unit-Basis		L			Analysis				
PFHpA 375-85-9 131.79 TD H7709-F51-D(3) 5.000 8/25/2020 1.23 4.72 23.58 PFOA 335-67-1 95.52 TD H7709-F51-D(3) 5.000 8/25/2020 2.41 7.08 23.58 PFNA 375-95-1 64.30 T H7709-F51(0) 1.000 8/25/2020 0.29 0.94 4.72 PFDA 335-76-2 3.86 JT H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFUA 2058-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-F51(0) 1.000 8/25/2020 0.69 1.89 4.72 NMEFOSAA 2355-31-9 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.33 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-F51(0) 1.000 8/25/2020 0.47 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFOS 1763-23-1 16.70 T H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFOS 1763-23-1 16.70 T H7709-F51(0) 1.000 8/25/2020 0.24 0.47 4.72 PFOD 1.000 13252-13-6 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.24 0.47 4.72 PAGONA 919005-14-4 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.25 0.94 4.72 11Cl-PF30UdS 763051-92-9 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.22 0.47 4.72	Analyte	CAS No.	Result (ng/L)	Extract ID	DF /	Date	DL	LOD	LOQ	
PFHpA 375-85-9 131.79 TD H7709-F51-D(3) 5.000 8/25/2020 1.23 4.72 23.58 PFOA 335-67-1 95.52 TD H7709-F51-D(3) 5.000 8/25/2020 2.41 7.08 23.58 PFNA 375-95-1 64.30 T H7709-F51(0) 1.000 8/25/2020 0.29 0.94 4.72 PFDA 335-76-2 3.86 JT H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFUA 2058-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-F51(0) 1.000 8/25/2020 0.69 1.89 4.72 NMEFOSAA 2355-31-9 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.33 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-F51(0) 1.000 8/25/2020 0.47 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFOS 1763-23-1 16.70 T H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72 PFOS 1763-23-1 16.70 T H7709-F51(0) 1.000 8/25/2020 0.24 0.47 4.72 PFOD 1.000 13252-13-6 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.24 0.47 4.72 PAGONA 919005-14-4 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.25 0.94 4.72 11Cl-PF30UdS 763051-92-9 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.22 0.47 4.72										
PFOA 335-67-1 95.52 TD H7709-FS1-D[3] 5.000 8/25/2020 2.41 7.08 23.58 PFNA 375-95-1 64.30 T H7709-FS1(0) 1.000 8/25/2020 0.29 0.94 4.72 PFDA 335-76-2 3.86 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFUA 2058-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTDA 72629-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.69 1.89 4.72 NMEFOSAA 2355-31-9 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72 NETFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72 PFHXS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 PFODA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72 PAGONA 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PHODA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PFGS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PFOS 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PFGS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFHxA	307-24-4	87.68 🍞 🗇	H7709-FS1(0)	1.000	8/25/2020	0.50	1.42	4.72	HT
PFNA         375-95-1         64.30 T         H7709-F\$1(0)         1.000         8/25/2020         0.29         0.94         4.72           PFDA         335-76-2         3.86 JT         H7709-F\$1(0)         1.000         8/25/2020         0.13         0.47         4.72           PFUnA         2058-94-8         0.47 UT         H7709-F\$1(0)         1.000         8/25/2020         0.21         0.47         4.72           PFTrDA         72629-94-8         0.47 UT         H7709-F\$1(0)         1.000         8/25/2020         0.18         0.47         4.72           PFTeDA         376-06-7         1.89 UT         H7709-F\$1(0)         1.000         8/25/2020         0.14         0.47         4.72           NMEFOSAA         2355-31-9         0.94 UT         H7709-F\$1(0)         1.000         8/25/2020         0.33         0.94         4.72           PFBS         375-73-5         0.94 UT         H7709-F\$1(0)         1.000         8/25/2020         0.47         0.94         4.72           PFHXS         355-46-4         7.35 T         H7709-F\$1(0)         1.000         8/25/2020         0.13         0.47         4.72           PFOS         1763-23-1         16.70 T         H7709-F\$1(0)         1.	PFHpA	375-85-9	131.79 TD	H7709-FS1-D(3)	5.000	8/25/2020	1.23	4.72	23.58	1
PFDA 335-76-2 3.86 JT H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72  PFUnA 2058-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.21 0.47 4.72  PFDOA 307-55-1 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.18 0.47 4.72  PFTrDA 72629-94-8 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.14 0.47 4.72  PFTeDA 376-06-7 1.89 UT H7709-F51(0) 1.000 8/25/2020 0.69 1.89 4.72  NMeFOSAA 2355-31-9 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.33 0.94 4.72  NEtFOSAA 2991-50-6 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.47 0.94 4.72  PFBS 375-73-5 1.37 JT J H7709-F51(0) 1.000 8/25/2020 0.13 0.47 4.72  PFHxS 355-46-4 7.35 T H7709-F51(0) 1.000 8/25/2020 0.10 0.38 4.72  PFOS 1763-23-1 16.70 T H7709-F51(0) 1.000 8/25/2020 0.42 0.94 4.72  HFPO-DA 13252-13-6 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 UT H7709-F51(0) 1.000 8/25/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 UT H7709-F51(0) 1.000 8/25/2020 0.22 0.47 4.72	PFOA	335-67-1	95.52 TD	H7709-FS1-D(3)	5.000	8/25/2020	2.41	7.08	23.58	
PFUNA 2058-94-8 0.47 UT 1 H7709-FS1(0) 1.000 8/25/2020 0.21 0.47 4.72 PFDOA 307-55-1 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.18 0.47 4.72 PFTrDA 72629-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTeDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.69 1.89 4.72 NMEFOSAA 2355-31-9 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72 NEtFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFHxS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 PFODA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72 PHO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PFGS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 PFFGS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72	PFNA	375-95-1	64.30 T	H7709-F\$1(0)	1.000	8/25/2020	0.29	0.94	4.72	
PFTDA 307-55-1	PFDA	335-76-2	3.86 JT 👃	H7709-FS1(0)	1.000	8/25/2020	0.13	0.47	4.72	
PFTrDA 72629-94-8 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.14 0.47 4.72 PFTeDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.69 1.89 4.72 NMeFOSAA 2355-31-9 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72 NEtFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFHxS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 PFPO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72 Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFUnA	2058-94-8	0.47 UT U	J H7709-FS1(0)	1.000	8/25/2020	0.21	0.47	4.72	
PFTEDA 376-06-7 1.89 UT H7709-FS1(0) 1.000 8/25/2020 0.69 1.89 4.72  NMeFOSAA 2355-31-9 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72  NEtFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72  PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72  PFHxS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72  PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72  HFPO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFDoA	307-55-1	0.47 UT	H7709-FS1(0)	1.000	8/25/2020	0.18	0.47	4.72	
NMeFOSAA 2355-31-9 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.33 0.94 4.72 NEtFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72 PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72 PFHxS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72 PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72 HFPO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72 Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFTrDA	72629-94-8	0.47 UT	H7709-FS1(0)	1.000	8/25/2020	0.14	0.47		
NEtFOSAA 2991-50-6 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.47 0.94 4.72  PFBS 375-73-5 1.37 JT H7709-FS1(0) 1.000 8/25/2020 0.13 0.47 4.72  PFHxS 355-46-4 7.35 T H7709-FS1(0) 1.000 8/25/2020 0.10 0.38 4.72  PFOS 1763-23-1 16.70 T H7709-FS1(0) 1.000 8/25/2020 0.42 0.94 4.72  HFPO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFTeDA	376-06-7	1.89 UT	H7709-FS1(0)	1.000	8/25/2020	0.69	1.89		
PFBS 375-73-5 1.37 JT	NMeFOSAA	2355-31-9	0.94 UT	H7709-FS1(0)	1.000	8/25/2020	0.33	0.94	4.72	
PFHxS     355-46-4     7.35 T     H7709-FS1(0)     1.000     8/25/2020     0.10     0.38     4.72       PFOS     1763-23-1     16.70 T     H7709-FS1(0)     1.000     8/25/2020     0.42     0.94     4.72       HFPO-DA     13252-13-6     0.47 UT     H7709-FS1(0)     1.000     8/25/2020     0.24     0.47     4.72       Adona     919005-14-4     0.94 UT     H7709-FS1(0)     1.000     8/25/2020     0.25     0.94     4.72       11CI-PF3OUdS     763051-92-9     0.47 UT     H7709-FS1(0)     1.000     8/25/2020     0.22     0.47     4.72	NEtFOSAA	2991-50-6	0.94 UT	H7709-FS1(0)	1.000	8/25/2020	0.47	0.94		
PFOS     1763-23-1     16.70 T     H7709-FS1(0)     1.000     8/25/2020     0.42     0.94     4.72       HFPO-DA     13252-13-6     0.47 UT     H7709-FS1(0)     1.000     8/25/2020     0.24     0.47     4.72       Adona     919005-14-4     0.94 UT     H7709-FS1(0)     1.000     8/25/2020     0.25     0.94     4.72       11CI-PF3OUdS     763051-92-9     0.47 UT     H7709-FS1(0)     1.000     8/25/2020     0.22     0.47     4.72	PFBS	375-73-5	1.37 J	7 H7709-FS1(0)	1.000	8/25/2020	0.13	0.47	4.72	8
HFPO-DA 13252-13-6 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.24 0.47 4.72  Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72  11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFHxS	355-46-4	7.35 T	H7709-FS1(0)	1.000	8/25/2020	0.10	0.38		
Adona 919005-14-4 0.94 UT H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72 11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	PFOS	1763-23-1	16.70 T	H7709-FS1(0)	1.000	8/25/2020	0.42			
11CI-PF3OUdS 763051-92-9 0.47 UT H7709-FS1(0) 1.000 8/25/2020 0.22 0.47 4.72	HFPO-DA	13252-13-6	0.47 UT (	J H7709-FS1(0)	1.000	8/25/2020	0.24	0.47		
1101130003 703031323	Adona	919005-14-4	0.94 UT	H7709-FS1(0)	1.000	8/25/2020	0.25			0
9CI-PF3ONS 756426-58-1 / 0.94 UT V H7709-FS1(0) 1.000 8/25/2020 0.25 0.94 4.72	11CI-PF3OUdS	763051-92-9	0.47 UT	H7709-FS1(0)	1.000	8/25/2020	0.22	0.47		
	9CI-PF3ONS	756426-58-1	0.94 UT	H7709-FS1(0)	1.000	8/25/2020	0.25	0.94	4.72	4



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-B1669-WT02P-0720
Battelle ID Sample Type Collection Date Extraction Date Analytical Instrument	H7709-FS1 SA 07/28/2020 08/24/2020 Sciex 5500 LC/MS/MS

•				Analysis		
Surrogate Recoveries (%)	Reco	very	Extract ID	Date		
13C5-PFHxA		88 D	H7709-FS1-D(3)	8/25/2020		
13C4-PFHpA		89 D	H7709-FS1-D(3)	8/25/2020		
13C8-PFOA		92 🗖	H7709-FS1-D(3)	8/25/2020		
13C9-PFNA		86 0	H7709-FS1-D(3)	8/25/2020		
13C6-PFDA		76	H7709-FS1(0)	8/25/2020		
13C7-PFUnA		81	H7709-FS1(0)	8/25/2020		
13C2-PFDoA		66	H7709-FS1(0)	8/25/2020	900	
13C2-PFTeDA		49	H7709-FS1(0)	8/25/2020		
d3-MeFOSAA		57	H7709-FS1(0)	8/25/2020		
d5-EtFOSAA		82	H7709-FS1(0)	8/25/2020		
13C3-PFBS		82	H7709-FS1(0)	8/25/2020		
13C3-PFHxS		88	H7709-FS1(0)	8/25/2020		
13C8-PFOS		84	H7709-FS1(0)	8/25/2020		
13C3-HFPO-DA		85 D	H7709-FS1-D(3)	8/25/2020		

NW 9/29/20

Analyzed by: Griffith, Lauren Printed: 8/26/2020



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT06-0720							
Battelle ID		H7719-F\$1					Wengi	0	
Sample Type		SA					Tel :	a	
Collection Date		07/27/2020					191		
Extraction Date		08/24/2020				1	6		
Analytical Instrumer	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		W							
Sample Size		0.260							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF /	Date	DL	LOD	LOQ	
PFHxA	307-24-4	111.74 🎵 🍼	H7719-FS1(0)	1.000	8/25/2020	0.51	1.44	4.81	H-
PFHpA	375-85-9	50.82 T	H7719-FS1(0)	1.000	8/25/2020	0.25	0.96	4.81	
PFOA	335-67-1	70.48 T	H7719-FS1(0)	1.000	8/25/2020	0.49	1.44	4.81	
PFNA	375-95-1	4.86 T	H7719-FS1(0)	1.000	8/25/2020	0.30	0.96	4.81	5
PFDA	335-76-2	0.90 1	H7719-FS1(0)	1.000	8/25/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 UT U	H7719-FS1(0)	1.000	8/25/2020	0.21	0.48	4.81	
PFDoA	307-55-1	0.48 UT	H7719-FS1(0)	1.000	8/25/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 UT	H7719-FS1(0)	1.000	8/25/2020	0.14	0.48	4.81	
PFTeDA	376-06-7	0.89 ガ ブ	H7719-FS1(0)	1.000	8/25/2020	0.70	1.92	4.81	
NMeFOSAA	2355-31-9	0.96 UT U.	H7719-FS1(0)	1.000	8/25/2020	0.34	0.96	4.81	
NEtFOSAA	2991-50-6	0.96 UT W	H7719-FS1(0)	1.000	8/25/2020	0.48	0.96	4.81	
PFBS	375-73-5	14.16 T □	H7719-FS1(0)	1.000	8/25/2020	0.13	0.48	4.81	
PFHxS	355-46-4	44.98 T	H7719-FS1(0)	1.000	8/25/2020	0.11	0.38	4.81	
PFOS	1763-23-1	34.39 T	H7719-FS1(0)	1.000	8/25/2020	0.42	0.96	4.81	
HFPO-DA	13252-13-6	1.12 1	H7719-FS1(0)	1.000	8/25/2020	0.24	0.48	4.81	
Adona	919005-14-4	0.96 UT (A)	T H7719-FS1(0)	1.000	8/25/2020	0.26	0.96	4.81	
11CI-PF3OUdS	763051-92-9	0.48 UT	H7719-FS1(0)	1.000	8/25/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 UT	H7719-FS1(0)	1.000	8/25/2020	0.26	0.96	4.81	- 4



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2905-WT06-0720

 Battelle ID
 H7719-FS1

 Sample Type
 SA

 Collection Date
 07/27/2020

 Extraction Date
 08/24/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

		Analysis					
Surrogate Recoveries (%)	Recovery	Extract ID	Date	/			
13C5-PFHxA	54	H7719-FS1(0)	8/25/2020				
13C4-PFHpA	70	H7719-FS1(0)	8/25/2020				
13C8-PFOA	71	H7719-FS1(0)	8/25/2020				
13C9-PFNA	65	H7719-FS1(0)	8/25/2020				
13C6-PFDA	64	H7719-FS1(0)	8/25/2020				
13C7-PFUnA	51	H7719-F51(0)	8/25/2020				
13C2-PFDoA	32 №	H7719-F51(0)	8/25/2020				
13C2-PFTeDA	6 1	H7719-FS1(0)	8/25/2020				
d3-MeFOSAA	38 N	H7719-FS1(0)	8/25/2020				
d5-EtFOSAA	36 N	H7719-FS1(0)	8/25/2020				
13C3-PFBS	63	H7719-FS1(0)	8/25/2020				
13C3-PFHxS	87	H7719-FS1(0)	8/25/2020				
13C8-PFOS	12	H7719-FS1(0)	8/25/2020				
13C3HFPO-DA	57	H7719-FS1(0)	8/25/2020				



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2905-WT07-0720						0
Battelle ID		H7720-FS1				1	lise	ral
Sample Type		SA				/	ma	, 10
Collection Date		07/27/2020			/		51	
Extraction Date		08/24/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		W						
Sample Size		0.260						
Size Unit-Basis		L		/	Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	/ DF	Date	DL	LOD	LOQ
			/					
PFHxA	307-24-4	12.39 🕇 💆	H7720-FS1(0)	1.000	8/25/2020	0.51	1.44	4.81
PFHpA	375-85-9	6.21	H7720-F81(0)	1.000	8/25/2020	0.25	0.96	4.81
PFOA	335-67-1	11.77 🕇	H7720-FS1(0)	1.000	8/25/2020	0.49	1.44	4.81
PFNA	375-95-1	1.45 /	H7720-FS1(0)	1.000	8/25/2020	0.30	0.96	4.81
PFDA	335-76-2	0.50 기	H7720-FS1(0)	1.000	8/25/2020	0.13	0.48	4.81
PFUnA	2058-94-8	0.48 UT U	// H7720-FS1(0)	1.000	8/25/2020	0.21	0.48	4.81
PFDoA	307-55-1	0.48 UT	H7720-FS1(0)	1.000	8/25/2020	0.18	0.48	4.81
PFTrDA	72629-94-8	0.48 OT	H7720-FS1(0)	1.000	8/25/2020	0.14	0.48	4.81
PFTeDA	376-06-7	1,92 UT	H7720-FS1(0)	1.000	8/25/2020	0.70	1.92	4.81
NMeFOSAA	2355-31-9	0.96 UT	H7720-FS1(0)	1.000	8/25/2020	0.34	0.96	4.81
NEtFOSAA	2991-50-6	0.96 UT	H7720-FS1(0)	1.000	8/25/2020	0.48	0.96	4.81
PFBS	375-73-5	2.80 JT	7 H7720-FS1(0)	1.000	8/25/2020	0.13	0.48	4.81
PFHxS	355-46-4	23.57 T	H7720-FS1(0)	1.000	8/25/2020	0.11	0.38	4.81
PFOS	1763-23-1	36.75 T	H7720-FS1(0)	1.000	8/25/2020	0.42	0.96	4.81
HFPO-DA	13252-13-6	0.48 UT	H7720-FS1(0)	1.000	8/25/2020	0.24	0.48	4.81
Adona	919005-14-4	0.96 UT	H7720-FS1(0)	1.000	8/25/2020	0.26	0.96	4.81
11CI-PF3OUdS	763051-92-9	0.48 UT	H7720-FS1(0)	1.000	8/25/2020	0.22	0.48	4.81
9CI-PF3ONS	756426-58-1	0.96 UT	H7720-FS1(0)	1.000	8/25/2020	0.26	0.96	4.81



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2905-WT07-0720

H7720-FS1 Battelle ID Sample Type SA 07/27/2020 Collection Date 08/24/2020 **Extraction Date** 

Analytical Instrument Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
13C5-PFHxA	80	H7720-FS1(0)	8/25/2020	
13C4-PFHpA	79	H7720-FS1(0)	8/25/2020	
13C8-PFOA	78	H7720-FS1(0)	8/25/2020	
13C9-PFNA	73	H7720-FS1(0)	8/25/2020	
13C6-PFDA	69	H7720-FS1(0)	8/25/2020	
13C7-PFUnA	55	H7720-FS1(0)	8/25/2020	
13C2-PFDoA	32 N	/ H7720-FS1(0)	8/25/2020	
13C2-PFTeDA	11 N	H7720-FS1(0)	8/25/2020	
d3-MeFOSAA	31	H7720-FS1(0)	8/25/2020	
d5-EtFOSAA	27 N	H7720-F51(0)	8/25/2020	
13C3-PFBS	83	H7720-FS1(0)	8/25/2020	
13C3-PFHxS	84	H7720-FS1(0)	8/25/2020	
13C8-PFOS	72	H7720-FS1(0)	8/25/2020	
13C3-HFPO-DA	75	H7720-FS1(0)	8/25/2020	



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0985

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 28, 2020

PFAS						
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix			
1	PX-BR-ACS-WT'06-0820	H8662-FS	Water			
2	PX-S41-WT06-0820	H8665-FS	Water			
3	PX-S41-WT07-0820	H8669-FS	Water			
4	PX-S41-WT05-0820	H8674-FS	Water			
5	PX-S41-FB01-081920	H8675-FS	Water			
6	PX-S41-EB01-081920-GW	H8676-FS	Water			
7	PX-S41-EB01-081920-SO	H8677-FS	Water			
8	PX-S41-WT03-0820	H8678-FS	Water			
9	PX-S41-WT04-0820	H8683-FS	Water			
9MS	PX-S41-WT04-0820MS	H8684-FSMS	Water			
9MSD	PX-S41-WT04-0820MSD	H8685-FSMSD	Water			

A Stage 2B/4 data validation was performed on the analytical data for six water samples, two aqueous equipment blank samples, and one aqueous field blank sample collected on August 19, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

# **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

# Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

# **Holding Times**

• All samples were extracted within 14 days for water samples and analyzed within 28 days.

# LC/MS Tuning

All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

# **Continuing Calibration**

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PB 08/31/20	PFBS	0.20	U_	5, 6, 7
	PFHxS	0.17	U	5, 6, 7

#### Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-S41-FB01-081920	None - ND			÷
PX-S41-EB01-081920-GW	None - ND		-	= 1
PX-S41-EB01-081920-SO	PFOS	3.51	None	Applies to other packages

# Surrogate Spike Recoveries

• EDS Sample 8 exhibited a low surrogate percent recovery (%R) for PFTeDA of 35%. PFTeDA was qualified as estimated (UJ) in this sample.

# Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RDP	Qualifier
9	PFOS	260%/0%/200	None - 4X Rule Applies

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# Target Compound Identification

• All mass spectra and quantitation criteria were met.

# Compound Quantitation

- The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.
- EDS Sample 8 was re-extracted outside of holding times in SDG 20-1118 to confirm surrogate deficiencies. Use the original analysis results for reporting purposes.

# Field Duplicate Sample Precision

Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Nancy Weaver

Senior Chemist

Dated: 10/31/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT06-0820							
Battelle ID		H8662-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/31/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	72.29	H8662-FS(0)	1.000	9/13/2020	0.53	1.50	5.00	
PFHpA	375-85-9	11.46	H8662-FS(0)	1.000	9/13/2020	0.26	1.00	5.00	
PFOA	335-67-1	28.32	H8662-FS(0)	1.000	9/13/2020	0.51	1.50	5.00	
PFNA	375-95-1	0.47 J	H8662-FS(0)	1.000	9/13/2020	0.31	1.00	5.00	
PFDA	335-76-2	0.23 J	H8662-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.50 U	H8662-FS(0)	1.000	9/13/2020	0.22	0.50	5.00	
PFDoA	307-55-1	0.50 U	H8662-FS(0)	1.000	9/13/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8	0.50 U	H8662-FS(0)	1.000	9/13/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 U	H8662-FS(0)	1.000	9/13/2020	0.73	2.00	5.00	
NMeFOSAA	2355-31-9	1.00 U	H8662-FS(0)	1.000	9/13/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 U	H8662-FS(0)	1.000	9/13/2020	0.50	1.00	5.00	
PFBS	375-73-5	12.83	H8662-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFHxS	355-46-4	195.08 🜓	H8662-FS-D(3)	5.000	9/13/2020	0.55	2.00	25.00	
PFOS	1763-23-1	78.92	H8662-FS(0)	1.000	9/13/2020	0.44	1.00	5.00	
HFPO-DA	13252-13-6	0.50 U	H8662-FS(0)	1.000	9/13/2020	0.25	0.50	5.00	
Adona	919005-14-4	1.00 U	H8662-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	
11CI-PF3OUdS	763051-92-9	0.50 U	H8662-FS(0)	1.000	9/13/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1.00 U	H8662-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Isotope Dilution

Client ID		PX-S41-WT06-0820						
Battelle ID		H8665-F\$						
Sample Type		SA						
Collection Date		08/19/2020						
Extraction Date		08/31/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix	5.5	WATER						
Sample Size		0.250						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1631.66 🖟	H8665-FS-D(7)	31.250	9/13/2020	16.56	46.88	156.25
PFHpA	375-85-9	661.40	H8665-FS-D(5)	12.500	9/13/2020	3.25	12.50	62.50
PFOA	335-67-1	768.09	H8665-FS-D(7)	31.250	9/13/2020	15.94	46.88	156.25
PFNA	375-95-1	92.03	H8665-FS(0)	1.000	9/13/2020	0.31	1.00	5.00
PFDA	335-76-2	27.11	H8665-FS(0)	1.000	9/13/2020	0.14	0.50	5.00
PFUnA	2058-94-8	112.75 🏚	H8665-FS-D(3)	5.000	9/13/2020	1.10	2.50	25.00
PFDoA	307-55-1	4.41 J	H8665-FS(0)	1.000	9/13/2020	0.19	0.50	5.00
PFTrDA	72629-94-8	8.62	H8665-FS(0)	1.000	9/13/2020	0.15	0.50	5.00
PFTeDA	376-06-7	2.00 U	H8665-FS(0)	1.000	9/13/2020	0.73	2.00	5.00
NMeFOSAA	2355-31-9	1.00 U	H8665-FS(0)	1.000	9/13/2020	0.35	1.00	5.00
NEtFOSAA	2991-50-6	6.73	H8665-FS(0)	1.000	9/13/2020	0.50	1.00	5.00
PFBS	375-73-5	73.76	H8665-FS(0)	1.000	9/13/2020	0.14	0.50	5.00
PFHxS	355-46-4	3812.33 <b>p</b>	H8665-FS-D(9)	156.250	9/13/2020	17.19	62.50	781.25
PFOS	1763-23-1	9473.12 0	H8665-FS-D(9)	156.250	9/13/2020	68.75	156.25	781.25
HFPO-DA	13252-13-6	0.50 U	H8665-FS(0)	1.000	9/13/2020	0.25	0.50	5.00
Adona	919005-14-4	1.00 U	H8665-FS(0)	1.000	9/13/2020	0.27	1.00	5.00
11CI-PF3OUdS	763051-92-9	0.50 U	H8665-FS(0)	1.000	9/13/2020	0.23	0.50	5.00
9CI-PF3ONS	756426-58-1	1.00 U	H8665-FS(0)	1.000	9/13/2020	0.27	1.00	5.00



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-S41-WT07-0820
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H8669-FS Battelle ID Sample Type SA Collection Date 08/19/2020 **Extraction Date** 08/31/2020 Sciex 5500 LC/MS/MS Analytical Instrument NA % Moisture Matrix WATER Sample Size 0.260 Size Unit-Basis

Analysis LOD LOQ CAS No. Result (ng/L) Extract ID DF Date DL Analyte 307-24-4 6.31 H8669-FS(0) 1.000 9/13/2020 0.51 1.44 4.81 **PFHxA** 4.81 5.18 H8669-FS(0) 1.000 9/13/2020 0.25 0.96 **PFHpA** 375-85-9 7.79 H8669-FS(0) 1.000 9/13/2020 0.49 1.44 4.81 **PFOA** 335-67-1 10.22 H8669-FS(0) 1.000 9/13/2020 0.30 0.96 4.81 **PFNA** 375-95-1 1.38 J 9/13/2020 0.13 0.48 4.81 PFDA 335-76-2 H8669-FS(0) 1.000 0.48 U H8669-FS(0) 1.000 9/13/2020 0.21 0.48 4.81 2058-94-8 **PFUnA** 0.48 U 1.000 9/13/2020 0.18 0.48 4.81 H8669-FS(0) **PFDoA** 307-55-1 4.81 72629-94-8 0.48 U H8669-FS(0) 1.000 9/13/2020 0.14 0.48 **PFTrDA** 9/13/2020 0.70 1.92 4.81 1.92 U H8669-FS(0) 1.000 PFTeDA 376-06-7 0.96 U 1.000 9/13/2020 0.34 0.96 4.81 2355-31-9 H8669-FS(0) **NMeFOSAA** 0.96 U H8669-FS(0) 1.000 9/13/2020 0.48 0.96 4.81 **NEtFOSAA** 2991-50-6 1.29 J 9/13/2020 0.13 0.48 4.81 PFBS 375-73-5 H8669-FS(0) 1.000 46.99 H8669-FS(0) 1.000 9/13/2020 0.11 0.38 4.81 355-46-4 **PFHxS** 25.000 9/14/2020 10.58 24.04 120.19 556.52 H8669-FS-D(5) **PFOS** 1763-23-1 0.48 U H8669-FS(0) 1.000 9/13/2020 0.24 0.48 4.81 HFPO-DA 13252-13-6 0.96 U H8669-FS(0) 1.000 9/13/2020 0.26 0.96 4.81 Adona 919005-14-4 9/13/2020 0.22 0.48 4.81 0.48 U H8669-FS(0) 1.000 11CI-PF3OUdS 763051-92-9 0.96 U H8669-FS(0) 1.000 9/13/2020 0.26 0.96 4.81 9CI-PF3ONS 756426-58-1



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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-WT05-0820						
Battelle ID		H8674-FS						
Sample Type		SA						
Collection Date		08/19/2020						
Extraction Date		08/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.250						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2944.68 📫	H8674-FS-D(7)	62.500	9/13/2020	33.13	93.75	312.50
PFHpA	375-85-9	680.75 <b>p</b>	H8674-FS-D(5)	12.500	9/13/2020	3.25	12.50	62.50
PFOA	335-67-1	1169.18	H8674-FS-D(7)	62.500	9/13/2020	31.88	93.75	312.50
PFNA	375-95-1	114.11	H8674-FS(0)	1.000	9/13/2020	0.31	1.00	5.00
PFDA	335-76-2	17.62	H8674-FS(0)	1.000	9/13/2020	0.14	0.50	5.00
PFUnA	2058-94-8	8.79	H8674-FS(0)	1.000	9/13/2020	0.22	0.50	5.00
PFDoA	307-55-1	0.50 U	H8674-FS(0)	1.000	9/13/2020	0.19	0.50	5.00
PFTrDA	72629-94-8	0.27 J	H8674-F5(0)	1.000	9/13/2020	0.15	0.50	5.00
PFTeDA	376-06-7	2.00 U	H8674-FS(0)	1.000	9/13/2020	0.73	2.00	5.00
NMeFOSAA	2355-31-9	1.00 U	H8674-FS(0)	1.000	9/13/2020	0.35	1.00	5.00
NEtFOSAA	2991-50-6	0.97 J	H8674-FS(0)	1.000	9/13/2020	0.50	1.00	5.00
PFBS	375-73-5	220.04	H8674-FS-D(3)	5.000	9/13/2020	0.70	2.50	25.00
PFHxS	355-46-4	6024.88 <b>D</b>	H8674-FS-D(9)	781.250	9/13/2020	85.94	312.50	3906.25
PFOS	1763-23-1	23765.25	H8674-FS-D(9)	781.250	9/13/2020	343.75	781.25	3906.25
HFPO-DA	13252-13-6	0.50 U	H8674-FS(0)	1.000	9/13/2020	0.25	0.50	5.00
Adona	919005-14-4	1.00 U	H8674-FS(0)	1.000	9/13/2020	0.27	1.00	5.00
11Cl-PF3OUdS	763051-92-9	0.50 U	H8674-FS(0)	1.000	9/13/2020	0.23	0.50	5.00
9CI-PF3ONS	756426-58-1	1.00 U	H8674-FS(0)	1.000	9/13/2020	0.27	1.00	5.00



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-FB01-081920							
Battelle ID		H8675-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/31/2020							
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.255							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	1.47 U	H8675-FS(0)	1.000	9/13/2020	0.52	1.47	4.90	
	375-85-9	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.25	0.98	4.90	
PFOA	335-67-1	1.47 U	H8675-FS(0)	1.000	9/13/2020	0.50	1.47	4.90	
PFNA	375-95-1	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.30	0.98	4.90	
PFDA	335-76-2	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.22	0.49	4.90	
PFDoA	307-55-1	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.96 U	H8675-FS(0)	1.000	9/13/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.49	0.98	4.90	
PFBS	375-73-5	0,49 0.19 h	H8675-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	MB
PFHxS	355-46-4	0.39 0.19+ W	H8675-FS(0)	1.000	9/13/2020	0.11	0.39	4.90	MB
PFOS	1763-23-1	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.25	0.49	4.90	
Adona	919005-14-4	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.49 U	H8675-FS(0)	1.000	9/13/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1	0.98 U	H8675-FS(0)	1.000	9/13/2020	0.26	0.98	4.90	

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-S41-EB01-081920-G	iW							
Battelle ID		H8676-	FS							
Sample Type		:	SA							
Collection Date		08/19/20	20							
Extraction Date		08/31/20	20							
Analytical Instrument		Sciex 5500 LC/MS/N	νS							
% Moisture		1	AV							
Matrix		WAT	ER							
Sample Size		0.2	55							
Size Unit-Basis			L			Analysis				
Analyte	CAS No.	Result (ng/	/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	1.	47 U	H8676-FS(0)	1.000	9/13/2020	0.52	1.47	4.90	
PFHpA	375-85-9	0.	98 U	H8676-FS(0)	1.000	9/13/2020	0.25	0.98	4.90	
PFOA	335-67-1	1.	47 U	H8676-FS(0)	1.000	9/13/2020	0.50	1.47	4.90	
PFNA	375-95-1	0.	98 U	H8676-FS(0)	1.000	9/13/2020	0.30	0.98	4.90	
PFDA	335-76-2	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.22	0.49	4.90	
PFDoA	307-55-1	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.	96 U	H8676-FS(0)	1.000	9/13/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9	0.	98 U	H8676-FS(0)	1.000	9/13/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.	98 U	H8676-FS(0)	1.000	9/13/2020	0.49	0.98	4.90	_
PFBS	375-73-5	0,49 0	191 U	H8676-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	MB
PFHxS	355-46-4		17 J U	H8676-FS(0)	1.000	9/13/2020	0.11	0.39	4.90	MB
PFOS	1763-23-1		98 U	H8676-FS(0)	1.000	9/13/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.25	0.49	4.90	
Adona	919005-14-4	0.	98 U	H8676-FS(0)	1.000	9/13/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.	49 U	H8676-FS(0)	1.000	9/13/2020	0.23	0.49	4.90	

0.98 U

H8676-FS(0)

1.000

9/13/2020

0.26

0.98

4.90

9CI-PF3ONS

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-EB01-081920-	-so							
Battelle ID		H8677	-FS							
Sample Type			SA							
Collection Date		08/19/20	020							
Extraction Date		08/31/20	020							
Analytical Instrument		Sciex 5500 LC/MS/	MS							
% Moisture			NA							
Matrix		WAT	ΓER							
Sample Size		0.2	250							
Size Unit-Basis			L			Analysis				
Analyte	CAS No.	Result (ng	:/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
		1	50.11	U9677 FS/O\	1.000	9/13/2020	0.53	1.50	5.00	
PFHxA	307-24-4		.50 U	H8677-FS(0)			0.26	1.00	5.00	
PFHpA	375-85-9		.00 U	H8677-FS(0)	1.000	9/13/2020	0.25	1.50	5.00	
PFOA	335-67-1		.50 U	H8677-FS(0)	1.000	9/13/2020			5.00	
PFNA	375-95-1		.00 U	HB677-FS(0)	1.000	9/13/2020	0.31	1.00		
PFDA	335-76-2		.50 U	H8677-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFUnA	2058-94-8		.50 U	H8677-FS(0)	1.000	9/13/2020	0.22	0.50	5.00	
PFDoA	307-55-1		.50 U	H8677-FS(0)	1.000	9/13/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8		.50 U	H8677-FS(0)	1.000	9/13/2020	0.15	0.50	5.00	
PFTeDA	376-06-7		.00 U	H8677-FS(0)	1.000	9/13/2020	0.73	2.00	5.00	
NMeFOSAA	2355-31-9		.00 U	H8677-FS(0)	1.000	9/13/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6		.00 U	H8677-FS(0)	1.000	9/13/2020	0.50	1.00	5.00	
PFBS	375-73-5	0.50	19 J U	H8677-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	MBL
PFHxS	355-46-4	0	.68 👉 🖊	H8677-FS(0)	1.000	9/13/2020	0.11	0.40	5.00	MBL
PFOS	1763-23-1	3	.51 J	H8677-FS(0)	1.000	9/13/2020	0.44	1.00	5.00	
HFPO-DA	13252-13-6	0	.50 U	H8677-FS(0)	1.000	9/13/2020	0.25	0.50	5.00	
Adona	919005-14-4	1	.00 U	H8677-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	
11CI-PF3OUdS	763051-92-9	0	.50 U	H8677-FS(0)	1.000	9/13/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1	.00 U	H8677-FS(0)	1.000	9/13/2020	0.27	1,00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-WT03-0820							
Battelle ID		H8678-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/31/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	77.15	H8678-FS(0)	1.000	9/13/2020	0.53	1.50	5.00	
PFHpA	375-85-9	35.68	H8678-FS(0)	1.000	9/13/2020	0.26	1.00	5.00	
PFOA	335-67-1	98.57	H8678-FS(0)	1.000	9/13/2020	0.51	1.50	5.00	
PFNA	375-95-1	47.16	H8678-FS(0)	1.000	9/13/2020	0.31	1.00	5.00	
PFDA	335-76-2	0.27 J	H8678-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.50 U	H8678-FS(0)	1.000	9/13/2020	0.22	0.50	5.00	
PFDoA	307-55 <b>-1</b>	0.50 U	H8678-FS(0)	1.000	9/13/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8	0.50 U	H8678-FS(0)	1.000	9/13/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 b LJ	H8678-FS(0)	1.000	9/13/2020	0.73	2.00	5.00	55L
NMeFOSAA	2355-31-9	1.00 U	H8678-FS(0)	1.000	9/13/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 U	H8678-FS(0)	1.000	9/13/2020	0.50	1.00	5.00	
PFBS	375-73-5	13.04	H8678-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFHxS	355-46-4	874.55 <b>p</b>	H8678-FS-D(5)	12.500	9/13/2020	1.38	5.00	62.50	
PFOS	1763-23-1	2127.67	H8678-FS-D(7)	31.250	9/13/2020	13.75	31.25	156.25	
HFPO-DA	13252-13-6	0.50 U	H8678-FS(0)	1.000	9/13/2020	0.25	0.50	5.00	
Adona	919005-14-4	1.00 U	H8678-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	
11Ci-PF3OUdS	763051-92-9	0.50 U	H8678-FS(0)	1.000	9/13/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1.00 U	H8678-FS(0)	1.000	9/13/2020	0.27	1,00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-541-WT03-0820

 Battelle ID
 H8678-FS

 Sample Type
 SA

 Collection Date
 08/19/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	79	H8678-FS(0)	9/13/2020	
13C4-PFHpA	74	H8678-FS(0)	9/13/2020	
13C8-PFOA	79	H8678-FS(0)	9/13/2020	
13C9-PFNA	58	H8678-FS(0)	9/13/2020	
13C6-PFDA	74	H8678-FS(0)	9/13/2020	
13C7-PFUnA	74	H8678-FS(0)	9/13/2020	
13C2-PFDoA	54	H8678-FS(0)	9/13/2020	
13C2-PFTeDA	35 N	H8678-FS(0)	9/13/2020	
d3-MeFOSAA	89 P	H8678-FS-D(7)	9/13/2020	
d5-EtFOSAA	98 🏚	H8678-FS-D(7)	9/13/2020	
13C3-PFBS	93 0	H8678-FS-D(7)	9/13/2020	
13C3-PFHxS	96 🗖	H8678-FS-D(7)	9/13/2020	
13C8-PFOS	93 C	H8678-FS-D(7)	9/13/2020	
13C3-HFPO-DA	74	H8678-FS(0)	9/13/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-S41-WT04-0820

Battelle ID H8683-FS SA Sample Type 08/19/2020 Collection Date 08/31/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument NA % Moisture WATER Matrix 0.265 Sample Size

Analysis Size Unit-Basis Extract ID DF Date DL LOD LOQ Result (ng/L) CAS No. Analyte 14.20 H8683-FS(0) 1.000 9/13/2020 0.50 1.42 4.72 **PFHxA** 307-24-4 4.72 9/13/2020 0.25 0.94 36.70 H8683-FS(0) 1.000 PFHDA 375-85-9 H8683-FS(0) 1.000 9/13/2020 0.48 1.42 4.72 74.60 **PFOA** 335-67-1 31.30 H8683-FS(0) 1.000 9/13/2020 0.29 0.94 4.72 PFNA 375-95-1 9/13/2020 0.13 0.47 4.72 9.11 H8683-FS(0) 1.000 PFDA 335-76-2 0.47 U H8683-FS(0) 1.000 9/13/2020 0.21 0.47 4.72 **PFUnA** 2058-94-8 0.47 4.72 0.47 U H8683-FS(0) 1.000 9/13/2020 0.18 PFDoA 307-55-1 0.47 U H8683-FS(0) 1.000 9/13/2020 0.14 0.47 4.72 PFTrDA 72629-94-8 4.72 1.000 9/13/2020 0.69 1.89 376-06-7 1.89 U H8683-FS(0) PFTeDA 0.33 0.94 4.72 0.94 U H8683-F5(0) 1.000 9/13/2020 **NMeFOSAA** 2355-31-9 1.000 9/13/2020 0.47 0.94 4.72 0.94 U H8683-FS(0) **NEtFOSAA** 2991-50-6 0.13 0.47 4.72 1.43 1 H8683-FS(0) 1.000 9/13/2020 **PFBS** 375-73-5 5.000 9/13/2020 0.52 1.89 23.58 H8683-FS-D(3) **PFHxS** 355-46-4 104.14 **P** 58.96 630.54 12.500 9/13/2020 5.19 11.79 H8683-FS-D(5) PFOS 1763-23-1 H8683-FS(0) 1.000 9/13/2020 0.24 0.47 4.72 0.47 U HFPO-DA 13252-13-6 1.000 9/13/2020 0.25 0.94 4.72 919005-14-4 0.94 U H8683-FS(0) Adona 4.72 9/13/2020 0.22 0.47 0.47 U H8683-FS(0) 1.000 11CI-PF3OUdS 763051-92-9 1.000 9/13/2020 0.25 0.94 4.72 0.94 U H8683-FS(0) 756426-58-1 9CI-PF3ONS



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0986

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 28, 2020

PFAS					
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix		
1	PX-S41-WT02-0820	H8686-FS	Water		
2	PX-S41-WT02P-0820	H8687-FS	Water		
3	PX-S41-WT01-0820	H8691-FS	Water		
4	PX-H2133-WT03-0820	H8698-FS	Water		
5	PX-H2133-WT04-0820	H8701-FS	Water		
5MS	PX-H2133-WT04-0820MS	H8702-FSMS	Water		
5MSD	PX-H2133-WT04-0820MSD	H8703-FSMSD	Water		
6	PX-H2133-SW01-0820	H8712-FS	Water		
7	PX-H2133-SW01P-0820	H8713-FS	Water		
8	PX-H2133-WT02-0820	H8714-FS	Water		
9	PX-H2133-WT06-0820	H8720-FS	Water		
10	PX-H2133-WT06P-0820	H8721-FS	Water		

A Stage 2B/4 data validation was performed on the analytical data for ten water samples collected on August 19-20, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

#### **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

#### Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

# **Holding Times**

All samples were extracted within 14 days for water samples and analyzed within 28 days.

# LC/MS Tuning

All criteria were met.

# **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## Continuing Calibration

• All percent recovery (%R) criteria were met.

#### **Method Blank**

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PB 08/31/20	PFBS	0.19	U	3
	PFHxS	0.18	None	Associated Samples >5X

#### Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-S41-FB01-081920	None - ND		1,4	1,3
PX-S41-EB01-081920-GW	None - ND			
PX-H2133-FB01-082020	None - ND	11 8 11	-	-
PX-H2133-EB01-082020-GW	None - ND		14	The same of the sa

# Surrogate Spike Recoveries

• Several samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds. These compounds were qualified as estimated (J/UJ) in each sample. Please refer to the Form Is for specific recoveries and qualifications.

# Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

## Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RDP	Qualifier
5	PFHxA	0%/0%/NC	None - 4X Rule Applies
	PFHpA	0%/22%/200.0	None - 4X Rule Applies
	PFOA	0%/40%/200.0	None - 4X Rule Applies
	PFHxS	40%/OK/94.0	I
	PFOS	35%/OK/107.9	Ţ

#### Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

#### **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

#### **Compound Quantitation**

- The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.
- Several samples were re-extracted outside of holding times in SDG 20-1118 to verify surrogate deficiencies. Use the original analysis results for reporting purposes.

# Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was unacceptable for PFHxS in one field duplicate pair. These results were qualified as estimated (]).

Compound	PX-S41-WT02-0820 ng/L	PX-S41-WT02P-0820 ng/L	RPD	Qualifier
PFHxA	35.50	33.02	7%	None
PFHpA	7.66	6.97	9%	
PFOA	51.44	42.43	19%	
PFNA	14.12	13.42	5%	
PFDA	2.77	2.90	5%	
PFUnA	0.31	0.69	76%	None - <5X LOQ

Compound	PX-S41-WT02-0820 ng/L	PX-S41-WT02P-0820 ng/L	RPD	Qualifier
PFBS	3.77	3.63	4%	None
PFHxS	534.53	399.74	29%	J
PFOS	926.81	874.37	6%	None

Compound	PX-H2133-SW01-0820 ng/L	PX-H2133-SW01P-0820 ng/L	RPD	Qualifier
PFHxA	58.40	50.39	15%	None
PFHpA	46.68	41.23	12%	
PFOA	41.19	36.62	12%	
PFNA	11.48	9.99	14%	
PFDA	3.32	2.74	19%	
PFUnA	0.89	0.84	6%	
PFDoA	0.19	0.22	15%	
PFT <sub>r</sub> DA	0.47U	0.17	NC	
PFBS	4.59	3.97	14%	
PFHxS	3.96	4.19	6%	
PFOS	7.53	6.56	14%	

Compound	PX-H2133-WT06-0820 ng/L	PX-H2133-WT06P-0820 ng/L	RPD	Qualifier
PFHxA	578.25	550.92	5%	None
PFHpA	545.81	521.54	5%	
PFOA	187.61	201.81	7%	
PFNA	68.57	68.52	0%	
PFDA	30.01	29.03	3%	
PFUnA	4.04	4.22	4%	
PFDoA	0.70	0.64	9%	
PFBS	3.72	4.00	7%	
PFHxS	4.25	4.27	0%	
PFOS	12.45	12.80	3%	
HFPO-DA	0.53	0.48	10%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Senior Chemist

Nancy Weaver Dated: 11/2120

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J=	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
Х	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

LOQ	_
5.32	
5.32	
5.32	
5.32	
5.32	
5.32	
5.32	556
5.32	
5.32	
66.49	60
66.49	
5.32	
5.32	
5.32	
	5.32 5.32 5.32 5.32 5.32 5.32 5.32 66.49 66.49 5.32 5.32



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-S41-WT02-0820
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 Battelle ID
 H8686-FS

 Sample Type
 SA

 Collection Date
 08/19/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	85	H8686-FS(0)	9/13/2020	
13C4-PFHpA	82	H8686-FS(0)	9/13/2020	
13C8-PFOA	81	H8686-FS(0)	9/13/2020	
13C9-PFNA	67	H8686-FS(0)	9/13/2020	
13C6-PFDA	83	H8686-FS(0)	9/13/2020	
13C7-PFUnA	89	H8686-FS(0)	9/13/2020	
13C2-PFDoA	76	H8686-FS(0)	9/13/2020	
13C2-PFTeDA	36 №	H8686-FS(0)	9/13/2020	
d3-MeFOSAA	91 🏴	H8686-FS-D(5)	9/13/2020	
d5-EtFOSAA	105	H8686-FS-D(5)	9/13/2020	
13C3-PFBS	100	H8686-FS-D(5)	9/13/2020	
13C3-PFHxS	99 🛊	H8686-FS-D(5)	9/13/2020	
13C8-PFOS	90 🏚	H8686-FS-D(5)	9/13/2020	
13C3-HFPO-DA	82	H8686-FS(0)	9/13/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-WT02P-0820							
Battelle ID		H8687-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/31/2020							
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
		22.02	110507 55(0)	1.000	0/12/2020	0.53	1 50	5.00	
PFHxA	307-24-4	33.02	H8687-FS(0)	1.000	9/13/2020	0.53	1.50		
PFHpA	375-85-9	6.97	H8687-FS(0)	1.000	9/13/2020	0.26	1.00	5.00	
PFOA	335-67-1	42.43	H8687-FS(0)	1.000	9/13/2020	0.51	1.50	5.00	
PFNA	375-95-1	13.42	H8687-FS(0)	1.000	9/13/2020	0.31	1.00	5.00	
PFDA	335-76-2	2.90 J	H8687-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.69 J	H8687-FS(0)	1.000	9/13/2020	0.22	0.50	5.00	
PFDoA	307-55-1	0.50 U	H8687-FS(0)	1.000	9/13/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8	0.50 U	H8687-FS(0)	1.000	9/13/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 🏏 ひブ	H8687-FS(0)	1.000	9/13/2020	0.73	2.00	5.00	55L
NMeFOSAA	2355-31-9	1.00 U	H8687-FS(0)	1.000	9/13/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 U	H8687-FS(0)	1.000	9/13/2020	0.50	1.00	5.00	
PFBS	375-73-5	3.63 J	H8687-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFHxS	355-46-4	399.74 🗘 🍏	H8687-FS-D(5)	12.500	9/13/2020	1.38	5.00	62.50	FO
PFOS	1763-23-1	874.37	H8687-FS-D(5)	12.500	9/13/2020	5.50	12.50	62.50	
HFPO-DA	13252-13-6	0.50 U	H8687-FS(0)	1.000	9/13/2020	0.25	0.50	5.00	
Adona	919005-14-4	1.00 U	H8687-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	
11CI-PF3OUdS	763051-92-9	0.50 U	H8687-FS(0)	1.000	9/13/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1,00 U	H8687-FS(0)	1.000	9/13/2020	0.27	1,00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-S41-WT02P-0820

 Battelle ID
 H8687-FS

 Sample Type
 SA

 Collection Date
 08/19/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

Recovery	Extract ID	Date	
76	H8687-FS(0)	9/13/2020	
80	H8687-FS(0)	9/13/2020	
78	H8687-FS(0)	9/13/2020	
62	H8687-FS(0)	9/13/2020	
72	H8687-FS(0)	9/13/2020	
76	H8687-FS(0)	9/13/2020	
63	H8687-FS(0)	9/13/2020	
27 N	H8687-FS(0)	9/13/2020	
98 D	H8687-FS-D(5)	9/13/2020	
108 D	H8687-FS-D(5)	9/13/2020	
102 D	H8687-FS-D(5)	9/13/2020	
104 D	H8687-FS-D(5)	9/13/2020	
90 0	H8687-FS-D(5)	9/13/2020	
74	H8687-FS(0)	9/13/2020	
	76 80 78 62 72 76 63 27 N 98 D 108 D 102 D 104 D 90 D	76 H8687-FS(0) 80 H8687-FS(0) 78 H8687-FS(0) 78 H8687-FS(0) 62 H8687-FS(0) 72 H8687-FS(0) 76 H8687-FS(0) 63 H8687-FS(0) 98 D H8687-FS-D(5) 108 D H8687-FS-D(5) 100 D H8687-FS-D(5) 104 D H8687-FS-D(5) 90 D H8687-FS-D(5)	76 H8687-FS(0) 9/13/2020  80 H8687-FS(0) 9/13/2020  78 H8687-FS(0) 9/13/2020  62 H8687-FS(0) 9/13/2020  72 H8687-FS(0) 9/13/2020  76 H8687-FS(0) 9/13/2020  63 H8687-FS(0) 9/13/2020  27 N H8687-FS(0) 9/13/2020  98 D H8687-FS-D(5) 9/13/2020  108 D H8687-FS-D(5) 9/13/2020  102 D H8687-FS-D(5) 9/13/2020  104 D H8687-FS-D(5) 9/13/2020  90 D H8687-FS-D(5) 9/13/2020



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-WT01-0820							
Battelle ID		H8691-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/31/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.260							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	2.39 J	H8691-FS(0)	1.000	9/13/2020	0.51	1.44	4.81	
PFHpA	375-85-9	3.04 J	H8691-FS(0)	1.000	9/13/2020	0.25	0.96	4.81	
PFOA	335-67-1	10.83	H8691-FS(0)	1.000	9/13/2020	0.49	1.44	4.81	
PFNA	375-95-1	2.32 J	H8691-FS(0)	1.000	9/13/2020	0.30	0.96	4.81	
PFDA	335-76-2	0.20 J	H8691-FS(0)	1.000	9/13/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 U	H8691-FS(0)	1.000	9/13/2020	0.21	0.48	4.81	
PFDoA	307-55-1	0.48 U	H8691-FS(0)	1.000	9/13/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 U	H8691-FS(0)	1.000	9/13/2020	0.14	0.48	4.81	
PFTeDA	376-06-7	1.92 U	H8691-FS(0)	1.000	9/13/2020	0.70	1.92	4.81	
NMeFOSAA	2355-31-9	0.96 U	H8691-FS(0)	1.000	9/13/2020	0.34	0.96	4.81	
NEtFOSAA	2991-50-6	0.96 U	H8691-FS(0)	1.000	9/13/2020	0.48	0.96	4.81	
PFBS	375-73-5	0.86 /	H8691-FS(0)	1.000	9/13/2020	0.13	0.48	4.81	MB
PFHxS	355-46-4	9.25	H8691-FS(0)	1.000	9/13/2020	0.11	0.38	4.81	
PFOS	1763-23-1	33.94	H8691-FS(0)	1.000	9/13/2020	0.42	0.96	4.81	
HFPO-DA	13252-13-6	0.48 U	H8691-FS(0)	1.000	9/13/2020	0.24	0.48	4.81	
Adona	919005-14-4	0.96 U	H8691-FS(0)	1.000	9/13/2020	0.26	0.96	4.81	
11CI-PF3OUdS	763051-92-9	0.48 U	H8691-FS(0)	1.000	9/13/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 U	H8691-FS(0)	1.000	9/13/2020	0.26	0.96	4.81	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2133-WT03-0820
CHICKLID	

H8698-FS Battelle ID 5A Sample Type 08/20/2020 Collection Date 08/31/2020 **Extraction Date** Analytical Instrument Sciex 5500 LC/MS/MS NA % Moisture WATER Matrix 0.240 Sample Size

Analysis Size Unit-Basis DF LOD LOQ Result (ng/L) Extract ID Date DL CAS No. Analyte 1.000 9/13/2020 0.55 1.56 5.21 **PFHxA** 307-24-4 2.68 J H8698-FS(0) 1.000 9/13/2020 0.27 1.04 5.21 **PFHpA** 375-85-9 2.53 J H8698-FS(0) 1.56 5.21 3.47 J 1.000 9/13/2020 0.53 **PFOA** 335-67-1 H8698-FS(0) 9/13/2020 0.32 1.04 5.21 1.13 J H8698-FS(0) 1.000 PFNA 375-95-1 0.26 J H8698-FS(0) 1.000 9/13/2020 0.15 0.52 5.21 **PFDA** 335-76-2 9/13/2020 0.23 0.52 5.21 0.52 U 1.000 **PFUnA** 2058-94-8 H8698-FS(0) 9/13/2020 0.52 5.21 0.52 U H8698-FS(0) 1.000 0.20 307-55-1 PFDoA 0.52 U 1.000 9/13/2020 0.16 0.52 5.21 **PFTrDA** 72629-94-8 H8698-FS(0) 9/13/2020 2.08 376-06-7 2.08 V UJ H8698-FS(0) 1.000 0.76 5.21 SSL **PFTeDA** 1.000 9/13/2020 0.36 1.04 5.21 1.04 U H8698-FS(0) **NMeFOSAA** 2355-31-9 1.04 5.21 9/13/2020 2991-50-6 1.04 U H8698-FS(0) 1.000 0.52 **NEtFOSAA** 1.000 9/13/2020 0.15 0.52 5.21 PFBS 375-73-5 1.12 3 H8698-FS(0) 9/13/2020 0.11 0.42 5.21 **PFHxS** 355-46-4 7.43 H8698-FS(0) 1.000 5.21 6.63 1.000 9/13/2020 0,46 1.04 H8698-FS(0) **PFOS** 1763-23-1 5.21 9/13/2020 0.26 0.52 HFPO-DA 13252-13-6 0.52 U H8698-FS(0) 1.000 5.21 1.04 U H8698-FS(0) 1.000 9/13/2020 0.28 1.04 919005-14-4 Adona 0.52 U 1.000 9/13/2020 0.24 0.52 5.21 11CI-PF3OUdS 763051-92-9 H8698-FS(0) 5.21 1.000 1.04 756426-58-1 1.04 U H8698-FS(0) 9/13/2020 0.28 9CI-PF3ONS



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2133-WT03-0820

 Battelle ID
 H8698-FS

 Sample Type
 SA

 Collection Date
 08/20/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	85	H8698-FS(0)	9/13/2020	
13C4-PFHpA	88	H8698-FS(0)	9/13/2020	
13C8-PFOA	81	H8698-FS(0)	9/13/2020	
13C9-PFNA	84	H8698-FS(0)	9/13/2028	
13C6-PFDA	89	H8698-FS(0)	9/13/2020	
13C7-PFUnA	85	H8698-FS(0)	9/13/2020	
13C2-PFDoA	71	H8698-FS(0)	9/13/2020	
13C2-PFTeDA	29 1	H8698-FS(0)	9/13/2020	
d3-MeFOSAA	78	H8698-FS(0)	9/13/2020	
d5-EtFOSAA	94	H8698-FS(0)	9/13/2020	
13C3-PFBS	83	H8698-FS(0)	9/13/2020	
13C3-PFHxS	80	H8698-FS(0)	9/13/2020	
13C8-PFOS	77	H8698-FS(0)	9/13/2020	
13C3-HFPO-DA	75	H8698-FS(0)	9/13/2020	

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-WT04-0820							
Battelle ID		H8701-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/31/2020							
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.255							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
			110704 FC D/F)	25.000	0/45/2020	12.00	26.76	122 55	
PFHxA	307-24-4	513.23	H8701-FS-D(5)	25.000	9/15/2020	12.99	36.76	122.55 122.55	
PFHpA	375-85-9	382.41 1	H8701-FS-D(5)	25.000	9/15/2020	6.37	24.51		
PFOA	335-67-1	205.56 🖟	H8701-FS-D(5)	25.000	9/15/2020	12.50	36.76	122.55	
PFNA	375-95-1	26.73	H8701-FS(0)	1.000	9/13/2020	0.30	0.98	4.90	
PFDA	335-76-2	9.43	H8701-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	3.99 J	H8701-FS(0)	1.000	9/13/2020	0.22	0.49	4.90	
PFDoA	307-55-1	1.97 J	H8701-FS(0)	1.000	9/13/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.66 J	H8701-FS(0)	1.000	9/13/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.96 U	H8701-FS(0)	1.000	9/13/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9	0.98 U	H8701-FS(0)	1.000	9/13/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.98 U	H8701-FS(0)	1.000	9/13/2020	0.49	0.98	4.90	
PFBS	375-73-5	17.67	H8701-FS(0)	1.000	9/13/2020	0.14	0.49	4.90	
PFHxS	355-46-4	179.57 🕴 💆	H8701-FS-D(3)	5.000	9/13/2020	0.54	1.96	24.51	MS
PFOS	1763-23-1	135.83 0	H8701-FS-D(3)	5.000	9/13/2020	2.16	4.90	24.51	ms
HFPO-DA	13252-13-6	0.39 J	H8701-FS(0)	1.000	9/13/2020	0.25	0.49	4.90	
Adona	919005-14-4	0.98 U	H8701-FS(0)	1.000	9/13/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.49 U	H8701-FS(0)	1.000	9/13/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1	0.98 U	H8701-FS(0)	1.000	9/13/2020	0.26	0.98	4.90	



Project Name: CTO-4256: PAX Basewide PFAS

756426-58-1

Project No.: 100142032

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Client ID		PX-H2133-SW01-0820							
Battelle ID		H8712-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/31/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	58.40	H8712-FS(0)	1.000	9/13/2020	0.50	1.42	4.72	
PFHpA	375-85-9	46.68	H8712-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	
PFOA	335-67-1	41.19	H8712-FS(0)	1.000	9/13/2020	0.48	1.42	4.72	
PFNA	375-95-1	11.48	H8712-FS(0)	1.000	9/13/2020	0.29	0.94	4.72	
PFDA	335-76-2	3.32 J	H8712-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	0.89 J	H8712-FS(0)	1.000	9/13/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.19 J	H8712-FS(0)	1.000	9/13/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8	0.47 U	H8712-FS(0)	1.000	9/13/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89 YuJ	H8712-FS(0)	1.000	9/13/2020	0.69	1.89	4.72	SSL
NMeFOSAA	2355-31-9	0.94 U	H8712-FS(0)	1.000	9/13/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94 U	H8712-FS(0)	1.000	9/13/2020	0.47	0.94	4.72	
PFBS	375-73-5	4,59 J	H8712-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	
PFHxS	355-46-4	3.96 J	H8712-FS(0)	1.000	9/13/2020	0.10	0.38	4.72	
PFOS	1763-23-1	7.53	H8712-FS(0)	1.000	9/13/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.47 U	H8712-FS(0)	1.000	9/13/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H8712-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H8712-FS(0)	1.000	9/13/2020	0.22	0.47	4.72	
					- 1 1				

0.94 U

H8712-FS(0)

1.000

9/13/2020

0.25

0.94

4.72

9CI-PF3ONS



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2133-SW01-0820

 Battelle ID
 H8712-FS

 Sample Type
 SA

 Collection Date
 08/20/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	67	H8712-FS(0)	9/13/2020	
13C4-PFHpA	84	H8712-FS(0)	9/13/2020	
13C8-PFOA	82	H8712-FS(0)	9/13/2020	
13C9-PFNA	87	H8712-FS(0)	9/13/2020	
13C6-PFDA	72	H8712-FS(0)	9/13/2020	
13C7-PFUnA	70	H8712-FS(0)	9/13/2020	
13C2-PFDoA	57	H8712-FS(0)	9/13/2020	
13C2-PFTeDA	39 №	H8712-FS(0)	9/13/2020	
d3-MeFOSAA	72	H8712-FS(0)	9/13/2020	
d5-EtFOSAA	88	H8712-FS(0)	9/13/2020	
13C3-PFBS	55	H8712-FS(0)	9/13/2020	
13C3-PFHxS	88	H8712-FS(0)	9/13/2020	
13C8-PFOS	69	H8712-FS(0)	9/13/2020	
13C3-HFPO-DA	69	H8712-FS(0)	9/13/2020	





Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2133-SW01P-0820
Battelle ID Sample Type	H8713-FS SA
Collection Date	08/20/2020
Extraction Date	08/31/2020
Analytical Instrument	Sciex 5500 LC/MS/MS

% Moisture NA
Matrix WATER
Sample Size 0.255

Size Unit-Basis Analysis Result (ng/L) Extract ID DF Date DL LOD LOQ CAS No. Analyte 50.39 H8713-FS(0) 1.000 9/13/2020 0.52 1.47 4.90 PFHxA 307-24-4 41.23 1.000 9/13/2020 0.25 0.98 4.90 H8713-FS(0) PFHpA 375-85-9 36.62 H8713-FS(0) 1.000 9/13/2020 0.50 1.47 4.90 PFOA 335-67-1 9.99 H8713-FS(0) 1.000 9/13/2020 0.30 0.98 4.90 **PFNA** 375-95-1 9/13/2020 4.90 PFDA 335-76-2 2.74 J H8713-FS(0) 1.000 0.14 0.49 0.84 J H8713-FS(0) 1.000 9/13/2020 0.22 0.49 4.90 **PFUnA** 2058-94-8 4.90 SSL 0.22 / 3 H8713-FS(0) 1.000 9/13/2020 0.19 0.49 **PFDoA** 307-55-1 0.17 J H8713-FS(0) 1.000 9/13/2020 0.15 0.49 4.90 **PFTrDA** 72629-94-8 1.96 W UJ 1.000 9/13/2020 0.72 1.96 4.90 SSL **PFTeDA** 376-06-7 H8713-FS(0) 0.98 U H8713-FS(0) 1.000 9/13/2020 0.34 0.98 4.90 2355-31-9 **NMeFOSAA** 0.98 U 1.000 9/13/2020 0.49 0.98 4.90 H8713-FS(0) **NEtFOSAA** 2991-50-6 4.90 375-73-5 3.97 J H8713-FS(0) 1.000 9/13/2020 0.14 0.49 PFBS 4.19 J 1.000 9/13/2020 0.11 0.39 4.90 H8713-FS(0) **PFHxS** 355-46-4 4.90 6.56 H8713-FS(0) 1.000 9/13/2020 0.43 0.98 **PFOS** 1763-23-1 0.49 U H8713-FS(0) 1.000 9/13/2020 0.25 0.49 4.90 13252-13-6 HFPO-DA 0.98 U 1.000 9/13/2020 0.26 0.98 4.90 Adona 919005-14-4 H8713-FS(0) 0.49 U 9/13/2020 0.23 0.49 4.90 763051-92-9 H8713-FS(0) 1.000 11CI-PF3OUdS 0.98 U 1.000 9/13/2020 0.26 0.98 4.90 H8713-FS(0) 9CI-PF3ONS 756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID PX-H2133-SW01P-0820

 Battelle ID
 H8713-FS

 Sample Type
 SA

 Collection Date
 08/20/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	58	H8713-FS(0)	9/13/2020	
13C4-PFHpA	72	H8713-FS(0)	9/13/2020	
13C8-PFOA	71	H8713-FS(0)	9/13/2020	
13C9-PFNA	69	H8713-FS(0)	9/13/2020	
13C6-PFDA	60	H8713-FS(0)	9/13/2020	
13C7-PFUnA	55	H8713-FS(0)	9/13/2020	
13C2-PFDoA	43 N	H8713-FS(0)	9/13/2020	
13C2-PFTeDA	27	H8713-FS(0)	9/13/2020	
d3-MeFOSAA	64	H8713-FS(0)	9/13/2020	
d5-EtFOSAA	76	H8713-FS(0)	9/13/2020	
13C3-PFBS	59	H8713-FS(0)	9/13/2020	
13C3-PFHxS	77	H8713-FS(0)	9/13/2020	
13C8-PFOS	64	H8713-FS(0)	9/13/2020	
13C3-HFRO-DA	57	H8713-FS(0)	9/13/2020	



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2133-WT02-0820							
Battelle ID		H8714-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/31/2020							
Analytical Instrumen	t	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.250							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
PFHxA	307-24-4	119.11 💆	H8714-FS-D(3)	5.000	9/15/2020	2.65	7.50	25.00	
PFHpA	375-85-9	43.07	H8714-FS(0)	1.000	9/13/2020	0.26	1.00	5.00	
PFOA	335-67-1	7.94	H8714-FS(0)	1.000	9/13/2020	0.51	1.50	5.00	
PFNA	375-95-1	1.17 J	H8714-FS(0)	1.000	9/13/2020	0.31	1.00	5.00	
PFDA	335-76-2	0.16 J	H8714-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFUnA	2058-94-8	0.50 U	H8714-FS(0)	1.000	9/13/2020	0.22	0.50	5.00	
PFDoA	307-55-1	0.50 U	H8714-FS(0)	1.000	9/13/2020	0.19	0.50	5.00	
PFTrDA	72629-94-8	0.50 U	H8714-FS(0)	1.000	9/13/2020	0.15	0.50	5.00	
PFTeDA	376-06-7	2.00 以 いブ	H8714-FS(0)	1.000	9/13/2020	0.73	2.00	5.00	SSL
NMeFOSAA	2355-31-9	1.00 U	H8714-FS(0)	1.000	9/13/2020	0.35	1.00	5.00	
NEtFOSAA	2991-50-6	1.00 ∪	H8714-FS(0)	1.000	9/13/2020	0.50	1.00	5.00	
PFBS	375-73-5	30.32	H8714-FS(0)	1.000	9/13/2020	0.14	0.50	5.00	
PFHxS	355-46-4	16.24	H8714-FS(0)	1.000	9/13/2020	0.11	0.40	5.00	
PFOS	1763-23-1	6.48	H8714-F5(0)	1.000	9/13/2020	0.44	1.00	5.00	
HFPO-DA	13252-13-6	0.50 U	H8714-FS(0)	1.000	9/13/2020	0.25	0.50	5.00	
Adona	919005-14-4	1.00 U	H8714-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	
11CI-PF3OUdS	763051-92-9	0.50 U	H8714-FS(0)	1.000	9/13/2020	0.23	0.50	5.00	
9CI-PF3ONS	756426-58-1	1.00 U	H8714-FS(0)	1.000	9/13/2020	0.27	1.00	5.00	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2133-WT02-0820

 Battelle ID
 H8714-FS

 Sample Type
 SA

 Collection Date
 08/20/2020

 Extraction Date
 08/31/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	100 🦸	H8714-FS-D(3)	9/15/2020	
13C4-PFHpA	75	H8714-FS(0)	9/13/2020	
13C8-PFOA	74	H8714-FS(0)	9/13/2020	
13C9-PFNA	74	H8714-FS(0)	9/13/2020	
13C6-PFDA	71	H8714-FS(0)	9/13/2020	
13C7-PFUnA	73	H8714-FS(0)	9/13/2020	
13C2-PFDoA	55	H8714-FS(0)	9/13/2020	
13C2-PFTeDA	46 N	H8714-FS(0)	9/13/2020	
d3-MeFOSAA	63 *	H8714-FS(0)	9/13/2020	
d5-EtFOSAA	71	H8714-FS(0)	9/13/2020	
13C3-PFBS	71	H8714-FS(0)	9/13/2020	
13C3-PFHxS	80	H8714-FS(0)	9/13/2020	
13C8-PFOS	71	H8714-FS(0)	9/13/2020	
13C3-HFPO-DA	64	H8714-FS(0)	9/13/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2133-WT06-0820						
Battelle ID		H8720-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/31/2020						
Analytical Instrume	ent	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.265						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	578.25 <b>þ</b>	H8720-FS-D(5)	12.500	9/15/2020	6.25	17.69	58.96
PFHpA	375-85-9	545.81	H8720-FS-D(5)	12.500	9/15/2020	3.07	11.79	58.96
PFOA	335-67-1	187.61 🏚	H8720-FS-D(5)	12.500	9/15/2020	6.01	17.69	58.96
PFNA	375-95-1	68.57	H8720-FS(0)	1.000	9/15/2020	0.29	0.94	4.72
PFDA	335-76-2	30.01	H8720-FS(0)	1.000	9/15/2020	0.13	0.47	4.72
PFUnA	2058-94-8	4.04 J	H8720-FS(0)	1.000	9/15/2020	0.21	0.47	4.72
PFDoA	307-55-1	0.70 J	H8720-FS(0)	1.000	9/15/2020	0.18	0.47	4.72
PFTrDA	72629-94-8	0.47 U	H8720-FS(0)	1.000	9/15/2020	0.14	0.47	4.72
PFTeDA	376-06-7	1.89 U	H8720-FS(0)	1.000	9/15/2020	0.69	1.89	4.72
NMeFOSAA	2355-31-9	0.94 U	H8720-FS(0)	1.000	9/15/2020	0.33	0.94	4.72
NEtFOSAA	2991-50-6	0.94 U	H8720-FS(0)	1.000	9/15/2020	0.47	0.94	4.72
PFBS	375-73-5	3.72 J	H8720-FS(0)	1.000	9/15/2020	0.13	0.47	4.72
PFHxS	355-46-4	4.25 J	H8720-FS(0)	1.000	9/15/2020	0.10	0.38	4.72
PFOS	1763-23-1	12.45	H8720-FS(0)	1.000	9/15/2020	0.42	0.94	4.72
HFPO-DA	13252-13-6	0,53 J	H8720-FS(0)	1.000	9/15/2020	0.24	0.47	4.72
Adona	919005-14-4	0.94 U	H8720-FS(0)	1.000	9/15/2020	0.25	0.94	4.72
11CI-PF3OUdS	763051-92-9	0.47 U	H8720-FS(0)	1.000	9/15/2020	0.22	0.47	4.72
9CI-PF3ONS	756426-58-1	0.94 U	H8720-FS(0)	1.000	9/15/2020	0.25	0.94	4.72

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-WT06P-0820							
Battelle ID		H8721-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/31/2020							
Analytical Instrume	nt	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	_
-									
PFHxA	307-24-4	550.92 <b>p</b>	H8721-FS-D(5)	12.500	9/13/2020	6.25	17.69	58.96	
PFHpA	375-85-9	521.54 <b>p</b>	H8721-FS-D(5)	12.500	9/13/2020	3.07	11.79	58.96	
PFOA	335-67-1	201.81 🛊	H8721-FS-D(5)	12.500	9/13/2020	6.01	17.69	58.96	
PFNA	375-95-1	68.52	H8721-FS(0)	1.000	9/13/2020	0.29	0.94	4.72	
PFDA	335-76-2	29.03	H8721-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	4,22 J	H8721-FS(0)	1.000	9/13/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.64 J	H8721-FS(0)	1.000	9/13/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8	0.47 U	H8721-FS(0)	1.000	9/13/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89 🏏 いづ	H8721-FS(0)	1.000	9/13/2020	0.69	1.89	4.72	SSL
NMeFOSAA	2355-31-9	0.94 U	H8721-FS(0)	1.000	9/13/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94 U	H8721-FS(0)	1.000	9/13/2020	0.47	0.94	4.72	
PFBS	375-73-5	4.00 J	H8721-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	
PFHxS	355-46-4	4.27 J	H8721-FS(0)	1.000	9/13/2020	0.10	0.38	4.72	
PFOS	1763-23-1	12.80	H8721-FS(0)	1.000	9/13/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.48 J	H8721-FS(0)	1.000	9/13/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H8721-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H8721-FS(0)	1.000	9/13/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H8721-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID	PX-H2133-WT06P-0820
Battelle ID	H8721-FS
Sample Type	SA
Collection Date	08/20/2020
Extraction Date	08/31/2020
Analytical Instrument	Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
13C5-PFHxA	86 🖟	H8721-FS-D(5)	9/13/2020	
13C4-PFHpA	91 0	H8721-FS-D(5)	9/13/2020	
13C8-PFOA	83 0	H8721-FS-D(5)	9/13/2020	
13C9-PFNA	89 D	H8721-FS-D(5)	9/13/2020	
13C6-PFDA	82	H8721-FS(0)	9/13/2020	
13C7-PFUnA	86	H8721-FS(0)	9/13/2020	
13C2-PFDoA	73	H8721-FS(0)	9/13/2020	
13C2-PFTeDA	46 N	H8721-FS(0)	9/13/2020	
d3-MeFOSAA	83	H8721-FS(0)	9/13/2020	
d5-EtFOSAA	99	H8721-FS(0)	9/13/2020	
13C3-PFBS	76	H8721-FS(0)	9/13/2020	
13C3-PFHxS	76	H8721-FS(0)	9/13/2020	
13C8-PFOS	75	H8721-FS(0)	9/13/2020	
13C3-HFPO-DA	85 0	H8721-FS-D(5)	9/13/2020	



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0987

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 28, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-H2133-SW02-0820	H8706-FS	Water
1MS	PX-H2133-SW02-0820MS	H8707-FSMS	Water
1MSD	PX-H2133-SW02-0820MSD	H8708-FSMSD	Water
2	PX-H2133-WT05-0820	H8725-FS	Water
3	PX-H2133-EB01-082020-SO	H8726-FS	Water
4	PX-H2133-FB01-082020	H8727-FS	Water
5	PX-H2133-EB01-082020-GW	H8728-FS	Water
6	PX-H2133-WT01-0820	H8729-FS	Water

A Stage 2B/4 data validation was performed on the analytical data for three water samples, two aqueous equipment blank samples, and one aqueous field blank sample collected on August 20, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- · and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## Data Usability Assessment

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Per- and Polyfluoroalkyl Substances (PFAS)

## Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

• All samples were extracted within 14 days for water samples and analyzed within 28 days.

# LC/MS Tuning

• All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## Continuing Calibration

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PB 08/26/20	PFBS	0.16	U	4
	PFHxS	0.18	U	4, 5

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-H2133-EB01-082020-SO	None - ND			
PX-H2133-FB01-082020	None - ND		I see	
PX-H2133-EB01-082020-GW	None - ND			-

## Surrogate Spike Recoveries

• All samples exhibited acceptable surrogate percent recoveries (%R),

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

## Internal Standard (IS) Area Performance

All internal standards met response and retention time (RT) criteria.

## **Target Compound Identification**

All mass spectra and quantitation criteria were met.

## Compound Quantitation

The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

## Field Duplicate Sample Precision

Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

<u>llaoy Weaver</u> Dated: <u>10131120</u>

Senior Chemist

Qualifier	Definition
Ŭ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SW02-0820							
Battelle ID		H8706-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/26/2020							
Analytical Instrument	t	Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	40.74	H8706-FS(0)	1.000	9/12/2020	0.50	1.42	4.72	
PFHpA	375-85-9	30.24	H8706-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
PFOA	335-67-1	25.45	H8706-FS(0)	1.000	9/12/2020	0.48	1.42	4.72	
PFNA	375-95-1	10.22	H8706-FS(0)	1.000	9/12/2020	0.29	0.94	4.72	
PFDA	335-76-2	4.11 J	H8706-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	
PFUnA	2058-94-8	1.89 J	H8706-FS(0)	1.000	9/12/2020	0.21	0.47	4.72	
PFDoA	307-55-1	0.75 J	H8706-FS(0)	1.000	9/12/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8	0.16 J	H8706-FS(0)	1.000	9/12/2020	0.14	0.47	4.72	
PFTeDA	376-06-7	1.89 U	H8706-FS(0)	1.000	9/12/2020	0.69	1.89	4.72	
NMeFOSAA	2355-31-9	0.94 U	H8706-FS(0)	1.000	9/12/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6	0.94 U	H8706-FS(0)	1.000	9/12/2020	0.47	0.94	4.72	
PFBS	375-73-5	2.77 J	H8706-FS(0)	1.000	9/12/2020	0.13	0.47	4.72	
PFHxS	355-46-4	3.69 J	H8706-FS(0)	1.000	9/12/2020	0.10	0.38	4.72	
PFOS	1763-23-1	10.20	H8706-FS(0)	1.000	9/12/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6	0.47 U	H8706-FS(0)	1.000	9/12/2020	0.24	0.47	4.72	
Adona	919005-14-4	0.94 U	H8706-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9	0.47 U	H8706-FS(0)	1.000	9/12/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1	0.94 U	H8706-FS(0)	1.000	9/12/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2133-WT05-0820						
Battelle ID		H8725-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/26/2020						
Analytical Instrument	t	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.265						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1438.38 🏚	H8725-FS-D(5)	25.000	9/13/2020	12.50	35.38	117.92
PFHpA	375-85-9	601.50	H8725-FS-D(5)	25.000	9/13/2020	6.13	23.58	117.92
PFOA	335-67-1	1138.18	H8725-FS-D(5)	25.000	9/13/2020	12.03	35.38	117.92
PFNA	375-95-1	36.89	H8725-FS(0)	1.000	9/13/2020	0.29	0.94	4.72
PFDA	335-76-2	11.41	H8725-FS(0)	1.000	9/13/2020	0.13	0.47	4.72
PFUnA	2058-94-8	0.40 J	H8725-FS(0)	1.000	9/13/2020	0.21	0.47	4.72
PFDoA	307-55-1	0.47 U	H8725-FS(0)	1.000	9/13/2020	0.18	0.47	4.72
PFTrDA	72629-94-8	0.47 U	H8725-FS(0)	1.000	9/13/2020	0.14	0.47	4.72
PFTeDA	376-06-7	1.89 U	H8725-FS(0)	1.000	9/13/2020	0.69	1.89	4.72
NMeFOSAA	2355-31-9	0.94 U	H8725-FS(0)	1.000	9/13/2020	0.33	0.94	4.72
NEtFOSAA	2991-50-6	0.94 U	H8725-FS(0)	1.000	9/13/2020	0.47	0.94	4.72
PFBS	375-73-5	60.80	H8725-FS(0)	1.000	9/13/2020	0.13	0.47	4.72
PFHxS	355-46-4	294.39	H8725-FS-D(3)	5.000	9/13/2020	0.52	1.89	23.58
PFOS	1763-23-1	29.44	H8725-FS(0)	1.000	9/13/2020	0.42	0.94	4.72
HFPO-DA	13252-13-6	0.34 J	H8725-FS(0)	1.000	9/13/2020	0.24	0.47	4.72
Adona	919005-14-4	0.94 U	H8725-FS(0)	1.000	9/13/2020	0.25	0.94	4.72
11CI-PF3OUdS	763051-92-9	0.47 U	H8725-FS(0)	1.000	9/13/2020	0.22	0.47	4.72
9CI-PF3ONS	756426-58-1	0.94 U	H8725-FS(0)	1.000	9/13/2020	0.25	0.94	4.72



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2133-EB01-082020-SO						
Battelle ID		H8726-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/26/2020						
Analytical Instrument		Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.265						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.42 U	H8726-FS(0)	1.000	9/15/2020	0.50	1.42	4.72
PFHpA	375-85-9	0.94 U	H8726-FS(0)	1.000	9/15/2020	0.25	0.94	4.72
PFOA	335-67-1	1.42 U	H8726-FS(0)	1.000	9/15/2020	0.48	1.42	4.72
PFNA	375-95-1	0.94 U	H8726-FS(0)	1.000	9/15/2020	0.29	0.94	4.72
PFDA	335-76-2	0.47 U	H8726-FS(0)	1.000	9/15/2020	0.13	0.47	4.72
PFUnA	2058-94-8	0.47 U	H8726-FS(0)	1.000	9/15/2020	0.21	0.47	4.72
PFDoA	307-55-1	0.47 U	H8726-FS(0)	1.000	9/15/2020	0.18	0.47	4.72
PFTrDA	72629-94-8	0.47 U	H8726-FS(0)	1.000	9/15/2020	0.14	0.47	4.72
PFTeDA	376-06-7	1.89 U	H8726-FS(0)	1.000	9/15/2020	0.69	1.89	4.72

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**NMeFOSAA** 

**NEtFOSAA** 

PFBS

**PFHxS** 

**PFOS** 

HFPO-DA

11CI-PF3OUdS

9CI-PF3ONS

Adona

2355-31-9

2991-50-6

**375-73-5 355-46-4** 

1763-23-1

13252-13-6

919005-14-4

763051-92-9

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2133-FB01-0	82020							
Battelle ID		Н8:	727-FS							
Sample Type			SA							
Collection Date		08/20	/2020							
Extraction Date		08/26	6/2020							
Analytical Instrume	ent	Sciex 5500 LC/MS/MS								
% Moisture		NA								
Matrix		WATER								
Sample Size			0.265							
Size Unit-Basis			L			Analysis				
Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4		1.42 U	H8727-FS(0)	1.000	9/13/2020	0.50	1.42	4.72	
PFHpA	375-85-9		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	
PFOA	335-67-1		1.42 U	H8727-FS(0)	1.000	9/13/2020	0.48	1.42	4.72	
PFNA	375-95-1		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.29	0.94	4.72	
PFDA	335-76-2		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	
PFUnA	2058-94-8		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.21	0.47	4.72	
PFDoA	307-55-1		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.18	0.47	4.72	
PFTrDA	72629-94-8		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.14	0.47	4.72	
PFTeDA	376-06-7		1.89 U	H8727-FS(0)	1.000	9/13/2020	0.69	1.89	4.72	
NMeFOSAA	2355-31-9		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.33	0.94	4.72	
NEtFOSAA	2991-50-6		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.47	0.94	4.72	
PFBS	375-73-5	0.47	0.19 y U	H8727-FS(0)	1.000	9/13/2020	0.13	0.47	4.72	MBL
PFHxS	355-46-4	0.38	0.16 J U	H8727-FS(0)	1.000	9/13/2020	0.10	0.38	4.72	MBL
PFOS	1763-23-1		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.42	0.94	4.72	
HFPO-DA	13252-13-6		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.24	0.47	4.72	
Adona	919005-14-4		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	
11CI-PF3OUdS	763051-92-9		0.47 U	H8727-FS(0)	1.000	9/13/2020	0.22	0.47	4.72	
9CI-PF3ONS	756426-58-1		0.94 U	H8727-FS(0)	1.000	9/13/2020	0.25	0.94	4.72	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

5

Client ID		PX-H2133-EB01-08202	0-GW							
Battelle ID		Н87	728-FS							
Sample Type			SA							
Collection Date		08/20	/2020							
Extraction Date		08/26	/2020							
Analytical Instrument		Sciex 5500 LC/N	15/MS							
% Moisture			NA							
Matrix		WATER								
Sample Size			0.260							
Size Unit-Basis		t				Analysis				
Analyte	CAS No.	Result	(ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
0511.4	207.24.4		1.44 U	H8728-FS(0)	1.000	9/13/2020	0.51	1.44	4.81	
PFHxA	307-24-4		0.96 U	H8728-FS(0)	1.000	9/13/2020	0.25	0.96	4.81	
PFHpA	375-85-9		1.44 U	H8728-FS(0)	1.000	9/13/2020	0.49	1.44	4.81	
PFOA	335-67-1		0.96 U	H8728-FS(0)	1.000	9/13/2020	0.30	0.96	4.81	
PFNA	375-95-1		0.48 U		1.000	9/13/2020	0.13	0.48	4.81	
PFDA	335-76-2		0.48 U	H8728-FS(0) H8728-FS(0)	1.000	9/13/2020	0.13	0.48	4.81	
PFUnA	2058-94-8		0.48 U	H8728-FS(0)	1.000	9/13/2020	0.18	0.48	4.81	
PFDoA	307-55-1				1.000	9/13/2020	0.14	0.48	4.81	
PFTrDA	72629-94-8		0.48 U 1.92 U	H8728-FS(0) H8728-FS(0)	1.000	9/13/2020	0.70	1.92	4.81	
PFTeDA	376-06-7		0.96 U		1.000	9/13/2020	0.34	0.96	4.81	
NMeFOSAA	2355-31-9		0.96 U	H8728-FS(0) H8728-FS(0)	1.000	9/13/2020	0.48	0.96	4.81	
NEtFOSAA	2991-50-6				1.000	9/13/2020	0.48	0.48	4.81	
PFBS	375-73-5		0.48 U	H8728-FS(0)		9/13/2020	0.13	0.38	4.81	MBL
PFHxS	355-46-4	0,36	0.16 J U	H8728-FS(0)	1.000		0.42	0.96	4.81	7662
PFOS	1763-23-1		0.96 U	H8728-FS(0)	1.000	9/13/2020		0.48	4.81	
HFPO-DA	13252-13-6		0.48 U	H8728-FS(0)	1.000	9/13/2020	0.24	0.48	4.81	
Adona	919005-14-4		0.96 U	H8728-FS(0)	1.000	9/13/2020	0.26		4.81	
11CI-PF3OUdS	763051-92-9		0.48 U	H8728-FS(0)	1.000	9/13/2020	0.22	0.48		
9CI-PF3ONS	756426-58-1		0.96 U	H8728-FS(0)	1.000	9/13/2020	0.26	0.96	4.81	

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS



Client ID		PX-H2133-WT01-0820						
Battelle ID		H8729-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/26/2020						
Analytical Instrumen	t	Sciex 5500 LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.265						
Size Unit-Basis		L			Analysis			
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	110.51 🏚	H8729-FS-D(3)	5.000	9/15/2020	2.50	7.08	23.58
PFHpA	375-85-9	68.46	H8729-FS(0)	1.000	9/13/2020	0.25	0.94	4.72
PFOA	335-67-1	36.58	H8729-FS(0)	1.000	9/13/2020	0.48	1.42	4.72
PFNA	375-95-1	9.12	H8729-FS(0)	1.000	9/13/2020	0.29	0.94	4.72
PFDA	335-76-2	1.35 J	H8729-FS(0)	1.000	9/13/2020	0.13	0.47	4.72
PFUnA	2058-94-8	0.22 J	H8729-FS(0)	1.000	9/13/2020	0.21	0.47	4.72
PFDoA	307-55-1	0.47 U	H8729-FS(0)	1.000	9/13/2020	0.18	0.47	4.72
PFTrDA	72629-94-8	0.47 U	H8729-FS(0)	1.000	9/13/2020	0.14	0.47	4.72
PFTeDA	376-06-7	1.89 U	H8729-FS(0)	1.000	9/13/2020	0.69	1.89	4.72
NMeFOSAA	2355-31-9	0.94 U	H8729-FS(0)	1.000	9/13/2020	0.33	0.94	4.72
NEtFOSAA	2991-50-6	0.94 U	H8729-FS(0)	1.000	9/13/2020	0.47	0.94	4.72
PFBS	375-73-5	6.07	H8729-FS(0)	1.000	9/13/2020	0.13	0.47	4.72
PFHxS	355-46-4	3.32 J	H8729-FS(0)	1.000	9/13/2020	0.10	0.38	4.72
PFOS	1763-23-1	10.11	H8729-FS(0)	1.000	9/13/2020	0.42	0.94	4.72
HFPO-DA	13252-13-6	0.37 J	H8729-FS(0)	1.000	9/13/2020	0.24	0.47	4.72
Adona	919005-14-4	0.94 U	H8729-FS(0)	1.000	9/13/2020	0.25	0.94	4.72
11CI-PF3OUdS	763051-92-9	0.47 U	H8729-FS(0)	1.000	9/13/2020	0.22	0.47	4.72
9CI-PF3ONS	756426-58-1	0.94 U	H8729-FS(0)	1.000	9/13/2020	0.25	0.94	4.72



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0989

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 28, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-S41-SB27-0304	H8682-FS	Soil
2	PX-S41-SS25-000H	H8688-FS	Soil
3	PX-S41-SB25-0304	H8689-FS	Soil
4	PX-S41-SB25P-0304	H8690-FS	Soil
5	PX-H2133-SS03-000H	H8692-FS	Soil
5MS	PX-H2133-SS03-000HMS	H8693-FSMS	Soil
5MSD	PX-H2133-SS03-000HMSD	H8694-FSMSD	Soil
6	PX-H2133-SB03-0304	H8695-FS	Soil
7	PX-H2133-SS04-000H	H8696-FS	Soil
8	PX-H2133-SB04-0304	H8697-FS	Soil
9	PX-H2133-SS02-000H	H8699-FS	Soil
10	PX-H2133-SB02-0304	H8700-FS	Soil

A Stage 2B/4 data validation was performed on the analytical data for ten soil samples collected on August 19-20, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Per- and Polyfluoroalkyl Substances (PFAS)

## Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

## **Holding Times**

• All samples were extracted within 14 days for soil samples and analyzed within 28 days.

## LC/MS Tuning

All criteria were met.

## **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## **Continuing Calibration**

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks were free of contamination.

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-S41-FB01-081920	None - ND		# #	*
PX-S41-EB01-081920-SO	PFOS	3.51	U	2
PX-H2133-EB01-082020-SO	None - ND	:-:	#	<u></u>
PX-H2133-FB01-082020-SO	None - ND	1=1	*	

## Surrogate Spike Recoveries

• All samples exhibited acceptable surrogate percent recoveries (%R).

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

# Internal Standard (IS) Area Performance

All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

All mass spectra and quantitation criteria were met.

# Compound Quantitation

All criteria were met.

# Field Duplicate Sample Precision

Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-S41-SB25-0304 ng/g	PX-S41-SB25P-0304 ng/g	RPD	Qualifier
None	ND	ND	Lagran B	~

Dated: 10/31/20

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Senior Chemist

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J=	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-SB27-0304						
Battelle ID		H8682-FS						
Sample Type		SA						
Collection Date		08/19/2020						
Extraction Date		08/27/2020						
Analytical Instrume	nt	Sciex 6500+ LC/MS/MS						
% Moisture		7.11						
Matrix		SOIL						
Sample Size		1.94						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.73	2.06	5.15
PFHpA	375-85-9	1.55 U	H8682-FS(3)	10.000	9/10/2020	0.53	1.55	5.15
PFOA	335-67-1	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.63	2.06	5.15
PFNA	375-95-1	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.51	1.03	5.15
PFDA	335-76-2	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.47	1.03	5.15
PFUnA	2058-94-8	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.47	1.03	5.15
PFDoA	307-55-1	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.63	2.06	5.15
PFTrDA	72629-94-8	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.29	1.03	5.15
PFTeDA	376-06-7	2.58 U	H8682-FS(3)	10.000	9/10/2020	1.11	2.58	5.15
NMeFOSAA	2355-31-9	2.58 U	H8682-FS(3)	10.000	9/10/2020	1.05	2.58	5.15
NEtFOSAA	2991-50-6	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.77	2.06	5.15
PFBS	375-73-5	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.36	1.03	5.15
PFHxS	355-46-4	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.84	2.06	5.15
PFOS	1763-23-1	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.71	2.06	5.15
HFPO-DA	13252-13-6	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.66	2.06	5.15
Adona	919005-14-4	2.06 U	H8682-FS(3)	10.000	9/10/2020	0.86	2.06	5.15
11CI-PF3OUdS	763051-92-9	1.55 U	H8682-FS(3)	10.000	9/10/2020	0.54	1.55	5.15
9CI-PF3ONS	756426-58-1	1.03 U	H8682-FS(3)	10.000	9/10/2020	0.49	1.03	5.15



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-S41-SS25-000H							
Battelle ID		H8688-FS							
Sample Type		SA							
Collection Date		08/19/2020							
Extraction Date		08/27/2020							
Analytical Instrumer	nt	Sciex 6500+ LC/MS/MS							
% Moisture		4.98							
Matrix		SOIL							
Sample Size		1.95							
Size Unit-Basis		g			Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	_
	207.24	3.05.11	110,000,55(2)	10.000	0/10/2020	0.73	2.05	5.13	
PFHxA	307-24-4	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.73	2.05		
PFHpA	375-85-9	1.54 U	H8688-FS(3)	10.000	9/10/2020	0.52	1.54	5.13	
PFOA	335-67-1	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.63	2.05	5.13	
PFNA	375-95-1	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.50	1.03	5.13	
PFDA	335-76-2	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.47	1.03	5.13	
PFUnA	2058-94-8	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.47	1.03	5.13	
PFDoA	307-55-1	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.63	2.05	5.13	
PFTrDA	72629-94-8	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.29	1.03	5.13	
PFTeDA	376-06-7	2.56 U	H8688-FS(3)	10.000	9/10/2020	1.11	2.56	5.13	
NMeFOSAA	2355-31-9	2.56 U	H8688-FS(3)	10.000	9/10/2020	1.05	2.56	5.13	
NEtFOSAA	2991-50-6	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.77	2.05	5.13	
PFBS	375-73-5	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.36	1.03	5.13	
PFHxS	355-46-4	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.83	2.05	5.13	
PFOS	1763-23-1	2.53	H8688-FS(3)	10.000	9/10/2020	0.71	2.05	5.13	EB
HFPO-DA	13252-13-6	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.66	2.05	5.13	
Adona	919005-14-4	2.05 U	H8688-FS(3)	10.000	9/10/2020	0.85	2.05	5.13	
11CI-PF3OUdS	763051-92-9	1.54 U	H8688-FS(3)	10.000	9/10/2020	0.53	1.54	5.13	
9CI-PF3ONS	756426-58-1	1.03 U	H8688-FS(3)	10.000	9/10/2020	0.49	1.03	5.13	



Project Name: CTO-4256: PAX Basewide PFAS

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			4

Client ID		PX-S41-SB25-0304						
Battelle ID		H8689-FS						
Sample Type		SA						
Collection Date		08/19/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		3.49						
Matrix		SOIL						
Sample Size		1.87						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.76	2.14	5.35
PFHpA	375-85-9	1.60 U	H8689-FS(3)	10.000	9/10/2020	0.55	1.60	5.35
PFOA	335-67-1	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.65	2.14	5.35
PFNA	375-95-1	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.52	1.07	5.35
PFDA	335-76-2	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.49	1.07	5.35
PFUnA	2058-94-8	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.49	1.07	5.35
PFDoA	307-55-1	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.65	2.14	5.35
PFTrDA	72629-94-8	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.30	1.07	5.35
PFTeDA	376-06-7	2.67 U	H8689-FS(3)	10.000	9/10/2020	1.16	2.67	5.35
NMeFOSAA	2355-31-9	2.67 U	H8689-FS(3)	10.000	9/10/2020	1.09	2.67	5.35
NEtFOSAA	2991-50-6	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.80	2.14	5.35
PFBS	375-73-5	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.37	1.07	5.35
PFHxS	355-46-4	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.87	2.14	5.35
PFOS	1763-23-1	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.74	2.14	5.35
HFPO-DA	13252-13-6	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.68	2.14	5.35
Adona	919005-14-4	2.14 U	H8689-FS(3)	10.000	9/10/2020	0.89	2.14	5.35
11CI-PF3OUdS	763051-92-9	1.60 U	H8689-FS(3)	10.000	9/10/2020	0.56	1.60	5.35
9CI-PF3ONS	756426-58-1	1.07 U	H8689-FS(3)	10.000	9/10/2020	0.51	1.07	5.35



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

4

Client ID		PX-S41-SB25P-0304						
Battelle ID		H8690-FS						
Sample Type		SA						
Collection Date		08/19/2020						
Extraction Date		08/27/2020						
Analytical Instrumer	nt	Sciex 6500+ LC/MS/MS						
% Moisture		4.97						
Matrix		SOIL						
Sample Size		1.94						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.73	2.06	5.15
PFHpA	375-85-9	1.55 U	H8690-FS(3)	10.000	9/10/2020	0.53	1.55	5.15
PFOA	335-67-1	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.63	2.06	5.15
PFNA	375-95-1	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.51	1.03	5.15
PFDA	335-76-2	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.47	1.03	5.15
PFUnA	2058-94-8	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.47	1.03	5.15
PFDoA	307-55-1	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.63	2.06	5.15
PFTrDA	72629-94-8	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.29	1.03	5.15
PFTeDA	376-06-7	2.58 U	H8690-FS(3)	10.000	9/10/2020	1.11	2.58	5.15
NMeFOSAA	2355-31-9	2.58 U	H8690-FS(3)	10.000	9/10/2020	1.05	2.58	5.15
NEtFOSAA	2991-50-6	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.77	2.06	5.15
PFBS	375-73-5	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.36	1.03	5.15
PFHxS	355-46-4	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.84	2.06	5.15
PFOS	1763-23-1	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.71	2.06	5.15
HFPO-DA	13252-13-6	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.66	2.06	5.15
Adona	919005-14-4	2.06 U	H8690-FS(3)	10.000	9/10/2020	0.86	2.06	5.15
11CI-PF3OUdS	763051-92-9	1.55 U	H8690-FS(3)	10.000	9/10/2020	0.54	1.55	5.15
9CI-PF3ONS	756426-58-1	1.03 U	H8690-FS(3)	10.000	9/10/2020	0.49	1.03	5.15



Project Name: CTO-4256: PAX Basewide PFAS

Client ID	PX-H2133-SS03-000H
Rattelle ID	H8692-FS

Battelle ID	H8092-F3
Sample Type	SA
Collection Date	08/20/2020
Extraction Date	08/27/2020
Analytical Instrument	Sciex 6500+ LC/MS/MS
% Moisture	18,20
Matrix	SOIL
Sample Size	1.76
Size Unit-Basis	g

Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.81	2.27	5.68
PFHpA	375-85-9	1.70 U	H8692-FS(3)	10.000	9/10/2020	0.58	1.70	5.68
PFOA	335-67-1	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.69	2.27	5.68
PFNA	375-95-1	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.56	1.14	5.68
PFDA	335-76-2	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.52	1.14	5.68
PFUnA	2058-94-8	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.52	1.14	5.68
PFDoA	307-55-1	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.69	2.27	5.68
PFTrDA	72629-94-8	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.32	1.14	5.68
PFTeDA	376-06-7	2.84 U	H8692-FS(3)	10.000	9/10/2020	1.23	2.84	5.68
NMeFOSAA	2355-31-9	2.84 U	H8692-FS(3)	10.000	9/10/2020	1.16	2.84	5.68
NEtFOSAA	2991-50-6	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.85	2.27	5.68
PFBS	375-73-5	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.40	1.14	5.68
PFHxS	355-46-4	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.92	2.27	5.68
PFOS	1763-23-1	1.59 J	H8692-FS(3)	10.000	9/10/2020	0.78	2.27	5.68
HFPO-DA	13252-13-6	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.73	2.27	5.68
Adona	919005-14-4	2.27 U	H8692-FS(3)	10.000	9/10/2020	0.94	2.27	5.68
11CI-PF3OUdS	763051-92-9	1.70 U	H8692-FS(3)	10.000	9/10/2020	0.59	1.70	5.68
9CI-PF3ONS	756426-58-1	1.14 U	H8692-FS(3)	10.000	9/10/2020	0.55	1.14	5.68



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2133-SB03-0304						
Battelle ID		H8695-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		12.01						
Matrix		SOIL						
Sample Size		1.88						
Size Unit-Basis		В			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.76	2.13	5.32
PFHpA	375-85-9	1.60 U	H8695-FS(3)	10.000	9/10/2020	0.54	1.60	5.32
PFOA	335-67-1	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.65	2,13	5.32
PFNA	375-95-1	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.52	1.06	5.32
PFDA	335-76-2	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.49	1.06	5.32
PFUnA	2058-94-8	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.49	1.06	5.32
PFDoA	307-55-1	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.65	2.13	5.32
PFTrDA	72629-94-8	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.30	1.06	5.32
PFTeDA	376-06-7	2.66 U	H8695-FS(3)	10.000	9/10/2020	1.15	2.66	5.32
NMeFOSAA	2355-31-9	2.66 U	H8695-FS(3)	10.000	9/10/2020	1.09	2.66	5.32
NEtFOSAA	2991-50-6	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.80	2.13	5.32
PFBS	375-73-5	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.37	1.06	5.32
PFHxS	355-46-4	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.86	2.13	5.32
PFOS	1763-23-1	2.13 U	H8695-F5(3)	10.000	9/10/2020	0.73	2.13	5.32
HFPO-DA	13252-13-6	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.68	2.13	5.32
Adona	919005-14-4	2.13 U	H8695-FS(3)	10.000	9/10/2020	0.88	2.13	5.32
11CI-PF3OUdS	763051-92-9	1.60 U	H8695-FS(3)	10.000	9/10/2020	0.55	1.60	5.32
9CI-PF3ONS	756426-58-1	1.06 U	H8695-FS(3)	10.000	9/10/2020	0.51	1.06	5.32



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SS04-000H						
Battelle ID		H8696-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		14.89						
Matrix		SOIL						
Sample Size		1.70						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.93 J	H8696-FS(3)	10.000	9/10/2020	0.84	2.35	5.88
PFHpA	375-85-9	1.76 U	H8696-FS(3)	10.000	9/10/2020	0.60	1.76	5.88
PFOA	335-67-1	2.04 J	H8696-FS(3)	10.000	9/10/2020	0.72	2.35	5.88
PFNA	375-95-1	0.99 J	H8696-FS(3)	10.000	9/10/2020	0.58	1.18	5.88
PFDA	335-76-2	1.08 J	H8696-FS(3)	10.000	9/10/2020	0.54	1.18	5.88
PFUnA	2058-94-8	0.74 J	H8696-FS(3)	10.000	9/10/2020	0.54	1.18	5.88
PFDoA	307-55-1	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.72	2.35	5.88
PFTrDA	72629-94-8	1.18 U	H8696-FS(3)	10.000	9/10/2020	0.33	1.18	5.88
PFTeDA	376-06-7	2.94 U	H8696-FS(3)	10.000	9/10/2020	1.27	2.94	5.88
NMeFOSAA	2355-31-9	2,94 U	H8696-FS(3)	10.000	9/10/2020	1.20	2.94	5.88
NEtFOSAA	2991-50-6	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.88	2.35	5.88
PFBS	375-73-5	1.18 U	H8696-FS(3)	10.000	9/10/2020	0.41	1.18	5.88
PFHxS	355-46-4	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.95	2.35	5.88
PFOS	1763-23-1	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.81	2.35	5.88
HFPO-DA	13252-13-6	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.75	2.35	5.88
Adona	919005-14-4	2.35 U	H8696-FS(3)	10.000	9/10/2020	0.98	2.35	5.88
11CI-PF3OUdS	763051-92-9	1.76 U	H8696-FS(3)	10.000	9/10/2020	0.61	1.76	5.88
9CI-PF3ONS	756426-58-1	1.18 U	H8696-FS(3)	10.000	9/10/2020	0.56	1.18	5.88



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2133-SB04-0304						
Battelle ID		H8697-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		16.22						
Matrix		SOIL						
Sample Size		1.73						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.82	2.31	5.78
PFHpA	375-85-9	1.73 U	H8697-FS(3)	10.000	9/10/2020	0.59	1.73	5.78
PFOA	335-67-1	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.71	2.31	5.78
PFNA	375-95-1	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.57	1.16	5.78
PFDA	335-76-2	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.53	1.16	5.78
PFUnA	2058-94-8	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.53	1.16	5.78
PFDoA	307-55-1	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.71	2.31	5.78
PFTrDA	72629-94-8	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.32	1.16	5.78
PFTeDA	376-06-7	2.89 U	H8697-FS(3)	10.000	9/10/2020	1.25	2.89	5.78
NMeFOSAA	2355-31-9	2.89 U	H8697-FS(3)	10.000	9/10/2020	1.18	2.89	5.78
NEtFOSAA	2991-50-6	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.87	2.31	5.78
PFBS	375-73-5	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.40	1.16	5.78
PFHxS	355-46-4	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.94	2.31	5.78
PFOS	1763-23-1	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.80	2.31	5.78
HFPO-DA	13252-13-6	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.74	2.31	5.78
Adona	919005-14-4	2.31 U	H8697-FS(3)	10.000	9/10/2020	0.96	2.31	5.78
11CI-PF3OUdS	763051-92-9	1.73 U	H8697-FS(3)	10.000	9/10/2020	0.60	1.73	5.78
9CI-PF3ONS	756426-58-1	1.16 U	H8697-FS(3)	10.000	9/10/2020	0.55	1.16	5.78

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Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2133-SS02-000H

H8699-FS Battelle ID Sample Type SA 08/20/2020 **Collection Date** 08/27/2020 **Extraction Date** Sciex 6500+ LC/MS/MS Analytical Instrument % Moisture 16.70 SOIL Matrix Sample Size 1.67

Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	1.22 J	H8699-FS(3)	10.000	9/10/2020	0.85	2.40	5.99
PFHpA	375-85-9	1.09 J	H8699-FS(3)	10.000	9/10/2020	0.61	1.80	5.99
PFOA	335-67-1	2.66 J	H8699-FS(3)	10.000	9/10/2020	0.73	2.40	5.99
PFNA	375-95-1	2.20 J	H8699-FS(3)	10.000	9/10/2020	0.59	1.20	5.99
PFDA	335-76-2	0.85 J	H8699-FS(3)	10.000	9/10/2020	0.55	1.20	5.99
PFUnA	2058-94-8	1.20 U	H8699-FS(3)	10.000	9/10/2020	0.55	1.20	5.99
PFDoA	307-55-1	2.40 U	H8699-FS(3)	10.000	9/10/2020	0.73	2.40	5.99
PFTrDA	72629-94-8	1.20 U	H8699-FS(3)	10.000	9/10/2020	0.34	1.20	5.99
PFTeDA	376-06-7	2.99 U	H8699-FS(3)	10.000	9/10/2020	1.29	2.99	5.99
NMeFOSAA	2355-31-9	2.99 U	H8699-FS(3)	10.000	9/10/2020	1.22	2.99	5.99
NEtFOSAA	2991-50-6	2.40 U	H8699-FS(3)	10.000	9/10/2020	0.90	2.40	5.99
PFBS	375-73-5	1.20 U	H8699-FS(3)	10.000	9/10/2020	0.42	1.20	5.99
PFHxS	355-46-4	2.16 J	H8699-FS(3)	10.000	9/10/2020	0.97	2.40	5.99
PFOS	1763-23-1	14.85	H8699-FS(3)	10.000	9/10/2020	0.83	2.40	5.99
HFPO-DA	13252-13-6	2.40 U	H8699-FS(3)	10.000	9/10/2020	0.77	2.40	5.99
Adona	919005-14-4	2.40 U	H8699-FS(3)	10.000	9/10/2020	0.99	2.40	5.99
11CI-PF3OUdS	763051-92-9	1.80 U	H8699-FS(3)	10.000	9/10/2020	0.62	1.80	5.99
9CI-PF3ONS	756426-58-1	1.20 U	H8699-FS(3)	10.000	9/10/2020	0.57	1.20	5.99



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2133-SB02-0304						
Battelle ID		H8700-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		13.68						
Matrix		SOIL						
Sample Size		1.78						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.80	2.25	5.62
PFHpA	375-85-9	0.78 J	H8700-FS(3)	10.000	9/10/2020	0.57	1.69	5.62
PFOA	335-67-1	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.69	2.25	5.62
PFNA	375-95-1	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.55	1.12	5.62
PFDA	335-76-2	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.52	1.12	5.62
PFUnA	2058-94-8	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.52	1.12	5.62
PFDoA	307-55-1	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.69	2.25	5.62
PFTrDA	72629-94-8	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.31	1.12	5.62
PFTeDA	376-06-7	2.81 U	H8700-FS(3)	10.000	9/10/2020	1.21	2.81	5.62
NMeFOSAA	2355-31-9	2.81 U	H8700-FS(3)	10.000	9/10/2020	1.15	2.81	5.62
NEtFOSAA	2991-50-6	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.84	2.25	5.62
PFBS	375-73-5	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.39	1.12	5.62
PFHxS	355-46-4	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.91	2.25	5.62
PFOS	1763-23-1	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.78	2.25	5.62
HFPO-DA	13252-13-6	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.72	2.25	5.62
Adona	919005-14-4	2.25 U	H8700-FS(3)	10.000	9/10/2020	0.93	2.25	5.62
11CI-PF3OUdS	763051-92-9	1.69 U	H8700-FS(3)	10.000	9/10/2020	0.58	1.69	5.62
9CI-PF3ONS	756426-58-1	1.12 U	H8700-FS(3)	10.000	9/10/2020	0.54	1.12	5.62

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# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client: CH2M HILL, Inc., Gainesville, Florida

SDG: 20-0990

Laboratory: Battelle Norwell Operations, Norwell, Massachusetts

Site: NAS Patuxent River, CTO-JU14, Maryland

Date: October 28, 2020

		PFAS		
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix	
1	PX-H2133-SD02-000H	H8704-FS	Sediment	
2	PX-H2133-SD02P-000H	H8705-FS	Sediment	
3	PX-H2133-SD01-000H	H8709-FS	Sediment	
3MS	PX-H2133-SD01-000HMS	H8710-FSMS	Sediment	
3MSD	PX-H2133-SD01-000HMSD	H8711-FSMSD	Sediment	
4	PX-H2133-SS06-000H	H8715-FS	Soil	
5	PX-H2133-SB06-0304	H8716-FS	Soil	
6	PX-H2133-SS05-000H	H8717-FS	Soil	
7	PX-H2133-SS05P-000H	H8718-FS	Soil	
8	PX-H2133-SB05-0304	H8719-FS	Soil	
9	PX-H2133-SS01-000H	H8722-FS	Soil	
10	PX-H2133-SB01-0304	H8723-FS	Soil	
11	PX-H2133-SB01P-0304	H8724-FS	Soil	

A Stage 2B/4 data validation was performed on the analytical data for three sediment samples and eight soil samples collected on August 20, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis Method References
PFAS Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes. There were no qualifications.

#### Per- and Polyfluoroalkyl Substances (PFAS)

#### Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

All samples were extracted within 14 days for soil samples and analyzed within 28 days.

## LC/MS Tuning

• All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## Continuing Calibration

• All percent recovery (%R) criteria were met.

#### **Method Blank**

• The method blanks were free of contamination.

#### Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-H2133-FB01-082020	None - ND			
PX-H2133-EB01-082020-SO	None - ND			

## Surrogate Spike Recoveries

All samples exhibited acceptable surrogate percent recoveries (%R).

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

All criteria were met.

# Field Duplicate Sample Precision

Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-H2133-SD02-000H ng/g	PX-H2133-SD02P-000H ng/g	RPD	Qualifier
PFNA	2.30U	4.80	NC	None
PFDA	2.30U	4.37	NC	
PFUnA	1.56	5.93	117%	None - <5X LOQ
PFOS	2.48	8.14	107%	

Compound	PX-H2133-SS05-000H ng/g	PX-H2133-SS05P-000H ng/g	RPD	Qualifier
PFHxA	2.34U	0.90	NC	None
PFHpA	0.71	0.84	17%	
PFOA	0.87	1.12	25%	
PFNA	0.87	1.00	14%	

Compound	PX-H2133-SB01-0304 ng/g	PX-H2133-SB01P-0304 ng/g	RPD	Qualifier
PFHpA	0.59	1.68U	NC	None

4 of 5

Dated: 10/31/20

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Many Weaver

Senior Chemist

Qualifier	Definition
Ū	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SD02-000H						
Battelle ID		H8704-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		58.40						
Matrix		SED						
Sample Size		0.87						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.63	4.60	11.49
PFHpA	375-85-9	3.45 U	H8704-FS(5)	10.000	9/12/2020	1.17	3.45	11.49
PFOA	335-67-1	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.40	4.60	11.49
PFNA	375-95-1	2.30 U	H8704-FS(5)	10.000	9/12/2020	1.13	2.30	11.49
PFDA	335-76-2	2.30 U	H8704-FS(5)	10.000	9/12/2020	1.06	2.30	11.49
PFUnA	2058-94-8	1.56 J	H8704-FS(5)	10.000	9/12/2020	1.06	2.30	11.49
PFDoA	307-55-1	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.40	4.60	11.49
PFTrDA	72629-94-8	2.30 U	H8704-FS(5)	10.000	9/12/2020	0.64	2.30	11.49
PFTeDA	376-06-7	5.75 U	H8704-FS(5)	10.000	9/12/2020	2.48	5.75	11.49
NMeFOSAA	2355-31-9	5.75 U	H8704-F5(5)	10.000	9/12/2020	2.34	5.75	11.49
NEtFOSAA	2991-50-6	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.72	4.60	11.49
PFBS	375-73-5	2.30 U	H8704-FS(5)	10.000	9/12/2020	0.80	2.30	11.49
PFHxS	355-46-4	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.86	4.60	11.49
PFOS	1763-23-1	2.48 J	H8704-FS(5)	10.000	9/12/2020	1.59	4.60	11.49
HFPO-DA	13252-13-6	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.47	4.60	11.49
Adona	919005-14-4	4.60 U	H8704-FS(5)	10.000	9/12/2020	1.91	4.60	11.49
11CI-PF3OUdS	763051-92-9	3.45 U	H8704-FS(5)	10.000	9/12/2020	1.20	3.45	11.49
9CI-PF3ONS	756426-58-1	2.30 U	H8704-FS(5)	10.000	9/12/2020	1.10	2.30	11.49



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SD02P-000H						
Battelle ID		H8705-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		81.25						
Matrix		SED						
Sample Size		0.40						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	10.00 U	H8705-FS(5)	10.000	9/12/2020	3.55	10.00	25.00
PFHpA	375-85-9	7.50 U	H8705-FS(5)	10.000	9/12/2020	2.55	7.50	25.00
PFOA	335-67-1	10.00 U	H8705-FS(5)	10.000	9/12/2020	3.05	10.00	25.00
PFNA	375-95-1	4.80 J	H8705-FS(5)	10.000	9/12/2020	2.45	5.00	25.00
PFDA	335-76-2	4.37 J	H8705-FS(5)	10.000	9/12/2020	2.30	5.00	25.00
PFUnA	2058-94-8	5.93 J	H8705-FS(5)	10.000	9/12/2020	2.30	5.00	25.00
PFDoA	307-55-1	10.00 U	H8705-FS(5)	10.000	9/12/2020	3.05	10.00	25.00
PFTrDA	72629-94-8	5.00 U	H8705-FS(5)	10.000	9/12/2020	1.40	5.00	25.00
PFTeDA	376-06-7	12.50 U	H8705-FS(5)	10.000	9/12/2020	5.40	12.50	25.00
NMeFOSAA	2355-31-9	12.50 U	H8705-FS(5)	10.000	9/12/2020	5.10	12.50	25.00
NEtFOSAA	2991-50-6	10.00 U	H8705-FS(5)	10.000	9/12/2020	3.75	10.00	25.00
PFBS	375-73-5	5.00 U	H8705-FS(5)	10.000	9/12/2020	1.75	5.00	25.00
PFHxS	355-46-4	10.00 U	H8705-FS(5)	10.000	9/12/2020	4.05	10.00	25.00
PFOS	1763-23-1	8.14 J	H8705-FS(5)	10.000	9/12/2020	3.45	10.00	25.00
HFPO-DA	13252-13-6	10.00 U	H8705-FS(5)	10.000	9/12/2020	3.20	10.00	25.00
Adona	919005-14-4	10.00 U	H8705-FS(5)	10.000	9/12/2020	4.15	10.00	25.00
11CI-PF3OUdS	763051-92-9	7.50 U	H8705-FS(5)	10.000	9/12/2020	2.60	7.50	25.00
9CI-PF3ONS	756426-58-1	5.00 U	H8705-FS(5)	10.000	9/12/2020	2.40	5.00	25.00



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

PX-H2133-SD01-000H Client ID Battelle ID H8709-FS SA Sample Type **Collection Date** 08/20/2020 08/27/2020 **Extraction Date** Analytical Instrument Sciex 6500+ LC/MS/MS % Moisture 67.02 SED Matrix 0.62 Sample Size Size Unit-Basis Analysis LOD LOQ DF Date DL Analyte CAS No. Result (ng/g\_Dry) Extract ID 3.11 J 10.000 9/12/2020 2.29 6.45 16.13 **PFHxA** 307-24-4 H8709-FS(5) 375-85-9 2.96 J H8709-FS(5) 10.000 9/12/2020 1.65 4.84 16.13 PFHDA 10.000 9/12/2020 1.97 6.45 16.13 PFOA 335-67-1 2.36 J H8709-FS(5) 1.96 J H8709-FS(5) 10.000 9/12/2020 1.58 3.23 16.13 **PFNA** 375-95-1 9/12/2020 16.13 3.23 U H8709-FS(5) 10.000 1.48 3.23 PFDA 335-76-2 5.62 J H8709-FS(5) 10.000 9/12/2020 1.48 3.23 16.13 **PFUnA** 2058-94-8 9/12/2020 1.97 6.45 16.13 3.88 J H8709-FS(5) 10.000 **PFDoA** 307-55-1 1.89 J 10.000 9/12/2020 0.90 3.23 16.13 72629-94-8 H8709-FS(5) **PFTrDA** 8.06 U H8709-FS(5) 10.000 9/12/2020 3.48 8.06 16.13 **PFTeDA** 376-06-7 9/12/2020 3.29 8.06 16.13 2355-31-9 8.06 U H8709-FS(5) 10.000 **NMeFOSAA** 9/12/2020 16.13 2991-50-6 6.45 U H8709-FS(5) 10.000 2.42 6.45 **NEtFOSAA** 10.000 9/12/2020 1.13 3.23 16.13 3.23 U H8709-FS(5) PFBS 375-73-5 6.45 U H8709-FS(5) 10.000 9/12/2020 2.61 6.45 16.13 355-46-4 **PFHxS** 3.07 J 10.000 9/12/2020 2.23 6.45 16.13 PFOS 1763-23-1 H8709-FS(5) 16.13 6.45 U 10.000 9/12/2020 2.06 6.45 13252-13-6 H8709-FS(5) HFPO-DA 6.45 16.13 6.45 U H8709-FS(5) 10.000 9/12/2020 2.68 919005-14-4 Adona 16.13 763051-92-9 4.84 U H8709-FS(5) 10.000 9/12/2020 1.68 4.84 11CI-PF3OUdS

3.23 U

H8709-FS(5)

10.000

9/12/2020

1.55

3.23

16.13

9CI-PF3ONS

756426-58-1



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2133-SS06-000H						
Battelle ID		H8715-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		19.21						
Matrix		SOIL						
Sample Size		1.71						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	28.66	H8715-FS(5)	10.000	9/14/2020	0.83	2.34	5.85
PFHpA	375-85-9	23.02	H8715-FS(5)	10.000	9/14/2020	0.60	1.75	5.85
PFOA	335-67-1	23.83	H8715-FS(5)	10.000	9/14/2020	0.71	2.34	5.85
PFNA	375-95-1	17.29	H8715-FS(5)	10.000	9/14/2020	0.57	1.17	5.85
PFDA	335-76-2	57.81	H8715-FS(5)	10.000	9/14/2020	0.54	1.17	5.85
PFUnA	2058-94-8	20,22	H8715-FS(5)	10.000	9/14/2020	0.54	1.17	5.85
PFDoA	307-55-1	14.57	H8715-FS(5)	10.000	9/14/2020	0.71	2.34	5.85
PFTrDA	72629-94-8	3.34 J	H8715-FS(5)	10.000	9/14/2020	0.33	1.17	5.85
PFTeDA	376-06-7	4.31 J	H8715-FS(5)	10.000	9/14/2020	1.26	2.92	5.85
NMeFOSAA	2355-31-9	2.92 U	H8715-FS(5)	10.000	9/14/2020	1.19	2.92	5.85
NEtFOSAA	2991-50-6	2.34 U	H8715-FS(5)	10.000	9/14/2020	0.88	2.34	5.85
PFBS	375-73-5	1.17 U	H8715-FS(5)	10.000	9/14/2020	0.41	1.17	5.85
PFHxS	355-46-4	2.34 U	H8715-FS(5)	10.000	9/14/2020	0.95	2.34	5.85
PFOS	1763-23-1	2.34 J	H8715-FS(5)	10.000	9/14/2020	0.81	2.34	5.85
HFPO-DA	13252-13-6	2.34 U	H8715-FS(5)	10.000	9/14/2020	0.75	2.34	5.85
Adona	919005-14-4	2.34 U	H8715-FS(5)	10.000	9/14/2020	0.97	2.34	5.85
11CI-PF3OUdS	763051-92-9	1.75 U	H8715-FS(5)	10.000	9/14/2020	0.61	1.75	5.85
9CI-PF3ONS	756426-58-1	1.17 U	H8715-FS(5)	10.000	9/14/2020	0.56	1.17	5.85



Project Name: CTO-4256: PAX Basewide PFAS

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Client ID		PX-H2133-SB06-0304						
Battelle ID		H8716-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
<b>Analytical Instrument</b>		Sciex 6500+ LC/MS/MS						
% Moisture		8.41						
Matrix		SOIL						
Sample Size		1.86						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
	207.24.4	2.15 U	110716 56(5)	10.000	9/14/2020	0.76	2.15	5.38
PFHxA	307-24-4		H8716-FS(5)	10.000	9/14/2020	0.75	1.61	5.38
PFHpA	375-85-9	1.61 U	H8716-FS(5)					
PFOA	335-67-1	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.66	2.15	5.38
PFNA	375-95-1	1.08 U	H8716-FS(5)	10.000	9/14/2020	0.53	1.08	5.38
PFDA	335-76-2	0.66 J	H8716-FS(5)	10.000	9/14/2020	0.49	1.08	5.38
PFUnA	2058-94-8	1.08 U	H8716-FS(5)	10.000	9/14/2020	0.49	1.08	5.38
PFDoA	307-55-1	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.66	2.15	5.38
PFTrDA	72629-94-8	1.08 U	H8716-FS(5)	10.000	9/14/2020	0.30	1.08	5.38
PFTeDA	376-06-7	2.69 U	H8716-FS(5)	10.000	9/14/2020	1.16	2.69	5.38
NMeFOSAA	2355-31-9	2.69 U	H8716-FS(5)	10.000	9/14/2020	1.10	2.69	5.38
NEtFOSAA	2991-50-6	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.81	2.15	5.38
PFBS	375-73-5	1.08 U	H8716-FS(5)	10.000	9/14/2020	0.38	1.08	5.38
PFHxS	355-46-4	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.87	2.15	5.38
PFOS	1763-23-1	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.74	2.15	5.38
HFPO-DA	13252-13-6	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.69	2.15	5.38
Adona	919005-14-4	2.15 U	H8716-FS(5)	10.000	9/14/2020	0.89	2.15	5.38
11CI-PF3OUdS	763051-92-9	1.61 U	H8716-FS(5)	10.000	9/14/2020	0.56	1.61	5.38
9CI-PF3ONS	756426-58-1	1.08 U	H8716-FS(5)	10.000	9/14/2020	0.52	1.08	5.38



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID	PX-H2133-SS05-000H

H8717-FS Battelle ID SA Sample Type 08/20/2020 **Collection Date** 08/27/2020 **Extraction Date** Sciex 6500+ LC/MS/MS Analytical Instrument 15.70 % Moisture SOIL Matrix 1.71 Sample Size

Sample Size		2.72							
Size Unit-Basis _		g	g		Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.83	2.34	5.85	
PFHpA	375-85-9	0.71 J	H8717-FS(5)	10.000	9/12/2020	0.60	1.75	5.85	
PFOA	335-67-1	0.87 J	H8717-FS(5)	10.000	9/12/2020	0.71	2.34	5.85	
PFNA	375-95-1	0.87 J	H8717-FS(5)	10.000	9/12/2020	0.57	1.17	5.85	
PFDA	335-76-2	1.17 U	H8717-FS(5)	10.000	9/12/2020	0.54	1.17	5.85	
PFUnA	2058-94-8	1.17 U	H8717-FS(5)	10.000	9/12/2020	0.54	1.17	5.85	
PFDoA	307-55-1	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.71	2.34	5.85	
PFTrDA	72629-94-8	1.17 U	H8717-FS(5)	10.000	9/12/2020	0.33	1.17	5.85	
PFTeDA	376-06-7	2.92 U	H8717-FS(5)	10.000	9/12/2020	1.26	2.92	5.85	
NMeFOSAA	2355-31-9	2.92 U	H8717-FS(5)	10.000	9/12/2020	1.19	2.92	5.85	
NEtFOSAA	2991-50-6	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.88	2.34	5.85	
PFBS	375-73-5	1.17 U	H8717-FS(5)	10.000	9/12/2020	0.41	1.17	5.85	
PFHxS	355-46-4	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.95	2.34	5.85	
PFOS	1763-23-1	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.81	2.34	5.85	
HFPO-DA	13252-13-6	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.75	2.34	5.85	
Adona	919005-14-4	2.34 U	H8717-FS(5)	10.000	9/12/2020	0.97	2.34	5.85	
11CI-PF3OUdS	763051-92-9	1.75 U	H8717-FS(5)	10.000	9/12/2020	0.61	1.75	5.85	
9CI-PF3ONS	756426-58-1	1.17 U	H8717-FS(5)	10.000	9/12/2020	0.56	1.17	5.85	

#### BATTELLE It can be done

Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2133-SS05P-000H						
Battelle ID		H8718-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		16.23						
Matrix		SOIL						
Sample Size		1.65						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
y <del></del>								
PFHxA	307-24-4	0.90 J	H8718-FS(5)	10.000	9/12/2020	0.86	2.42	6.06
PFHpA	375-85-9	0.84 J	H8718-FS(5)	10.000	9/12/2020	0.62	1.82	6.06
PFOA	335-67-1	1.12 J	H8718-FS(5)	10.000	9/12/2020	0.74	2.42	6.06
PFNA	375-95-1	1.00 J	H8718-FS(5)	10.000	9/12/2020	0.59	1.21	6.06
PFDA	335-76-2	1.21 U	H8718-FS(5)	10.000	9/12/2020	0.56	1.21	6.06
PFUnA	2058-94-8	1.21 U	H8718-FS(5)	10.000	9/12/2020	0.56	1.21	6.06
PFDoA	307-55-1	2.42 U	H8718-FS(5)	10.000	9/12/2020	0.74	2.42	6.06
PFTrDA	72629-94-8	1.21 U	H8718-FS(5)	10.000	9/12/2020	0.34	1.21	6.06
PFTeDA	376-06-7	3.03 U	H8718-FS(5)	10.000	9/12/2020	1.31	3.03	6.06
NMeFOSAA	2355-31-9	3.03 U	H8718-FS(5)	10.000	9/12/2020	1.24	3.03	6.06
NEtFOSAA	2991-50-6	2.42 U	H8718-FS(5)	10.000	9/12/2020	0.91	2.42	6.06
PFBS	375-73-5	1.21 U	H8718-FS(5)	10.000	9/12/2020	0.42	1.21	6.06
PFHxS	355-46-4	2.42 U	H8718-FS(5)	10.000	9/12/2020	0.98	2.42	6.06
PFOS	1763-23-1	2.42 U	H8718-FS(5)	10.000	9/12/2020	0.84	2.42	6.06
HFPO-DA	13252-13-6	2.42 U	H8718-FS(5)	10.000	9/12/2020	0.78	2.42	6.06
Adona	919005-14-4	2.42 U	H8718-FS(5)	10.000	9/12/2020	1.01	2.42	6.06
11CI-PF3OUdS	763051-92-9	1.82 U	H8718-FS(5)	10.000	9/12/2020	0.63	1.82	6.06
9CI-PF3ONS	756426-58-1	1.21 U	H8718-FS(5)	10.000	9/12/2020	0.58	1.21	6.06



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

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Client ID		PX-H2133-SB05-0304							
Battelle ID		H8719-FS							
Sample Type		SA							
Collection Date		08/20/2020							
Extraction Date		08/27/2020							
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS							
% Moisture		12.83							
Matrix		SOIL							
Sample Size		1.78							
Size Unit-Basis		g			Analysis				
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ	
•									Ī
PFHxA	307-24-4	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.80	2.25	5.62	
PFHpA	375-85-9	1.69 U	H8719-FS(5)	10.000	9/12/2020	0.57	1.69	5.62	
PFOA	335-67-1	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.69	2.25	5.62	
PFNA	375-95-1	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.55	1.12	5.62	
PFDA	335-76-2	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.52	1.12	5.62	
PFUnA	2058-94-8	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.52	1.12	5.62	
PFDoA	307-55-1	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.69	2.25	5.62	
PFTrDA	72629-94-8	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.31	1.12	5.62	
PFTeDA	376-06-7	2.81 U	H8719-FS(5)	10.000	9/12/2020	1.21	2.81	5.62	
NMeFOSAA	2355-31-9	2.81 U	H8719-F5(5)	10.000	9/12/2020	1.15	2.81	5.62	
NEtFOSAA	2991-50-6	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.84	2.25	5.62	
PFBS	375-73-5	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.39	1.12	5.62	
PFHxS	355-46-4	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.91	2.25	5.62	
PFOS	1763-23-1	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.78	2.25	5.62	
HFPO-DA	13252-13-6	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.72	2.25	5.62	
Adona	919005-14-4	2.25 U	H8719-FS(5)	10.000	9/12/2020	0.93	2.25	5.62	
11CI-PF3OUdS	763051-92-9	1.69 U	H8719-FS(5)	10.000	9/12/2020	0.58	1.69	5.62	
9CI-PF3ONS	756426-58-1	1.12 U	H8719-FS(5)	10.000	9/12/2020	0.54	1.12	5.62	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID		PX-H2133-SS01-000H						
Battelle ID		H8722-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrume	ent	Sciex 6500+ LC/MS/MS						
% Moisture		17.57						
Matrix		SOIL						
Sample Size		1.71						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
7								
PFHxA	307-24-4	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.83	2.34	5.85
PFHpA	375-85-9	1.75 U	H8722-FS(5)	10.000	9/12/2020	0.60	1.75	5.85
PFOA	335-67-1	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.71	2.34	5.85
PFNA	375-95-1	1.17 U	H8722-FS(5)	10.000	9/12/2020	0.57	1.17	5.85
PFDA	335-76-2	1.17 U	H8722-FS(5)	10.000	9/12/2020	0.54	1.17	5.85
PFUnA	2058-94-8	1.17 U	H8722-FS(5)	10.000	9/12/2020	0.54	1.17	5.85
PFDoA	307-55-1	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.71	2.34	5.85
PFTrDA	72629-94-8	1.17 U	H8722-FS(5)	10.000	9/12/2020	0.33	1.17	5.85
PFTeDA	376-06-7	2.92 U	H8722-FS(5)	10.000	9/12/2020	1.26	2.92	5.85
NMeFOSAA	2355-31-9	2.92 U	H8722-FS(5)	10.000	9/12/2020	1.19	2.92	5.85
NEtFOSAA	2991-50-6	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.88	2.34	5.85
PFBS	375-73-5	1.17 U	H8722-FS(5)	10.000	9/12/2020	0.41	1.17	5.85
PFHxS	355-46-4	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.95	2.34	5.85
PFOS	1763-23-1	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.81	2.34	5.85
HFPO-DA	13252-13-6	2.34 U	H8722-FS(5)	10.000	9/12/2020	0.75	2.34	5.85

2.34 U

1.75 U

1.17 U

H8722-FS(5)

H8722-FS(5)

H8722-FS(5)

9/12/2020

9/12/2020

9/12/2020

10.000

10.000

10.000

0.97

0.61

0.56

2.34

1.75

1.17

5.85

5.85

5.85

Adona

11CI-PF3OUdS

9CI-PF3ONS

919005-14-4

763051-92-9

756426-58-1

10

5.62

5.62

5.62



Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

919005-14-4

763051-92-9

756426-58-1

Project No.: 100142032

Client ID

Adona

11CI-PF3OUdS

9CI-PF3ONS

H8723-FS Battelle ID Sample Type SA Collection Date 08/20/2020 **Extraction Date** 08/27/2020 Sciex 6500+ LC/MS/MS Analytical Instrument 10.82 % Moisture Matrix SOIL 1.78 Sample Size Size Unit-Basis Analysis g CAS No. Result (ng/g\_Dry) Extract ID DF Date DL LOD LOQ Analyte 2.25 U 9/12/2020 0.80 2.25 5.62 **PFHxA** 307-24-4 H8723-FS(5) 10.000 0.59 J 9/12/2020 0.57 1.69 5.62 375-85-9 H8723-FS(5) 10.000 **PFHpA** 2.25 U 9/12/2020 5.62 PFOA 335-67-1 H8723-FS(5) 10.000 0.69 2.25 PFNA 375-95-1 1.12 U H8723-FS(5) 10.000 9/12/2020 0.55 1.12 5.62 9/12/2020 5.62 PFDA 335-76-2 1.12 U H8723-FS(5) 10.000 0.52 1.12 9/12/2020 0.52 1.12 5.62 **PFUnA** 2058-94-8 1.12 U H8723-FS(5) 10.000 307-55-1 2.25 U H8723-FS(5) 10.000 9/12/2020 0.69 2.25 5.62 **PFDoA** 9/12/2020 0.31 1.12 5.62 PFTrDA 72629-94-8 1.12 U H8723-FS(5) 10.000 2.81 376-06-7 2.81 U H8723-FS(5) 10.000 9/12/2020 1.21 5.62 **PFTeDA** 2355-31-9 2.81 U H8723-F5(5) 10.000 9/12/2020 1.15 2.81 5.62 **NMeFOSAA NEtFOSAA** 2991-50-6 2.25 U H8723-FS(5) 10.000 9/12/2020 0.84 2.25 5.62 9/12/2020 0.39 1.12 5.62 PFBS 375-73-5 1.12 U H8723-FS(5) 10.000 9/12/2020 2.25 5.62 **PFHxS** 355-46-4 2.25 U H8723-FS(5) 10.000 0.91 1763-23-1 2.25 U H8723-FS(5) 10.000 9/12/2020 0.78 2.25 5.62 PFOS 5.62 HFPO-DA 13252-13-6 2.25 U H8723-FS(5) 10.000 9/12/2020 0.72 2.25

2.25 U

1.69 U

1.12 U

PX-H2133-SB01-0304

H8723-FS(5)

H8723-FS(5)

H8723-FS(5)

10.000

10.000

10.000

9/12/2020

9/12/2020

9/12/2020

0.93

0.58

0.54

2.25

1.69

1.12



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SB01P-0304						
Battelle ID		H8724-FS						
Sample Type		SA						
Collection Date		08/20/2020						
Extraction Date		08/27/2020						
Analytical Instrument		Sciex 6500+ LC/MS/MS						
% Moisture		11.76						
Matrix		SOIL						
Sample Size		1.79						
Size Unit-Basis		g			Analysis			
Analyte	CAS No.	Result (ng/g_Dry)	Extract ID	DF	Date	DL	LOD	LOQ
PFHxA	307-24-4	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.79	2.23	5.59
PFHpA	375-85-9	1.68 U	H8724-FS(5)	10.000	9/12/2020	0.57	1.68	5.59
PFOA	335-67-1	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.68	2.23	5.59
PFNA	375-95-1	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.55	1.12	5.59
PFDA	335-76-2	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.51	1.12	5.59
PFUnA	2058-94-8	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.51	1.12	5.59
PFDoA	307-55-1	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.68	2.23	5.59
PFTrDA	72629-94-8	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.31	1.12	5.59
PFTeDA	376-06-7	2.79 U	H8724-FS(5)	10.000	9/12/2020	1.21	2.79	5.59
NMeFOSAA	2355-31-9	2.79 U	H8724-F5(5)	10.000	9/12/2020	1.14	2.79	5.59
NEtFOSAA	2991-50-6	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.84	2.23	5.59
PFBS	375-73-5	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.39	1.12	5.59
PFHxS	355-46-4	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.91	2.23	5.59
PFOS	1763-23-1	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.77	2.23	5.59
HFPO-DA	13252-13-6	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.72	2.23	5.59
Adona	919005-14-4	2.23 U	H8724-FS(5)	10.000	9/12/2020	0.93	2.23	5.59
11CI-PF3OUdS	763051-92-9	1.68 U	H8724-FS(5)	10.000	9/12/2020	0.58	1.68	5.59
9CI-PF3ONS	756426-58-1	1.12 U	H8724-FS(5)	10.000	9/12/2020	0.54	1.12	5.59



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client:

CH2M HILL, Inc., Gainesville, Florida

SDG:

20-0996

Laboratory:

Battelle Norwell Operations, Norwell, Massachusetts

Site:

NAS Patuxent River, St. Mary's County, CTO-JU14, Maryland

Date:

September 29, 2020

	PFAS							
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix					
1	PX-ETA-WT01-0720	H8030-FS1	Water					

A Stage 2B/4 data validation was performed on the analytical data for one water sample collected on July 29, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

<u>Analysis</u> PFAS Method References
Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- · and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning

- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Per- and Polyfluoroalkyl Substances (PFAS)

## Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

## **Holding Times**

• The sample was extracted at 26 days which is outside of the 14 days for water samples criteria. All results were qualified as estimated (J/UJ) in this sample.

## LC/MS Tuning

• All criteria were met.

## **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## Continuing Calibration

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
LC62 IB	PFDA	0.15	U	1
	PFHxS	0.13	None	All Associated >5X

## Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-ETA-FB01-072920	None - ND			I-
PX-ETA-EB01-072920-GW	None - ND		-4	

## Surrogate Spike Recoveries

• The sample exhibited a low surrogate percent recovery (%R) for PFTeDA of 44%, however, all results were already qualified due to holding times and no further action was required.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

MS/MSD samples were not analyzed.

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

The sample was originally analyzed in SDG 20-0895 with low surrogate recoveries. The sample was re-extracted outside of holding times and reanalyzed in this data package. The original analysis results should be used for reporting purposes.

# Field Duplicate Sample Precision

Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Senior Chemist

Mancy Weaver Dated: 10/2/20

Qualifier	Definition					
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.					
J	The reported result was an estimated value with an unknown bias.					
J+	The result was an estimated quantity, but the result may be biased high.					
J-	The result was an estimated quantity, but the result may be biased low.					
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."					
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.					
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.					
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.					



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-ETA-WT01-0720							
Battelle ID		H8030-FS1					0 .	0.	
Sample Type		SA					use		a C
Collection Date		07/29/2020					2016	100	
Extraction Date		08/24/2020			/		SYLY	- 0 t	•
Analytical Instrument		Sciex 5500 LC/MS/MS					0 1 0	70	
% Moisture		NA					10		
Matrix		W					( •		
Sample Size		0.270		/					
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	2
			. >						The same
PFHxA	307-24-4	15.50 T	J H8030-FS1(0)	1.000	8/27/2020	0.49	1.39	4.63	HT
PFHpA	375-85-9	4.55 JT	H8030-651(0)	1.000	8/27/2020	0.24	0.93	4.63	1
PFOA	335-67-1	11.87 T	H8030-FS1(0)	1.000	8/27/2020	0.47	1.39	4.63	
PFNA	375-95-1	0.87 JT	H8030-FS1(0)	1.000	8/27/2020	0.29	0.93	4.63	
PFDA	335-76-2	0.46 0.24.17	H8030-FS1(0)	1.000	8/27/2020	0.13	0.46	4.63	MBL
PFUnA	2058-94-8	0.46 UD	H8030-FS1(0)	1.000	8/27/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.46 UT	H8030-FS1(0)	1.000	8/27/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46 UT	H8030-FS1(0)	1.000	8/27/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85 UT	H8030-FS1(0)	1.000	8/27/2020	0.68	1.85	4.63	
NMeFOSAA	2355-31-9	0.93 UT	H8030-F51(0)	1.000	8/27/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93 UT	H8030-FS1(0)	1.000	8/27/2020	0.46	0.93	4.63	
PFBS	375-73-5	16.03 T	J H8030-FS1(0)	1.000	8/27/2020	0.13	0.46	4.63	
PFHxS	355-46-4	55.86 T	H8030-FS1(0)	1.000	8/27/2020	0.10	0.37	4.63	
PFOS	1763-23-1	13.31 T	H8030-FS1(0)	1.000	8/27/2020	0.41	0.93	4.63	
HFPO-DA	13252-13-6	0.46 UT	<b>ル</b> ブ H8030-FS1(0)	1.000	8/27/2020	0.23	0.46	4.63	
Adona	919005-14-4	0.93 UT	H8030-FS1(0)	1.000	8/27/2020	0.25	0.93	4.63	
11CI-PF3OUdS	763051-92-9	0.46 UT	H8030-FS1(0)	1.000	8/27/2020	0.21	0.46	4.63	
9CI-PF3ONS	756426-58-1	0.93 Ut	H8030-FS1(0)	1.000	8/27/2020	0.25	0.93	4.63	



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-ETA-WT01-0720

 Battelle ID
 H8030-FS1

 Sample Type
 SA

 Collection Date
 07/29/2020

 Extraction Date
 08/24/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

,	• •		Analysis	
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
13C5-PFHxA	84	H8030-FS1(0)	8/27/2020	
13C4-PFHpA	95	H8030-FS1(0)	8/27/2020	
13C8-PFOA	90	H8030-FS1(0)	8/27/2020	
13C9-PFNA	85	H8030-FS1(0)	8/27/2020	
13C6-PFDA	84	H8030-FS1(0)	8/27/2020	
13C7-PFUnA	82	H8030-FS1(0)	8/27/2020	
13C2-PFDoA	68	H8030-FS1(0)	8/27/2020	
13C2-PFTeDA	- 44 b	H8030-FS1(0)	8/27/2020	
d3-MeFOSAA	84	H8030-FS1(0)	8/27/2020	
d5-EtFOSAA	78	H8030-FS1(0)	8/27/2020	
13C3-PFBS	93	H8030-FS1(0)	8/27/2020	
13C3-PFHxS	211	H8030-FS1(0)	8/27/2020	
13C8-PFOS	89	H8030-FS1(0)	8/27/2020	
13C3-HFPO-DA	86	H8030-FS1(0)	8/27/2020	



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client:

CH2M HILL, Inc., Gainesville, Florida

SDG:

20-1112

Laboratory:

Battelle Norwell Operations, Norwell, Massachusetts

Site:

NAS Patuxent River, CTO-JU14, Maryland

Date:

October 27, 2020

		PFAS	
EDS ID Client Sample ID		Laboratory Sample ID	Matrix
1	PX-BR-ACS-WT04-0820	H8583-FS1	Water
2	PX-BR-ACS-WT07-0820	H8586-FS1	Water

A Stage 2B/4 data validation was performed on the analytical data for two water samples collected on August 18, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

<u>Analysis</u> PFAS Method References
Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

## Organics

- Date Completeness, Case Narrative & Custody Documentation
- Holding times

- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Per- and Polyfluoroalkyl Substances (PFAS)

## Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

## **Holding Times**

• All samples were extracted at 27 days which is outside of the 14 days for water samples criteria. All results were qualified as estimated (J/UJ) in all samples.

#### LC/MS Tuning

All criteria were met.

## **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## **Continuing Calibration**

• All percent recovery (%R) criteria were met.

#### Method Blank

• The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
LC62 IB	PFBS	0.16	None	Associated Samples >5X
	PFHxS	0.19	None	

## Field QC Blank

• Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-BR-ACS-EB01-081820-GW	None - ND			6
PX-BR-ACS-FB01-081820	None - ND			41

# Surrogate Spike Recoveries

• One sample exhibited a low surrogate percent recovery (%R) for one surrogate compound, however, all results were already qualified due to holding times and no further action was required.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R),

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values.

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

- The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.
- All samples were originally analyzed in SDG 20-0968 with low surrogate recoveries. The samples were re-extracted outside of holding times and reanalyzed in this data package. The original analysis results should be used for reporting purposes.

# Field Duplicate Sample Precision

Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Mancy Weaver Dated: 10/31/20

Qualifier	Definition					
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.					
J	The reported result was an estimated value with an unknown bias.					
J+	The result was an estimated quantity, but the result may be biased high.					
J-	The result was an estimated quantity, but the result may be biased low.					
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."					
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.					
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.					
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.					



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT04-0820							
Battelle ID		H8583-FS1							1
Sample Type		SA						· al	-10
Collection Date		08/18/2020						UB,	aid
Extraction Date		09/14/2020						we	7.0
Analytical Instrument		Sciex 5500 LC/MS/MS						0.	
% Moisture		NA						10	1
Matrix		WATER					100		
Sample Size		0.245							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
						/			
PFHxA	307-24-4	77.14   🗂	H8583-FS1(0)	1.000	9/15/2020	0.54	1.53	5.10	47
PFHpA	375-85-9	30.96	H8583-FS1(0)	1.000	9/15/2020	0.27	1.02	5.10	
PFOA	335-67-1	56.75	H8583-FS1(0)	1.000	9/15/2020	0.52	1.53	5.10	1
FNA	375-95-1	15.13	H8583-FS1(0)	1.000	9/15/2020	0.32	1.02	5.10	1
PFDA	335-76-2	0.18 🕅 🤚	H8583-FS1(0)	1.000	9/15/2020	0.14	0.51	5.10	
PFUnA	2058-94-8	0.51 UT V	J H8583-FS1(0)	1.000	9/15/2020	0.22	0.51	5.10	
PFDoA	307-55-1	0.51 U <mark>T</mark>	H8583-FS1(0)	1.000	9/15/2020	0.19	0.51	5.10	1
PFTrDA	72629-94-8	0.51 UT	H8583-FS1(0)	1.000	9/15/2020	0.15	0.51	5.10	1
PFTeDA	376-06-7	2.04 UT	H8583-FS1(0)	1.000	9/15/2020	0.74	2.04	5.10	1
NMeFOSAA	2355-31-9	1.02 UT	H8583-FS1(0)	1.000	9/15/2020	0.36	1.02	5.10	1
NEtFOSAA	2991-50-6	1.02 UT	H8583-FS1(0)	1.000	9/15/2020	0.51	1.02	5.10	1
PFBS	375-73-5	8.74 T	H8583-F\$1(0)	1.000	9/15/2020	0.14	0.51	5.10	
PFHxS	355-46-4	496.68 TD	H8583-FS1-D(5)	25.000	9/16/2020	2.81	10.20	127.55	
PFOS	1763-23-1	544.68 TD	H8883-FS1-D(5)	25.000	9/16/2020	11.22	25.51	127.55	
HFPO-DA	13252-13-6	0.51 UT V	H8583-FS1(0)	1.000	9/15/2020	0.26	0.51	5.10	
Adona	919005-14-4	1.02 UT	H8583-FS1(0)	1.000	9/15/2020	0.28	1.02	5.10	
L1CI-PF3OUdS	763051-92-9	0.51 AT	H8583-FS1(0)	1.000	9/15/2020	0.23	0.51	5.10	
9CI-PF3ONS	756426-58-1	1,82 UT	H8583-FS1(0)	1.000	9/15/2020	0.28	1.02	5.10	ł



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-BR-ACS-WT07-0820							
Battelle ID Sample Type		H8586-FS1 SA						Wal	10 ° 0
Collection Date		08/18/2020						10	91,
Extraction Date		09/14/2020						- n1	100
Analytical Instrument		Sciex 5500 LC/MS/MS							-
% Moisture		NA						11	1
Matrix		WATER					/		
Sample Size		0.260				/			
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
					/				
PFHxA	307-24-4	119.40 TD	T H8586-F51-D(3)	5.000	9/15/2020	2.55	7.21	24.04	HT.
PFHpA	375-85-9	35.45 T	H8586-FS1(0)	1.000	9/15/2020	0.25	0.96	4.81	1
PFOA	335-67-1	44.53 T	H8586-FS1(0)	1.000	9/15/2020	0.49	1.44	4.81	
PFNA	375-95-1	1.25 년	H8586-FS1(0)	1.000	9/15/2020	0.30	0.96	4.81	
PFDA	335-76-2	0.48 UT U	H8586-FS1(0)	1.000	9/15/2020	0.13	0.48	4.81	
PFUnA	2058-94-8	0.48 UT	H8586-F51(0)	1.000	9/15/2020	0.21	0.48	4.81	U
PFDoA	307-55-1	0.48 UT	H8586-F51(0)	1.000	9/15/2020	0.18	0.48	4.81	
PFTrDA	72629-94-8	0.48 UT	H8586-FS1(0)	1.000	9/15/2020	0.14	0.48	4.81	
PFTeDA	376-06-7	1.92 UT	H8586-F51(0)	1.000	9/15/2020	0.70	1.92	4.81	
NMeFOSAA	2355-31-9	0.96 UT	H8586-FS1(0)	1.000	9/15/2020	0.34	0.96	4.81	1
NEtFOSAA	2991-50-6	0.96 UT	H8586-FS1(0)	1.000	9/15/2020	0.48	0.96	4.81	
PFBS	375-73-5	21.49 🌓	H8586-FS1(0)	1.000	9/15/2020	0.13	0.48	4.81	
PFHxS	355-46-4	567.72	H8586-FS1-D(5)	25.000	9/15/2020	2.64	9.62	120.19	1
PFOS	1763-23-1	67.00	H8586-FS1(0)	1.000	9/15/2020	0.42	0.96	4.81	1
HFPO-DA	13252-13-6	Ø.48 UT	/ブ H8586-FS1(0)	1.000	9/15/2020	0.24	0.48	4.81	1
Adona	919005-14-4	0.96 UT	H8586-FS1(0)	1.000	9/15/2020	0.26	0.96	4.81	T.
11CI-PF3OUdS	763051-92-9	0.48 UT	H8586-FS1(0)	1.000	9/15/2020	0.22	0.48	4.81	
9CI-PF3ONS	756426-58-1	0.96 UT	H8586-FS1(0)	1.000	9/15/2020	0.26	0.96	4.81	4



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-BR-ACS-WT07-0820
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 Battelle ID
 H8586-FS1

 Sample Type
 SA

 Collection Date
 08/18/2020

 Extraction Date
 09/14/2020

 Analytical Instrument
 Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	103 🍯	H8586-FS1-D(3)	9/15/2020	
13C4-PFHpA	83	H8586-FS1(0)	9/15/2020	
13C8-PFOA	89	H8586-FS1(0)	9/15/2020	
13C9-PFNA	88	H8586-PS1(0)	9/15/2020	
13C6-PFDA	85	H8586-FS1(0)	9/15/2020	
13C7-PFUnA	84	H8586-FS1(0)	9/15/2020	
13C2-PFDoA	64	H8586-FS1(0)	9/15/2020	
13C2-PFTeDA	34 N	H8586-FS1(0)	9/15/2020	
d3-MeFOSAA	89	H8586-FS1(0)	9/15/2020	
d5-EtFOSAA	103	H8586-FS1(0)	9/15/2020	
13C3-PFBS	82	H8586-FS1(0)	9/15/2020	
13C3-PFHxS	101 0	H8586-FS1-D(5)	9/15/2020	
13C8-PFOS	88	H8586-FS1(0)	9/15/2020	
13C3-HFPO-DA	73	H8586-FS1(0)	9/15/2020	



# DATA VALIDATION SUMMARY REPORT NAS PATUXENT RIVER, MARYLAND

Client:

CH2M HILL, Inc., Gainesville, Florida

SDG:

20-1118

Laboratory:

Battelle Norwell Operations, Norwell, Massachusetts

Site:

NAS Patuxent River, CTO-JU14, Maryland

Date:

October 27, 2020

		PFAS	
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	PX-S41-WT03-0820	H8678-FS1	Water
2	PX-H2133-WT03-0820	H8698-FS1	Water
3	PX-H2133-SW01-0820	H8712-FS1	Water
4	PX-H2133-SW01P-0820	H8713-FS1	Water
5	PX-H2133-WT02-0820	H8714-FS1	Water
6	PX-H2133-WT06P-0820	H8721-FS1	Water

A Stage 2B/4 data validation was performed on the analytical data for six water samples collected on August 19-20, 2020 by CH2M HILL at the NAS Patuxent River site in Maryland. The samples were analyzed under the Analysis of Poly and Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS).

Specific method references are as follows:

Analysis PFAS Method References
Battelle SOP 5-369-08

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, Webster Field Annex, Naval Air Station Patuxent River, Maryland, April 2020, the Final Basewide Per- and Polyfluoroalkyl Substances (PFAS) Site Inspection Sampling and Analysis Plan, St. Mary's County, Naval Air Station Patuxent River, Maryland, April 2020, and the DoD Final General Data Validation Guidelines, November 2019, including the following Module:

- The Department of Defense (DoD) Data Validation Guidelines Module 3, Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual for Environmental Laboratories (QSM) Table B-15, May 2020;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

#### **Organics**

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Surrogate Spike recoveries
- Laboratory Fortified Blank (LFB)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Stage 2B/4) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

## **Data Usability Assessment**

There were no serious deficiencies of data.

The data are acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

# Per- and Polyfluoroalkyl Substances (PFAS)

## Data Completeness, Case Narrative & Custody Documentation

• The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

## **Holding Times**

• All samples were extracted at 26 or 27 days which is outside of the 14 days for water samples criteria. All results were qualified as estimated (J/UJ) in all samples.

# LC/MS Tuning

• All criteria were met.

#### **Initial Calibration**

• All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

## **Continuing Calibration**

• All percent recovery (%R) criteria were met.

## Method Blank

• The method blanks were free of contamination.

## Field QC Blank

Field QC sample results are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
PX-S41-FB01-081920	None - ND		440	3
PX-S41-EB01-081920-GW	None - ND			Service Servic
PX-H2133-FB01-082020	None - ND			3
PX-H2133-EB01-082020-GW	None - ND		-	- 0

## Surrogate Spike Recoveries

• Several samples exhibited low surrogate percent recoveries (%R) for several surrogate compounds, however, all results were already qualified due to holding times and no further action was required.

## Laboratory Fortified Blank (LFB)

• The LFB samples exhibited acceptable percent recoveries (%R).

# Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

• MS/MSD samples were not analyzed.

## Internal Standard (IS) Area Performance

• All internal standards met response and retention time (RT) criteria.

# **Target Compound Identification**

• All mass spectra and quantitation criteria were met.

# **Compound Quantitation**

- The samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.
- All samples were originally analyzed in SDGs 20-0985 and 20-0986 with low surrogate recoveries. The samples were re-extracted outside of holding times and reanalyzed in this data package. The original analysis results should be used for reporting purposes.

## Field Duplicate Sample Precision

• Field duplicate results are summarized below. The precision was acceptable.

Compound	PX-H2133-SW01-0820 ng/L	PX-H2133-SW01P-0820 ng/L	RPD	Qualifier
PFHxA	58.40	50.39	15%	None
PFHpA	46.68	41.23	12%	
PFOA	41.19	36.62	12%	
PFNA	11.48	9.99	14%	
PFDA	3.32	2.74	19%	
PFUnA	0.89	0.84	6%	
PFDoA	0.19	0.22	15%	
PFTrDA	0.47U	0.17	NC	
PFBS	4.59	3.97	14%	
PFHxS	3.96	4.19	6%	
PFOS	7.53	6.56	14%	

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:

Mancy Weaver
Senior Chemist

Dated: 10/31/20

Qualifier	Definition
U	The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a "tentative identification."
NJ	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value was the estimated concentration in the sample.
UJ	The analyte was not detected and was reported as less than the LOD or as defined by the customer. However, the associated numerical value is approximate.
Х	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.  Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-S41-WT03-0820					ا /		rigin
Battelle ID		H8678-FS1					1	ise o	N
Sample Type		SA						Nº IL	M
Collection Date		08/19/2020						M.	<b>1</b> , 0
Extraction Date		09/15/2020						10000	0
Analytical Instrume	nt	Sciex 5500 LC/MS/MS					/	1	5.1
% Moisture		NA				No			
Matrix		WATER							
Sample Size		0.270							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	-
		-20							
PFHxA	307-24-4	77.35 🏌 🍠		1.000	9/16/2020	0.49	1.39	4.63	HT
PFHpA	375-85-9	33.22 T	H8678-FS1(0)	1.000	9/16/2020	0.24	0.93	4.63	- 1
PFOA	335-67-1	105.85	H8678-FS1(0)	1.000	9/16/2020	0.47	1.39	4.63	_
PFNA	375-95-1	45.61 T	H8678-FS1(0)	1.000	9/16/2020	0.29	0.93	4.63	
PFDA	335-76-2	0.18 🖟	H8678-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	_
PFUnA	2058-94-8	0.46 UT L	THE PERSON NAMED OF THE PE	1.000	9/16/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.46 <b>Ú</b> T	H8678-FS1(0)	1.000	9/16/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46 UT	H8678-FS1(0)	1.000	9/16/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85	H8678-FS1(0)	1.000	9/16/2020	0.68	1.85	4.63	
NMeFOSAA	2355-31-9	0.93 UT	H8678-FS1(0)	1.000	9/16/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93 UT		1.000	9/16/2020	0.46	0.93	4.63	
PFBS	375-73-5	13.80 T	H8678-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	
PFHxS	355-46-4	899.22 TD	H8678-FS1-D(5)	12.500	9/16/2020	1.27	4.63	57.87	
PFOS	1763-23-1	2351.48 TD	H8678-FS1-D(7)	31.250	9/16/2020	12.73	28.94	144.68	
HFPO-DA	13252-13-6	0.46 UT U	√ H8678-FS1(0)	1.000	9/16/2020	0.23	0.46	4.63	
Adona	919005-14-4	0.93 UT	H8678-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	
11CI-PF3OUdS	763051-92-9	0.46 UT	H8678-FS1(0)	1.000	9/16/2020	0.21	0.46	4.63	
9CI-PF3ONS	756426-58-1	0.93 UT	H8678-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	+



Project Name: CTO-4256: PAX Basewide PFAS

Client ID	PX-S41-WT03-0820			4	
Battelle ID	H8678-FS1				we gived
Sample Type	SA				4
Collection Date	08/19/2020				0,0
Extraction Date	09/15/2020				
Analytical Instrument	Sciex 5500 LC/MS/MS				
·			Analysis		
Surrogate Recoveries (%)	Recovery	Extract ID	Date		
13C5-PFHxA	84	H8678-FS1(0)	9/16/2020		
13C4-PFHpA	80	H8678-FS1(0)	9/16/2020		
13C8-PFOA	80	H8678-F\$1(0)	9/16/2020		
13C9-PFNA	62	H8678-FS1(0)	9/16/2020		
13C6-PFDA	83	H8678-FS1(0)	9/16/2020		
13C7-PFUnA	75	H8678-FS1(0)	9/16/2020		
13C2-PFDoA	57	H8678-FS1(0)	9/16/2020		
13C2-PFTeDA	28 1	H8678-FS1(0)	9/16/2020		
d3-MeFOSAA	8 <b>9</b> D	H8678-FS1-D(7)	9/16/2020		
d5-EtFOSAA	101 0	H8678-FS1-D(7)	9/16/2020		
13C3-PFBS	98 🕩	H8678-FS1-D(7)	9/16/2020		
13C3-PFHxS	95 0	H8678-FS1-D(7)	9/16/2020		
13C8-PFOS	94 0	H8678-FS1-D(7)	9/16/2020		
13C3-HFPO-DA	81	H8678-FS1(0)	9/16/2020		



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-WT03-0820							2 19 21	resu
Battelle ID		H8698-FS1						112	ا ۽ د	
Sample Type		SA						CV-3	~ / N	091
Collection Date		08/20/2020					1	00	19.	0
Extraction Date		09/15/2020						U		
Analytical Instrument		Sciex 5500 LC/MS/MS							$T_{\mathbf{G}}$	
% Moisture		NA								
Matrix		WATER								
Sample Size		0.270								
Size Unit-Basis		L				Analysis				
Analyte	CAS No.	Result (ng/L)		Extract ID	DF	Date	DL	LOD	LOQ	
PFHxA	307-24-4	2.57	IT J	H8698-FS1(0)	1.000	9/16/2020	0.49	1.39	4.63	HT
PFHpA	375-85-9	2.39	1	H8698-FS1(0)	1.000	9/16/2020	0.24	0.93	4.63	1.0
PFOA	335-67-1	3.27	1 t	H8698-F81(0)	1.000	9/16/2020	0.47	1.39	4.63	- 1
PFNA	375-95-1	0.97	1	H8698-FS1(0)	1.000	9/16/2020	0.29	0.93	4.63	
PFDA	335-76-2	0.46	YT UJ	H8698-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	
PFUnA	2058-94-8	0.46	UT X	H8698-F51(0)	1.000	9/16/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.46	UT	H8698-FS1(0)	1.000	9/16/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46	UT	H8698-FS1(0)	1.000	9/16/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85	uт	H8698-FS1(0)	1.000	9/16/2020	0.68	1.85	4.63	
NMeFOSAA	2355-31-9	0.93	UT	H8698-FS1(0)	1.000	9/16/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93	UT 🛓	H8698-F51(0)	1.000	9/16/2020	0.46	0.93	4.63	
PFBS	375-73-5	1.10	11 7	H8698-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	
PFHxS	355-46-4	6.97	1	H8698-FS1(0)	1.000	9/16/2020	0.10	0.37	4.63	
PFOS	1763-23-1	6.40	† •	H8698-FS1(0)	1.000	9/16/2020	0.41	0.93	4.63	
IFPO-DA	13252-13-6	0.46	UT UJ	H8698-FS1(0)	1.000	9/16/2020	0.23	0.46	4.63	
Adona	919005-14-4	0.93	UT	H8698-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	
11CI-PF3OUdS	763051-92-9	0.46	UT	H8698-FS1(0)	1.000	9/16/2020	0.21	0.46	4.63	
OCI-PF3ONS	756426-58-1	0.93	UT	H8698-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID	PX-H2133-WT03-0820			use rol
Battelie ID	H8698-FS1			Maine
Sample Type	SA			0119
Collection Date	08/20/2020			
Extraction Date	09/15/2020			
Analytical Instrument	Sciex 5500 LC/MS/MS			
•			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	86	H8698-FS1(0)	9/16/2020	
1324-PFHDA	89	H8698-FS1(0)	9/16/2020	
13C8-PFOA	87	H8698-FS1(0)	9/16/2020	
13C9-PFNA	84	H8698-FS1(0)	9/16/2020	
13C6-PFDA	84	H8698-F81(0)	9/16/2020	
13C7-PFUnA	82	H8698-FS1(0)	9/16/2020	
13C2-PFDoA	63	H8698-FS1(0)	9/16/2020	
13C2-PFTeDA	30 N	H8698-FS1(0)	9/16/2020	
d3-MeFOSAA	83	H8698-FS1(0)	9/16/2020	
d5-EtFOSAA	92	H8698-FS1(0)	9/16/2020	
13C3-PFBS	90	H8698-FS1(0)	9/16/2020	
13C3-PFHxS	91	H8698-FS1(0)	9/16/2020	
13C8-PFOS	82	H8698-FS1(0)	9/16/2020	
13C3-HFPO-DA	82	H8698-FS1(0)	9/16/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SW01-0820					(be con	٨٠٠٨	ol
Battelle ID		H8712-FS1					- (	origin	
Sample Type		SA					upe	11	١ ,
Collection Date		08/20/2020					O	1/5 '	26
Extraction Date		09/15/2020					POU	. 1	ng o
Analytical Instrument		Sciex 5500 LC/MS/MS					102	20	
% Moisture		NA							
Matrix		WATER			/				
Sample Size		0.270							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DŁ	LOD	LOQ	_
PFHxA	307-24-4	86.14 <b>T</b>	H8712-FS1(0)	1.000	9/16/2020	0.49	1.39	4.63	HT
PFHpA	375-85-9	70.79 T	H8712-FS1(0)	1.000	9/16/2020	0.24	0.93	4.63	1
PFOA	335-67-1	56.55 T	H8712-FS1(0)	1.000	9/16/2020	0.47	1.39	4.63	
PFNA	375-95-1	13.65 T	H8712-F81(0)	1.000	9/16/2020	0.29	0.93	4.63	
PFDA	335-76-2	3.39 J	H8712-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	
PFUnA	2058-94-8	0.86 J	H8712-FS1(0)	1.000	9/16/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.29 J	H8712-FS1(0)	1.000	9/16/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46 UT U	<b>ブ H8712-FS1(0)</b>	1.000	9/16/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85 UT	H8712-FS1(0)	1.000	9/16/2020	0.68	1.85	4.63	
NMeFOSAA	2355-31-9	0.93 UT	H8712-FS1(0)	1.000	9/16/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93 UT	H8712-FS1(0)	1.000	9/16/2020	0.46	0.93	4.63	
PFBS	375-73-5	4.83 T	H8712-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	
PFHxS	355-46-4	8.32 T J	H8712-FS1(0)	1.000	9/16/2020	0.10	0.37	4.63	
PFOS	1763-23-1	8.13 T	H8712-FS1(0)	1.000	9/16/2020	0.41	0.93	4.63	
HFPO-DA	13252-13-6	0.46 UT U	<b>ブ</b> H8712-FS1(0)	1.000	9/16/2020	0.23	0.46	4.63	
dona	919005-14-4	0.93 UT	H8712-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	
1Cl-PF3OUdS	763051-92-9	0.46 UT	H8712-FS1(0)	1.000	9/16/2020	0.21	0.46	4.63	
CI-PF3ONS	756426-58-1	0.93 UT	H8712-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	

3



Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

13C5-PEHyA	65	H8712-FS1(0)	9/16/2020	
Surrogate Recoverles (%)	Recovery	Extract ID	Date	
			Analysis	
Analytical Instrument	Sciex 5500 LC/MS/MS			
Extraction Date	09/15/2020			
Collection Date	08/20/2020			
Sample Type	SA			
Battelle ID	H8712-FS1			
Client ID	PX-H2133-SW01-0820			

Project No.: 100142032				<b>A</b>
Client ID	PX-H2133-SW01-0820			use original in 20-0986
Battelle ID	H8712-FS1			use over 1980
Sample Type	SA			(No and the second seco
Collection Date	08/20/2020			20
Extraction Date	09/15/2020			120
Analytical Instrument	Sciex 5500 LC/MS/MS			
			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	65	H8712-FS1(0)	9/16/2020	
13C4-PFHpA	79	H8712-FS1(0)	9/16/2020	
13C8-PFOA	75	H8712-FS1(0)	9/16/2020	
13C9-PFNA	74	H8712-FS1(0)	9/16/2020	
13C6-PFDA	70	H8712-FS1(0)	9/16/2020	
13C7-PFUnA	61	H8712-FS1(0)	9/16/2020	
13C2-PFDoA	42 🐧	H8712-FS1(0)	9/16/2020	
13C2-PFTeDA	31 N	H8712-PS1(0)	9/16/2020	
d3-MeFOSAA	66	H8712-FS1(0)	9/16/2020	
d5-EtFOSAA	70	H8712-F51(0)	9/16/2020	
13C3-PFBS	62	H8712-FS1(0)	9/16/2020	
13C3-PFHxS	82	H8712-FS1(0)	9/16/2020	
1200 0000	programme and the second	110712 FC1(0)	0/16/2020	
13C8-PFOS	67	H8712-FS1(0)	9/16/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-SW01P-0820						F (	ol res
Battelle ID		H8713-FS1						29.2	
Sample Type		SA					une c	51°J	06
Collection Date		08/20/2020					W	09	D ′
Extraction Date		09/15/2020				/	12	7,0	
Analytical Instrument		Sciex 5500 LC/MS/MS					10		
% Moisture		NA					•		
Matrix		WATER							
Sample Size		0.270							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
				/					
PFHxA	307-24-4	54.45 🏅 🍼	H8713-FS1(0)	1.000	9/16/2020	0.49	1.39	4.63	HT
PFHpA	375-85-9	43.43 †	H8713-FS1(0)	2.000	9/16/2020	0.24	0.93	4.63	ï
PFOA	335-67-1	40.02	H8713-FS1(0)	1.000	9/16/2020	0.47	1.39	4.63	
PFNA	375-95-1	10.22 1	H8713-FS1(0)	1.000	9/16/2020	0.29	0.93	4.63	
PFDA	335-76-2	2.94 J	H8713-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	1
PFUnA	2058-94-8	0.53 1 🛊	H8718-FS1(0)	1.000	9/16/2020	0.20	0.46	4.63	
PFDoA	307-55-1	0.46 UT	J H8713-FS1(0)	1.000	9/16/2020	0.18	0.46	4.63	
PFTrDA	72629-94-8	0.46 UT	H8713-FS1(0)	1.000	9/16/2020	0.14	0.46	4.63	
PFTeDA	376-06-7	1.85 UT	H8713-F51(0)	1.000	9/16/2020	0.68	1.85	4.63	
NMeFOSAA	2355-31-9	0.93	H8713-FS1(0)	1.000	9/16/2020	0.32	0.93	4.63	
NEtFOSAA	2991-50-6	0.93 பா	H8713-F51(0)	1.000	9/16/2020	0.46	0.93	4.63	
PFBS	375-73-5	4.69 T J	H8713-FS1(0)	1.000	9/16/2020	0.13	0.46	4.63	- 1
PFHxS	355-46-4	3.92	H8713-FS1(0)	1.000	9/16/2020	0.10	0.37	4.63	_ 1
PFOS	1763-23-1	8.05 †	H8713-FS1(0)	1.000	9/16/2020	0.41	0.93	4.63	
HFPO-DA	13252-13-6	0.46 UT	H8713-FS1(0)	1.000	9/16/2020	0.23	0.46	4.63	
Adona	919005-14-4	0.93 UT	H8713-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	
11Cl-PF3OUdS	763051-92-9	0.46 UT	H8713-FS1(0)	1.000	9/16/2020	0.21	0.46	4.63	
9CI-PF3ONS	756426-58-1	0.93 UT	H8713-FS1(0)	1.000	9/16/2020	0.25	0.93	4.63	4



Project Name: CTO-4256: PAX Basewide PFAS

Project No.: 100142032

Client ID	PX-H2133-SW01P-0820
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H8713-FS1 Battelle ID Sample Type SA **Collection Date** 08/20/2020 09/15/2020 **Extraction Date** Sciex 5500 LC/MS/MS Analytical Instrument

				, 111di 1010	
Surrogate Recoverles (%)	Recov	ery	Extract ID	Date	
13C5-PFHxA		65	H8713-FS1(0)	9/16/2020	
13C4-PFHpA		79	H8713-FS1(0)	9/16/2020	
13C8-PFOA		76	H8713-FS1(0)	9/16/2020	
13C9-PFNA		72	H8713-F51(0)	9/16/2020	
13C6-PFDA		60	H8713-F51(0)	9/16/2020	
13C7-PFUnA		42 N	H8713-FS1(0)	9/16/2020	
13C2-PFDoA		25 N	H8713-FS1(0)	9/16/2020	
13C2-PFTeDA		10 N	H8713-FS1(0)	9/16/2020	
d3-MeFOSAA		54	H8713-FS1(0)	9/16/2020	
d5-EtFOSAA		50	H8713-PS1(0)	9/16/2020	
13C3-PFBS	/	68	H8713-FS1(0)	9/16/2020	
13C3-PFHxS		96	H8713-PS1(0)	9/16/2020	
13C8-PFOS		66	H8713-FS1(0)	9/16/2020	
13C3-HFPO-DA		69	H8713-PS1(0)	9/16/2020	

Analysis

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Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-WT02-0820					/ Vo	- 071	ginal
Battelle ID		H8714-FS1				The Co	/ Up		.N
Sample Type		SA						115	۱, ک
Collection Date		08/20/2020					H.	an, ,	. 89
Extraction Date		09/15/2020					10	$\tilde{v}$	0
Analytical Instrument		Sciex 5500 LC/MS/MS							
% Moisture		NA							
Matrix		WATER							
Sample Size		0.255							
Size Unit-Basis		L		/	Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Date	DL	LOD	LOQ	
			/						==1
PFHxA	307-24-4	146.55 TP 🦪	H8714-FS1-D(3)	5.000	9/16/2020	2.60	7.35	24.51	HT
PFHpA	375-85-9	40.38 T	H8714-FS1(0)	1.000	9/16/2020	0.25	0.98	4.90	1
PFOA	335-67-1	6.99 T	H8714-FS1(0)	1.000	9/16/2020	0.50	1.47	4.90	
PFNA	375-95-1	0.68 1	H8714-FS1(0)	1.000	9/16/2020	0.30	0.98	4.90	
PFDA	335-76-2	0.49 UT U	H8714-FS1(0)	1.000	9/16/2020	0.14	0.49	4.90	
PFUnA	2058-94-8	0.49 UT 1	H8714-P51(0)	1.000	9/16/2020	0.22	0.49	4.90	3
PFDoA	307-55-1	0.49 UT	H8714-FS1(0)	1.000	9/16/2020	0.19	0.49	4.90	
PFTrDA	72629-94-8	0.49 UT	H8714-PS1(0)	1.000	9/16/2020	0.15	0.49	4.90	
PFTeDA	376-06-7	1.96 UT	H8714-FS1(0)	1.000	9/16/2020	0.72	1.96	4.90	
NMeFOSAA	2355-31-9	0.98 UT	H8714-F51(0)	1.000	9/16/2020	0.34	0.98	4.90	
NEtFOSAA	2991-50-6	0.98 UT 🖠	H8714-FS1(0)	1.000	9/16/2020	0.49	0.98	4.90	
PFBS	375-73-5	30.84 † 🗾	H8714-FS1(0)	1.000	9/16/2020	0.14	0.49	4.90	
PFHxS	355-46-4	15.32	H8714-FS1(0)	1.000	9/16/2020	0.11	0.39	4.90	
PFOS	1763-23-1	7.32	H8714-F51(0)	1.000	9/16/2020	0.43	0.98	4.90	
HFPO-DA	13252-13-6	0.49 UT U	H8714-F51(0)	1.000	9/16/2020	0.25	0.49	4.90	1
Adona	919005-14-4	0.98 UT	H8714-FS1(0)	1.000	9/16/2020	0.26	0.98	4.90	
11CI-PF3OUdS	763051-92-9	0.49 UT	H8714-FS1(0)	1.000	9/16/2020	0.23	0.49	4.90	
9CI-PF3ONS	756426-58-1	0.98 ult	H8714-F51(0)	1.000	9/16/2020	0.26	0.98	4.90	- d

use is iral results



Project Client: CH2M

Project Name: CTO-4256: PAX Basewide PFAS

Client ID	PX-H2133-WT02-0820
Battelie ID	H8714-FS1
Sample Type	SA
Collection Date	08/20/2020
Extraction Date	09/15/2020
Analytical Instrument	Sciex 5500 LC/MS/MS

			Analysis	
Surrogate Recoveries (%)	Recovery	Extract ID	Date	
13C5-PFHxA	86 🏚	H8714-FS1-D(3)	9/16/2020	
13C4-PFHpA	81	H8714-FS1(0)	9/16/2020	
13C8-PFOA	76	H8714-FS1(0)	9/16/2020	
19C9-PFNA	75	H8714-551(0)	9/16/2020	
13C6-PFDA	65	H8714-FS1(0)	9/16/2020	
13C7-PFUnA	59	H8714-FS1(0)	9/16/2020	
13C2-PFDoA	44 🥦	H8714-FS1(0)	9/16/2020	
13C2-PFTeDA	28 N	H8714-FS1(0)	9/16/2020	
d3-MeFOSAA	64	H8714-FS1(0)	9/16/2020	
d5-EtPOSAA	69	H8714-F51(0)	9/16/2020	
13C3-PFBS	79	H8714-FS1(0)	9/16/2020	
13C3-PFHxS	82	H8714-FS1(0)	9/16/2020	
13C8-PFOS	68	H8714-FS1(0)	9/16/2020	
13C3-HFPO-DA	72	H8714-FS1(0)	9/16/2020	



Project Name: CTO-4256: PAX Basewide PFAS

Client ID		PX-H2133-WT06P-0820							
Battelle ID		H8721-FS1					Us r	e. W	. ,
Sample Type		SA					100	MIN	. N
Collection Date		08/20/2020				/	6	(1)	•
Extraction Date		09/15/2020					. 0	au	109
Analytical Instrument		Sciex 5500 LC/MS/MS					P	20	, -
% Moisture		NA							
Matrix		WATER							
Sample Size		0.265							
Size Unit-Basis		L			Analysis				
Analyte	CAS No.	Result (ng/L)	Extract ID	DF /	Date	DL	LOD	LOQ	
		St. 16.		/					-
PFHxA	307-24-4	525.69 Tp 🥣	H8721-FS1-D(5)	25.000	9/17/2020	12.50	35.38	117.92	HT
PFHpA	375-85-9	460.57 TD	H8721-F51-D(5)	25.000	9/17/2020	6.13	23.58	117.92	
PFOA	335-67-1	189.63 TD	H8721-F51-D(3)	5.000	9/16/2020	2.41	7.08	23.58	1
PFNA	375-95-1	65.42 T	H8721-581(0)	1.000	9/16/2020	0.29	0.94	4.72	
FDA	335-76-2	33.14 Т	H8721-=S1(0)	1.000	9/16/2020	0.13	0.47	4.72	
FUnA	2058-94-8	4.09 1	H8721-F51(0)	1.000	9/16/2020	0.21	0.47	4.72	- 1
FDoA	307-55-1	0.57 』	H8721-FS1(0)	1.000	9/16/2020	0.18	0.47	4.72	
FTrDA	72629-94-8	0.47 Uft (4	<b>J H8721-FS1(0)</b>	1.000	9/16/2020	0.14	0.47	4.72	- 1
PFTeDA	376-06-7	1.89	H8721-FS1(0)	1.000	9/16/2020	0.69	1.89	4.72	
IMeFOSAA	2355-31-9	0,94 UT	H8721-FS1(0)	1.000	9/16/2020	0.33	0.94	4.72	1
IEtFOSAA	2991-50-6	0.94 UT	H8721-FS1(0)	1.000	9/16/2020	0.47	0.94	4.72	1
FBS	375-73-5	4.12 J	H8721-FS1(0)	1.000	9/16/2020	0.13	0.47	4.72	
FHxS	355-46-4	4.41 시	H8721-FS1(0)	1.000	9/16/2020	0.10	0.38	4.72	
FOS	1763-23-1	13.45	H8721-FS1(0)	1.000	9/16/2020	0.42	0.94	4.72	
IFPO-DA	13252-13-6	0.42 🏗 🕏	H8721-FS1(0)	1.000	9/16/2020	0.24	0.47	4.72	
dona	919005-14-4	0.94 Ur W	√ H8721-FS1(0)	1.000	9/16/2020	0.25	0.94	4.72	
1CI-PF3OUdS	763051-92-9	0.47 UT	H8721-FS1(0)	1.000	9/16/2020	0.22	0.47	4.72	

Appendix D Laboratory Analytical Data

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-BR-ACS-SO01			PX-BR-ACS-SO02		PX-BR-ACS-SO03		PX-BR-ACS-SO04	
Sample ID	PAX PFAS SO Values	PX-BR-ACS-SS01-000H	PX-BR-ACS-SB01-0304	PX-BR-ACS-SB01P-0304	PX-BR-ACS-SS02-000H	PX-BR-ACS-SB02-0304	PX-BR-ACS-SS03-000H	PX-BR-ACS-SB03-0304	PX-BR-ACS-SS04-000H	PX-BR-ACS-SB04-0304
Sample Date		08/17/20	08/17/20	08/17/20	08/18/20	08/18/20	08/18/20	08/18/20	08/18/20	08/18/20
Chemical Name										
Per- and Polyfluooalkyl Substances (ng/g)										
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.29 U	2.27 U	2.26 U	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	2.08 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		1.14 U	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.23 U	1.04 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.71 U	1.7 U	1.69 U	1.89 U	1.78 U	2.01 U	1.85 U	1.85 U	1.56 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.29 U	2.27 U	2.26 U	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	2.08 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.86 U	2.84 U	2.82 U	3.14 U	2.96 U	3.36 U	3.09 U	3.09 U	2.6 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.29 U	2.27 U	2.26 U	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	2.08 U
Perfluorooctanesulfonic Acid (PFOS)	130	88.48	3.79 J	2.01 J	1.08 J	2.37 U	5.79 J	30.21	26.14	2.08 U
Perfluoroundecanoic Acid (PFUnA)		1.14 U	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.23 U	1.04 U
Perfluorohexanoic Acid (PFHxA)		0.96 J	2.27 U	2.26 U	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	2.08 U
Perfluorododecanoic Acid (PFDoA)		2.29 U	2.27 U	2.26 U	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	2.08 U
Perfluorooctanoic Acid (PFOA)	130	1.77 J	0.86 J	0.77 J	2.52 U	2.37 U	2.68 U	2.47 U	0.89 J	2.08 U
Perfluorodecanoic Acid (PFDA)		1.14 U	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.23 U	1.04 U
Perfluorohexanesulfonic Acid (PFHxS)		6.53	7.25	6.11	2.52 U	2.37 U	2.68 U	2.47 U	2.47 U	4.38 J
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.14 U	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.23 U	1.04 U
Perfluoroheptanoic Acid (PFHpA)		0.75 J	0.65 J	1.69 U	1.89 U	1.78 U	2.01 U	1.85 U	1.85 U	1.56 U
Perfluorononanoic Acid (PFNA)		1.87 J	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.46 J	1.04 U
Perfluorotetradecanoic Acid (PFTeDA)		2.86 U	2.84 U	2.82 U	3.14 U	2.96 U	3.36 U	3.09 U	3.09 U	2.6 U
Perfluorotridecanoic Acid (PFTrDA)		1.14 U	1.14 U	1.13 U	1.26 U	1.18 U	1.34 U	1.23 U	1.23 U	1.04 U

### Notes:

# Exceeds one or more criteria

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ng/g - nanograms per gram μg/kg - micrograms per kilogram ng/g = μg/kg

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID			PX-BR-ACS-SO05			PX-ETA-SO01		PX-ETA-SO02		
Sample ID	PAX PFAS SO Values	PX-BR-ACS-SS05-000H	PX-BR-ACS-SS05P-000H	PX-BR-ACS-SB05-0304	PX-ETA-SS01-000H	PX-ETA-SB01-0304	PX-ETA-SB01P-0304	PX-ETA-SS02-000H	PX-ETA-SB02-0304	
Sample Date		08/17/20	08/17/20	08/17/20	07/29/20	07/29/20	07/29/20	07/29/20	07/29/20	
Chemical Name										
Per- and Polyfluooalkyl Substances (ng/g)										
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.31 U	2.23 U	2.41 U	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		1.16 U	1.12 U	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.73 U	1.68 U	1.81 U	1.61 U	1.68 U	1.69 U	1.54 U	1.89 U	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.31 U	2.23 U	2.41 U	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.89 U	2.79 U	3.01 U	2.69 U	2.79 U	2.81 U	2.56 U	3.14 U	
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.31 U	2.23 U	2.41 U	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
Perfluorooctanesulfonic Acid (PFOS)	130	137.57	123.77	59.24	0.82 J	2.23 U	2.25 U	0.84 J	2.52 U	
Perfluoroundecanoic Acid (PFUnA)		1.16 U	1.12 U	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	
Perfluorohexanoic Acid (PFHxA)		2.02 J	1.86 J	2.41 U	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
Perfluorododecanoic Acid (PFDoA)		2.31 U	2.23 U	2.41 U	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
Perfluorooctanoic Acid (PFOA)	130	2.75 J	2.35 J	2.41 U	2.15 U	2.23 U	2.25 U	1.19 J	2.52 U	
Perfluorodecanoic Acid (PFDA)		1.16 U	1.12 U	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	
Perfluorohexanesulfonic Acid (PFHxS)		11.01	9.7	1.35 J	2.15 U	2.23 U	2.25 U	2.05 U	2.52 U	
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.16 U	1.12 U	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	
Perfluoroheptanoic Acid (PFHpA)		1 J	0.99 J	1.81 U	1.61 U	1.68 U	1.69 U	1.54 U	1.89 U	
Perfluorononanoic Acid (PFNA)		1.98 J	1.69 J	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	
Perfluorotetradecanoic Acid (PFTeDA)		2.89 U	2.79 U	3.01 U	2.69 U	2.79 U	2.81 U	2.56 U	3.14 U	
Perfluorotridecanoic Acid (PFTrDA)		1.16 U	1.12 U	1.2 U	1.08 U	1.12 U	1.12 U	1.03 U	1.26 U	

### Notes:

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ng/g - nanograms per gram μg/kg - micrograms per kilogram

ng/g = μg/kg

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-ETA	N-SO03	PX-ETA	A-SO04		PX-ETA-SO05	PX-ETA-SO06		
Sample ID	PAX PFAS SO Values	PX-ETA-SS03-000H	PX-ETA-SB03-0304	PX-ETA-SS04-000H	PX-ETA-SB04-0304	PX-ETA-SS05-000H	PX-ETA-SS05P-000H	PX-ETA-SB05-0304	PX-ETA-SS06-000H	PX-ETA-SB06-0304
Sample Date		07/30/20	07/30/20	07/29/20	07/29/20	07/30/20	07/30/20	07/30/20	07/30/20	07/30/20
Chemical Name										
Per- and Polyfluooalkyl Substances (ng/g)										
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.14 U	2.44 U	2.05 U	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		1.07 U	1.22 U	1.03 U	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.6 U	1.83 U	1.54 U	1.6 U	1.61 U	1.52 U	1.81 U	1.91 U	1.73 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.14 U	2.44 U	2.12 J	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.67 U	3.05 U	2.56 U	2.67 U	2.69 U	2.53 U	3.01 U	3.18 U	2.89 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.14 U	2.44 U	2.05 U	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
Perfluorooctanesulfonic Acid (PFOS)	130	0.91 J	2.44 U	17.32	2.14 U	0.99 J	2.02 U	2.41 U	2.55 U	1.08 J
Perfluoroundecanoic Acid (PFUnA)		1.07 U	1.22 U	1.34 J	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U
Perfluorohexanoic Acid (PFHxA)		2.14 U	2.44 U	2.05 U	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
Perfluorododecanoic Acid (PFDoA)		2.14 U	2.44 U	2.05 U	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
Perfluorooctanoic Acid (PFOA)	130	1.35 J	1.73 J	2.98 J	5.49	2.15 U	2.02 U	2.41 U	2.55 U	1.48 J
Perfluorodecanoic Acid (PFDA)		1.07 U	1.22 U	14.12	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U
Perfluorohexanesulfonic Acid (PFHxS)		2.14 U	2.44 U	2.05 U	2.14 U	2.15 U	2.02 U	2.41 U	2.55 U	2.31 U
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.07 U	1.22 U	1.03 U	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U
Perfluoroheptanoic Acid (PFHpA)		1.6 U	1.83 U	0.82 J	1.6 U	1.61 U	1.52 U	1.81 U	1.91 U	1.73 U
Perfluorononanoic Acid (PFNA)		1.07 U	1.22 U	4.5 J	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U
Perfluorotetradecanoic Acid (PFTeDA)		2.67 U	3.05 U	2.56 U	2.67 U	2.69 U	2.53 U	3.01 U	3.18 U	2.89 UJ
Perfluorotridecanoic Acid (PFTrDA)		1.07 U	1.22 U	1.03 U	1.07 U	1.08 U	1.01 U	1.2 U	1.27 U	1.16 U

### Notes:

# Exceeds one or more criteria

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Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-H2133-SO01			PX-H2133-S002		PX-H2133-SO03		PX-H2133-SO04	
Sample ID	PAX PFAS SO Values	PX-H2133-SS01-000H	PX-H2133-SB01-0304	PX-H2133-SB01P-0304	PX-H2133-SS02-000H	PX-H2133-SB02-0304	PX-H2133-SS03-000H	PX-H2133-SB03-0304	PX-H2133-SS04-000H	PX-H2133-SB04-0304
Sample Date		08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20
Chemical Name										
Per- and Polyfluooalkyl Substances (ng/g)										
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.34 U	2.25 U	2.23 U	2.4 U	2.25 U	2.27 U	2.13 U	2.35 U	2.31 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		1.17 U	1.12 U	1.12 U	1.2 U	1.12 U	1.14 U	1.06 U	1.18 U	1.16 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.75 U	1.69 U	1.68 U	1.8 U	1.69 U	1.7 U	1.6 U	1.76 U	1.73 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.34 U	2.25 U	2.23 U	2.4 U	2.25 U	2.27 U	2.13 U	2.35 U	2.31 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.92 U	2.81 U	2.79 U	2.99 U	2.81 U	2.84 U	2.66 U	2.94 U	2.89 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.34 U	2.25 U	2.23 U	2.4 U	2.25 U	2.27 U	2.13 U	2.35 U	2.31 U
Perfluorooctanesulfonic Acid (PFOS)	130	2.34 U	2.25 U	2.23 U	14.85	2.25 U	1.59 J	2.13 U	2.35 U	2.31 U
Perfluoroundecanoic Acid (PFUnA)		1.17 U	1.12 U	1.12 U	1.2 U	1.12 U	1.14 U	1.06 U	0.74 J	1.16 U
Perfluorohexanoic Acid (PFHxA)		2.34 U	2.25 U	2.23 U	1.22 J	2.25 U	2.27 U	2.13 U	1.93 J	2.31 U
Perfluorododecanoic Acid (PFDoA)		2.34 U	2.25 U	2.23 U	2.4 U	2.25 U	2.27 U	2.13 U	2.35 U	2.31 U
Perfluorooctanoic Acid (PFOA)	130	2.34 U	2.25 U	2.23 U	2.66 J	2.25 U	2.27 U	2.13 U	2.04 J	2.31 U
Perfluorodecanoic Acid (PFDA)		1.17 U	1.12 U	1.12 U	0.85 J	1.12 U	1.14 U	1.06 U	1.08 J	1.16 U
Perfluorohexanesulfonic Acid (PFHxS)		2.34 U	2.25 U	2.23 U	2.16 J	2.25 U	2.27 U	2.13 U	2.35 U	2.31 U
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.17 U	1.12 U	1.12 U	1.2 U	1.12 U	1.14 U	1.06 U	1.18 U	1.16 U
Perfluoroheptanoic Acid (PFHpA)		1.75 U	0.59 J	1.68 U	1.09 J	0.78 J	1.7 U	1.6 U	1.76 U	1.73 U
Perfluorononanoic Acid (PFNA)		1.17 U	1.12 U	1.12 U	2.2 J	1.12 U	1.14 U	1.06 U	0.99 J	1.16 U
Perfluorotetradecanoic Acid (PFTeDA)		2.92 U	2.81 U	2.79 U	2.99 U	2.81 U	2.84 U	2.66 U	2.94 U	2.89 U
Perfluorotridecanoic Acid (PFTrDA)		1.17 U	1.12 U	1.12 U	1.2 U	1.12 U	1.14 U	1.06 U	1.18 U	1.16 U

### Notes:

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Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-H2133-S005			PX-H213	33-SO06	PX-H2905-S001			
Sample ID	PAX PFAS SO Values	PX-H2133-SS05-000H	PX-H2133-SS05P-000H	PX-H2133-SB05-0304	PX-H2133-SS06-000H	PX-H2133-SB06-0304	PX-H2905-SS01-000H	PX-H2905-SB01-0304	PX-H2905-SB01P-0304	
Sample Date		08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	07/27/20	07/27/20	07/27/20	
Chemical Name										
Per- and Polyfluooalkyl Substances (ng/g)										
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.34 U	2.42 U	2.25 U	2.34 U	2.15 U	1.91 U	2.11 U	2.13 U	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)		1.17 U	1.21 U	1.12 U	1.17 U	1.08 U	0.96 U	1.05 U	1.06 U	
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.75 U	1.82 U	1.69 U	1.75 U	1.61 U	1.44 U	1.58 U	1.6 U	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.34 U	2.42 U	2.25 U	2.34 U	2.15 U	1.91 U	2.11 U	2.13 U	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.92 U	3.03 U	2.81 U	2.92 U	2.69 U	2.39 U	2.63 U	2.66 U	
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.34 U	2.42 U	2.25 U	2.34 U	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluorooctanesulfonic Acid (PFOS)	130	2.34 U	2.42 U	2.25 U	2.34 J	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluoroundecanoic Acid (PFUnA)		1.17 U	1.21 U	1.12 U	20.22	1.08 U	0.96 U	1.05 U	1.06 U	
Perfluorohexanoic Acid (PFHxA)		2.34 U	0.9 J	2.25 U	28.66	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluorododecanoic Acid (PFDoA)		2.34 U	2.42 U	2.25 U	14.57	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluorooctanoic Acid (PFOA)	130	0.87 J	1.12 J	2.25 U	23.83	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluorodecanoic Acid (PFDA)		1.17 U	1.21 U	1.12 U	57.81	0.66 J	0.96 U	1.05 U	1.06 U	
Perfluorohexanesulfonic Acid (PFHxS)		2.34 U	2.42 U	2.25 U	2.34 U	2.15 U	1.91 U	2.11 U	2.13 U	
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.17 U	1.21 U	1.12 U	1.17 U	1.08 U	0.96 U	1.05 U	1.06 U	
Perfluoroheptanoic Acid (PFHpA)		0.71 J	0.84 J	1.69 U	23.02	1.61 U	1.44 U	1.58 U	1.6 U	
Perfluorononanoic Acid (PFNA)		0.87 J	1 J	1.12 U	17.29	1.08 U	0.96 U	1.05 U	1.06 U	
Perfluorotetradecanoic Acid (PFTeDA)		2.92 U	3.03 U	2.81 U	4.31 J	2.69 U	2.39 U	2.63 U	2.66 U	
Perfluorotridecanoic Acid (PFTrDA)		1.17 U	1.21 U	1.12 U	3.34 J	1.08 U	0.96 U	1.05 U	1.06 U	

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ng/g - nanograms per gram μg/kg - micrograms per kilogram

ng/g = μg/kg

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-H2905-SO02		PX-H290	05-SO03	PX-H2905-SO04		PX-H2905-SO05			
Sample ID	PAX PFAS SO Values	PX-H2905-SS02-000H	PX-H2905-SB02-0304	PX-H2905-SS03-000H	PX-H2905-SB03-0304	PX-H2905-SS04-000H	PX-H2905-SB04-0304	PX-H2905-SS05-000H	PX-H2905-SS05P-000H	PX-H2905-SB05-0304	
Sample Date		07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	
Chemical Name											
Per- and Polyfluooalkyl Substances (ng/g)											
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		2.34 U	2.26 U	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		1.17 U	1.13 U	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUd		1.75 U	1.69 U	1.55 U	1.55 U	1.57 U	1.65 U	1.59 U	1.69 U	1.89 U	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		2.34 U	2.26 U	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		2.92 U	2.82 U	2.58 U	2.58 U	2.62 U	2.75 U	2.65 U	2.82 U	3.14 U	
Hexafluoropropylene oxide dimer acid (HFPO-DA)		2.34 U	2.26 U	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluorooctanesulfonic Acid (PFOS)	130	2.34 U	2.26 U	2.06 U	2.06 U	0.74 J	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluoroundecanoic Acid (PFUnA)		1.17 U	1.13 U	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	
Perfluorohexanoic Acid (PFHxA)		2.34 U	2.82 J	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluorododecanoic Acid (PFDoA)		2.34 U	2.26 U	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluorooctanoic Acid (PFOA)	130	2.34 U	1.3 J	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluorodecanoic Acid (PFDA)		1.17 U	0.56 J	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	
Perfluorohexanesulfonic Acid (PFHxS)		2.34 U	2.26 U	2.06 U	2.06 U	2.09 U	2.2 U	2.12 U	2.26 U	2.52 U	
Perfluorobutanesulfonic Acid (PFBS)	1,900	1.17 U	1.13 U	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	
Perfluoroheptanoic Acid (PFHpA)		1.75 U	5.91	1.55 U	1.55 U	0.92 J	1.65 U	1.59 U	1.69 U	1.89 U	
Perfluorononanoic Acid (PFNA)		1.17 U	1.13 U	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	
Perfluorotetradecanoic Acid (PFTeDA)		2.92 U	2.82 U	2.58 U	2.58 U	2.62 U	2.75 U	2.65 U	2.82 U	3.14 U	
Perfluorotridecanoic Acid (PFTrDA)		1.17 U	1.13 U	1.03 U	1.03 U	1.05 U	1.1 U	1.06 U	1.13 U	1.26 U	

### Notes:

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## **Bold indicates detections**

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate

ng/g - nanograms per gram μg/kg - micrograms per kilogram ng/g = μg/kg

\_\_\_\_\_

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-BR-ACS-WT01	PX-BR-A	CS-WT02	PX-BR-ACS-WT03	PX-BR-ACS-WT04	PX-BR-ACS-WT05	PX-BR-ACS-WT06	PX-BR-ACS-WT07
Sample ID	PAX PFAS GW Values	PX-BR-ACS-WT01-0820	PX-BR-ACS-WT02-0820	PX-BR-ACS-WT02P-0820	PX-BR-ACS-WT03-0820	PX-BR-ACS-WT04-0820	PX-BR-ACS-WT05-0820	PX-BR-ACS-WT06-0820	PX-BR-ACS-WT07-0820
Sample Date		08/17/20	08/18/20	08/18/20	08/18/20	08/18/20	08/17/20	08/19/20	08/18/20
Chemical Name									
Per- and Polyfluoroalkyl Substances (ng/L)									
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		0.89 U	0.98 U	0.93 U	1.02 U	1 U	0.91 U	1 U	1 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		0.89 U	0.98 U	0.93 U	1.02 U	1 U	0.91 U	1 U	1 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		0.45 U	0.49 U	0.46 U	0.51 U	0.5 U	0.45 U	0.5 U	0.25 J
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.89 U	0.98 U	0.93 U	1.02 U	1 U	0.91 U	1 U	1 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.89 U	0.98 U	0.93 U	1.02 U	1 U	0.91 U	1 U	1 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		0.45 U	0.49 U	0.46 U	0.51 U	0.5 UJ	0.45 U	0.5 U	0.5 U
Perfluorooctanesulfonic Acid (PFOS)	40	799.32	1,395.67	1,157.47	113.57	228.56	1,989.99	78.92	63.31
Perfluoroundecanoic Acid (PFUnA)		0.39 J	0.49 U	0.46 U	0.51 U	0.5 UJ	0.45 U	0.5 U	0.5 U
Perfluorohexanoic Acid (PFHxA)		64.78	25.69	26.62	14.45	80.12 J	147.67	72.29	131.17
Perfluorododecanoic Acid (PFDoA)		0.45 U	0.49 U	0.46 U	0.51 U	0.5 UJ	0.45 U	0.5 U	0.5 U
Perfluorooctanoic Acid (PFOA)	40	62.12	25.4	23.93	20.71	55.4 J	117.12	28.32	42.33
Perfluorodecanoic Acid (PFDA)		4.13 J	0.32 J	0.3 J	0.51 U	0.19 J	0.33 J	0.23 J	0.5 U
Perfluorohexanesulfonic Acid (PFHxS)		174.46	189.22	165.26	89.48	209.16	1,083.71	195.08	681.2
Perfluorobutanesulfonic Acid (PFBS)	600	4.49	2.55 J	2.55 J	3.03 J	8.73	12.35	12.83	24.04
Perfluoroheptanoic Acid (PFHpA)		58.19	10.24	10.21	4.61 J	29.64 J	53.66	11.46	37.27
Perfluorononanoic Acid (PFNA)		44.4	26.35	25.06	1.02 U	14.63 J	47.92	0.47 J	1.28 J
Perfluorotetradecanoic Acid (PFTeDA)		1.79 U	1.96 U	1.85 U	2.04 U	2 UJ	1.82 U	2 U	2 UJ
Perfluorotridecanoic Acid (PFTrDA)		0.45 U	0.49 U	0.46 U	0.51 U	0.5 U	0.45 U	0.5 U	0.51 J

### Notes:

# Exceeds one or more criteria

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate
- ng/L nanograms per liter

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-ETA-WT01	PX-ET/	N-WT02	PX-ETA-WT03	PX-ETA-WT04	PX-ETA-WT05	PX-ETA-WT06	PX-ETA-WT07
Sample ID	PAX PFAS GW Values	PX-ETA-WT01-0720	PX-ETA-WT02-0720	PX-ETA-WT02P-0720	PX-ETA-WT03-0720	PX-ETA-WT04-0720	PX-ETA-WT05-0720	PX-ETA-WT06-0720	PX-ETA-WT07-0820
Sample Date		07/29/20	07/29/20	07/29/20	07/30/20	07/30/20	07/30/20	07/30/20	08/18/20
Chemical Name									
Per- and Polyfluoroalkyl Substances (ng/L)									
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		0.94 U	0.98 U	0.94 U	0.98 U	0.96 U	0.93 U	0.96 U	0.93 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		0.94 U	0.98 U	0.94 U	0.98 U	0.96 U	0.93 U	0.96 U	0.93 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		0.47 U	0.49 U	0.47 U	0.49 U	0.48 U	0.46 U	0.48 U	0.46 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.94 UJ	0.98 U	0.94 U	0.98 U	0.96 U	0.93 U	0.96 U	0.93 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.94 UJ	0.98 U	0.94 U	0.98 U	0.96 U	0.93 U	0.96 U	0.93 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		0.47 U	0.49 U	0.47 U	0.49 U	0.48 U	0.46 U	0.48 U	0.46 U
Perfluorooctanesulfonic Acid (PFOS)	40	16.1	8.85	8.33	6.88	33.37	24.47	10.46	1.13 J
Perfluoroundecanoic Acid (PFUnA)		0.47 U	0.49 U	0.47 U	0.49 U	0.54 J	0.84 J	0.38 J	0.46 U
Perfluorohexanoic Acid (PFHxA)		18.32	9.92 J	7.62 J	8.93	13.53	19.92	5.38	1.15 J
Perfluorododecanoic Acid (PFDoA)		0.47 UJ	0.49 U	0.47 UJ	0.49 U	0.48 U	0.46 U	0.48 U	0.46 U
Perfluorooctanoic Acid (PFOA)	40	13.99	16.29	13.65	25.15	46.18	347.71	15.76	1.88 J
Perfluorodecanoic Acid (PFDA)		0.47 U	0.17 J	0.2 J	0.49 U	15.2	3.74 J	0.97 J	0.46 U
Perfluorohexanesulfonic Acid (PFHxS)		65.93	5.61	5.58	10.17	13.13	21.51	5.9	1.67 J
Perfluorobutanesulfonic Acid (PFBS)	600	17.34	2.27 J	1.8 J	2.93 J	2.32 J	2.8 J	1.74 J	1.19 J
Perfluoroheptanoic Acid (PFHpA)		4.76	4.46 J	3.81 J	6.51	8.64	8.5	4.18 J	0.75 J
Perfluorononanoic Acid (PFNA)		0.94 J	1.31 J	1.17 J	1.17 J	11.04	3.54 J	3.24 J	0.93 U
Perfluorotetradecanoic Acid (PFTeDA)		1.89 UJ	1.96 UJ	1.89 UJ	1.96 U	1.92 U	1.85 U	1.92 U	1.85 U
Perfluorotridecanoic Acid (PFTrDA)		0.47 U	0.49 U	0.47 U	0.49 U	0.48 U	0.46 U	0.48 U	0.46 U

### Notes:

# Exceeds one or more criteria

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate
- ng/L nanograms per liter

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-H2133-WT01	PX-H2133-WT02	PX-H2133-WT03	PX-H2133-WT04	PX-H2133-WT05	PX-H213	33-WT06	PX-H2905-WT01
Sample ID	PAX PFAS GW Values	PX-H2133-WT01-0820	PX-H2133-WT02-0820	PX-H2133-WT03-0820	PX-H2133-WT04-0820	PX-H2133-WT05-0820	PX-H2133-WT06-0820	PX-H2133-WT06P-0820	PX-H2905-WT01-0720
Sample Date		08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	08/20/20	07/27/20
Chemical Name									
Per- and Polyfluoroalkyl Substances (ng/L)									
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		0.94 U	1 U	1.04 U	0.98 U	0.94 U	0.94 U	0.94 U	0.96 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		0.94 U	1 U	1.04 U	0.98 U	0.94 U	0.94 U	0.94 U	0.96 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		0.47 U	0.5 U	0.52 U	0.49 U	0.47 U	0.47 U	0.47 U	0.48 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.94 U	1 U	1.04 U	0.98 U	0.94 U	0.94 U	0.94 U	0.96 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.94 U	1 U	1.04 U	0.98 U	0.94 U	0.94 U	0.94 U	0.96 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		0.37 J	0.5 U	0.52 U	0.39 J	0.34 J	0.53 J	0.48 J	0.48 U
Perfluorooctanesulfonic Acid (PFOS)	40	10.11	6.48	6.63	135.83 J	29.44	12.45	12.8	99.65
Perfluoroundecanoic Acid (PFUnA)		0.22 J	0.5 U	0.52 U	3.99 J	0.4 J	4.04 J	4.22 J	0.48 U
Perfluorohexanoic Acid (PFHxA)		110.51	119.11	2.68 J	513.23	1,438.38	578.25	550.92	23.06
Perfluorododecanoic Acid (PFDoA)		0.47 U	0.5 U	0.52 U	1.97 J	0.47 U	0.7 J	0.64 J	0.48 U
Perfluorooctanoic Acid (PFOA)	40	36.58	7.94	3.47 J	205.56	1,138.18	187.61	201.81	24.17
Perfluorodecanoic Acid (PFDA)		1.35 J	0.16 J	0.26 J	9.43	11.41	30.01	29.03	0.2 J
Perfluorohexanesulfonic Acid (PFHxS)		3.32 J	16.24	7.43	179.57 J	294.39	4.25 J	4.27 J	38.21
Perfluorobutanesulfonic Acid (PFBS)	600	6.07	30.32	1.12 J	17.67	60.8	3.72 J	4 J	3.63 J
Perfluoroheptanoic Acid (PFHpA)		68.46	43.07	2.53 J	382.41	601.5	545.81	521.54	12.69
Perfluorononanoic Acid (PFNA)		9.12	1.17 J	1.13 J	26.73	36.89	68.57	68.52	5
Perfluorotetradecanoic Acid (PFTeDA)		1.89 U	2 UJ	2.08 UJ	1.96 U	1.89 U	1.89 U	1.89 UJ	1.92 U
Perfluorotridecanoic Acid (PFTrDA)		0.47 U	0.5 U	0.52 U	0.66 J	0.47 U	0.47 U	0.47 U	0.48 U

### Notes:

# Exceeds one or more criteria

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate
- ng/L nanograms per liter

Buildings 215 and 217, Hangar 2905, Hangar 2133, and Bronson Road Basewide PFAS Site Inspection Report NAS Patuxent River

St. Mary's County, Maryland

Station ID		PX-H290	)5-WT02	PX-H2905-WT03	PX-H2905-WT04	PX-H2905-WT05	PX-H2905-WT06	PX-H2905-WT07
Sample ID	PAX PFAS GW Values	PX-H2905-WT02-0720	PX-H2905-WT02P-0720	PX-H2905-WT03-0720	PX-H2905-WT04-0720	PX-H2905-WT05-0720	PX-H2905-WT06-0720	PX-H2905-WT07-0720
Sample Date		07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20	07/27/20
Chemical Name								
Per- and Polyfluoroalkyl Substances (ng/L)								
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		0.93 U	0.96 U	0.94 U	0.96 U	0.96 U	0.94 U	0.96 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)		0.93 U	0.96 U	0.94 U	0.96 U	0.96 U	0.94 U	0.96 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		0.46 U	0.48 U	0.47 U	0.48 U	0.48 U	0.47 U	0.48 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.93 UJ	0.96 UJ	0.94 U	0.96 UJ	0.96 U	0.94 UJ	0.96 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.93 UJ	0.96 UJ	0.94 U	0.96 UJ	0.96 UJ	0.94 UJ	0.96 UJ
Hexafluoropropylene oxide dimer acid (HFPO-DA)		0.46 U	0.48 U	0.47 U	0.48 UJ	0.48 U	1.22 J	0.48 U
Perfluorooctanesulfonic Acid (PFOS)	40	41.73	46.1	30.69	59.1 J	85.18	34.61	38.09
Perfluoroundecanoic Acid (PFUnA)		0.46 U	0.48 U	0.47 U	0.48 U	0.48 U	0.47 U	0.48 U
Perfluorohexanoic Acid (PFHxA)		13.82	14.99	58.46	1,014.80	25.99	113.83	12.23
Perfluorododecanoic Acid (PFDoA)		0.46 U	0.48 U	0.47 U	0.48 U	0.48 U	0.47 UJ	0.48 U
Perfluorooctanoic Acid (PFOA)	40	13.15	13.52	34.01	71.18 J	28.54	69.77	11.92
Perfluorodecanoic Acid (PFDA)		0.46 U	0.14 J	0.47 U	0.21 J	0.46 J	0.78 J	0.55 J
Perfluorohexanesulfonic Acid (PFHxS)		21.8	21.88	86.07	28.1	31.45	47.24	25.77
Perfluorobutanesulfonic Acid (PFBS)	600	1.99 J	2.52 J	12.52	7.61	3.49 J	13.39	2.54 J
Perfluoroheptanoic Acid (PFHpA)		7.17	7.74	23.66	73.89	15 J	51.02	6.15
Perfluorononanoic Acid (PFNA)		2.46 J	2.43 J	2.02 J	4.38 J	4.84	4.84	1.54 J
Perfluorotetradecanoic Acid (PFTeDA)		1.85 UJ	1.92 UJ	1.89 UJ	1.92 U	1.92 UJ	1.89 UJ	1.92 UJ
Perfluorotridecanoic Acid (PFTrDA)		0.46 U	0.48 U	0.47 U	0.48 U	0.48 U	0.47 U	0.48 U

### Notes:

# Exceeds one or more criteria

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate
- ng/L nanograms per liter

Table D-3. Surface Water PFAS Analytical Data

Hangar 2133
Basewide PFAS Site Inspection Report
NAS Patuxent River
St. Mary's County, Maryland

Station ID		PX-H2133	3-SDSW01	PX-H2133-SDSW02
Sample ID	PAX PFAS SW Values	PX-H2133-SW01-0820	PX-H2133-SW01P-0820	PX-H2133-SW02-0820
Sample Date		08/20/20	08/20/20	08/20/20
Chemical Name				
Per- and Polyfluoroalkyl Substances (ng/L)				
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		0.94 U	0.98 U	0.94 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		0.94 U	0.98 U	0.94 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		0.47 U	0.49 U	0.47 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		0.94 U	0.98 U	0.94 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		0.94 U	0.98 U	0.94 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		0.47 U	0.49 U	0.47 U
Perfluorooctanesulfonic Acid (PFOS)	400	7.53	6.56	10.2
Perfluoroundecanoic Acid (PFUnA)		0.89 J	0.84 J	1.89 J
Perfluorohexanoic Acid (PFHxA)		58.4	50.39	40.74
Perfluorododecanoic Acid (PFDoA)		0.19 J	0.22 J	0.75 J
Perfluorooctanoic Acid (PFOA)	400	41.19	36.62	25.45
Perfluorodecanoic Acid (PFDA)		3.32 J	2.74 J	4.11 J
Perfluorohexanesulfonic Acid (PFHxS)		3.96 J	4.19 J	3.69 J
Perfluorobutanesulfonic Acid (PFBS)	6,000	4.59 J	3.97 J	2.77 J
Perfluoroheptanoic Acid (PFHpA)		46.68	41.23	30.24
Perfluorononanoic Acid (PFNA)		11.48	9.99	10.22
Perfluorotetradecanoic Acid (PFTeDA)		1.89 UJ	1.96 UJ	1.89 U
Perfluorotridecanoic Acid (PFTrDA)		0.47 U	0.17 J	0.16 J

#### Notes:

### Exceeds one or more criteria

- J Analyte present, value may or may not be accurate or precise
- U The material was analyzed for, but not detected
- UJ Analyte not detected, quantitation limit may be inaccurate
- ng/L nanograms per liter

## Table D-4. Sediment PFAS Analytical Data

Hangar 2133
Basewide PFAS Site Inspection Report
NAS Patuxent River
St. Mary's County, Maryland

Station ID		PX-H2133-SDSW01	PX-H2133	3-SDSW02
Sample ID	PAX PFAS SD Values	PX-H2133-SD01-000H	PX-H2133-SD02-000H	PX-H2133-SD02P-000H
Sample Date		08/20/20	08/20/20	08/20/20
Chemical Name				
Per- and Polyfluoroalkyl Substances (ng/g)				
4,8-dioxa-3H-perfluorononanoic acid (ADONA)		6.45 U	4.6 U	10 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)		3.23 U	2.3 U	5 U
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)		4.84 U	3.45 U	7.5 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		6.45 U	4.6 U	10 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		8.06 U	5.75 U	12.5 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)		6.45 U	4.6 U	10 U
Perfluorooctanesulfonic Acid (PFOS)	1,300	3.07 J	2.48 J	8.14 J
Perfluoroundecanoic Acid (PFUnA)		5.62 J	1.56 J	5.93 J
Perfluorohexanoic Acid (PFHxA)		3.11 J	4.6 U	10 U
Perfluorododecanoic Acid (PFDoA)		3.88 J	4.6 U	10 U
Perfluorooctanoic Acid (PFOA)	1,300	2.36 J	4.6 U	10 U
Perfluorodecanoic Acid (PFDA)		3.23 U	2.3 U	4.37 J
Perfluorohexanesulfonic Acid (PFHxS)		6.45 U	4.6 U	10 U
Perfluorobutanesulfonic Acid (PFBS)	19,000	3.23 U	2.3 U	5 U
Perfluoroheptanoic Acid (PFHpA)		2.96 J	3.45 U	7.5 U
Perfluorononanoic Acid (PFNA)		1.96 J	2.3 U	4.8 J
Perfluorotetradecanoic Acid (PFTeDA)		8.06 U	5.75 U	12.5 U
Perfluorotridecanoic Acid (PFTrDA)		1.89 J	2.3 U	5 U

#### Notes:

### Exceeds one or more criteria

### **Bold indicates detections**

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

ng/g - nanograms per gram

μg/kg - micrograms per kilogram

 $ng/g = \mu g/kg$