FINAL PRELIMINARY ASSESSMENT AND SITE INSPECTION OF PER- AND POLYFLUOROALKYL SUBSTANCES

Fort Hood, Texas

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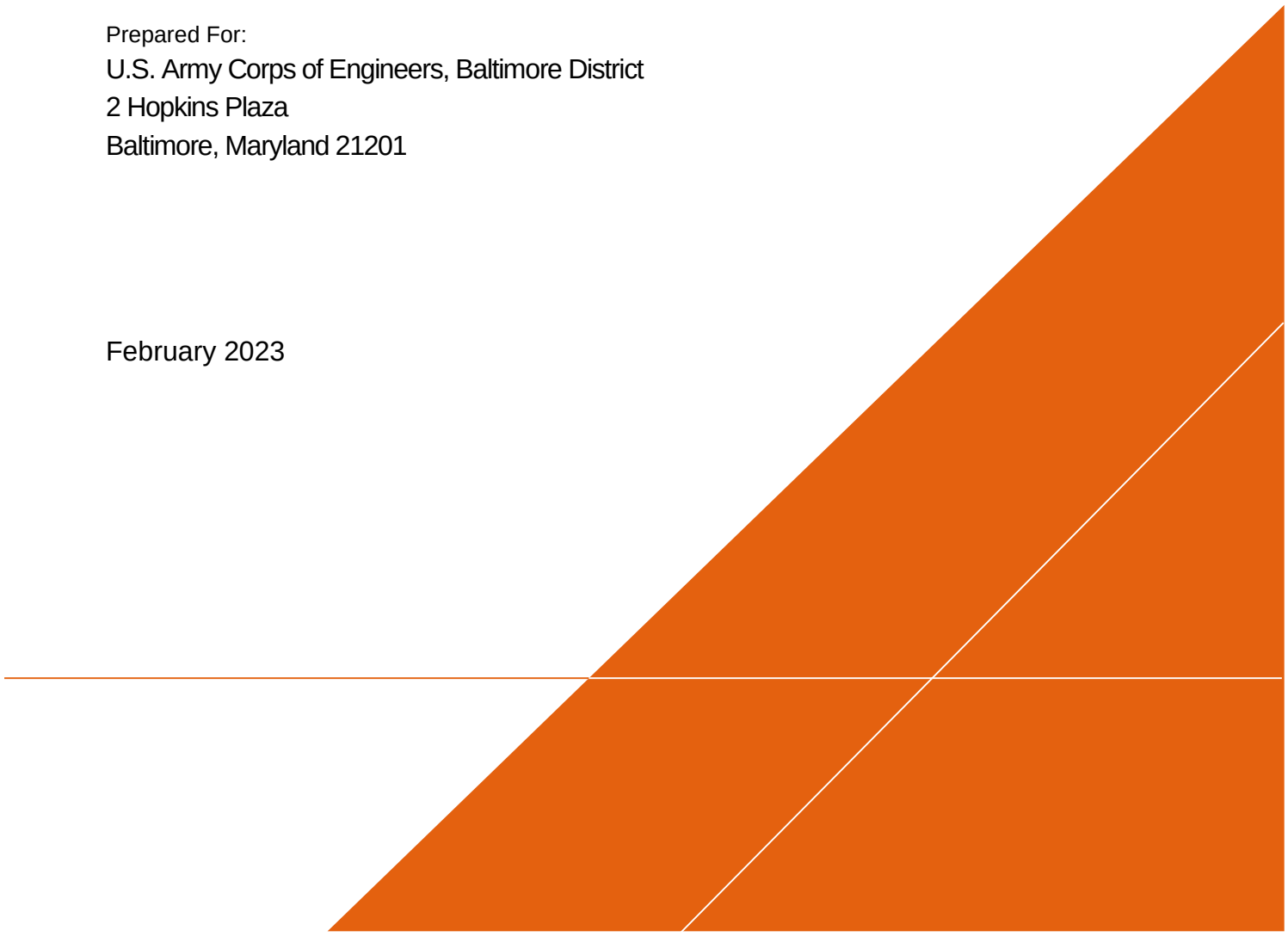

Final Preliminary Assessment and Site Inspection of Per- and Polyfluoroalkyl Substances

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EXECUTIVE SUMMARY

The United States Army (Army) is performing preliminary assessments (PAs) and site inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexane sulfonate (PFHxS), and hexafluoropropylene oxide dimer acid (HFPO-DA) at Army installations (installations) nationwide. The PA identifies areas of potential interest (AOPIs) where PFAS-containing materials were used, stored, and/or disposed, or areas where known or suspected releases to the environment occurred. The SI includes multi-media sampling at AOPIs to determine whether a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. This Fort Hood PA/SI was completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), National Oil and Hazardous Substances Pollution Contingency Plan, and Army/Department of Defense (DoD) policy and guidance.

Fort Hood occupies approximately 218,419 acres in central Texas in Bell and Coryell counties. The installation has three cantonment areas (designated the main cantonment area [also known as South Fort Hood], West Fort Hood, and North Fort Hood) on 8,604 acres, two airfields on 2,915 acres, and maneuver and live-fire training areas on 197,603 acres. The main cantonment area is at the southern edge of the large, central portion of the installation and is adjacent to Killeen, Texas. West Fort Hood is near Copperas Cove, Texas, in the center of the southern extension of the installation. North Fort Hood is near Gatesville, Texas, in the northernmost part of the installation. Both urban and rural areas surround Fort Hood. Urban land uses are primarily residential, business, and industrial. The rural areas surrounding Fort Hood support the agricultural land uses of farming and cattle ranching. Nearby Belton and Stillhouse Hollow reservoirs are used for recreation by surrounding communities and Fort Hood residents. Fort Hood does not utilize groundwater as a drinking water supply or for any other beneficial use.

The Fort Hood PA identified 27 AOPIs for investigation during the SI phase. SI sampling was completed at 26 of the 27 AOPIs[1] during the SI field events completed during the first mobilization on 20 to 30 July 2020, the second mobilization on 17 to 22 November 2021, and the third mobilization on 1 to 2 December 2021. SI sampling results from the 26 AOPIs were compared to residential risk screening levels for soil and groundwater (tap water) as well as industrial/commercial risk screening levels calculated by the Office of the Secretary of Defense (OSD) for PFOS, PFOA, PFBS, PFNA, and PFHxS based on the USEPA oral reference dose for PFOS, PFOA, PFBS, PFNA, and PFHxS.

HFPO-DA was not in the suite of PFAS compounds analyzed during the SI at Fort Hood; therefore, there are no HFPO-DA SI analytical results to compare to the 2022 OSD risk screening levels. PFOS, PFOA, PFBS, PFNA, and/or PFHxS were detected in soil and/or groundwater at 24 AOPIs; 14 of the 26 AOPIs

[1] Note that one of the 27 AOPIs (Building 88038) was identified as an AOPI in the PA. However, sampling was not completed at this location as potential PFAS-containing material was disposed at an indoor location into a sanitary sewer discharging to a municipal wastewater treatment plant, and potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling.

sampled had PFOS, PFOA, PFBS, PFNA, and/or PFHxS present at concentrations greater than the risk-based screening levels.

The Fort Hood PA/SI identified the need for further study in a CERCLA remedial investigation. **Table ES-1** below summarizes the PA/SI sampling results and provides recommendations for further study in a remedial investigation or no action at this time at each AOPI.

Table ES-1. Summary of AOPIs Identified during the PA, PFOS, PFOA, PFBS, PFNA, and PFHxS Sampling at Fort Hood, and Recommendations

AOPI Name	PFOS, PFOA, PFBS, PFNA, and/or PFHxS detected greater than OSD Risk Screening Levels? (Yes/No/ND/NS)		Recommendation
	GW	SO	
FH-023 – Old Firefighter Training Area	NS	No	No action at this time
FH-024 – New Firefighter Training Area	Yes	Yes	Further study in a remedial investigation
Building 2455 – Former Fire Station	NS	Yes	Further study in a remedial investigation
Building 90145 – Active Fire Station	NS	Yes	Further study in a remedial investigation
Building 3201 – Former Fire Station	ND	No	No action at this time
Building 7081 – Active Fire Station	Yes	No	Further study in a remedial investigation
Building 23025 – Active Fire Station	NS	No	No action at this time
Building 1285 – Former Fire Station	NS	ND	No action at this time
Building 4335 – Former Fire Station	No	No	No action at this time
Building 7002 – Former Fire Station	NS	Yes	Further study in a remedial investigation

AOPI Name	PFOS, PFOA, PFBS, PFNA, and/or PFHxS detected greater than OSD Risk Screening Levels? (Yes/No/ND/NS)		Recommendation
	GW	SO	
Building 52940 – Active Fire Station	NS	Yes	Further study in a remedial investigation
Building 56326 – Former Fire Station	NS	Yes	Further study in a remedial investigation
Building 56519 – Active Fire Station	ND	No	No action at this time
Building 90050 – Old Fire and Crash Hangar	NS	Yes	Further study in a remedial investigation
Building 6975 – Hangar	NS	ND	No action at this time
Building 90120 – Hangar	NS	No	No action at this time
Building 90033 – Hangar	NS	Yes	Further study in a remedial investigation
Building 90176 – Hangar	NS	No	No action at this time
Building 7027 – Hangar	Yes	No	Further study in a remedial investigation
Building 91039 – Motor Pool	Yes	Yes	Further study in a remedial investigation
Building 90094 – Hangar	NS	No	No action at this time
Building 90108 – Hangar	NS	Yes	Further study in a remedial investigation
Building 90109 – Hangar	NS	No	No action at this time
Building 90101 – Hangar	NS	No	No action at this time

AOPI Name	PFOS, PFOA, PFBS, PFNA, and/or PFHxS detected greater than OSD Risk Screening Levels? (Yes/No/ND/NS)		Recommendation
	GW	SO	
FH-001 – Abandoned Sanitary Landfill No. 1	Yes	NS	Further study in a remedial investigation
Active Fort Hood Landfill	Yes	NS	Further study in a remedial investigation
Building 88038 – Logistics[1] Readiness Center (LRC) Facility	NS	NS	No action at this time

Notes:

[1] Note that although Building 88038 was identified as a AOPI in the PA, sampling was not completed at this AOPI because potential PFAS-containing material was disposed at an indoor location into a sanitary sewer discharging to a municipal wastewater treatment plant; therefore, potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling

Light gray shading – detection greater than the OSD residential risk screening levels for tap water and soil
GW – groundwater
ND – non-detect
NS – not sampled
SO – soil

1 INTRODUCTION

The United States (U.S.) Army (Army) is performing preliminary assessments (PAs) and site inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexane sulfonate (PFHxS), and hexafluoropropylene oxide dimer acid (HFPO-DA) at Army installations (installations) nationwide. The Army is the lead agency under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Executive Order 12580 and is conducting the PA/SI consistent with its authority under CERCLA, 42 United States Code §§ 9600, et seq. (as amended), and the Defense Environmental Restoration Program, 10 United States Code §§ 2701, et seq. The PFAS PA/SI included two distinct efforts. The PA identified locations that are areas of potential interest (AOPIs) at Fort Hood based on the use, storage, and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per-and Polyfluoroalkyl Substances (Army 2018). The SI included multi-media sampling at AOPIs to determine whether a release has occurred, and the analytical results were compared to the Office of the Secretary of Defense (OSD) PFOS, PFOA, PFBS, PFNA, and PFHxS residential risk screening levels for soil and groundwater (tap water) as well as the industrial/commercial risk screening levels for soil. The risk screening levels were calculated by the OSD based on the USEPA oral reference dose for PFOS, PFOA, PFBS, PFNA, and PFHxS. This was done to determine whether further investigation is warranted. HFPO-DA was not in the suite of PFAS compounds analyzed during the SI; therefore, there are no HFPO-DA SI analytical results to compare to the OSD risk screening levels. This report provides the PA/SI for Fort Hood and was completed in accordance with CERCLA and The National Oil and Hazardous Substances Pollution Contingency Plan.

1.1 Project Background

PFAS are a class of compounds that have been used in a wide range of industrial applications and commercial products due to their unique surface tension/leveling properties. Due to industry and regulatory concerns about the potential health effects and adverse environmental impacts, there has been a reduction in the manufacture and use of PFAS worldwide. In the U.S., significant reductions in the production, importation, and use of PFOS and PFOA (two individual compounds in the PFAS class) occurred between 2001 and 2015 (Interstate Technology Regulatory Council 2017). PFBS replaced PFOS in some applications and is currently used and manufactured in the U.S.

In 2016, the United States Environmental Protection Agency (USEPA) established a lifetime health advisory of 70 nanograms per liter (ng/L) in drinking water for PFOS or PFOA and for the sum of PFOS and PFOA when both are present (USEPA 2016a). On 15 October 2019, the OSD provided guidance on the investigation of PFOS, PFOA, and PFBS at Department of Defense (DoD) restoration sites (OSD 2019). The DoD guidance provides risk screening levels for PFOS, PFOA, and PFBS in tap water and soil, calculated using the USEPA's Regional Screening Level (RSL) calculator for residential and industrial/commercial worker receptor scenarios. Following the issuance of the 2019 OSD memo, on 08 April 2021, USEPA published an updated toxicity assessment for PFBS (USEPA 2021). Based on the updated toxicity assessment for PFBS, the OSD issued a memorandum on 15 September 2021 to include updated PFBS risk screening levels (OSD 2021). On 18 May 2022, the USEPA published an update to

the RSLs table. The May 2022 RSL table included six PFAS constituents: PFOS, PFOA, PFBS, PFNA, PFHxS, and HFPO-DA (USEPA 2022). On 06 July 2022, the OSD issued a memorandum to include revised risk screening levels based on the May 2022 USEPA RSLs (OSD 2022). The SI analytical results were compared to these revised risk screening levels (residential risk screening levels for soil and tap water as well as the industrial/commercial risk screening levels for soil). The July 2022 Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program is provided for reference as **Appendix A**. These screening criteria are discussed further in **Section 6.5**.

1.2 PA/SI Objectives

This PA/SI was conducted consecutively because the results of the PA yielded AOPIs that necessitated continuing onto the SI phase in accordance with CERCLA. Consequently, this report provides the combined objectives of both PA and SI reports.

1.2.1 PA Objectives

During the PA, investigators collect readily available information and conduct site reconnaissance. This PA will evaluate and document areas where PFAS-containing materials were used, stored, and/or disposed, so the Army can distinguish between sites that pose little or no threat to human health and the environment and sites that require further investigation.

1.2.2 SI Objectives

An SI is conducted when the PA determines an AOPI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOPIs to determine whether a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required.

Installation-specific data quality objectives (DQOs) and the sampling design and rationale are summarized in **Sections 6.1** and **6.2**.

1.3 PA/SI Process Description

For Fort Hood, PA/SI development followed the process as described below. **Section 3** provides a summary of the PA activities completed, and **Section 6** provides a summary of the SI activities completed for Fort Hood. The PA and SI processes are documented in the PA/SI Quality Control Checklist included as **Appendix B**.

1.3.1 Pre-Site Visit

First, an installation kickoff teleconference was held between applicable points of contact (POCs) from United States Army Environmental Command (USAEC), United States Army Corps of Engineers (USACE), Fort Hood, and Arcadis U.S., Inc. (Arcadis). The kickoff call occurred 11 December 2018, 8 weeks before the site visit, to discuss the goals and scope of the PA, project scheduling, installation

access, timeline for the site visit, access to installation-specific databases, and to request available records.

Records review was conducted before the site visit to obtain electronically available documents from the installation and external sources for review. The purpose of the records research is to identify any area on the installation that may have been a location where PFAS-containing materials were used, stored, and/or disposed, as well as gather information on the physical setting and site history of Fort Hood.

A read-ahead package was prepared and submitted to the appropriate POCs 2 weeks before the site visit. The read-ahead package contains the following information:

- The Installation Management Command (IMCOM) operation order
- The Army PA Operations Security requirements package, which includes the antiterrorism/operations security review cover sheet (**Appendix C**)
- The PFAS PA kickoff call minutes
- An information paper on the PA portion of the Army's PFAS PA/SI
- Contact information for key POCs
- A list of the data sources requested and reviewed
- A list of preliminary locations identified during the kickoff call and pre-site visit records review to be evaluated for use, storage, and/or disposal of PFAS-containing materials, where additional information on those areas will be collected through personnel interviews, additional document review, and site reconnaissance
- A list of roles for the installation POC to consider when recommending potential interviewees

1.3.2 Preliminary Assessment Site Visit

The site visit was conducted on 12 to 14 February 2020. An in-brief meeting was held to provide installation staff with the objectives of the site visit and team introductions. **Section 3** includes information regarding personnel interviewed.

Personnel interviews were conducted with individuals having significant historical knowledge at Fort Hood. The interviews focused on confirming information discussed in historical documents, collecting information that may have not been in historical documents, corroborating other interviewees' information.

Site reconnaissance included visual surveys that assessed the points of potential use, storage, and/or disposal of PFAS-containing materials, as well as potential secondary impacts, and the migration potential from each AOPI (e.g., stormwater drains, building drains and sumps, cracks in the floor/pavement). Physical attributes of the preliminary locations were documented, including local slope and ground and floor conditions (i.e., paved, unpaved, visual staining), surface water bodies and surface flow, potential receptors, and the distance to the installation boundary. Access to existing groundwater monitoring wells, if present, were also noted during the site reconnaissance in case the monitoring wells could be proposed for SI sampling. Photo documentation of the preliminary locations was collected, and access limitations or advantages related to potential future sampling activities were noted.

An exit briefing was offered to installation personnel at the conclusion of the site visit to raise any items identified during the site visit, discuss any follow-up items, and review the schedule for submitting deliverables. The exit briefing was conducted on 14 February 2020 with the installation and USAEC to discuss preliminary findings of the PA site visit.

1.3.3 Post-Site Visit

Information collected before, during, and after the site visit was reviewed and corroborated by cross-referencing records and reviewing interview details and observations noted during site visit reconnaissance. A site visit trip report was completed and provided to the installation POC, applicable USAEC POCs, and USACE regional POCs following the site visit. The information collected during the pre-site visit and site visit activities was compiled to develop the installation-specific PA portion of the PA/SI report (**Section 3**). Site data obtained during the PA were used to develop preliminary conceptual site models (CSMs) for each AOPI, which serve as the basis for developing the SI scope of work presented in an installation-specific Quality Assurance Project Plan (QAPP) Addendum.

1.3.4 Site Inspection Planning and Field Work

The SI process was initiated at the installation to evaluate PFOS, PFOA, PFBS, PFNA, and PFHxS presence or absence at each AOPI and determine whether further investigation is warranted. First, an SI kickoff teleconference was held between the Army PA team and the Fort Hood.

The objectives of the SI kickoff teleconference were to:

- discuss the AOPIs selected for sampling
- gauge regulatory involvement requirements or preferences
- identify utility clearance process and required personnel who need to be notified
- discuss general SI deliverable and field work schedule information and logistics

Following development of the SI sampling technical approach, an SI scoping teleconference was held to obtain concurrence on the SI sampling plan from USAEC, USACE, and the installation. Additional discussion topics included:

- discuss the AOPIs selected for sampling and the proposed sampling plan for each AOPI
- confirm the plan for investigation-derived waste (IDW) handling and disposal
- identify specific installation access requirements and potential schedule conflicts
- provide an updated SI deliverable and field work schedule

A Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP) was developed and finalized in October 2019 for the USAEC PFAS PA/SI (Arcadis 2019). The PQAPP details general planning processes for collecting data and describes the implementation of quality assurance (QA) and quality control (QC) activities for the SI portion for Army installations nationwide. Additionally, an installation-specific QAPP Addendum was developed to define the DQOs, present the sampling design and rationale, and provide qualifications for project personnel. The QAPP Addendum was followed in conjunction with the PQAPP (Arcadis 2019) to complete the SI scope of work. A Site Safety and Health

Plan (SSHP) was also developed as an attachment to the QAPP Addendum to identify specific health and safety hazards that may be encountered at the installation during sampling. The SSHP was designed to supplement the Accident Prevention Plan (Arcadis 2018), which was developed for Army installations nationwide. The QAPP Addendum and SSHP were submitted to the installation and finalized before commencement of field work.

The DQOs, sampling design and rationale, and field methods employed for the SI are summarized from the QAPP Addendum developed for Fort Hood (Arcadis 2020) in **Sections 6.1** through **6.3**.

After finalization of the QAPP Addendum and SSHP, field planning and coordination with the installation and subcontractors was completed. Once the schedule was determined, field teams mobilized to the installation to complete the scope of work defined in the QAPP Addendum.

1.3.5 Data Analysis, Validation, and Reporting

Environmental samples collected during the SI were submitted to a laboratory which is DoD Environmental Laboratory Accreditation Program (ELAP)-accredited for PFOS, PFOA, PFBS, PFNA, and PFHxS analysis by liquid chromatography with tandem mass spectrometry and compliant with the DoD Quality Systems Manual (QSM) 5.3 (DoD and Department of Energy 2019). Laboratory analytical results were then validated and verified by a project chemist to assess the usability of the data collected. Validated analytical results were summarized in the context of OSD risk screening levels (defined in **Section 6.5**).

2 INSTALLATION OVERVIEW

The following subsections provide general information about Fort Hood, including the location and layout, the installation mission(s) over time, a brief site history, current and projected land use, climate, topography, geology, hydrogeology, surface water hydrology, potable wells within a 5-mile radius of the installation, and applicable ecological receptors.

2.1 Site Location

Fort Hood occupies approximately 218,419 acres in central Texas in Bell and Coryell counties. It is 58 miles north of Austin, Texas and 39 miles southwest of Waco, Texas. The location of Fort Hood is shown on **Figure 2-1**. The installation has three cantonment areas (designated the main cantonment area [also known as South Fort Hood], West Fort Hood, and North Fort Hood) on 8,604 acres, two airfields on 2,915 acres, and maneuver and live-fire training areas on 197,603 acres. The cantonment areas have primarily urban land uses. The main cantonment area is at the southern edge of the large, central portion of the installation and is adjacent to Killeen, Texas. West Fort Hood is near Copperas Cove, Texas, in the center of the southern extension of the installation. North Fort Hood is near Gatesville, Texas, in the northernmost part of the installation (III Corps and Fort Hood 2013). **Figure 2-2** shows the layout of Fort Hood.

Both urban and rural areas surround Fort Hood. The urban areas include the cities of Killeen, Harker Heights, and Copperas Cove near the southern boundary of the installation, and the city of Gatesville north of the installation. Urban land uses are primarily residential, business, and industrial. The rural areas surrounding Fort Hood support the agricultural land uses of farming and cattle ranching. Nearby Belton and Stillhouse Hollow reservoirs are used for recreation by surrounding communities and Fort Hood residents (III Corps and Fort Hood 2013).

2.2 Mission and Brief Site History

Fort Hood provides and maintains the installation infrastructure to support power projection and training of Fort Hood units and soldiers; maintains a quality living and working environment for soldiers, families, retirees, and authorized civilians; sustains an effective partnership with 28 surrounding communities; serves as Commanding General Fort Hood's executive agent for mobilization; and supports the III Corps/Fort Hood transformation process (III Corps and Fort Hood 2013).

In 1942, the Tank Destroyer Center, located in Fort Meade, Maryland, was transferred to 61,290 acres near Killeen, Texas, and was designated as Camp Hood. Camp Hood was declared a permanent station in April 1950 and was renamed Fort Hood. In 1946, Gray Air Force Base was constructed in the southern portion of present-day West Fort Hood. In 1953, Gray Air Force Base was transferred to the Department of the Army, which became the present-day RGAAF (III Corps and Fort Hood 2001).

Historically, industrial operations at Fort Hood have mostly been related to vehicle maintenance and preservation. Activities have varied between routine tasks (fluid changes, lubrication, minor repairs, painting, washing, and steam cleaning) and heavier tasks (major repairs, degreasing, and engine overhaul).

Currently, there are no large-scale industrial operations located at Fort Hood that require vast amounts of chemicals, nor were there large-scale industrial operations noted in historical documents for Fort Hood. Minimal amounts of industrial-type chemicals are used for vehicle maintenance (Chemical Systems Laboratory 1982).

2.3 Current and Projected Land Use

Fort Hood is an active U.S. Army installation with a primary mission of stationing and providing tactical and/or maintenance training to combat battalions (tank, mechanized infantry, armored, and air cavalry units), combat support battalions (field artillery units), and combat service support battalions (medical, transportation, and maintenance units) (III Corps and Fort Hood 1996).

Other land uses at Fort Hood include minor industrial operations (mostly related to vehicle maintenance), lessee operations (the Texas National Guard leases land for training), laboratory operations (onsite medical laboratory facilities), and handling and storage of hazardous materials (Chemical Systems Laboratory 1982).

2.4 Climate

Fort Hood is located between two climatic zones. A semi-arid steppe climate to the west and a warm, rainy climate to the east resulting in cool, rainy winters and hot, dry summers. The highest temperatures are recorded in the months of July and August (mean daily maximum of 94 degrees Fahrenheit [°F]) with the lowest temperatures recorded in December through February (mean daily minimum of 38°F). The average annual precipitation for Fort Hood is 30 inches. The maximum amount of rainfall occurs in September with the minimum occurring in July. For most of the year surface winds originate from the south and southeast, but during September through February, winds come in from the north, northwest, and northeast (64th Engineer Detachment 1977).

Installation-wide, flooding is usually of short duration, occurring only after heavy downpours, but can be a safety concern to soldiers and equipment (III Corps and Fort Hood 2013).

2.5 Topography

The topography of Fort Hood is defined by rolling hills and steep breaks, and it includes karst topographic features such as caves, sinkholes, rock shelters, and springs (III Corps and Fort Hood 2013). Fort Hood is located northwest of the Balcones Fault Zone, a region of many small faults. Over geologic time the area surrounding this fault zone, including Fort Hood, has elevated as much as 500 feet in certain areas. The subsequent erosion of these areas has created an irregular and steeply sloping terrain (III Corps and Fort Hood 2013).

Elevations range from 561 feet above sea level near the shores of Belton Lake in the Northeast Region, to 1,231 feet above sea level in the Seven Mile Mountain area in the South Region of the installation. Slopes generally range from level in the floodplains of Cowhouse Creek to as much as 33 percent (%) on tributary valley walls. The average slope of the installation is between 5 and 8%. The area north of Highway 190 generally slopes east, while the area south of Highway 190 generally slopes south and east (III Corps and Fort Hood 2013). **Figure 2-3** shows the topographic relief of Fort Hood.

2.6 Geology

Fort Hood is located near the southeastern edge of the Mid-Continent Plains and Escarpments physiographic region, and near the eastern edge of the Edwards Plateau region. The underlying geology of Fort Hood is predominantly composed of Cretaceous Age limestone and Quaternary deposits are present along major streams (III Corps and Fort Hood 2013).

Specifically, Fort Hood is underlain by the Fredericksburg and Trinity Group of the Comanche series. The Fredericksburg Group consists of an undifferentiated unit, the Comanche Peak, and the Walnut Formations. The Trinity Group consists of the Paluxy, Glen Rose, and Travis Peak Formations. In general, the formations include one or more of the following rock types: limestone, shale, clay, or sandstone (Black & Veatch Waste Science, Inc. 1995).

The Fort Hood region is characterized as “hill and lake country,” with topographic features and landforms characterized by valleys, buttes, and mesas. This area was originally a rolling prairie underlain by limestone beds, but softer limestone has slowly eroded away, leaving long narrow valleys and streams flowing in a generally southeastern direction separated by ridges of harder limestone. The dissolution of the remaining limestone has formed the karst topographic features (caves, sinkholes, underground springs) that are found throughout the region, primarily in the Northeast Region of Fort Hood near Belton Lake (III Corps and Fort Hood 2013).

2.7 Hydrogeology

The two principal aquifers in the Fort Hood Area are the alluvial aquifer (approximately 0 to 100 feet below ground surface [bgs]) and the Trinity Group aquifer (approximately 400 to 1,200 feet bgs). The alluvial aquifers consist predominately of sand and gravel with varying amounts of silt and clay deposited by rivers and streams (groundwater can be found approximately between 6 and 20 feet bgs). Precipitation and runoff from the surrounding areas are the biggest source of recharge for these aquifers, which are somewhat limited to the valley of the rivers and streams that drain Fort Hood (Black & Veatch Waste Science, Inc. 1995). Due to the low permeability of the overburden clay and the underlying limestone or shale, it is possible that shallow groundwater accumulates in select areas and is prevented from spreading.

The Trinity Group aquifer consists of three formations (Paluxy, Glen Rose, and Travis Peak formations) and is approximately 800 feet thick. Any water supply is produced by the Hensell and Hosston members (approximately 800 and 1,100 feet bgs, respectively) of the Travis Peak formation being that groundwater from the Paluxy and Glen Rose formations is highly mineralized. The Hensell member consists of sand, sandy clay, and sandy limestone while the Hosston member consists of sandstone and shale. A shale unit of low permeability (Pearsall member) separates the members. Primary recharge mainly occurs off-post, to the northwest and west of Fort Hood. However, recharge can also generate from precipitation on exposed sections of the Paluxy and Glenn Rose formations as well as from seepage into streams. Generally, the groundwater flow direction is in the east to southeast direction (Black & Veatch Waste Science, Inc. 1995).

Historically, groundwater was the main source of drinking water for the communities surrounding Fort Hood (including Fort Hood). However, the regional water table has reportedly dropped approximately 330 feet between the 1940s and the 1980s, and water quality has decreased, due to the increase of

water usage by the surrounding communities and irrigation practices (Chemical Systems Laboratory 1982). Belton Lake reservoir is currently utilized by Fort Hood and the surrounding communities, which allows a sustainable supply for drinking water. Fort Hood does not utilize groundwater as a drinking water supply or for any other beneficial use.

Potentially sensitive groundwater areas of the Fort Hood region are the outcrop areas of the Paluxy formation and recent alluvial materials within and adjacent to Cowhouse Creek, Henson Creek, and the Leon River, as well as the karst or cave systems found on mesas throughout the training areas of the installation. The aquifers recharged by these areas are relatively shallow, and therefore they could be affected by hazardous material spills and seepage. However, these waters are rarely used as a groundwater source (III Corps and Fort Hood 2013). Groundwater studies have been conducted at Fort Hood, and the results do not show critical issues directly attributed to the installation. Additionally, due to the depth of groundwater throughout Fort Hood and the steep vertical gradient from potential recharge areas to groundwater, it is assumed that surface water (i.e., Belton Lake), which is the primary drinking water source at Fort Hood, is not affected by groundwater discharge.

2.8 Surface Water Hydrology

Fort Hood's major uses of water resources primarily include municipal water supply, training, recreation, vehicle maintenance, and aquatic habitat. Surface water is the primary water supply for Fort Hood (III Corps and Fort Hood 2013).

Fort Hood is in the Brazos River Basin. Surface water resources consist of numerous small to moderate sized streams, which generally flow in a southeasterly direction. Fort Hood has approximately 200 miles of named intermittent and perennial streams with numerous additional tributaries of those features. Fort Hood contains more than 200 water impoundments constituting approximately 692 surface-acres. Most of these are used for flood control, sediment retention, wildlife and livestock water, and fish habitat. Wetlands exist across the installation and range from small emergent wetlands associated with ephemeral streams to large, forested wetland complexes adjacent to perennial channels. The installation is located directly upstream of two man-made reservoirs—Belton Lake (a sole source drinking water supply for approximately 200,000 people in Fort Hood and surrounding communities) and Stillhouse Hollow Lake (a water supply for several surrounding communities). Additionally, both reservoirs function as fish and wildlife habitat and provide flood control and recreation opportunities for the public (III Corps and Fort Hood 2013; Fort Hood 2019). Due to the depth of groundwater throughout Fort Hood and the steep vertical gradient from potential recharge areas to groundwater, it is assumed that surface water used for drinking water (i.e., Belton and Hollow Lakes) is not affected by groundwater discharge.

Fort Hood can be divided into portions of six large watersheds and several smaller sub-watersheds. The six main watersheds are the Belton Lake, Cowhouse Creek, Lampasas River, Leon River, Nolan Creek, and Owl Creek watersheds. These watersheds can be further divided into minor sub-watersheds, which include portions of the main stems and tributaries of the major water bodies listed above. The Leon River and Cowhouse Creek form the two arms of Belton Lake, while Owl Creek flows directly into the Leon River arm. Reese Creek and its tributaries flow south toward the Lampasas River which feeds Stillhouse Hollow Lake. Various water quality studies have been conducted to monitor the condition of the water resources across the installation. Sediment transport and erosion are the most prevalent water quality threats at Fort Hood. Additionally, activities at Fort Hood might contribute to source pollutants infiltrating

nearby water bodies. Stormwater runoff from training areas, as well as runoff from agricultural operations, could carry impacted sediment (i.e., pesticides, fertilizer, animal waste, oil/grease, vehicle fluids, metals, phosphorus, and toxins contained within munitions) to water bodies (III Corps and Fort Hood 2013).

Most of the surface water features located on the installation are classified as waters of the United States as defined in Section 404 of the Clean Water Act (III Corps and Fort Hood 2013).

2.9 Relevant Utility Infrastructure

The following subsections provide general information regarding the installation's stormwater and wastewater management systems, as well as information on how the utility infrastructures may influence the fate and transport of PFAS constituents at Fort Hood.

2.9.1 Stormwater Management System Description

The majority of Fort Hood's stormwater is managed through a series of swales and culverts as opposed to underground piping. In the cantonment areas, stormwater is managed by curbs, gutters, storm drains, and ditches (Chemical Systems Laboratory 1982).

During light rain events, stormwater drains into swales and either naturally evaporates or infiltrates. During heavy rain events, stormwater flows in the swales until it pools or reaches a body of surface water (depending on the location of the swale).

2.9.2 Sewer System Description

A sanitary sewer system is present at Fort Hood and is connected to an off-post municipal system. Sanitary wastewater generated at Fort Hood is conveyed via lift stations and gravity mains with collector laterals to an off-post publicly owned treatment works (POTW). The primary off-post POTW for South and West Fort Hood is located approximately 1.25 miles south of Fort Hood in the City of Killeen. The POTW is operated by Bell County Water Control and Improvement District No. 1, and processed wastewater from the POTW reportedly discharges into South Nolan Creek, which joins North Nolan Creek (becomes Nolan Creek) and eventually into the Leon River south of Belton Lake. From there, the Leon River flows into the Little River, a tributary of the Brazos River which eventually discharges to the Gulf of Mexico (Chemical Systems Laboratory 1982; Black & Veatch Waste Science, Inc. 1995; Fort Hood 2019).

2.10 Potable Water Supply and Drinking Water Receptors

Drinking water supplies for Fort Hood and surrounding communities are primarily sourced through Belton Lake and Stillhouse Hollow Lake. These two reservoirs were constructed to provide drinking water supplies as groundwater supplies were severely depleted from overuse. Fort Hood does not currently use groundwater for any water supplies. However, there remain some off-post uses of groundwater, either from wells screened hundreds of feet bgs or from shallow wells screened within the alluvial aquifer of surface water bodies. The AOPIs identified at Fort Hood are in a watershed for either Belton Lake, Stillhouse Hollow Lake, or the Leon River.

Eleven wells were historically used as a potable water supply sources between the early 1940s and mid-1980s on Fort Hood. Ten of these wells were in North Fort Hood, which was the primary area to use the

wells for a potable water supply. The wells in North Fort Hood have since been plugged and abandoned. The remaining well was located a mile northeast of South Fort Hood, but was also plugged and abandoned, sometime in the 1960s or 1970s. The depths of the wells reportedly varied between 690 and 910 feet with a screen depth varying between 400 and 870 feet (Black & Veatch Waste Science, Inc. 1995). The wells were screened into the Travis Peak Formation, specifically the Hensell and Hosston members of the Travis Peak formation. In addition, South Fort Hood and West Fort Hood once received potable water from an off-post well field in Stillhouse Hollow located approximately 5 miles southeast of Fort Hood. Following the construction of Belton Lake in 1954, Fort Hood did not rely on groundwater for potable water supplies (Chemical Systems Laboratory 1982; III Corps and Fort Hood 2013). Presently, Fort Hood relies on surface water (Belton Lake), not groundwater, as a primary drinking water source (64th Engineer Detachment 1977).

An Environmental Data Resources, Inc. (EDR) report includes search results from a variety of environmental, state, city, and other publicly available databases for a referenced property. An EDR report was generated for Fort Hood, which along with state and county geographic information system (GIS) provided by the installation identified several off-post public and private wells within 5 miles of the installation boundary (**Figure 2-4**). The EDR report providing well search results provided as **Appendix E**. As identified from the relevant EDR report well search for Fort Hood, numerous water supply wells surround Fort Hood off-post; these wells have various uses and owners.

Several of the off-post wells include public supply and domestic wells that may be used as a potable water source located east and southeast of the installation, within the surface and groundwater flow direction paths leaving Fort Hood. These wells include USACE wells, private owner wells, mobile park wells, park water system wells, and water supply wells (ranging from 0 to approximately 4 miles from the eastern and southern boundary of Fort Hood).

2.11 Ecological Receptors

The PA team collected information regarding ecological receptors that was available in the installation documents. The following information is provided for future reference should the Army decide to evaluate exposure pathways relevant to the ecological receptors.

Fort Hood's wildlife includes mostly animals indigenous to central Texas; deer, turkey, and fish (which are seasonally stocked) are the installation's primary game species. Several hundred non-game birds protected by the Migratory Bird Treaty Act can also be found on Fort Hood. Currently, one federally-listed endangered species has a significant presence on the installation: the Golden-cheeked warbler (nests in Fort Hood from March through July). Other federally-listed species occupy the installation on a transient basis, which includes Whooping cranes that pass over Fort Hood during migration and may stop to rest and forage. Sprague's pipits (which spend the winters in the Fort Hood grasslands) and Smooth pimpleback mussels (which have been documented in the Leon River) are candidates for federal listing. Bald eagles and Black-capped vireo, which have been de-listed, can also be found on the installation. In addition to federally-listed species, the state-threatened Texas horned lizard has also been documented on the installation (III Corps and Fort Hood 2013).

2.12 Previous PFAS Investigations

In 2015 and 2016, under the IMCOM Operations Order 16-088, three total potable water samples were collected from taps found within Buildings 34133 (South Fort Hood, two samples) and 57130 (North Fort Hood, one sample) and were analyzed for PFOS and PFOA.

Analytical results indicated that PFOS and PFOA were not detected above the laboratory limit of quantitation (LOQ; **Table 2-1**). The results did not exceed OSD risk screening levels in drinking water for PFOS, PFOA, or the combined PFOS and PFOA results. However, the LOQ for PFOS and PFOA (40 ng/L) exceeded the current OSD risk screening levels in drinking water for these constituents (4 ng/L and 6 ng/L, respectively). The location of Building 57130 (Building 34133 no longer exists) is depicted on **Figure 2-2**.

In response to the third Unregulated Contaminant Monitoring Rule (UCMR3) and IMCOM Operations Order 16-088, PFOA/PFOS were sampled at water systems (serving less than or equal to 10,000 people) surrounding the installation. The laboratory which analyzed samples under UCMR3 met the USEPA's UCMR3 Laboratory Approval Program application and Proficiency Testing criteria for USEPA Method 537 Version 1.1. Several water systems in zip codes bordering Fort Hood (as well as the water system in the zip code for Fort Hood) were sampled as part of the UCMR3. Water systems from the following jurisdictions had data reported as part of the UCMR3 data set, Belton, Copperas Cove, Harker Heights, Kempner, Killeen, and the U.S. Army South Fort Hood. The results for the UCMR3 testing were below their respective LOQs (identified as the "minimum reporting limit" in the UCMR3 data) for all samples collected. However, the minimum reporting limit for each of the samples were above the OSD risk screening levels for PFOS, PFOA, and PFNA. The minimum reporting limit for each of the samples were below the OSD risk screening levels for PFBS and PFHxS. (USEPA 2016b).

3 SUMMARY OF PA ACTIVITIES

To document areas where any potential current and/or historical PFAS-containing materials were used, stored and/or disposed at Fort Hood, data were collected from three principal sources of information and are described in the subsections below:

1. Records review
2. Personnel interviews
3. Site reconnaissance

Preliminary locations of potential use, storage, and/or disposal of PFAS-containing materials were then evaluated in the PA (during records review, personnel interviews, and/or site reconnaissance) and were categorized as AOPIs or as areas not retained for further investigation at this time based on a combination of information collected (e.g., records reviewed, personnel interviews, internet searches). A summary of the observations made, and data collected through records reviews (**Appendix F**), installation personnel interviews (**Appendix G**), site reconnaissance photos (**Appendix H**), and site reconnaissance logs (**Appendix I**) during the PA process for Fort Hood is presented in **Section 4**. Further discussion regarding rationale for not retaining areas for further investigation is presented in **Section 5.1**, and further discussion regarding categorizing areas as AOPIs is presented in **Section 5.2**.

3.1 Records Review

The records reviewed for this PA included, but were not limited to, various Installation Restoration Program (IRP) administrative record documents, compliance documents, Fort Hood fire department documents, Fort Hood directorate of public works documents, and GIS files. Internet searches were also conducted to identify publicly available and other relevant information. Additionally, an EDR report generated for Fort Hood was reviewed to obtain off-post water supply well information. A list of the specific documents reviewed for Fort Hood is provided in **Appendix F**.

3.2 Personnel Interviews

Interviews were conducted during the site visit. If a previously identified interviewee was not available during the site visit, attempts were made to complete the interview via telephone before or following the site visit or by contacting an alternate interviewee identified by the installation POC.

The list of roles or groups for the installation personnel interviewed during the PA process for Fort Hood is presented below (affiliation is with Fort Hood unless otherwise noted):

- Environmental Chief
- National Environmental Policy Act Program
- GIS Coordinator (Army Installation Geospatial Information and Services Manager)
- Fire Chief
- Real Property Account Officer

- Real Property Reality Specialist
- Maintenance Division, Service Branch
- Waste Program Manager
- Environmental Support Manager
- Environmental Manager
- Hood Army Airfield (HAAF) Manager
- RGAAF Manager
- RGAAF and HAAF Safety Officer
- Deputy Project Manager (A-1 Fire and Security Equipment)
- Deputy Fire Chief
- Former Fire Chief
- Former Assistant Chief
- Fire Captain
- Pesticide Manager
- Staff Oversight
- Fire Extinguisher Maintenance Technician
- Chief of Maintenance
- Cultural Resources Manager/Archaeologist
- QA and Environmental Specialist (DynCorp)
- Contractor Site Manager (DynCorp)
- Contractor Site Safety (DynCorp)
- Regional Safety Manager (DynCorp)
- Utility Manager (American Water)
- Range Officer
- Sheet Metal Mechanic
- Environmental Specialist
- Tri-max Trainer

The compiled interview logs are provided in **Appendix G**.

3.3 Site Reconnaissance

Site reconnaissance and visual surveys were conducted at 19 of the preliminary AOPI locations identified at Fort Hood during the records review process, the installation in-brief meeting, and/or during the installation personnel interviews. Site reconnaissance was completed for the remaining eight AOPIs during the first SI sampling event based on other information collected after the PA site visit (e.g., records reviewed, personnel interviews, internet searches) as described in **Sections 5.1** and **5.2**. A photo log from the site reconnaissance is provided in **Appendix H**; photos were used to assist in verification of qualitative data collected in the field. The site reconnaissance logs are provided in **Appendix I**.

Access to existing groundwater monitoring wells, if present, were also noted during the site reconnaissance in case the monitoring wells could be proposed for site inspection sampling.

4 POTENTIAL PFAS USE, STORAGE, AND/OR DISPOSAL AREAS

Fort Hood was evaluated for all potential current and historical use, storage, and/or disposal of PFAS-containing materials. There are a variety of PFAS-containing materials used in relation to current and historical Army operations. However, the use, storage, and/or disposal of aqueous film forming foam (AFFF) is the most prevalent potential source of PFAS chemicals at DoD facilities. As such, this section is organized to summarize the AFFF-related uses first, and all remaining potential PFAS-containing materials in the subsequent section.

4.1 AFFF Use, Storage, and Disposal Areas

AFFF was developed in the mid-1960s in response to a need for firefighting foams better suited to extinguish Class B, fuel-based fires. AFFF formulations consist of water, an organic solvent, up to 5% hydrocarbon surfactants, and 1 to 3% PFAS (Interstate Technology Regulatory Council 2020). AFFF concentrate is designed to be diluted with water to become a 1, 3, or 6% foam. AFFF releases at DoD facilities may have occurred during firefighter training, emergency response actions, equipment testing, or accidental releases. The military still primarily uses AFFF for Class B fires; however, the current formulations of AFFF contain significantly lower amounts of PFOS, PFOA, and their precursors, and significant operational changes have been implemented to restrict uncontrolled releases and non-essential use of PFAS-containing foams. Army installations may still house AFFF, commonly stored in closed containers (e.g., 55-gallon drums, 5-gallon buckets), within designated storage buildings or at firehouses.

Currently, the Fort Hood Fire Department utilizes several active fire stations located throughout Fort Hood. Building 90145 (Fire Station #2) is used as the largest storage area of fire response-related materials, including AFFF. During the February 2019 PA site visit, the following volumes of AFFF stored in Building 90145 were noted: approximately 250 gallons left in a 1,000-gallon tank; one 55-gallon drum; approximately eighteen 5-gallon buckets; and eight 1,000-gallon totes. No evidence of spills or leaks from the AFFF containers was observed during the site visit, nor reported by fire department personnel.

Additionally, according to fire department personnel, AFFF is currently stored in the Fort Hood Fire Department fire trucks located at Building 90145 (Fire Station #2), Building 56519 (Fire Station #4), and Building 7081 (Fire Station #3).

There are several hangars at both of Fort Hood's airfields (HAAF and RGAAF) which are equipped with AFFF fire suppression systems. The building number and the approximate volume of AFFF stored at each hangar is provided below:

HAAF Hangars

- Building 6975 – 800 gallons
- Building 7027 – 700 gallons

RGAAF Hangars

- Building 90120 – 800 gallons

- Building 90033 – 2,000 gallons
- Building 90176 – 2,000 gallons

Three hangars at RGAAF (Building 90101, Building 90108, and Building 90109) do not have permanent AFFF fire suppression systems, but, according to RGAAF personnel, RMT systems (portable firefighting suppression systems powered by compressed air) containing AFFF concentrate were staged in each hanger either permanently or periodically. Each RMT system has a max capacity of 120 gallons of AFFF concentrate.

At the RGAAF Motor pool (Building 91039), Tri-Max systems (portable AFFF firefighting suppression systems powered by compressed air) are stationed throughout in the event of a vehicle fire. Each Tri-Max system has a max capacity of 30 gallons of AFFF concentrate.

The majority of AFFF on-post is C-8 Chemguard 3% AFFF (safety data sheet [SDS], Chemguard 2006), however, C-8 Ansulite 3% AFFF (SDS, Ansulite 2010) and C-6 Buckeye 3% AFFF (SDS, Buckeye 2018) are also used at the installation.

Following personnel interviews, site reconnaissance, and document research, it was concluded that AFFF has been used at Fort Hood during routine fire department operations (e.g., equipment testing, training) and during fire responses as an effective way to combat large fires (e.g., those occurring at airfield facilities).

There are currently five active firehouses utilized by the Fort Hood Fire Department. Building 23025, also referred to as Fire Station #1, was constructed in 2004 and is the primary location of current fire department operations. This station provides support during routine calls. Nozzle testing and/or tank flushing conducted here was reportedly completed using water only.

Building 90145, also referred to as Fire Station #2, was constructed in the late 2000s and is located at the west end of RGAAF. It is utilized for fire support at RGAAF as well as during routine calls. Additionally, this location stores the largest volume of AFFF (in fire trucks and in storage containers as discussed above) compared to other stations on-post and performs weekly nozzle testing with AFFF onto the concrete apron located at the eastern end of the fire station.

Building 7081, also referred to as Fire Station #3, was constructed in 2007 and is located at the west end of HAAF. It is utilized for fire support within HAAF and during routine calls. This location stores AFFF inside the fire trucks onsite.

Building 56519, also referred to as Fire Station #4, was constructed in 2007 and is in North Fort Hood. It is used for support in routine calls throughout North Fort Hood. This location stores AFFF inside the fire trucks onsite; however, water is reportedly used for nozzle and/or pump testing.

Building 52940, also referred to as Fire Station #5, was constructed in 2000 and is located at the west end of South Fort Hood. It used for support in routine calls throughout South Fort Hood. Nozzle and/or pump testing conducted at this location was reportedly completed using water. Nozzle testing, which was performed with AFFF and/or water at firehouses, was conducted to ensure optimal flow and release of AFFF mixture in case of an emergency; nozzle testing specifically with AFFF could lead to a release to the environment if the mixture is not fully contained.

Through site interviews and document research, it was discovered that Fort Hood has at least six former fire stations, which were demolished and redeveloped or transferred to a different department. Building 3201, which was utilized during World War II, was located at the intersection of 72nd Street and Battalion Avenue (South Fort Hood). Building 1285 was constructed in the 1940s and is currently a parking lot located at the intersection of 37th Street and Old Ironside Avenue (South Fort Hood). According to personnel interviews, fire extinguishers filled with foam (carbon or protein based) were serviced here. Building 4335 was built in the 1940s and is currently a vacant lot located near the intersection of S 77th Street and Tank Destroyer Boulevard (South Fort Hood). Building 56326, also referred to as Former Fire Station #2, was constructed sometime in the 1970s and located at the intersection of 18th Street and Avenue F (North Fort Hood). It is unknown if AFFF was stored at these locations and if nozzle testing was performed.

Building 2455 reportedly was constructed as a fire station sometime in the 1940s and was located at the intersection of 63rd Street and Central Drive (South Fort Hood). It was confirmed that nozzle testing with AFFF was conducted at this location on a yearly basis. The last year of operation is unknown.

Building 7002, also known as the Former Fire Station #3, was used during the 1960s up until 2007 as a fire station. According to site personnel, daily nozzle testing, which eventually tapered off to weekly and yearly nozzle testing, took place at this fire station. The building was transferred to a different department after the construction of the new Fire Station #3 (Building 7081). Evidence of other former fire stations was not found through site reconnaissance, personnel interviews, and document research during the PA.

Historically, firefighter training involving AFFF occurred at two separate locations. The Old Firefighter Training Area, also referred to as Fort Hood site FH-023, was an area located adjacent to and east of RGAAF that consisted of an open area of exposed soil surrounded by constructed dikes. Between 1960 and 1980, fuel oil and/or used oil was placed on the ground, ignited, and then extinguished using AFFF. The area has since been excavated, regraded, and closed (it is now partially occupied by Building 90094). The 14 August 1964 Armored Sentinel (a newspaper on Fort Hood) indicates a “burned out [aircraft fuselage] of many such demonstrations, was placed in a shallow pit at the end of the runway. Aircraft fuel and oil was poured over the hull and set afire” at the RGAAF (Armored Sentinel 1964). It is unlikely that a fire training area was located at the “end of the runway” and this location is assumed to be FH-023, which was actively used for firefighter training at RGAAF during this time.

The New Firefighter Training Area, also referred to as FH-024, was an area located on Old Copperas Cove Road across from Building 93009. The area consisted of an open concrete trough burn pit filled with volcanic rock, three above ground storage tanks, and an oil/sand interceptor. Between 1979 and 1992, oil/fuel was poured into the burn pit, ignited, and then extinguished with AFFF. Currently, there are no dedicated firefighter training areas on-post at which AFFF is used during training exercises.

The following are instances of firefighting activities involving AFFF, according to fire department personnel.

- In 2014, AFFF was used to extinguish four burning cars near baseball fields located off Battalion Avenue. The volume of AFFF used for the event is unknown.
- In 2015, AFFF was used to extinguish a burning car also along Battalion Avenue. The volume of AFFF used for the event is unknown.

- In 2018, AFFF from a Tri-max system was used by RGAAF personnel to put out an aircraft fire outside of Building 90094. According to an interview with RGAAF personnel, the Fort Hood Fire Department was on the scene. The volume of AFFF used for the event is unknown

Mobile firefighting equipment (e.g., fire extinguisher) is repaired, recharged, and decommissioned at Building 88038. The contents of emptied firefighting equipment are disposed through a sanitary sewer at this location. Interviews conducted during the PA indicated AFFF containing equipment (e.g., RMTs) were historically managed here and the contents were also disposed using the sanitary sewer, which transported the material offsite to a municipal wastewater treatment facility. PFAS-containing AFFF material is no longer managed at this location and is instead sent off-site for disposal.

4.2 Other PFAS Use, Storage, and/or Disposal Areas

Following document research, personnel interviews, and site reconnaissance at Fort Hood, automobile maintenance shops, wash racks, metal plating areas, X-ray processing solution disposal areas, landfills, and pesticide processing and disposal areas were identified as preliminary locations for use, storage, and/or disposal of PFAS-containing materials. A summary of information gathered in the PA for each of these preliminary locations is described below. Specific discussion regarding areas not retained for further investigation is presented in **Section 5.1** and specific discussion regarding areas retained as AOPIs is presented in **Section 5.2**.

Building 91039 – Motor Pool (located at the north end of West Fort Hood) is the location where military vehicles are maintained in the event of dispatchment. In addition to the presence of Tri-max systems (containing AFFF) this building was identified as a preliminary location for use, storage, and/or disposal of PFAS-containing materials based on its being an automotive maintenance shop.

Although no onsite large/industrial metal plating operations were identified at Fort Hood through document research, personnel interviews, and site reconnaissance, small scale cadmium and Alodine® plating operations were identified at Building 89010. These operations involved plating via dabbing or dipping by hand for mechanical parts of aircraft. The use of PFAS containing material as mist suppressants was not documented due to the nature of the small scale of this plating.

One pesticide burial site (FH-018), and two pesticide processing areas (FH-055 and FH-056) were identified. During a telephonic interview with the IMCOM Pest Management Consultant, it was noted that products containing Sulfluramid (i.e., associated with insecticides) may have contained PFAS and were phased out in 1996. During the PA records review, the IMCOM Pest Management Consultant provided records of potentially PFAS-containing pesticides and insecticides used at and/or stored at Army installations, and review of these records did not identify Fort Hood as an installation having used or stored PFAS-containing pesticides/insecticides. Additionally, the PA team reviewed available pesticide use inventory documentation provided by the installation and did not identify PFAS-containing pesticides use, storage, or disposal.

Various landfills were identified and evaluated for the possibility of whether PFAS-containing materials may have been disposed of at these locations. Also, one dump site of X-ray processing solution outside and adjacent to former Building 4405 was identified. However, the composition of the X-ray solution is unlikely to have included PFAS-containing materials.

Tactical wash racks were also identified based on an interviewee who indicated that nozzle testing occurred at a wash rack location; however, interviews with fire department personnel indicated that this had not occurred.

4.3 Readily Identifiable Off-Post PFAS Sources

An exhaustive search to identify all potential off-post PFAS sources (i.e., not related to operations at Fort Hood) is not part of the PA/SI. However, potential off-post PFAS sources within a 5-mile radius of the installation that were identified during the records search and site visit are described below.

As identified during the record search, the following sites are listed as Superfund or Brownfield sites:

- Dan Edwards Oil Co. located north of Fort Hood (Superfund)
- Texas Army National Guard located within Fort Hood (Superfund)
- 1408 Eagle Trail located west of Fort Hood (Superfund)
- Rotunda Property located north of Fort Hood (Brownfield)
- Copperas Cove Treatment located west of Fort Hood (Brownfield)

The sites are or were under environmental investigations for contaminants other than PFAS (the presence or absence of PFAS as a contaminant at these sites is not known). Documentation stating if PFAS was released to the environment at these locations was not obtained.

Nearby community fire departments such as Killeen Fire Department, Harker Heights Fire Department, Gatesville Fire Department, Morgan's Point Resort Fire Department, Central Bell County Fire/Rescue, and Copperas Cove Fire Department could have potentially used PFAS-containing AFFF off-post and potentially be PFAS sources within 5 miles of the installation.

Nearby airports Gatesville Municipal Airport (1.75 miles north of Fort Hood) and Draughon-Miller Central Texas Regional Airport (5 miles east of Fort Hood) are up-gradient of Belton Lake and could potentially be off-post PFAS sources near Fort Hood if the airports currently or historically used AFFF.

Interviews with Fort Hood Fire Department personnel identified one occasion where Fort Hood firefighting resources used AFFF during an off-post garage fire response. However, the location, volume of AFFF used, and year of the incident is unknown.

5 SUMMARY AND DISCUSSION OF PA RESULTS

The preliminary locations evaluated for potential use, storage and/or disposal of PFAS-containing materials at Fort Hood, were further refined during the PA process and identified either as an area not retained for further investigation or as an AOPI. In accordance with the established process for the PA/SI, 27 areas have been identified as AOPIs. The process used for refining these areas is presented on **Figure 5-1**, below.

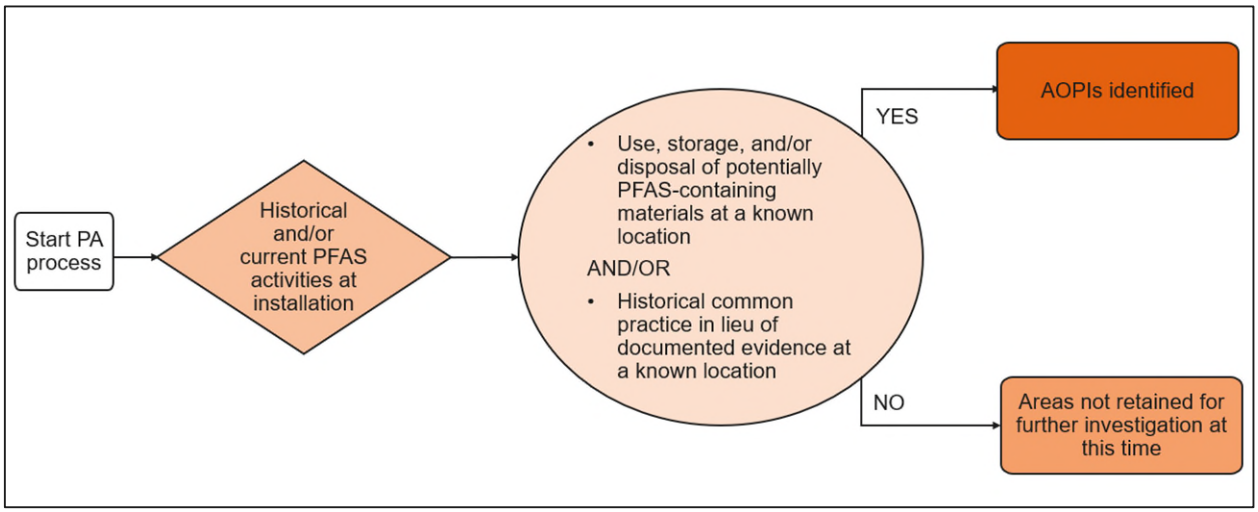


Figure 5-1: AOPI Decision Flowchart

The areas not retained for further investigation are presented in **Section 5.1**. The areas retained as AOPIs are presented in **Section 5.2**.

Data limitations for this PA/SI at Fort Hood are presented in **Section 8**.

5.1 Areas Not Retained for Further Investigation

Through the evaluation of information obtained during record reviews, personnel interviews, and/or site reconnaissance, the areas described below were categorized as areas not retained for further investigation.

A brief site history and rationale for areas not retained for further investigation are presented in **Table 5-1**, below.

Table 5-1. Installation Areas Not Retained for Further Investigation

Area Description	Dates of Operation	Relevant Site History	Rationale
Building 89010 – DynCorp	DynCorp has occupied the building from 2013 to present.	Minor cadmium-plating operations to strengthen mechanical pieces by dabbing or dipping by hand	Based on interviews and site reconnaissance, no large industrial metal plating processes utilizing PFAS-containing mist suppressants occurred onsite. No evidence of PFAS containing materials used, stored, and/or disposed at this location.
Pesticide Burial Site **IRP Site FH-018** **Headquarters Army Environmental System (HQAES): 48255.1014**	1975	One-time burial site where six 5-gallon cans of Vapona® (Dichlorvos) pesticide granules were disposed of in 1975. Exact location and depth of the where the cans were disposed is unknown, but the burial site is reportedly at the northwest corner of the intersection of Turkey Run Road and an unnamed road (approximately 0.4 mile west of the Clear Creek Road).	Based on historical research, Vapona® does not contain PFAS constituents. No evidence of PFAS containing materials used, stored, and/or disposed at this location.
Pesticide Processing Area **IRP Site FH-055** **HQAES: 48255.1055**	Start and end of use is unknown	Pesticide processing area adjacent to Building 4493 (demolished) where pesticides were mixed before their transportation to points of application. The area is now covered by an asphalt parking lot. Historical research did not identify PFAS-containing pesticides use at this area.	No evidence of PFAS containing materials used, stored, and/or disposed at this location.

Area Description	Dates of Operation	Relevant Site History	Rationale
Pesticide Processing Area **IRP Site FH-056** **HQAES: 48255.1056**	Start and end of use is unknown	Pesticide storage area near Building 4485 (demolished) where pesticides were stored in small metal sheds. Historical research did not identify PFAS-containing pesticides storage in this area.	No evidence of PFAS containing materials used, stored, and/or disposed at this location.
Fort Hood Landfills – Various Building/Site Numbers **(Does not include closed landfill FH-001 or the Active Fort Hood Landfill, which were evaluated separately)**	Approximately 1940s to present	Various waste has been disposed of at historical landfills as well as the active landfill onsite. Based on interviews and historical research, there is no indication that PFAS-containing materials have been disposed of at these locations.	No evidence of PFAS containing materials used, stored, and/or disposed at these locations.
Tactical Wash Racks – Various Building Numbers	Start of use is unknown to present	During the PA site visit, an interviewee indicated that nozzle testing occurred at a wash rack location; however, Fort Hood Fire Department personnel indicated that this had not occurred.	Based on interviews and historical research, no specific evidence was identified confirming AFFF nozzle testing occurred at these locations. No evidence of PFAS containing materials used, stored, and/or disposed at these locations.
Building 4405 **IRP Site FH-051** **HQAES: 48255.1051**	Start of use is unknown to 1980	Dumping site of spent X-ray processing solution outside and adjacent to former Building 4405 located near the intersection of 65th Street and Warehouse Avenue. Composition of X-ray processing solution is unlikely to have included PFAS-containing materials.	No evidence of PFAS containing materials used, stored, and/or disposed at these locations.

Area Description	Dates of Operation	Relevant Site History	Rationale
Building 4938 – Temporary Building	Mid-2000s to present	Temporary building located near Santa Fe Avenue and Clear Creek Road used for welding operations. Building has a non-PFAS containing fire suppression system that uses FM200 (colorless and odorless gas) to extinguish fires.	No evidence of PFAS containing materials used, stored, and/or disposed at this location.
Potential Fire Training Area - South Runway of RGAAF	1960s to end of use unknown	Old firefighter training pit potentially located at the southern end of north-south runway at the RGAAF. AFFF was potentially used during fire training exercises using controlled petroleum fires on an airframe. Based on historical research, it is likely that references to this old fire training pit are references to the Old Firefighter Training Area (FH-023), because it is unlikely that a fire training area would have been located at the end of an active runway. No specific evidence was identified confirming a separate Fire Training Area was present at this location that used AFFF.	No evidence of PFAS containing materials used, stored, and/or disposed at a location at the south runway of the RGAAF.

5.2 AOPIs

Overviews for each AOPI identified during the PA process are presented in this section. Three of the AOPIs overlap with Fort Hood IRP sites and/or HQAES sites (**Figure 5-2**). The AOPI, overlapping IRP site identifier, HQAES number, and current site status are discussed within each AOPI subsection presented below. At the time of this PA, none of the Fort Hood IRP sites have historically been investigated or are currently being investigated for the possible presence of PFAS.

The AOPI locations are shown on **Figure 5-2**. Aerial photographs of each AOPI that also show the approximate extent of AFFF use (if applicable) are presented on **Figures 5-3** through **5-17** and include active monitoring wells in the vicinity of each AOPI. Presentation of the AOPIs is grouped by the installation area in which they are located (West Fort Hood, Main Cantonment, AOPIs between West Fort Hood and the Main Cantonment, and North Fort Hood).

5.2.1 West Fort Hood AOPIs

During the PFAS PA, eleven AOPIs were identified within the West Fort Hood Cantonment Area. The specific AOPIs and their historical or current associations with use, storage, and/or disposal of PFAS-containing materials are described in each AOPI subsection below.

5.2.1.1 Robert Gray Army Airfield AOPIs

Ten AOPIs were identified at the RGAAF, which is located within West Fort Hood. These AOPIs are discussed in the subsections below.

5.2.1.1.1 FH-023 – Old Firefighter Training Area

FH-023 – Old Firefighter Training Area (HQAES: 48255.1018) was identified as an AOPI following document research, personnel interviews, and site reconnaissance due to AFFF usage. The site was located adjacent to and east of RGAAF and consisted of an open area of soil surrounded by constructed dikes located on an area of elevated topography relative to the airfield elevation. Between the 1960s and 1980s, fuel oil and/or used oil was placed on the ground near the eastern boundary of the AOPI and lit on fire for training purposes. The fires were extinguished with AFFF.

Following the closure of the fire training area, the area was excavated and regraded to make room for the expansion of RGAAF facilities. The FH-023 - Old Firefighter Training Area location currently consists of a road, grassy areas, several small buildings, a paved parking lot, and a portion of an airplane hangar (Building 90108). Additionally, the AOPI boundary was drawn to include the adjacent Hangar 90094. There are two drainage ditches/areas in the vicinity of the AOPI, one to north and one to the east. The current and expected future use of this area is industrial. **Figure 5-3** depicts FH-023 – Old Firefighter Training Area.

As part of the IRP, the FH-023 - Old Firefighter Training Area was addressed under FH-023 (HQAES: 48255.1018) for petroleum hydrocarbon impacted soils due to firefighting training activities. The site is now closed under the IRP, and impacted soil excavated from the site was disposed of at the Abandoned Sanitary Landfill No. 1.

5.2.1.1.2 Building 90094 – Hangar

Building 90094 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF usage and staging. Building 90094 is an airplane hangar located at the east end of RGAAF. The hangar is equipped with a deluge fire suppression system, which does not use AFFF. However, AFFF-containing RMT systems are brought into the hangar when the water-only deluge system is off-line. In 2018, an aircraft fire outside and to the west of the hangar was extinguished using

approximately 30 gallons of AFFF from a Tri-max system. The hangar was constructed adjacent to and north of the FH-023 - Old Firefighter Training Area.

Building 90094 consists of a large building with a small building to the east, smaller aircraft hangars to the south, the hangar apron consisting of a concrete pad to the west, and an asphalt parking lot to the east. Access roads are also present east of the hangar (with associated drainage ditches). The current and expected future use of this area is industrial. **Figure 5-3** depicts Building 90094.

5.2.1.1.3 Building 90101 – Hangar

Building 90101 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF staging. Building 90101 is an airplane hangar located at the east end of RGAAF. The hangar is equipped with dry chemical fire extinguishers and does not have an AFFF fire suppression system. However, when aircraft are parked inside overnight, RMTs containing AFFF are brought into the hangar. There are no reports of AFFF use at Building 90101.

Building 90101 consists of a building with a grassy area to the east and south, storage containers to the southwest, other aircraft hangars to the north, a concrete pad to the north and west, and power lines to the east. Access roads are also present east of the hangar (with associated drainage ditches). The current and expected future use of this area is industrial. **Figure 5-3** depicts Building 90101.

5.2.1.1.4 Building 90108 – Hangar

Building 90108 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF staging. Building 90108 is an airplane hangar located at the east end of RGAAF. The hangar is equipped with dry chemical fire extinguishers and does not have an AFFF fire suppression system. However, RMTs containing AFFF are stored inside the hangar. There are no reports of AFFF use at Building 90108.

Building 90108 consists of an aluminum building with a grassy area to the east, concrete pads in the remaining directions, other aircraft hangars to the north and south, and power lines to the east. Access roads are also present east of the hangar (with associated drainage ditches). The current and expected future use of this area is industrial. The northern two-thirds of the hangar was constructed over the FH-023 - Old Firefighter Training Area as delineated on **Figure 5-3**, which depicts Building 90108.

5.2.1.1.5 Building 90109 – Hangar

Building 90109 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF staging. Building 90109 is an airplane hangar located at the east end of RGAAF. The hangar is equipped with dry chemical fire extinguishers and does not have an AFFF fire suppression system. However, when aircraft are parked inside overnight, RMTs containing AFFF are brought into the hangar. There are no reports of AFFF use at Building 90109.

Building 90109 consists of an aluminum building with a grassy area to the east, concrete pads in the remaining directions, other aircraft hangars to the north and south, and power lines to the east. Access roads are also present east of the hangar (with associated drainage ditches). The current and expected future use of this area is industrial. **Figure 5-3** depicts Building 90109.

5.2.1.1.6 Building 90120 – Hangar

Building 90120 – Hangar was identified as an AOPI following document research, personnel interviews, and site reconnaissance due to AFFF storage. Building 90120 is an airplane hangar equipped with an 800-gallon AFFF fire suppression system located at the east end of RGAAF.

In 2016, approximately 750 gallons of AFFF were released due to incorrect assembly of the system (defective gaskets). AFFF spilled onto the grassy area adjacent to and south of the hangar. Approximately 210 cubic yards of affected soil were excavated and disposed of at the Active Fort Hood Landfill. Clean soil was used to backfill the excavation, and grass was used as a cover (Fort Hood Directorate of Public Works, Environmental Division 2016).

Building 90120 consists of a large building with general storage containers to the east and west, a grassy area to the south, and concrete pad to the north. Additionally, access roads are located to the east and south (with associated drainage ditches). An asphalt parking lot is located farther south of the hangar and drains into a large drainage area located southwest of Building 90120. The current and expected future use of this area is industrial. **Figure 5-3** depicts Building 90120.

5.2.1.1.7 Building 90176 – Hangar

Building 90176 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF storage. Building 90176 is an airplane hangar equipped with a 2,000-gallon AFFF (C-8 Chemguard 3%) fire suppression system located at the east end of RGAAF.

Between 2013 and 2015, AFFF was slowly leaking from the system due to incorrect assembly. In 2016, the system released the remainder of the AFFF from the tank into the containment/storage room. However, little left the containment/storage room (located at the southeastern corner of the building). The minor amounts reportedly reached the grassy area adjacent to and west of the containment/storage room. There is a storage tank inside the hangar structure and located just outside the containment/storage room where the spilled AFFF was relocated. This tank is periodically emptied, and the contents taken offsite by a subcontractor.

Building 90176 consists of a large building with the following: a small road, large satellite dishes and grassy areas to the south; general storage containers to the north; a concrete pad to the west; and asphalt parking lots to the east and southeast. Lastly, drainage ditches/areas are present south and southeast of Building 90176. The current and expected future use of this area is industrial. **Figure 5-3** depicts Building 90176.

5.2.1.1.8 Building 90033 – Hangar

Building 90033 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF use and storage. Building 90033 is an airplane hangar located at the northwest end of RGAAF. The hangar is equipped with a 1,200- and 800-gallon C-6 AFFF fire suppression system with no reported releases. However, between approximately 1983 and 2013, three foam cannons (which were capable of spraying foam 100 yards) were operated periodically at the northeast corner of the hangar and sprayed AFFF onto the concrete pad to the east/northeast. The amount of AFFF released is unknown, but the cannons contained C-8 Arrow AFFF based on the period of

cannon testing. The cannons were removed sometime after 2014 (during renovation of the AFFF system).

Building 90033 consists of a large building with a concrete pad to the east, grassy areas to the north and west, and an asphalt parking lot to the south. Lastly, drainage ditches/areas are present north of Building 90033. The current and expected future use of this area is industrial. **Figure 5-4** depicts Building 90033.

5.2.1.1.9 Building 90050 – Old Fire and Crash Hangar

Building 90050 – Old Fire and Crash Hangar was identified as an AOPI following personnel interviews due to AFFF use. Building 90050 was a Fire and Crash hangar located at the west end of RGAAF. Between approximately 1970 and 2000, it was used as an area of nozzle testing and truck tank flushing (northeast corner of the building). There is a drainage ditch to the south of the site, which released AFFF could have migrated to (the type and amount of AFFF is unknown). Sometime in the 2000s, Building 90050 was demolished and Building 90029 was constructed in its place.

Based on historical aerial photographs, structures around historical Building 90050 consisted of a building to the north, a possible concrete pad to the east, a grassy patch to the west, and a possible paved parking lot to the south. A small drainage ditch is present to the south of the Building 90050 AOPI boundary. The current and expected future use of this area is industrial. **Figure 5-4** depicts the Building 90050 AOPI. Please note that the structure shown on **Figure 5-4** is Building 90029, which was constructed over the demolished Building 90050.

5.2.1.1.10 Building 90145 – Active Fire Station

Building 90145 – Active Fire Station was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF use and storage. Building 90145 (referred to as Fire Station #2) is located along Gray Drive, adjacent to and west of RGAAF, and was constructed in the late 2000s. At the time of PA site reconnaissance, the fire station housed approximately 250 gallons of Chemguard C-8 AFFF and 8,000 gallons of Chemguard C-6 AFFF. Interviews with the fire department indicated that weekly nozzle testing is conducted at this location. AFFF, most likely Chemguard 3% AFFF, is sprayed onto the concrete apron located just east of the main building (amount is unknown) and allowed to dissipate on the pavement.

Building 90145 consists of a stone/brick building used for office/living space for the fire department personnel, as well as multiple bays for firetrucks and material storage. Additionally, there are concrete pads to the west and east as well as an asphalt parking lot to the southwest. Lastly, drainage ditches/areas are present in all directions surrounding Building 90145. The current and expected future use of this area is industrial. **Figure 5-5** depicts Building 90145.

5.2.1.2 Building 91039 – Motor Pool

During the PFAS PA, one AOPI was identified within West Fort Hood outside of RGAAF. Building 91039 – Motor Pool was identified as an AOPI following personnel interviews due to AFFF storage. Building 91039 is where military vehicles are maintained in the event of dispatchment and is located at the north end of West Fort Hood. Tri-max systems (containing AFFF) are staged throughout the Motor Pool in case of fire. There are no reports of AFFF use at Building 91039.

Building 91039 consists of a building surrounding by concrete pads and asphalt parking lots where vehicles and storage containers are staged. Additionally, there is a wooded area to the west, access roads to the south (with associated drainage ditches), a drainage ditch and powerlines to the east. The current and expected future use of this area is industrial. **Figure 5-6** depicts Building 91039.

5.2.2 Main Cantonment AOPIs

Twelve AOPIs were identified within the Main Cantonment (South Fort Hood) during the PFAS PA. The specific AOPIs and their historical or current associations with use, storage, and/or disposal of PFAS-containing materials are described in each AOPI subsection below.

5.2.2.1 Building 2455 – Former Fire Station

Building 2455 – Former Fire Station was identified as an AOPI following document research and personnel interviews due to AFFF use. Building 2455 (also referred to as the former Fire Station #1) was located at the intersection of 63rd Street and Central Avenue (currently Old Ironside Avenue) and was constructed sometime in the 1940s. Between the 1950s and 1970s, nozzle testing with AFFF was conducted yearly (the type and amount of AFFF used as well as the location of nozzle testing is unknown). A new Fire Station #1 (Building 23025) was constructed at a different location after Building 2455 was demolished sometime after 1995.

The Building 2455 AOPI currently consists of a concrete pad, concrete apron, grassy area, pavement, and a small structure at the southwest end of the AOPI. The current and expected future use of this area is industrial. **Figure 5-7** depicts Building 2455.

5.2.2.2 Building 23025 – Active Fire Station

Building 23025 – Active Fire Station was identified as an AOPI following personnel interviews and site reconnaissance due to potential AFFF storage. Building 23025 (referred to as Fire Station #1) is located at the intersection of 58th Street and Headquarters Avenue and was constructed in 2004. It is possible that AFFF was stored at this location after its construction, however, no AFFF storage was identified based on the site reconnaissance and personnel interviews.

Building 23025 currently consists of a building used for office/living space for the fire department personnel, as well as multiple bays for firetrucks and storage. Additionally, there are grassy areas and/or concrete pads in all directions of the building. There is a drainage area farther west of the building. The current and expected future use of this area is industrial. **Figure 5-7** depicts Building 23025.

5.2.2.3 Building 3201 – Former Fire Station

Building 3201 – Former Fire Station was identified as an AOPI following document research and due to potential AFFF use and storage. Building 3201 was located at the intersection of 72nd Street and Battalion Avenue and was constructed sometime in the 1940s. It is possible that AFFF was used and stored at this location prior to its demolition, sometime after 1995.

Building 3201 currently consists of large grassy area that is adjacent to and east of two large buildings. There are power lines along the north and east side of the AOPI. The current and expected future use of this area is industrial. **Figure 5-8** depicts the Building 3201 AOPI.

5.2.2.4 Building 4335 – Former Fire Station

Building 4335 – Former Fire Station was identified as an AOPI following document research and due to the potential for AFFF use and storage. Building 4335 was located at the intersection of S 77th Street and Tank Destroyer Boulevard and was constructed sometime in the 1940s. It is possible that AFFF was used and stored at this location prior to its demolition, sometime after 2012.

Building 4335 currently consists of large grassy area with trees, a parking area, a concrete pad, and power lines. It appears that a drainage ditch runs through the center of the AOPI and flows to the east. The current and expected future use of this area is industrial. **Figure 5-9** depicts the Building 4335 AOPI.

5.2.2.5 Building 1285 – Former Fire Station

Building 1285 – Former Fire Station was identified as an AOPI following document research, personnel interviews and due to AFFF storage. Building 1285 was located at the intersection of 37th Street and Old Ironside Avenue and was constructed sometime in the 1940s. According to former fire department personnel, fire extinguishers filled with foam (carbon and protein based) were serviced at Building 1285. It was demolished sometime after 1996.

Building 1285 currently consists of an asphalt parking lot with powerlines along the south side of the parking lot and grassy areas bordering the asphalt parking lot in all directions. Lastly, a drainage ditch appears to be present along the powerlines. The current and expected future use of this area is industrial. **Figure 5-10** depicts the Building 4335 AOPI.

5.2.2.6 FH-001 – Abandoned Sanitary Landfill No. 1

FH-001 – Abandoned Sanitary Landfill No. 1 (HQAES: 48255.1001) was identified as an AOPI following document research and personnel interviews due to the disposal of soil that may have been impacted by PFAS. The soil was excavated from the Old Firefighter Training Area to address petroleum impacts and transported to this landfill. The Abandoned Sanitary Landfill No. 1 was a trench-and-fill landfill that, from 1977 to 1991, received a variety of municipal waste including: wet garbage; paint cans and painting waste; pesticide containers; outdated drugs; hospital waste; and other municipal-type waste. Additionally, a specific section of the landfill was reserved for demolition-type waste/rubble.

As part of the IRP, the Abandoned Sanitary Landfill No.1 was addressed under site identification FH-001 (HQAES: 48255.1001) for soils and groundwater (and various constituents) due to the disposal of municipal and demolition waste. The site is now closed under the IRP and is currently vacant land with ongoing maintenance of the landfill cap (United States Army Environmental Hygiene Agency 1988).

The Abandoned Sanitary Landfill No. 1 currently consists of unoccupied land covered with vegetation. A wooded area is present to the north, access roads to the east and west, and Turkey Run Road to the south. The surface water drainage is to the west towards Clear Creek. The current and expected future use of this area is industrial. **Figure 5-11** depicts FH-001 - Abandoned Sanitary Landfill No.1.

5.2.2.7 Active Fort Hood Landfill

The Active Fort Hood Landfill is a municipal solid waste landfill that has been in operation since 1990 and is approximately 100 acres. The Active Fort Hood Landfill was identified as an AOPI following document research and personnel interviews due to the disposal of soil that may have been impacted by PFAS. In response to the 2016 release of AFFF from the fire suppression system at Building 90120, impacted soil directly south of the building was excavated and disposed of at this landfill.

The Active Fort Hood Landfill consists of land containing different disposal cells with access roads in between the cells and around the landfill perimeter. A wooded area is present to the east and Turkey Run Road is present to the south. The surface water drainage is to the east towards Clear Creek. An existing groundwater monitoring network is present at the landfill. The current and expected future use of this area is industrial. **Figure 5-11** depicts the Active Fort Hood Landfill.

5.2.2.8 Building 52940 – Active Fire Station

Building 52940 – Active Fire Station was identified as an AOPI following personnel interviews due to potential AFFF storage. Building 52940 (also referred to as Fire Station #5) is located along Tank Destroyer Boulevard and was constructed in 2000. It is possible that AFFF was stored at this location after its construction, however, no AFFF storage was identified based on the site reconnaissance and personnel interviews.

Building 52940 currently consists of a building used for office/living space for the fire department personnel, as well as multiple bays for firetrucks and storage. Additionally, there are grassy areas and/or concrete pads in all directions of the building. There are storage sheds behind the building as well as drainage ditches south of the building along Tank Destroyer Boulevard. The current and expected future use of this area is industrial. **Figure 5-12** depicts Building 52940.

5.2.2.9 Hood Army Airfield AOPIs

Four AOPIs were identified at HAAF, which is located within the Main Cantonment. These AOPIs are described in the subsections below.

5.2.2.9.1 Building 6975 – Hangar

Building 6975 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF storage. Building 6975 is an airplane hangar located at the northwest end of HAAF. The hangar is equipped with an 800-gallon AFFF fire suppression system. Although there is no record of a release from the fire suppression system, interviews with airfield personnel indicate that an accidental release occurred around 2005, which left the hangar filled with AFFF.

Building 6975 consists of a large building with the following: general storage containers to the southeast and northwest; an asphalt parking lot is present north of the building and a large concrete pad to the south. Lastly, a drainage area is present southeast of Building 6975. The current and expected future use of this area is industrial. **Figure 5-13** depicts Building 6975.

5.2.2.9.2 Building 7002 – Former Fire Station

Building 7002 – Former Fire Station was identified as an AOPI following personnel interviews due to AFFF use and storage. Building 7002 (also referred to as the former Fire Station #3) was constructed in the 1960s and is located at the northeast end of HAAF (along Murphy Loop). The Fort Hood Fire Department utilized the fire station until 2007 when it was transferred to another department. According to former fire department personnel, daily nozzle testing with AFFF occurred at this location. Additionally, 5- and 50-gallon containers of AFFF were historically stored here according to fire department personnel.

Building 7002 currently consists of a building with smaller buildings attached to it (possibly for fire department equipment and personnel). There is a concrete apron with a grassy area to the west, a grassy area next to an asphalt parking lot to the east, and a grassy area along an access road to the south. There is a large drainage area northeast of Building 7002. The current and expected future use of this area is industrial. **Figure 5-13** depicts Building 7002.

5.2.2.9.3 Building 7081 – Active Fire Station

Building 7081 – Active Fire Station was identified as an AOPI following personnel interviews due to possible use of AFFF and AFFF storage. Building 7081 (also referred to as Fire Station #3) is located at the west end of HAAF along Warrior Way and was constructed in 2007. It is possible that nozzle testing with AFFF took place at this location and, according to fire department personnel, AFFF is stored in fire trucks at Building 7081.

Building 7081 currently consists of a building used for office/living space for the fire department personnel, as well as multiple bays for firetrucks and storage. Additionally, there are grassy areas and/or concrete pads in all directions of the building. There are drainage ditches/areas in each direction of Building 7081. The current and expected future use of this area is industrial. **Figure 5-14** depicts Building 7081.

5.2.2.9.4 Building 7027 – Hangar

Building 7027 – Hangar was identified as an AOPI following personnel interviews and site reconnaissance due to AFFF storage. Building 6975 is an airplane hangar located at the south end of HAAF. The hangar is equipped with a 700-gallon AFFF fire suppression system. There have reportedly been no releases from the fire suppression system.

Building 7027 consists of a large building with the following: general storage containers to the north and south; concrete pads to the north, south, and west; and a grassy area/drainage ditch to the east as well as a small building. An intermittent stream is present farther south of Building 7027. The current and expected future use of this area is industrial. **Figure 5-15** depicts Building 7027.

5.2.3 AOPIs Between West Fort Hood and Main Cantonment

During the PFAS PA, two AOPIs were identified between West Fort Hood and the Main Cantonment. The specific AOPIs and their historical or current associations with use, storage, and/or disposal of PFAS-containing materials are described in each AOPI subsection below.

5.2.3.1 FH-024 New Firefighter Training Area

FH-024 – New Firefighter Training Area (HQAES: 48255.1019) was identified as an AOPI following document research, personnel interviews, and site reconnaissance due to AFFF usage. The training area is located on Old Copperas Cove Road across from Building 93009. It consisted of an open concrete trough burn pit filled with volcanic rock, an oil/water separator, and fuel tanks. Between 1972 and 1992, fuel oil and/or used oil was placed in the burn pit (located near the center of the AOPI) and lit on fire for training purposes. The fires were extinguished with AFFF (the type and amount of AFFF used is unknown).

As part of the IRP, the New Firefighter Training Area was addressed under FH-024 (HQAES: 48255.19) for soils and groundwater due to firefighting training activities. The site is now closed under the IRP; structures that were previously onsite were demolished, and the site is currently vacant land.

The New Firefighter Training Area currently consists of sparsely vegetated land with some dirt roads. The surface water drainage direction is to the east towards Clear Creek. The current and expected future use of this area is industrial. **Figure 5-16** depicts FH-024.

5.2.3.2 Building 88038 – Logistics Readiness Center (LRC) Facility

Building 88038 – LRC Facility was identified as an AOPI following personnel interviews and due to AFFF disposal. Mobile firefighting equipment (e.g., fire extinguisher) is repaired, recharged, and decommissioned at Building 88038. Interviews conducted during the PA indicated AFFF containing equipment (e.g., RMTs) were historically managed here and the contents were also disposed using the sanitary sewer. **Figure 5-2** depicts the location of Building.

The firefighting equipment maintenance work is completed indoors at Building 88038 in a room with a floor drain set in a concrete floor that is connected to the sanitary sewer (see photographs in **Appendix H**). Firefighting equipment contents (both for PFAS and non-PFAS charged equipment) were discharged directly to the drain and sewer, which transported the material offsite to a municipal wastewater treatment facility. Therefore, SI sampling was not completed at Building 88038 as there was not media present to sample.

5.2.4 North Fort Hood AOPIs

Two AOPIs were identified within North Fort Hood during the PFAS PA. The specific AOPIs and their historical or current associations with use, storage, and/or disposal of PFAS-containing materials are described in each AOPI subsection below.

5.2.4.1 Building 56326 – Former Fire Station

Building 56326 – Former Fire Station was identified as an AOPI following personnel interviews and due to potential AFFF storage. Building 56326 (also referred to as former Fire Station #2) was located at the intersection of 18th Street and Avenue F and was constructed sometime in the 1970s. Building 56326 was demolished sometime after 2005.

Building 56326 currently consists of a vacant lot with a concrete pad, trees, drainage ditches along the road, and powerlines along the road. The current and expected future use of this area is industrial. **Figure 5-17** depicts the Building 56326 AOPI.

5.2.4.2 Building 56519 – Active Fire Station

Building 56519 – Active Fire Station was identified as an AOPI following document research and personnel interviews due to AFFF storage. Building 56519 (also referred to as Fire Station #4) is located at the intersection of 18th Street and Central Avenue and was constructed in 2007. Approximately 280 gallons of AFFF is stored in fire trucks staged at the fire station.

Building 56519 currently consists of a building used for office/living space for the fire department personnel, as well as multiple bays for firetrucks and storage. Additionally, there are grassy areas and/or concrete pads in all directions of the building. There is a drainage ditch and asphalt parking lot southeast of the AOPI along 17th Street. The current and expected future use of this area is industrial. **Figure 5-17** depicts Building 52940.

6 SUMMARY OF SI ACTIVITIES

Based on the results of the PA at Fort Hood, an SI for PFOS, PFOA, PFBS, PFNA, and PFHxS was conducted in accordance with CERCLA. SI sampling was completed at Fort Hood at 26 of the 27 AOPIs to evaluate presence or absence of PFOS, PFOA, PFBS, PFNA, and PFHxS in comparison with the OSD residential risk screening levels for soil and tap water as well as industrial/commercial risk screening levels for soil. Building 88038 – LRC Facility was not recommended for sampling as described in **Section 6.2**. As such, an installation-specific QAPP Addendum (Arcadis 2020) was developed to supplement the general information provided in the PQAPP (Arcadis 2019) and to detail the site-specific proposed scopes of work for the SI. A preliminary CSM was prepared for each of the installation's AOPIs in accordance with the USACE Engineer Manual on Conceptual Site Models, EM 200-1-12 (USACE 2012). The preliminary CSMs identified potential human receptors and chemical exposure pathways based on current and/or reasonably anticipated future land uses. The preliminary CSMs identified soil, groundwater, surface water, and/or sediment pathways as potentially complete which guided the SI sampling. The QAPP Addendum details the sampling design and rationale based on each AOPI's preliminary CSM. The SI scope of work was completed in July 2020, November 2021, and December 2021 through the collection of field data and analytical samples.

The SI field work was completed in accordance with the standard operating procedures (SOPs), technical guidance instructions (TGIs), sampling design, and QA/QC requirements as detailed in the QAPP Addendum (Arcadis 2020) and PQAPP (Arcadis 2019). The subsections below summarize the DQOs, sampling design and rationale, sampling activities and methods, and data analyses procedures for the SI phase at Fort Hood. Non-conformances to the prescribed procedures in the PQAPP and QAPP Addendum are described in **Section 6.3.4**. Analytical results obtained through SI field activities are summarized in **Section 7**.

6.1 Data Quality Objectives

As identified during the DQO process and outlined in the site-specific QAPP Addendum (Arcadis 2020), the objective of the SI is to identify whether there has been a release to the environment from any of the AOPIs identified in the PA and to determine if further investigation is warranted. This SI evaluated groundwater and soil for PFOS, PFOA, PFBS, PFNA, and PFHxS presence or absence at each of the sampled AOPIs.

6.2 Sampling Design and Rationale

The rationale for sampling at each AOPI is illustrated on **Figure 6-1** below.

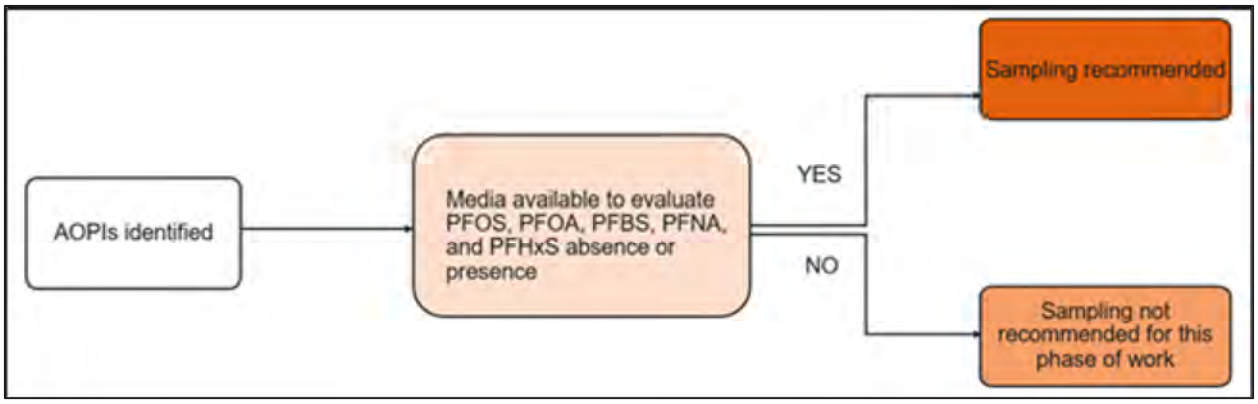


Figure 6-1: AOPI Sampling Decision Tree

The sampling design for SI sampling activities at Fort Hood is detailed in Worksheet #17 of the QAPP Addendum (Arcadis 2020). Because the focus of this PA/SI was to define presence/absence of PFAS in the source area of each AOPI, only soil and groundwater were sampled, because these media would have been most directly affected by AFFF use and storage. Groundwater was sampled, when available, to identify PFAS presence, type, and concentrations. Soil was sampled to identify PFAS presence, type and to evaluate the potential for those areas to be sources of PFAS to surface water and groundwater as an influence to drinking water, and to update the individual AOPI CSMs. Additionally, total organic carbon (TOC), pH, and grain size were analyzed for one soil sample per AOPI (i.e., not in every soil sample collected) as it may be useful in future fate and transport studies. Sample locations were selected to be in the direct vicinity of where AFFF was believed to have been used or stored, based on historical information (e.g., nozzle testing discharge areas, fire response areas, adjacent to burn pits at fire training areas). Additionally, samples were collected from locations within drainages downslope of AFFF use/storage. These targeted sampling areas were believed to have the potential for the greatest PFAS concentrations closest to known use/storage of AFFF. Note that although Building 88038 was identified as a AOPI in the PA, sampling was not completed at this AOPI because potential PFAS-containing material was disposed at an indoor location into a sanitary sewer discharging to a municipal wastewater treatment plant; therefore, potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling.

The sampling depths at existing monitoring wells were at approximately the center of the saturated screened interval. **Table 6-1** includes the monitoring well and temporary well details for the wells sampled during the SI (if available).

6.3 Sampling Methods and Procedures

Environmental data were collected and analyzed in accordance with the PQAPP (Arcadis 2019), the SOPs and TGIs included as Appendix A to the PQAPP, the QA/QC requirements identified in Worksheet #20 of the PQAPP, the approved scope and sampling methods outlined in the site-specific QAPP Addendum (Arcadis 2020), and the safety procedures specified in the Accident Prevention Plan (Arcadis 2018) and SSHP (Arcadis 2020). The sampling methods described in the SOPs and TGIs establish equipment requirements, procedures for preparing equipment and containers before sampling, sampling procedures under various conditions, and procedures for storing samples to ensure that sample

contamination does not occur during collection, and transport. In general, sampling techniques used in the SI were consistent with conventional sampling techniques used in the environmental industry, but special considerations were made regarding PFAS-containing materials and equipment and cross-contamination potential.

The sampling methods employed during the SI are detailed in the PQAPP (Arcadis 2019) and QAPP Addendum (Arcadis 2020). The subsections below provide a summary of the field methods and procedures utilized to complete the SI scope of work. Field notes and field forms (i.e., daily summaries, soil boring logs, groundwater purging logs, utility checklists, tailgate health and safety forms, and shallow soil sample collection logs) documenting the SI sampling activities are included in **Appendices J** and **K**, respectively. Photographs of the sampling activities are included in **Appendix L**.

6.3.1 Field Methods

Groundwater samples were planned to be collected via direct-push technology (DPT) from 28 discrete direct-push points at each of the following 19 potential source areas: FH-023, FH-024, Building 2455, Building 7002, Building 1285, Building 4335, Building 3201, Building 7081, Building 23025, Building 52940, Building 56326, Building 56519, Building 90120, Building 90176, FH-001, Building 7027, Building 90108, Building 90109, and Building 91039. Grab groundwater samples were planned to be collected from shallow (the first encountered) groundwater, which was anticipated to be approximately 6 to 20 feet bgs; however, individual samples were collected based on site-specific conditions. Coordinates for each borehole's groundwater sampling location were recorded using a handheld global positioning system. As explained further in **Section 6.3.4**, only three of the 19 planned groundwater sample locations (FH-024, Building 7081, and FH-001) were able to be collected via DPT due to encountered bedrock. Another groundwater sampling mobilization was completed with samples planned to be collected via a rotosonic drill rig to a maximum estimated depth of 70 feet bgs from seven potential source areas: FH-023, Building 91039, Building 23025, Building 3201, Building 4335, Building 7027, and Building 56519. Groundwater samples were unable to be collected from FH-023 and Building 23025 during the second mobilization due to insufficient groundwater recharge.

In addition, groundwater samples were collected using low-flow purging methods at the Active Fort Hood Landfill from the following existing monitoring wells (MW-2, MW-6, MW-8, MW-18, P-5, and P-7). Each groundwater sample was collected from the approximate center of the saturated screened interval.

Groundwater samples were analyzed for select PFAS (identified in **Section 6.4.1**), and field parameters (temperature, pH, specific conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential) were measured during purging and allowed to stabilize (or purged for a maximum of 20 minutes, whichever is sooner) before groundwater sampling to ensure a representative sample is collected and, potentially, to inform the interpretation of analytical data.

Soil samples were collected via hand auger or DPT drilling methods from 76 discrete points at each of the following AOPIs for a total of 76 sampling points: FH-023, FH-024, Building 2455, Building 90145, Building 7002, Building 1285, Building 4335, Building 3201, Building 7081, Building 23025, Building 52940, Building 56326, Building 56519, Building 6975, Building 90120, Building 90033, Building 90050, Building 90094, Building 90176, Building 7027, Building 90101, Building 90108, Building 90109, and Building 91039. DPT boring and sampling was completed using macro-core samplers, or a hand auger. At each sampling point at each AOPI, soil samples consisted of a composite soil sample collected from 0

to 2 feet bgs. Soil samples were analyzed for select PFAS; TOC, pH, and grain size were analyzed in one soil sample per AOPI (i.e., these analytes will not be analyzed for in every soil sample collected). Soil lithological descriptions were continuously logged and documented on field forms.

The soil sampling locations final coordinates were dependent on field conditions and infrastructure (if present). Coordinates for each soil sampling location were recorded using a handheld global positioning system.

Decontamination procedures for non-dedicated equipment used during sampling are described in **Section 6.3.5**.

6.3.2 Quality Assurance/Quality Control

Worksheets #20 of the PQAPP and QAPP Addendum provide QA/QC requirements for field duplicates, matrix spike/matrix spike duplicates, equipment blanks (EBs), source blanks for water used in the initial decontamination step for drill tooling, and field blanks for laboratory-supplied water used in the final decontamination step.

QA/QC samples were collected at the frequencies specified in the QAPP Addendum (Arcadis 2020), typically at a rate of 1 per 20 parent samples. Field duplicates and matrix spike/matrix spike duplicate samples were collected for media sampled for PFOS, PFOA, PFBS, PFNA, and PFHxS, and TOC only. EBs were collected for media sampled for PFOS, PFOA, PFBS, PFNA, and PFHxS at a frequency of one per piece of relevant equipment for each sampling event, as specified in the QAPP Addendum (Arcadis 2020). The decontaminated reusable equipment from which EBs were collected include tubing, tubing weights, groundwater sampling device screen, drill casing and cutting shoes, hand augers, water-level meters, and stainless-steel trowels as applicable to the sampled media. Source blanks were collected from the water used in the initial decontamination of drill tooling. Analytical results for blank samples are discussed in **Section 7.8**.

6.3.3 Dedicated Equipment Background

Dedicated equipment background (DEB) blanks were collected at a frequency of one DEB per AOPI, at AOPIs where groundwater sampling was conducted at existing monitoring wells that contained dedicated, down-hole equipment. When collecting samples from monitoring wells with dedicated, down-hole equipment, two water samples were taken from one monitoring well at each AOPI. One DEB sample was collected from the first water produced through the pump and tubing and was used to evaluate whether the dedicated equipment may be impacting the PFOS, PFOA, PFBS, PFNA, and/or PFHxS results, as it is unknown if the dedicated equipment was comprised of PFAS-containing components; PFOS, PFOA, PFBS, PFNA, and/or PFHxS concentrations in the DEBs reflect concentrations of stagnant groundwater, and they may be biased high by contributions from equipment that contains PFOS, PFOA, PFBS, PFNA, and/or PFHxS components. The parent sample was collected after the well was purged until the field parameters stabilized. One DEB was collected during the groundwater sampling at the Active Fort Hood Landfill. The DEB was collected at P-7, which uses dedicated bladder pump equipment. Further DEB analysis is included in **Section 7.5.**

6.3.4 Field Change Reports

Non-conformances to the approved sampling scope and/or procedures may occur during the sampling events. Non-conformances were reviewed and approved in accordance with the following chain of communication: 1) minor modifications or clarifications are communicated within the field team; and 2) major modifications are communicated to USACE in the daily/periodic field status email updates submitted by the SI project manager during the sampling event. Non-conformances to the approved sampling plan, which affect the DQOs are documented in Non-Conformance Reports (NCRs) included as **Appendix M** and are summarized below:

- NCR-FH-01: Twenty-seven samples were received by the laboratory outside of the acceptable temperature range for PFAS, TOC, and pH (qualified as estimated, but still usable for reporting)
- NCR-FH-02: Only three groundwater samples were collected and analyzed out of the 28 planned groundwater borings due to the lack of groundwater at the sampling locations during the first mobilization

In some cases, clarifications to the established scope of work may be needed but do not necessarily constitute a non-conformance from the sampling plans described in the QAPP Addendum. Minor modifications from and clarifications for the procedures and scope of work detailed in the QAPP Addendum and PQAPP and that did not affect DQOs are documented in Field Change Reports (FCRs) included as **Appendix N** and are summarized below:

- FCR-FH-01: Five locations (Building 7027, Building 90101, Building 90108, Building 90109, and Building 91039) were added as AOPIs due to AFFF storage or staging.
- FCR-FH-02: The depth of groundwater borings was extended from 20 feet to 40 feet to ensure the sampling of shallow groundwater (if lithology and conditions during drilling allowed).
- FCR-FH-03: A DEB sample was added to the sampling plan to evaluate whether the dedicated equipment may be impacting the PFOS, PFOA, PFBS, PFNA, and/or PFHxS results, as it is unknown if the dedicated equipment was comprised of PFAS-containing components. The Active Fort Hood Landfill is the only AOPI with a DEB sample.
- FCR-FH-04: Monitoring well MW-14A was sampled instead of MW-18 at the Active Fort Hood Landfill because MW-14A is more aligned with the groundwater flow at the AOPI
- FCR-FH-05: Two soil sample locations at Building 90120 (B90120-1 and B90120-2) were moved approximately 50 feet south of their original locations to avoid a fiber optic line.
- FCR-FH-06: The depth for two soil samples at FH-023 (FH-023-1 and FH-023-2) was changed from 2 to 4 feet to 0 to 2 feet based on the amount of excavation and regrading that took place at the AOPI.
- A set of matrix spike/matrix spike duplicate (MS/MSD) samples were collected at different sample locations than originally planned due to the progression of the sampling event
    - FCR-FH-07: MS/MSD sample was collected with parent sample FH-B90120-02-SO instead of with parent sample FH-B90094-03-SO
    - FCR-FH-08: MS/MSD sample was collected with parent sample FH-FH001-02-GW instead of with parent sample FH-FH001-05-GW

  - FCR-FH-09: MS/MSD sample was collected with parent sample FH-B1285-02-SO instead of with parent sample FH-B1285-03-SO

- FCR-FH-10: Groundwater samples were added to seven AOPIs (FH-023, Building 91039, Building 23025, Building 3201, Building 4335, Building 7027, and Building 56519). The groundwater samples were to be collected from first encountered groundwater via rotosonic drilling to a maximum depth of 70 feet bgs
- FCR-FH-11: Two of the planned groundwater samples (FH-023 and Building 23025) were unable to be collected due to the lack of groundwater at the sampling locations during the second mobilization. Since the soil boring for FH-023 was located at the presumed firefighter training area, a soil sample was collected from the soil and bedrock interface at a depth of 4 to 5 feet bgs.

6.3.5 Decontamination

Non-dedicated reusable sampling equipment (e.g., tubing, tubing weights, groundwater sampling device screen, drill casing and cutting shoes, hand augers, water-level meters, and stainless-steel trowels) that came into direct contact with sampling media was decontaminated before first use, between sampling locations/intervals, and before demobilization in accordance with P-09, TGI - Groundwater and Soil Sampling Equipment Decontamination (Arcadis 2019, Appendix A).

6.3.6 Investigation-Derived Waste

IDW, including soil cuttings, groundwater, and decontamination fluids were collected and placed in Department of Transportation-approved 55-gallon drums, labeled as non-hazardous, segregated by medium: water and soil, and transported to a staging area pending analysis. A composite soil sample was collected from the 15 soil drums and a composite water sample was collected from the four water drums during December 2021. On 22 June 2022, the 19 drums containing IDW were collected by SET Environmental, Inc. and transported the Itasca Landfill in Itasca, Texas for disposal. The IDW transportation and disposal documentation is provided in **Appendix O**.

Equipment IDW was collected in bags and disposed in municipal waste receptacles. Equipment IDW includes personal protective equipment and other disposable materials (e.g., gloves, plastic sheeting, Lexan tubes, and high-density polyethylene and silicon tubing) that may come in contact with sampling media. Analytical results for IDW samples collected during the SI are discussed in **Section 7.6**.

6.4 Data Analysis

The subsections below summarize the laboratory analytical methods and the methodology used to evaluate data collected during the SI through data verification and usability assessments (as completed by a project chemist, independent of the project team).

6.4.1 Laboratory Analytical Methods

Analytical samples collected during the SI were submitted to Pace South Carolina (formerly Shealy Environmental Services, Inc.), an ELAP-accredited laboratory for PFAS analysis, including PFOS, PFOA, PFBS, PFNA, and PFHxS, by liquid chromatography with tandem mass spectrometry. Laboratory

analyses associated with the SI were completed in accordance with Worksheets #12.1 through #12.5 in the PQAPP (Arcadis 2019). Eighteen PFAS-related compounds, including PFOS, PFOA, PFBS, PFNA, and PFHxS, were analyzed for in groundwater and soil samples using an analytical method that is ELAP-accredited and compliant with QSM 5.3 (DoD and Department of Energy 2019), Table B-15.

Additionally, the following general chemistry and physical characteristic analyses were completed for select soil samples in accordance with Worksheet #18 of the QAPP Addendum (Arcadis 2020) by the analytical method noted:

- TOC by Solid Waste Test Method 846 9060A
- Grain size analysis by American Society for Testing and Materials D422-63
- pH by Solid Waste Test Method 846 9045D

These data are collected as they may be useful in future fate and transport studies.

The laboratory limit of detection (LOD) is defined as “the lowest concentration for reliable reporting of a non-detect of a specific analyte in a specific matrix with a specific method at 99 percent confidence” (DoD 2017). The lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias is known as the LOQ (DoD 2017). Concentrations detected between the LOD and LOQ, therefore, are considered estimates and are qualified as such on laboratory analytical reports. Instrument-specific detection limits (e.g., the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99 percent confidence; DoD 2017), as provided for each analyte by the laboratory, are reported along with the LODs and LOQs in the laboratory analytical reports included in the Data Usability Summary Report (DUSR) (**Appendix P**).

6.4.2 Data Validation

All analytical data generated during the SI, except grain size and data generated from IDW profiling, were verified, and validated in accordance with the data verification procedures described in Worksheets #34 through #36 of the PQAPP (Arcadis 2019). Each laboratory data package/sample delivery group underwent Stage 3 data validation in accordance with DoD QSM 5.3 (DoD and Department of Energy 2019). Additionally, 10% of the data underwent Stage 4 data validation. Copies of the data validation reports for each sample delivery group are included as attachments to the DUSR in **Appendix P**. The Level IV analytical reports are included within **Appendix P** in the final electronic deliverable only.

6.4.3 Data Usability Assessment and Summary

A data usability assessment was completed for all analytical data associated with SI sampling at Fort Hood. Documentation generated during the data usability assessments, which were compiled into a DUSR (**Appendix P**), was prepared in accordance with the USACE Engineer Manual 200-1-10 (USACE 2005), the Final DoD General Data Validation Guidelines (DoD 2019) and the Final DoD Data Validation Guidelines Module 3: Data Validation Procedure for Per-and Polyfluoroalkyl Substances Analysis by QSM Table B-15 (DoD 2020), that reviewed precision, accuracy, completeness, representativeness, comparability, and sensitivity. A statement of overall data usability is included in the DUSR.

Based on the final data usability assessment, the environmental data collected at Fort Hood during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the

DUSR and its associated data validation reports (**Appendix P**), and as indicated in the full analytical tables (**Appendix Q**) provided for the SI results. These data are of sufficient quality to meet the objectives and requirements of the PQAPP (Arcadis 2019) and Fort Hood QAPP Addendum (Arcadis 2020). Data qualifiers applied to laboratory analytical results for samples collected during the SI at Fort Hood are provided in the data tables, data validation reports, and the Data Usability Summary Table located at the end of DUSR. Qualifiers for data shown on figures are defined in the notes of figures.

6.5 Office of the Secretary of Defense Risk Screening Levels

The OSD risk screening levels for PFOS, PFOA, PFBS, PFNA, PFHxS, and HFPO-DA in groundwater (tap water) and soil were calculated using the USEPA's RSL calculator for residential and industrial/commercial worker receptor scenarios and current toxicity values. These risk screening levels are shown below in **Table 6-2**.

The OSD residential tap water risk screening levels will be used to compare all groundwater data for this Army PFAS PA/SI. While the current and most likely future land uses of the AOPIs at Fort Hood are industrial/commercial, both residential and industrial/commercial soil risk screening levels for PFOS, PFOA, PFBS, PFNA, and PFHxS will be used to evaluate detected soil concentrations. The data from the SI sampling event are compared to the OSD risk screening levels in **Section 7**. If concentrations of PFOS, PFOA, PFBS, PFNA, or PFHxS are detected greater than the applicable OSD risk screening levels, further study in a remedial investigation is recommended in **Section 8**.

Table 6-2 OSD Risk Screening Levels Calculated for PFOS, PFOA, PFBS, PFNA, PFHxS, and HFPO-DA in Tap Water and Soil Using USEPA's Regional Screening Level Calculator

Chemical	Residential Scenario Risk Screening Levels Calculated Using USEPA RSL Calculator		Industrial/Commercial Scenario Risk Screening Levels Calculated Using USEPA RSL Calculator
	Tap Water (ng/L or ppt) [1]	Soil (mg/kg or ppm) [1,2,3]	Soil (mg/kg or ppm) [1,2]
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFNA	6	0.019	0.25
PFHxS	39	0.13	1.6
HFPO-DA	6	0.023	0.35

Notes:

1. Risk screening levels for tap water and soil provided by the OSD. 2022. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. July 06 (**Appendix A**).
2. All soil data will be screened against both the Residential Scenario and Industrial/Commercial risk screening levels (if collected from less than 2 feet bgs), regardless of the current and projected land use of the AOPI.

3. HFPO-DA was not in the suite of PFAS compounds analyzed during the SI; therefore, there are no HFPO-DA SI analytical results to screen against the 2022 OSD risk screening levels.
mg/kg = milligram per kilogram
ng/L = nanograms per liter
ppm = parts per million
ppt = parts per trillion

7 SUMMARY AND DISCUSSION OF SI RESULTS

This section summarizes the analytical results obtained from samples collected during the SI at Fort Hood (field duplicate results are displayed in brackets following the parent sample results and are provided in the associated tables). Sampled media and QA/QC samples were analyzed for the constituents prescribed per Worksheet #18 of the QAPP Addendum (Arcadis 2020). The sample results discussion below focuses on the PFOS, PFOA, PFBS, PFNA, and PFHxS analytical results because they have OSD risk screening levels. The Army will make subsequent investigation decisions based on these constituents' concentrations relative to the OSD residential risk screening levels for soil and tap water as well as the industrial/commercial risk screening levels for soil.

Tables 7-1 and **7-2** provide a summary of the soil and groundwater analytical results for PFOS, PFOA, PFBS, PFNA, and PFHxS. **Table 7-3** summarizes AOPIs and whether their SI results exceed the OSD risk screening levels**. Appendix Q** includes the full suite of analytical results for these media, as well as for the QA/QC samples. An overview of AOPIs at Fort Hood with OSD risk screening level exceedances is depicted on **Figure 7-1**. **Figures 7-2** through **7-16** show the PFOS, PFOA, PFBS, PFNA, and PFHxS analytical results for groundwater and soil for each AOPI. Non-detected results are reported as less than the LOQ. Detections of PFOS, PFOA, PFBS, PFNA, and/or PFHxS greater than the applicable OSD risk screening levels are highlighted in summary tables and on figures. Final qualifiers applied to the data by the laboratory and the project chemist (as defined in **Section 6.4.3**) are presented on the analytical tables. Groundwater data are reported in ng/L, or parts per trillion, and soil data are reported in mg/kg, or parts per million.

Field parameters measured for groundwater during low-flow purging and sample collection are provided on the field forms in **Appendix K**. Soil descriptions are provided on the field forms in **Appendix K**. The results of the SI are grouped by AOPI and discussed for each medium as applicable. Where encountered, groundwater was generally first found at depths of approximately 10 to 15 feet bgs in DPT groundwater borings and approximately 20 to 50 feet bgs in temporary wells and existing monitoring wells.

Table 7-3 AOPIs and OSD Risk Screening Level Exceedances

AOPI Name	OSD Exceedances (Yes/No/NS)
FH-023 – Old Firefighter Training Area	No
FH-024 – New Firefighter Training Area	Yes
Building 2455 – Former Fire Station	Yes
Building 90145 – Active Fire Station	Yes
Building 3201 – Former Fire Station	No
Building 7081 – Active Fire Station	Yes
Building 23025 – Active Fire Station	No
Building 1285 – Former Fire Station	No
Building 4335 – Former Fire Station	No

AOPI Name	OSD Exceedances (Yes/No/NS)
Building 7002 – Former Fire Station	Yes
Building 52940 – Active Fire Station	Yes
Building 56326 – Former Fire Station	Yes
Building 56519 – Active Fire Station	No
Building 90050 – Old Fire and Crash Hangar	Yes
Building 6975 – Hangar	No
Building 90120 – Hangar	No
Building 90033 – Hangar	Yes
Building 90176 – Hangar	No
Building 7027 – Hangar	Yes
Building 91039 – Motor Pool	Yes
Building 90094 – Hangar	No
Building 90108 – Hangar	Yes
Building 90109 – Hangar	No
Building 90101 – Hangar	No
FH-001 – Abandoned Sanitary Landfill No. 1	Yes
Active Fort Hood Landfill	Yes
Building 88038 – Logistics Readiness Center (LRC) Facility	NS[1]

Notes:

[1] Note that although Building 88038 was identified as a AOPI in the PA, sampling was not completed at this AOPI because potential PFAS-containing material was disposed at an indoor location into a sanitary sewer discharging to a municipal wastewater treatment plant; therefore, potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling

NS – not sampled

7.1 West Fort Hood AOPIs

7.1.1 Robert Gray Army Airfield AOPIs

7.1.1.1 FH-023 – Old Firefighter Training Area

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with FH-023 – Old Firefighter Training Area and the attempt made to sample groundwater at this AOPI.

7.1.1.1.1 Soil

Four soil samples and a field duplicate (results are indicated within the brackets below) were collected. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-FH023-01-SO-072220 (0.0015 mg/kg), FH-FH023-01-SO-120221 (0.0054 mg/kg), FH-FH023-02-SO-072220 (0.0017 mg/kg [0.0017 mg/kg]), and FH-FH023-03-SO-072720 (0.00063 J mg/kg). The “J” qualifier indicates that the result is estimated.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-FH023-01-SO-120221 (0.011 mg/kg) and FH-FH023-02-SO-072220 (0.00061 J mg/kg in the duplicate sample and was not detected in the primary sample). PFOA was not detected in the remaining samples.

PFBS was not detected in the four soil samples and the associated duplicate.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-FH023-01-SO-072220 (0.0013 mg/kg), FH-FH023-01-SO-120221 (0.0013 mg/kg), and FH-FH023-02-SO-072220 (0.00058 J mg/kg [0.00076 J mg/kg]).

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-FH023-01-SO-120221 (0.0026 mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-2**.

7.1.1.1.2 Groundwater

The two groundwater samples originally proposed for FH-023 could not be collected as planned due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling locations, as described in the NCRs (**Appendix M**). One groundwater sample was proposed to be collected from FH-023 in a second mobilization but was also unable to be collected due to insufficient groundwater recharge. A soil sample collected in December 2021 at the soil-bedrock interface from the temporary well boring location was submitted for laboratory analysis because of not collecting a groundwater sample.

7.1.1.2 Building 90094 – Hangar

Soil was the only media sampled at Building 90094. Three soil samples and a field duplicate (results are indicated within the brackets below) were collected. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B90094-01-SO-072120 (0.0029 mg/kg), FH-B90094-02-SO-072120 (0.0021 mg/kg [0.0029 mg/kg]), and FH-B90094-03-SO-072120 (0.0082 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90094-03-SO-072120 (0.0011 mg/kg). PFOA was not detected in the remaining samples or field duplicate.

PFBS was not detected in any of the three soil samples or the associated duplicate.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in the samples FH-B90094-02-SO-072120 (0.00054 J mg/kg [0.00052 J mg/kg]) and FH-B90094-03-SO-072120 (0.00086 J mg/kg). PFHxS was not detected in the remaining sample.

PFNA was not detected in any of the three soil samples or the associated duplicate.

The analytical results are depicted on **Figure 7-2**.

7.1.1.3 Building 90101 – Hangar

Soil was the only media sampled at Building 90101 and three soil samples were collected. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in all three samples: FH-B90101-01-SO-072720 (0.00095 J mg/kg), FH-B90101-02- SO-072720 (0.0012 J mg/kg), and FH-B90101-03- SO-072720 (0.0013 J mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90101-02-SO-072720 (0.00055 J mg/kg) and FH-B90101-03-SO-072720 (0.00066 J mg/kg). PFOA was not detected in the remaining sample.

PFBS and PFHxS were not detected in any of the three soil samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90101-03-SO-072720 (0.00055 J mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-2**.

7.1.1.4 Building 90108 – Hangar

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 90108 and the attempt made to sample groundwater at this AOPI.

7.1.1.4.1 Soil

Three soil samples were collected. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90108-01-SO-072720 (0.018 J mg/kg), collected adjacent and northeast of the AOPI. PFOS was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in remaining samples FH-B90108-02-SO-072720 (0.0015 J mg/kg), and FH-B90108-03- SO-072720 (0.0018 J mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90108-01-SO-072720 (0.0018 J mg/kg) and FH-B90108-03-SO-072720 (0.00048 J mg/kg). PFOA was not detected in the remaining sample.

PFBS was not detected in any of the three soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90108-01-SO-072720 (0.0019 J mg/kg). PFHxS was not detected in the remaining samples.

PFNA was not detected in any of the three soil samples.

The analytical results are depicted on **Figure 7-2**.

7.1.1.4.2 Groundwater

The one groundwater sample proposed for Building 90108 could not be collected as planned due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling locations, as described in the NCRs (**Appendix M**).

7.1.1.5 Building 90109 – Hangar

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 90109 and the attempt made to sample groundwater at this AOPI.

7.1.1.5.1 Soil

Three soil samples were collected from Building 90109. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B90109-01-SO-072720 (0.0033 J mg/kg), FH-B90109-02-SO-072720 (0.0016 J mg/kg), and FH-B90109-03-SO-072720 (0.0029 J mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B90109-01-SO-072720 (0.0035 J mg/kg), FH-B90109-02-SO-072720 (0.00078 J mg/kg), and FH-B90109-03-SO-072720 (0.00068 J mg/kg).

PFBS was not detected in any of the three soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90109-01-SO-072720 (0.00073 J mg/kg). PFHxS was not detected in the remaining samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90109-01-SO-072720 (0.0019 J mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-2**.

7.1.1.5.2 Groundwater

The one groundwater sample proposed for Building 90109 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.1.1.6 Building 90120 – Hangar

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 90120 and the attempt made to sample groundwater at this AOPI.

7.1.1.6.1 Soil

Two soil samples were collected from Building 90120. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90120-02-SO-072320 (0.00073 J mg/kg). PFOS was not detected in the remaining sample.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90120-02-SO-072320 (0.0012 mg/kg). PFOA was not detected in the remaining sample.

PFBS and PFHxS were not detected in either of the two soil samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90120-02-SO-072320 (0.00077 J mg/kg). PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-2**.

7.1.1.6.2 Groundwater

The one groundwater sample proposed for Building 90120 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.1.1.7 Building 90176 – Hangar

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 90176 and the attempt made to sample groundwater at this AOPI.

7.1.1.7.1 Soil

One soil sample was collected from Building 90176. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90176-01-SO-072220 (0.00089 J mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90176-01-SO-072220 (0.002 mg/kg).

PFBS and PFHxS were not detected in the soil sample.

PFNA was detected at a concentration was less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90176-01-SO-072220 (0.0018 mg/kg).

The analytical results are depicted on **Figure 7-2**.

7.1.1.7.2 Groundwater

The one groundwater sample proposed for Building 90176 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.1.1.8 Building 90033 – Hangar

Soil was the only media sampled at Building 90033 and three soil samples were collected. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90033-01-SO-072120 (0.62 J mg/kg), collected north of the AOPI. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90033-02-SO-072120 (0.0036 mg/kg) and FH-B90033-03-SO-072120 (0.0014 mg/kg).

PFOA was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) at FH-B90033-01-SO-072120 (0.0089 mg/kg) and FH-B90033-03-SO-072120 (0.00091 J mg/kg). PFOA was not detected in the remaining sample.

PFBS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90033-01-SO-072120 (0.0029 mg/kg). PFBS was not detected in the remaining samples.

PFHxS was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) at FH-B90033-01-SO-072120 (0.0037 mg/kg) and FH-B90033-03-SO-072120 (0.00051 J mg/kg). PFHxS was not detected in the remaining sample.

PFNA was not detected in any of the three soil samples.

The analytical results are depicted on **Figure 7-3**.

7.1.1.9 Building 90050 – Old Fire and Crash Hangar

Soil was the only media sampled at Building 90050 and four soil samples were collected. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90050-02-SO-072120 (0.065 mg/kg), FH-B90050-03 (0.22 mg/kg), and FH-B90050-04-SO-072120 (0.13 mg/kg). Samples FH-B90050-02-SO-072120 and FH-B90050-03 were collected near the eastern half of the AOPI while sample FH-B90050-04-SO-072120 was collected from within the drainage ditch south of the AOPI. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90050-01 (0.0039 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90050-02-SO-072120 (0.0013 mg/kg), FH-B90050-03-SO-072120 (0.0019 mg/kg), and FH-B90050-04-SO-072120 (0.0029 mg/kg). PFOA was not detected in the remaining sample.

PFBS was not detected in any of the four soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90050-02-SO-072120 (0.0086 mg/kg), FH-B90050-03-SO-072120 (0.0042 mg/kg), and FH-B90050-04-SO-072120 (0.0074 mg/kg). PFHxS was not detected in the remaining sample.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90050-02-SO-072120 (0.00092 J mg/kg), FH-B90050-03-SO-072120 (0.0014 mg/kg), and FH-B90050-04-SO-072120 (0.0031 mg/kg). PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-3**.

7.1.1.10 Building 90145 – Active Fire Station

Soil was the only media sampled at Building 90145 and four soil samples were collected. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90145-02-SO-072120 (0.018 mg/kg) and FH-B90145-04-SO-072120 (0.33 J mg/kg), collected east and within the drainage ditch south of the AOPI, respectively. PFOS was detected at a concentration equal to the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90145-01-SO-072120 (0.013 mg/kg), collected east of the AOPI. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B90145-03-SO-072120 (0.0021 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B90145-01-SO-072120 (0.0014 mg/kg), FH-B90145-02-SO-072120 (0.00093 J mg/kg), FH-B90145-03-SO-072120 (0.0008 J mg/kg), and FH-B90145-04-SO-072120 (0.0049 J- mg/kg). The “J-” qualifier indicates that the result is estimated and may be biased low.

PFBS was not detected in any of the four soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B90145-01-SO-072120 (0.0014 mg/kg), FH-B90145-02-SO-072120 (0.00052 J mg/kg), FH-B90145-03-SO-072120 (0.00054 J mg/kg), and FH-B90145-04-SO-072120 (0.012 mg/kg).

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B90145-01-SO-072120 (0.00062 J mg/kg), FH-B90145-02-SO-072120 (0.00088 J mg/kg), and FH-B90145-04-SO-072120 (0.004 J- mg/kg). PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-4**.

7.1.2 Building 91039 – Motor Pool

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 91039.

7.1.2.1 Soil

Three soil samples were collected from Building 91039. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B91039-02-SO-072320 (0.059 mg/kg) and FH-B91039-03-SO-072320 (0.033 mg/kg), collected within the drainage ditch east of the AOPI. PFOS was not detected in the remaining sample.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B91039-02-SO-072320 (0.0012 mg/kg). PFOA was not detected in the remaining samples.

PFBS was not detected in any of the three soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B91039-02-SO-072320 (0.0018 mg/kg) and FH-B91039-03-SO-072320 (0.0013 mg/kg. PFHxS was not detected in the remaining sample.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B91039-02-SO-072320 (0.00057 J mg/kg) and FH-B91039-03-SO-072320 (0.00064 J mg/kg. PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-5**.

7.1.2.2 Groundwater

The one groundwater sample originally proposed for Building 91039 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location (FH-B91039-01), as described in the NCRs (**Appendix M**). However, one groundwater sample (FH-B91039-02-GW-112221) was collected at Building 91039 during the second mobilization.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in FH-B91039-02-GW-112221 (25 ng/L), collected within a drainage ditch east of the AOPI.

PFOA was detected at a concentration less than the OSD risk screening level in sample FH-B91039-02-GW-112221 B91039-02 (2.5 J ng/L).

PFBS was not detected in the groundwater sample.

PFHxS was detected at a concentration less than the OSD risk screening level in sample FH-B91039-02-GW-112221 B91039-02 (7.2 ng/L).

PFNA was not detected in the groundwater sample.

The analytical results are depicted on **Figure 7-5**.

7.2 Main Cantonment AOPIs

7.2.1 Building 2455 – Former Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 2455 and the attempt made to sample groundwater at this AOPI.

7.2.1.1 Soil

Three soil samples were collected from Building 2455. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B2455-03-SO-072820 (0.91 J mg/kg), collected at the southeast corner of the AOPI. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B2455-01-SO-073020 (0.0031 mg/kg) and FH-B2455-02-SO-073020 (0.0027 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B2455-01-SO-073020 (0.00075 J mg/kg) and FH-B2455-03-SO-072820 (0.011 mg/kg). PFOA was not detected in the remaining sample.

PFBS was not detected in any of the three soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B2455-01-SO-073020 (0.00089 J mg/kg) and FH-B2455-03-SO-072820 (0.048 mg/kg). PFHxS was not detected in the remaining sample.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B2455-03-SO-072820 (0.017 mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-6**.

7.2.1.2 Groundwater

The one groundwater sample proposed for Building 2455 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.2.2 Building 23025 – Active Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 23025 and the attempts made to sample groundwater at this AOPI.

7.2.2.1 Soil

Four soil samples were collected from Building 23025. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B23025-03-SO-072820 (0.0051 J mg/kg). PFOS was not detected in the remaining samples.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B23025-01-SO-072820 (0.00051 J mg/kg) and FH-B23025-03-SO-072820 (0.0017 J mg/kg). PFOA was not detected in the remaining samples.

PFBS was not detected in any of the four soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B23025-03-SO-072820 (0.00064 J mg/kg). PFHxS was not detected in the remaining samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B23025-03-SO-072820 (0.0015 J mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-6**.

7.2.2.2 Groundwater

The one groundwater sample originally proposed for Building 23025 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**). One groundwater sample was proposed to

be collected from Building 23025 during the second mobilization but was also unable to be collected due to insufficient groundwater recharge.

7.2.3 Building 3201 – Former Fire Station

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 3201.

7.2.3.1 Soil

Three soil samples were collected from Building 3201. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B3201-01-SO-072820 (0.00072 J mg/kg) and FH-B3201-03-SO-072820 (0.0006 J mg/kg). PFOS was not detected in the remaining sample.

PFOA, PFBS, PFHxS, and PFNA were not detected in any of the three soil samples.

The analytical results are depicted on **Figure 7-7**.

7.2.3.2 Groundwater

The two groundwater samples originally proposed for Building 3201 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling locations, as described in the NCRs (**Appendix M**). However, one groundwater sample (FH-B3201-03-GW-111921) was collected at Building 3201 during the second mobilization.

PFOS, PFOA, PFBS, PFHxS, and PFNA were not detected in the groundwater sample.

The analytical results are depicted on **Figure 7-7**.

7.2.4 Building 4335 – Former Fire Station

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 4335.

7.2.4.1 Soil

Four soil samples were collected from Building 4335. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B4335-01-SO-072820 (0.0021 J mg/kg), FH-B4335-03-SO-072820 (0.0038 J mg/kg), and FH-B4335-04-SO-072820 (0.0034 J mg/kg). PFOS was not detected in the remaining sample.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B4335-03-SO-072820 (0.00082 J mg/kg) and FH-B4335-04-SO-072820 (0.00087 J mg/kg). PFOA was not detected in the remaining samples.

PFBS was not detected in any of the four soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B4335-04-SO-072820 (0.0022 J mg/kg). PFHxS was not detected in the remaining samples.

PFNA was not detected in any of the four soil samples.

The analytical results are depicted on **Figure 7-8**.

7.2.4.2 Groundwater

The one groundwater sample originally proposed for Building 4335 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**). However, one groundwater sample (FB-B4335-02-GW-112021) was collected at Building 4335 during the second mobilization.

PFOS was detected at a concentration less than the OSD risk screening level in sample FB-B4335-02-GW-112021 (3.0 J ng/L).

PFOA was detected at a concentration less than the OSD risk screening level in sample FB-B4335-02-GW-112021 (2.8 J ng/L).

PFBS, PFHxS, and PFNA were not detected in the groundwater sample.

The analytical results are depicted on **Figure 7-8**.

7.2.5 Building 1285 – Former Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 1285 and the attempt made to sample groundwater at this AOPI.

7.2.5.1 Soil

Three soil samples and a field duplicate were collected from Building 1285 (FH-B1285-01-SO-072720, FH-B1285-02-SO-072720, FH-B1285-03-SO-072720, and FH-FD-02-SO-072720). PFOS, PFOA, PFBS, PFHxS, and PFNA were not detected in any of the three soil samples or the duplicate sample.

The analytical results are depicted on **Figure 7-9**.

7.2.5.2 Groundwater

The one groundwater sample proposed for Building 1285 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.2.6 FH-001 – Abandoned Sanitary Landfill No. 1

Groundwater was the only media sampled at FH-001 and six groundwater samples were proposed for FH-001. However, groundwater samples could not be collected at five of the proposed sampling locations due to insufficient groundwater recharge and refusal due to limestone bedrock. One groundwater sample

(FH-FH001-02-GW-072420) was collected at a depth of approximately 15 feet bgs. A field duplicate sample was also collected, and results are indicated within the brackets below.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-FH001-02-GW-072420 (56 J+ ng/L [71 J+ ng/L]), collected along the western boundary of the AOPI. The “J+” qualifier indicates that the result is estimated and may be biased high.

PFOA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-FH001-02-GW-072420 (130 J- ng/L [150 J- ng/L]), collected along the western boundary of the AOPI.

PFBS was detected at a concentration less than the OSD risk screening level in groundwater sample FH-FH001-02-GW-072420 (22 J- ng/L [25 J- ng/L]).

PFHxS was detected at a concentration less than the OSD risk screening level in groundwater sample FH-FH001-02-GW-072420 (32 J- ng/L [36 J- ng/L]).

PFNA was detected at a concentration less than the OSD risk screening level in the field duplicate of groundwater sample FH-FH001-02-GW-072420 (2.8 J- ng/L).

The analytical results are depicted on **Figure 7-10**.

7.2.7 Active Fort Hood Landfill

Groundwater was the only media sampled at the Active Fort Hood Landfill. Six groundwater samples were collected at approximately 35 feet bgs from existing monitoring wells at the Active Fort Hood Landfill.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-MW-8-072220 (5.8 ng/L), collected along the western boundary of the AOPI. PFOS was not detected in the remaining samples.

PFOA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-MW-8-072220 (16 ng/L), collected along the western boundary of the AOPI. PFOA was not detected in the remaining samples.

PFBS was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-MW-8-072220 (2.6 J ng/L). PFBS was not detected in the remaining samples.

PFHxS was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-MW-8-072220 (3.2 J ng/L). PFHxS was not detected in the remaining samples.

PFNA was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-MW-8-072220 (2.1 J ng/L). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-10**.

7.2.8 Building 52940 – Active Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 52940 and the attempt made to sample groundwater at this AOPI.

7.2.8.1 Soil

Three soil samples were collected from Building 52940. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B52940-01-SO-072420 (0.021 mg/kg) and FH-B52940-03-SO-072420 (0.79 J mg/kg), collected near the northern boundary and southern boundary of the AOPI, respectively. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B52940-02-SO-072420 (0.0029 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B52940-03-SO-072420 (0.0016 mg/kg). PFOA was not detected in the remaining samples.

PFBS was not detected in any of the three soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B52940-01-SO-072420 (0.00055 J mg/kg), FH-B52940-02-SO-072420 (0.00066 J mg/kg), and FH-B52940-03-SO-072420 (0.0033 mg/kg).

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B52940-03-SO-072420 (0.007 mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-11**.

7.2.8.2 Groundwater

The one groundwater sample proposed for Building 52940 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.2.9 Hood Army Airfield AOPIs

7.2.9.1 Building 6975 – Hangar

Soil was the only media sampled at Building 6975 and two soil samples were collected. PFOS, PFOA, PFBS, PFHxS, and PFNA were not detected in either of the two samples.

The analytical results are depicted on **Figure 7-12**.

7.2.9.2 Building 7002 – Former Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 7002 and the attempt made to sample groundwater at this AOPI.

7.2.9.2.1 Soil

Four soil samples were collected from Building 7002. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B7002-01-SO-072920 (4.8 J mg/kg), FH-B7002-02-SO-072920 (0.049 mg/kg), FH-B7002-03-SO-072920 (0.02 mg/kg), and

FH-B7002-04 (0.25 J mg/kg). Samples FH-B7002-01-SO-072920, FH-B7002-02-SO-072920, and FH-B7002-04-SO-072920 were collected from within the AOPI boundary while sample FH-B7002-03-SO-072920 was collected northeast of the AOPI.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7002-01-SO-072920 (0.0052 J+ mg/kg), FH-B7002-02-SO-072920 (0.003 mg/kg), and FH-B7002-04-SO-072920 (0.0047 mg/kg). PFOA was not detected in the remaining sample.

PFBS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7002-01-SO-072920 (0.0018 J+ mg/kg) and FH-B7002-04-SO-072920 (0.002 mg/kg). PFBS was not detected in the remaining samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample FH-B7002-01-SO-072920 (0.068 mg/kg), FH-B7002-02-SO-072920 (0.0054 mg/kg), FH-B7002-03-SO-072920 (0.0015 mg/kg), and FH-B7002-04-SO-072920 (0.037 mg/kg).

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7002-01-SO-072920 (0.0041 J+ mg/kg), FH-B7002-02-SO-072920 (0.00083 J mg/kg), and FH-B7002-04-SO-072920 (0.0044 mg/kg). PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-12**.

7.2.9.2.2 Groundwater

The one groundwater sample proposed for Building 7002 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.2.9.3 Building 7081 – Active Fire Station

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 7081.

7.2.9.3.1 Soil

Four soil samples were collected from Building 7081. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B7081-01-SO-073020 (0.0024 mg/kg), FH-B7081-02-SO-073020 (0.0011 mg/kg), FH-B7081-03-SO-072920 (0.0023 mg/kg), and FH-B4335-04-SO-072920 (0.0023 mg/kg).

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7081-03-SO-072920 (0.002 mg/kg) and FH-B7081-04-SO-072920 (0.0018 mg/kg). PFOA was not detected in the remaining samples.

PFBS was not detected in any of the four soil samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7081-01-SO-073020 (0.00067 J mg/kg) and FH-B7081-04-SO-072920 (0.0011 J mg/kg). PFHxS was not detected in the remaining samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7081-03-SO-072920 (0.0017 mg/kg) and FH-B7081-04-SO-072920 (0.00073 J mg/kg). PFNA was not detected in the remaining samples.

The soil analytical results are depicted on **Figure 7-13**.

7.2.9.3.2 Groundwater

One groundwater sample was collected at a depth of approximately 15 feet bgs at Building 7081 from a location downgradient and southeast of the AOPI.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7081-01-GW-072920 (200 J ng/L).

PFOA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7081-01-GW-072920 (50 ng/L).

PFBS was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-B7081-01-GW-072920 (180 ng/L).

PFHxS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7081-01-GW-072920 (500 J ng/L).

PFNA was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-B7081-01-GW-072920 (3.0 J ng/L).

The groundwater analytical results are depicted on **Figure 7-13**.

7.2.9.4 Building 7027 – Hangar

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 7027.

7.2.9.4.1 Soil

Three soil samples were collected from Building 7027. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7027-01-SO-072920 (0.0022 mg/kg) and FH-B7027-03-SO-072920 (0.0065 mg/kg). PFOS was not detected in the remaining sample.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B7027-01-SO-072920 (0.00063 J mg/kg) and FH-B7027-03-SO-072920 (0.0024 mg/kg). PFOA was not detected in the remaining sample.

PFBS and PFHxS were not detected in any of the three soil samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B7027-03-SO-072920 (0.0017 mg/kg). PFNA was not detected in the remaining samples.

The analytical results are depicted on **Figure 7-14**.

7.2.9.4.2 Groundwater

The one groundwater sample originally proposed for Building 7027 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**). However, one groundwater sample (FH-B7027-02-GW-111721) was collected at Building 7027 during the second mobilization. A field duplicate sample was also collected, and results are indicated within the brackets below.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7027-02-GW-111721 (310 ng/L [290 ng/L]).

PFOA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7027-02-GW-111721 (35 ng/L [36 ng/L]).

PFBS was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-B7027-02-GW-111721 (20 ng/L [18 ng/L]).

PFHxS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7027-02-GW-111721 (210 ng/L [200 ng/L]).

PFNA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-B7027-02-GW-111721 (7.8 ng/L [9.1 ng/L]).

The analytical results are depicted on **Figure 7-14**.

7.3 AOPIs Between West Fort Hood and Main Cantonment

7.3.1 FH-024 – New Firefighter Training Area

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with FH-024.

7.3.1.1 Soil

Five soil samples were collected from FH-024. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-FH024-01-SO-072320 (0.037 mg/kg), FH-FH024-02-SO-072320 (0.055 mg/kg), FH-FH024-03-SO-072320 (0.2 mg/kg), FH-FH024-04-SO-072320 (0.031 mg/kg), and FH-FH024-05-SO-072320 (0.032 mg/kg). Sample FH-FH024-02-SO-072320 was collected from Clear Creek while the other four sample were collected from within the AOPI.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-FH024-01-SO-072320 (0.0023 mg/kg), FH-FH024-02-SO-072320

(0.0038 mg/kg), FH-FH024-03-SO-072320 (0.0018 mg/kg), and FH-FH024-05-SO-072320 (0.0049 mg/kg). PFOA was not in the remaining sample.

PFBS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-FH024-02-SO-072320 (0.00063 J mg/kg). PFBS was not detected in the remaining samples.

PFHxS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-FH024-01-SO-072320 (0.0098 mg/kg), FH-FH024-02-SO-072320 (0.017 J+ mg/kg), FH-FH024-03-SO-072320 (0.0073 mg/kg), FH-FH024-04-SO-072320 (0.0035 mg/kg), and FH-FH024-05-SO-072320 (0.0039 mg/kg).

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-FH024-02-SO-072320 (0.001 mg/kg), FH-FH024-03-SO-072320 (0.0047 mg/kg), and FH-FH024-05-SO-072320 (0.0019 mg/kg). PFNA was not detected in the remaining samples.

The soil analytical results are depicted on **Figure 7-15**.

7.3.1.2 Groundwater

Two groundwater samples were planned at FH-024. One groundwater sample was collected from a depth of approximately 15 feet bgs at sample location FH-FH024-02. However, the second groundwater sample planned (co-located with soil sampling location FH-FH024-04) could not be collected as planned due to insufficient groundwater recharge and refusal due to limestone bedrock.

PFOS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-FH024-02-GW-072420 (260 ng/L), collected near the center of the AOPI and co-located with soil sampling location FH-FH024-03.

PFOA was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-FH024-02-GW-072420 (10 ng/L), collected near the center of the AOPI and co-located with soil sampling location FH-FH024-03.

PFBS was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-FH024-02-GW-072420 (9.6 ng/L).

PFHxS was detected at a concentration greater than the OSD risk screening level in groundwater in sample FH-FH024-02-GW-072420 (49 ng/L), collected near the center of the AOPI and co-located with soil sampling location FH-FH024-03.

PFNA was detected at a concentration less than the OSD risk screening level in groundwater in sample FH-FH024-02-GW-072420 (4.6 ng/L).

The groundwater analytical results are depicted on **Figure 7-15**.

7.4 North Fort Hood AOPIs

7.4.1 Building 56326 – Former Fire Station

The subsections below summarize the soil PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 56326 and the attempt made to sample groundwater at this AOPI.

7.4.1.1 Soil

Three soil samples and a field duplicate (results are indicated within the brackets below) were collected at Building 56326. PFOS was detected at a concentration greater than the OSD risk screening level in surface soil (0 to 2 feet bgs) in samples FH-B56326-01-SO-072720 (0.71 J mg/kg [0.07 J mg/kg]) and FH-B56326-02-SO-072720 (0.014 mg/kg), collected within the AOPI boundaries. PFOS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B56326-03-SO-072720 (0.0017 J+ mg/kg).

PFOA was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B56326-01-SO-072720 (0.004 mg/kg [0.0016 mg/kg]), FH-B56326-02-SO-072720 (0.0022 mg/kg), and FH-B56326-03-SO-072720 (0.0012 J+ mg/kg).

PFBS was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B56326-01-SO-072720 (0.0049 J mg/kg [PFBS was not detected in the duplicate sample]). PFBS was not detected in the remaining samples.

PFHxS was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in each sample: FH-B56326-01-SO-072720 (0.043 J mg/kg [0.012 J mg/kg]), FH-B56326-02-SO-072720 (0.0071 mg/kg), and FH-B56326-03-SO-072720 (0.0037 J- mg/kg).

PFNA was detected at concentrations less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in the samples FH-B56326-01-SO-072720 (0.0098 J mg/kg [0.0011 J mg/kg]) and FH-B56326-02-SO-072720 (0.0007 J mg/kg). PFNA was not detected in the remaining sample.

The analytical results are depicted on **Figure 7-16**.

7.4.1.2 Groundwater

The one groundwater sample proposed for Building 56326 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**).

7.4.2 Building 56519 – Active Fire Station

The subsections below summarize the soil and groundwater PFOS, PFOA, PFBS, PFHxS, and PFNA analytical results associated with Building 56519.

7.4.2.1 Soil

Three soil samples were collected from Building 56519. PFOS was not detected in any of the three samples.

PFOA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B56519-01-SO-072720 (0.0014 mg/kg). PFOA was not detected in the remaining samples.

PFBS and PFHxS were not detected in any of the three soil samples.

PFNA was detected at a concentration less than the OSD risk screening level in surface soil (0 to 2 feet bgs) in sample FH-B56519-01-SO-072720 (0.00057 J mg/kg). PFNA was not detected in the remaining samples.

The soil analytical results are depicted on **Figure 7-16**.

7.4.2.2 Groundwater

The two groundwater samples originally proposed at Building 56519 could not be collected as planned at this AOPI due to insufficient groundwater recharge and refusal due to limestone bedrock at the planned sampling location, as described in the NCRs (**Appendix M**). However, one groundwater sample (FH-B56519-03-GW-112121) was collected at Building 56519 during the second mobilization.

PFOS, PFOA, PFBS, PFHxS, and PFNA were not detected in the groundwater sample.

The analytical results are depicted on **Figure 7-16**.

7.5 Dedicated Equipment Background Samples

One DEB was collected during the groundwater sampling at the Active Fort Hood Landfill from monitoring well P-7, due to the presence of a dedicated bladder pump. PFOS, PFOA, PFBS, PFNA, and PFHxS were not detected in the DEB sample. Based on these results, using the dedicated downhole sampling equipment did not bias the parent sample PFOS, PFOA, PFBS, PFNA, or PFHxS results.

7.6 Investigation Derived Waste

A composite soil sample and a composite water sample were collected from the 15 soil drums and four water drums during December 2021. The results include the following detections in the water waste characterization sample: 21 ng/L for PFOS, 6.9 ng/L for PFOA, 3.1 J ng/L (result is estimated) for PFBS, 1.8 J ng/L (result is estimated) for PFNA, and 16 ng/L for PFHxS. The PFOS and PFOA concentrations did exceed the OSD risk screening levels. The PFBS, PFNA, and PFHxS concentrations did not exceed the OSD risk screening levels.

PFAS constituents were not detected in the soil waste characterization sample above the LOD. The IDW soil and water was disposed at the Itasca Landfill in Itasca, Texas as non-hazardous waste. The full analytical results (i.e., for all constituents analyzed) for IDW samples collected during the SI are included in **Appendix Q**.

7.7 TOC, pH, Moisture Content, and Grain Size

In addition to sampling soil for PFOS, PFOA, PFBS, PFNA, and PFHxS, one soil sample per AOPI was analyzed for TOC, pH, moisture content, and grain size data as they may be useful in future fate and transport studies. The TOC in the soil samples ranged from 5,550 to 61,300 mg/kg. The TOC at this installation was higher than typically observed in topsoil (topsoil: 5,000 to 30,000 mg/kg). The combined percentage of fines (silt and clay) in soils at Fort Hood ranged from 5.40 to 94.30%, with an average of 52%. In general, PFAS constituents tend to be more mobile in soils with less than 20% fines and lower TOC. The percent moisture of soils, 14%, is typical for clay (0 to 20%). The average pH of the soils was 7.7 standard units, slightly alkaline (7 to 9). Based on these geochemical and physical soil characteristics observed underlying the installation during the SI, PFAS constituents are expected to be relatively less mobile at Fort Hood than in soils with lower percentages of fines and TOC. The TOC, pH, moisture content, and grain size data can be found in **Appendix Q**.

7.8 Blank Samples

PFOS was detected at a concentration less than the OSD risk screening level in equipment blank sample FH-EB-04-072820 (1.8 ng/L). PFOS was not detected in the remaining blank samples.

PFOA, PFBS, PFNA, and PFHxS were not detected in any of the blank samples collected during the SI work. The full analytical results for blank samples collected during the SI are included in **Appendix Q**.

7.9 Conceptual Site Models

The preliminary CSMs presented in the QAPP Addendum (Arcadis 2020) were re-evaluated and updated, if necessary, based on the SI sampling results. The CSMs presented on **Figures 7-17** through **7-24** and in this section therefore represent the current understanding of the potential for human exposure. For some AOPIs, the CSM is the same and thus shown on the same figure.

Many of the PFAS constituents found in AFFF are surfactants (which do not volatilize) and are found in a charged or ionic state at environmentally-relevant pH (i.e., pH 5 to 9 standard units). PFOS, PFOA, PFBS, PFNA, and PFHxS are each negatively charged at environmentally-relevant pH. The media potentially affected by PFOS, PFOA, PFBS, PFNA, and PFHxS releases at Army installations are soil, groundwater, surface water, and sediment. Once released to the environment, a primary factor that inhibits the movement of PFAS constituents is the presence of organic matter and organic co-constituents in soils and sediments. Generally, PFAS constituents are mobile in the potentially affected media, and they are not known to be fully broken down by natural processes.

Based on the use, storage, and/or disposal of PFAS-containing materials at the AOPIs, affected media are likely to consist of soil and groundwater, which may subsequently impact surface water and sediment.

Release and transport mechanisms include dissolution/desorption from soil to groundwater, transport via sediment carried in and dissolution to stormwater and surface water, discharge/recharge between groundwater and surface water, and adsorption/desorption between surface water and sediment. Generic categories of potential human receptors and their associated exposure scenarios that are typically evaluated in a CERCLA human health risk assessment were considered and include on-installation site workers (e.g., industrial/commercial workers, utility workers, or future construction workers who could be

exposed to chemicals in soil at an AOPI or to chemicals in tap water in an industrial/commercial building), on-installation residents (e.g., adults and children who could be exposed to chemicals in tap water in a residence), and on-installation recreational users (e.g., hikers or hunters who could be exposed to chemicals in waterways at an installation). Off-installation receptor types could include drinking water receptors (i.e., commercial/industrial workers or residents) and recreational users.

Human exposure pathways are shown as “complete”, “potentially complete”, or “incomplete” on the CSM figures. A complete exposure pathway consists of a constituent source and release mechanism, a transport or retention medium, an exposure point where human contact with the contaminated medium could occur, and an exposure route at the exposure point. If any of these elements is missing, the exposure pathway is incomplete. Pathways are “potentially complete” where data are insufficient to conclude the pathway is either “complete” or “incomplete”. Additionally, the CSMs do not include ecological receptors and exposure pathways. The potential for ecological exposures to PFOS, PFOA, PFBS, PFNA, and PFHxS may be evaluated at a future date if those pathways warrant further consideration.

CSMs were developed for each individual AOPI and were combined where source media, potential migration pathways and exposure media, and human exposure pathway determinations are congruent. The 27 AOPIs were grouped into eight CSMs based on watersheds and receptors associated with the AOPI location and release characteristics. **Figure 5-2** presents the AOPI locations with color coding identifying the corresponding CSM figure. Exposure pathway descriptions for the eight CSMs are listed below by figure.

Figure 7-17 shows the CSM for four AOPIs located upgradient of Belton Lake, which is the primary drinking water resource for Fort Hood and several nearby communities. The AOPIs are connected to Belton Lake by tributaries that flow exclusively through Fort Hood property and are not accessible to off-post receptors. The AOPIs represented by the CSM shown in **Figure 7-17** include a hangar on the northern portion of Robert Gray Army Airfield (Building 90033), a motor pool location (Building 91039), the fire station identified as Building 52940, and the New Firefighter Training Area (FH-024). AFFF was historically released to soil and/or paved surfaces during firefighter training exercises, routine handling of AFFF materials, from a fire suppression system, or staged. Surface waters generally drain to the north, and the groundwater gradient is reportedly to the east-southeast.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in soil at the above listed AOPIs, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPIs are not likely to be regularly accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in the groundwater sample collected from Building 91039 and FH-024. Shallow groundwater samples were not collected at the remaining AOPIs on **Figure 7-17** due to site conditions. Groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is also incomplete.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS in soil could potentially impact surface runoff, and PFAS impacted surface water may potentially enter alluvial aquifers associated with the tributaries to Belton Lake (e.g., Cowhouse Creek). However, the tributaries which connect the AOPIs to Belton Lake flow exclusively on installation property. Therefore, off-post receptors are prevented from using potentially impacted groundwater from the alluvial aquifers of these tributaries, and the groundwater exposure pathway for off-installation drinking water receptors is incomplete.
- Surface water bodies on Fort Hood, including Clear Creek and tributaries to Cowhouse Creek, are not used for drinking water supplies. However, surface water in these tributaries ultimately flows into Belton Lake, which is used for drinking water by Fort Hood and surrounding communities. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) is potentially complete for on-installation site workers and residents, and for off-installation drinking water receptors.
- Clear Creek flows through on-installation residential and recreational areas and could be accessed under a recreational scenario. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are potentially complete. However, on-installation site workers and residents are not likely to contact sediment in the on-post surface water body through incidental ingestion and dermal contact, therefore, the sediment exposure pathways for these receptors are incomplete.
- Belton Lake is also a recreational feature. Recreational users off-post could contact constituents in Belton Lake through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-18 shows the CSM for the two AOPIs located in North Fort Hood and include current and former fire stations identified as Building 56326 and Building 56519, respectively. Both AOPIs are located upgradient of Belton Lake. However, unlike the previous CSM (**Figure 7-17**) the tributaries connecting these two AOPIs to Belton Lake are located off-post and are accessible to off-post receptors. AFFF was historically released to soil and/or paved surfaces during firefighter training and routine handling of AFFF materials. Surface waters generally drain to the southeast, and the groundwater gradient is reportedly to the southeast.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in soil at the above listed AOPIs, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPIs are not likely to be regularly accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, PFBS, PFNA and/or PFHxS were not detected in the groundwater sample collected from Building 56519. Shallow groundwater samples were not collected at the remaining AOPI **on Figure 7-18** due to site conditions. Groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is also incomplete.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS in soil could potentially impact surface runoff, and PFAS impacted surface water may potentially enter alluvial aquifers associated with the tributaries to Belton Lake, which in this area, are potential groundwater resources for off-installation receptors. Due to the absence of land use controls preventing potable use of the off-post groundwater, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- Surface water in the North Fort Hood area consists of an unnamed tributary that enters the Leon River. Surface water bodies on Fort Hood are not used for drinking water supplies. However, the Leon River ultimately flows into Belton Lake, which is used for drinking by Fort Hood and several other nearby communities. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) is potentially complete for on-installation site workers and residents, and for off-installation drinking water receptors.
- The on-installation surface water tributary flows through a generally restricted area near the Shorthorn Auxiliary Landing Strip. Recreational access is unlikely; therefore, the surface water and sediment exposure pathways for on-installation recreational users are considered incomplete. Additionally, on-installation site workers and residents are not likely to contact sediment in the on-post surface water body through incidental ingestion and dermal contact, therefore, the sediment exposure pathways for these receptors are incomplete.
- Belton Lake is also a recreational feature. Recreational users off-post could contact constituents in Belton Lake through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-19 shows the CSM for the nine AOPIs located upgradient of Stillhouse Hollow Lake, which is the primary drinking water resource for several nearby communities. The tributaries connecting the AOPIs to Stillhouse Hollow Lake are not accessible to recreational use on Fort Hood property but are accessible at off-post locations to off-post receptors. The AOPIs represented by the CSM shown in **Figure 7-19** include locations on the southern and eastern sides of Robert Gray Army Airfield (FH-023, Building 90094, Building 90101, Building 90108, Building 90109, Building 90120, Building 90176, Building 90145, and Building 90050). AFFF was historically released to soil and/or paved surfaces during firefighter training exercises, from a fire suppression system, or staged. Surface waters drain to the south, and the groundwater gradient is reportedly to the east-southeast.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in soil at the above listed AOPIs, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPIs are not likely to be regularly accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- Shallow groundwater samples were not collected at the described AOPIs due to site conditions. Groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is also incomplete.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS in soil could potentially impact surface runoff, and PFAS impacted surface water may potentially enter alluvial aquifers associated with the tributaries to Stillhouse Hollow Lake, which are potential groundwater resources for off-installation receptors. Due to the absence of land use controls preventing potable use of the off-post groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- Surface water bodies on Fort Hood, consisting of unnamed tributaries to the Lampasas River, which flows to Stillhouse Hollow Lake, are not used for on-post drinking water supplies. Additionally, the on-installation surface water tributaries flow through a generally restricted area to the south of the Robert Gray Army Airfield, where recreational use is unlikely. Therefore, the surface water and sediment exposure pathways for on-installation receptors are considered incomplete.
- Stillhouse Hollow Lake is a recreational feature and the primary drinking water supply for several nearby communities. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is potentially complete. Recreational users off-post could contact constituents in Stillhouse Hollow Lake through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-20 shows the CSM for the AOPIs in the Main Cantonment (Building 2455, Building 3201, Building 4335, and Building 23025) and near Hood Army Airfield, which is in within the Main Cantonment (Building 7002, Building 7027, and Building 7081). These AOPIs are located upgradient of Nolan Creek, which enters the Leon River downgradient of Belton Lake. The connecting tributaries on Fort Hood are in areas with potential on-post recreational use. The off-post areas of Nolan Creek and the Leon River are accessible to off-post receptors and the associated alluvial aquifers are a potential groundwater resource for shallow wells. AFFF was historically released to soil and/or paved surfaces during firefighter training exercises, routine handling, or from fire suppression systems. Surface water drainage is generally to the east and southeast and the groundwater gradient is reportedly to the east-southeast.

- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in soil at the above listed AOPIs, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPIs are not likely to be regularly accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, PFBS, PFNA and/or PFHxS were detected in the groundwater samples collected from Building 4335, Building 7027, and Building 7081. Shallow groundwater samples were not collected at the remaining AOPIs on **Figure 7-20** due to site conditions. Groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is also incomplete.
- PFOS, PFOA, PFBS, PFNA and/or PFHxS in soil could potentially impact surface runoff, and PFAS impacted surface water may potentially enter alluvial aquifers associated with the Leon River, which

are potential groundwater resources for off-installation receptors. Due to the absence of land use controls preventing potable use of the off-post groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.

- Surface water bodies on Fort Hood, consisting of unnamed tributaries to the Leon River, are not used for on-post drinking water supplies. On-installation site workers and residents are not likely to otherwise contact surface water and sediment, therefore these pathways are incomplete. However, the tributaries flow through on-installation residential and recreational areas and could be accessed under a recreational scenario. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are potentially complete.
- The Leon River is a recreational feature. Recreational users off-post could contact constituents in the river through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-21 shows the CSM for the AOPI identified as Building 6975, which is a hangar at Hood Army Airfield. AFFF was historically stored at the hangar, and the location was investigated as an AOPI due to the potential for AFFF releases. Surface water drainage is generally to the east and southeast and the groundwater gradient is reportedly to the east-southeast.

- PFOS, PFOA, PFBS, PFNA, and PFHxS were not detected in soil samples associated with Building 6975. Sampling was completed based on reports of AFFF material being stored at the hangar, likely in the form of mobile firefighting equipment. However, there are no reported releases of AFFF material at this AOPI. Therefore, the soil exposure pathways for all receptors are incomplete.
- Building 6975 is located upgradient of Nolan Creek, which enters the Leon River downgradient of Belton Lake. The alluvial aquifers associated with the Lampasas River and Nolan Creek at off-post locations presents a potential groundwater resource for shallow wells. However, due to the lack of PFOS, PFOA, or PFBS detections in soil and without evidence of a historical release, the groundwater, surface water, and sediment exposure pathways are considered incomplete.

Figure 7-22 shows the CSM for the AOPI identified as Building 1285, a former fire station. AFFF was potentially stored at this location based on its use as a fire station, and the location was investigated as an AOPI due to the potential for AFFF releases.

- PFOS, PFOA, PFBS, PFNA, and PFHxS were not detected in soil samples associated with Building 1285. There are no specific reports of AFFF material being stored or used at this location. The fire station was reportedly closed in the 1990s and subsequently converted to a parking lot. Therefore, the soil exposure pathways for all receptors are considered incomplete.
- Shallow groundwater samples were not collected at this AOPI due to site conditions. If AFFF was used at this location for nozzle testing, as was commonly reported at other fire stations, impacts could have migrated through the soil column and into groundwater. However, groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete.

- Groundwater at this location is likely unable to migrate off-post or reach a gaining stream. Therefore, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is considered incomplete, and surface water and sediment are not considered potential exposure media.

Figure 7-23 shows the CSM for the former and current landfills identified as FH-001 and the Active Fort Hood Landfill. Potentially impacted media, including AFFF impacted soil from known excavations, was placed in each of the landfills. These two AOPIs are located upgradient of Belton Lake, which is the primary drinking water resource for Fort Hood and several nearby communities. The AOPIs are connected to Belton Lake by tributaries that flow exclusively through Fort Hood property and are not accessible to on-post residents and recreational users or off-post receptors.

The material contained in the landfills is covered to prevent infiltration; however, groundwater sampling indicated the presence of PFOS, PFOA, PFBS, PFNA, and/or PFHxS at both locations. Therefore, migration of PFAS-containing constituents through groundwater is the primary release mechanism for the landfills. Groundwater flow direction for FH-001 is reportedly to the west towards Clear Creek and groundwater at the Active Fort Hood Landfill has a radial flow component, with some component of flow likely heading to the east towards Clear Creek.

- Soil sampling was not completed at the landfills as part of the SI. The landfills are constructed to isolate buried materials from human contact by design. Therefore, the soil exposure pathways for all receptors are considered incomplete.
- PFOS, PFOA, PFBS, PFNA, and/or PFHxS were detected in the groundwater samples collected from both landfills. Groundwater on Fort Hood is not used currently and is not likely to be used in the future for a drinking water supply; therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is also incomplete.
- PFAS impacted groundwater may enter Clear Creek (assumed to be a gaining stream), which is located between the two landfills and is at an elevation lower than the landfills. Clear Creek is a tributary of Cowhouse Creek which flows exclusively on-installation property prior to discharging into Belton Lake. Therefore, off-post receptors are prevented from using potentially impacted groundwater from the alluvial aquifers of these tributaries, and the groundwater exposure pathway for off-installation drinking water receptors is incomplete.
- Surface water bodies on Fort Hood are not used for on-post drinking water supplies. However, Clear Creek and Cowhouse Creek ultimately flow into Belton Lake, which is used for drinking water by Fort Hood and surrounding communities. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) is potentially complete for on-installation site workers and residents, and for off-installation drinking water receptors.
- The portion of Clear Creek potentially receiving groundwater discharge from the landfills is in a relatively secure training area, downstream of on-installation residential and recreational areas. Recreational access is unlikely; therefore, the surface water and sediment exposure pathways for on-installation recreational users are considered incomplete.

- Belton Lake is also a recreational feature. Recreational users off-post could contact constituents in Belton Lake through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-24 shows the CSM for AOPI, Building 88038, where wastewater containing AFFF was released through the sanitary sewer system. The wastewater was transported to an off-post wastewater treatment plant, where it was treated and then discharged into South Nolan Creek.

- Soil sampling was not completed at this location as part of the SI. The location of the releases to the sewer system were inside a building with a concrete floor. All discharged fluids were likely fully contained within the building prior to being disposed in the sanitary sewer. Therefore, soil is not considered an exposure medium.
- The sanitary wastewater stream is piped to the off-installation POTW. Therefore, there is no opportunity for on-installation site workers, residents, or recreational users to contact the exposure media. The groundwater, surface water, and sediment exposure pathways for all on-installation receptors are incomplete.
- Treated effluent from the POTW enters South Nolan Creek prior to entering the Leon River downgradient of Belton Lake. These surface waters are recreational features and a potential drinking water supply through wells in the alluvial aquifer. Therefore, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is potentially complete, and the surface water and sediment exposure pathways (via incidental ingestion and dermal contact) for off-installation recreational users are potentially complete.

Following the SI, 25 out of the 27 AOPIs were considered to have complete or potentially complete exposure pathways. Although the CSMs indicate complete or potentially complete exposure pathways may exist, the recommendation for remedial investigation is based on the comparison of analytical results for PFOS, PFOA, PFBS, PFNA, and PFHxS to the OSD risk screening levels (**Table 6-2**).

8 CONCLUSIONS AND RECOMMENDATIONS

The PFAS PA/SI included two distinct efforts. The PA identified AOPIs at Fort Hood based on the use, storage, and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per-and Polyfluoroalkyl Substances (Army 2018). The SI included multi-media sampling at AOPIs to determine whether a release of PFOS, PFOA, PFBS, PFNA, and PFHxS to the environment occurred.

OSD provided residential risk screening levels based on the USEPA oral reference dose for PFOS, PFOA, PFBS, PFNA, and PFHxS in soil and groundwater (tap water) and industrial/commercial risk screening levels for PFOS, PFOA, PFBS, PFNA, and PFHxS in soil (**Appendix A**). A combination of document review, internet searches, interviews with installation personnel, and an installation site visit were used to identify specific areas of suspected PFOS, PFOA, PFBS, PFNA, and PFHxS use, storage, and/or disposal at Fort Hood. Following the evaluation, 27 AOPIs were identified.

On-post drinking water is purchased from off-site surface water reservoirs, which is the primary drinking water source for the nearby off-post receptors. Drinking water was previously obtained through water wells located at Fort Hood. However, due to historical overutilization of regional groundwater resources the water wells on Fort Hood were abandoned as regional surface water reservoirs were constructed. Under the IMCOM Operations Order 16-088, sampling of the drinking water supplied to the site during 2015 and 2016 indicated PFAS and PFOA were not present above OSD screening levels in the water supplied to Fort Hood.

Twenty-six of 27 AOPIs were sampled during the SI at Fort Hood to identify presence or absence of PFOS, PFOA, PFBS, PFNA, and PFHxS at each AOPI. Sampling was not completed at the Building 88038 AOPI because potential PFAS-containing material was disposed at an indoor location into a sanitary sewer that discharges to a municipal wastewater treatment plant; therefore, potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling. The SI scope of work was completed in accordance with the Final PQAPP (Arcadis 2019) and the Fort Hood QAPP Addendum (Arcadis 2020).

Twenty-four AOPIs had detections of PFOS, PFOA, PFBS, PFNA, and/or PFHxS in soil and/or groundwater and 14 AOPIs exceeded OSD risk screening levels.

PFOS, PFOA, PFBS, PFNA, and/or PFHxS were detected in 63 of the 77 soil samples collected (approximately 82% of soil samples). Twenty-four of the 77 soil samples resulted in PFOS concentrations that exceeded the OSD risk screening level for the residential receptor scenario or both residential and industrial/commercial receptor scenario. The maximum concentration of PFOS in soil was observed at Building 7002 – Former Fire Station (FH-B7002-01-SO-072920, 4.8 J mg/kg). PFOA, PFBS, PFNA, and PFHxS were not detected above the OSD risk screening levels in any of the soil samples.

PFOS, PFOA, PFBS, PFNA, and/or PFHxS were detected in seven of the 14 groundwater samples collected (50% of groundwater samples). Six of the 14 groundwater samples resulted in PFOS concentrations that exceeded the OSD risk screening level for tapwater. The maximum concentration of PFOS in groundwater was observed at Building 7027 (FH-B7027-02-GW-111721, 310 ng/L). Five of the 14 groundwater samples resulted in PFOA concentrations that exceeded the OSD risk screening level for tapwater. The maximum concentration of PFOA in groundwater was observed at FH-001 (FH-FH001-02-

GW-072420, 130 J- ng/L). The field duplicate collected with this sample (FH-FD-02-GW-072420) had a higher concentration of PFOA (150 J- ng/L). PFBS was not detected above the OSD risk screening level in any of the groundwater samples. One of the 14 groundwater samples resulted in PFNA concentration that exceeded the OSD risk screening level for tapwater. This concentration of PFNA in groundwater was observed at Building 7027 – Hangar (FH-B7027-02-GW-111721, 7.8 ng/L). The field duplicate collected with this sample (FH-FD-03-GW-111721) had a higher concentration of PFNA (9.1 ng/L). Three of the 14 groundwater samples resulted in PFHxS concentrations that exceeded the OSD risk screening level for tapwater. The maximum concentration of PFHxS in groundwater was observed at Building 7081 (FH-B7081-01-GW-072920, 500 J ng/L).

Following the SI sampling, 25 out of the 27 AOPIs were considered to have complete or potentially complete exposure pathways.

- Soil exposure pathways for on-installation site workers were considered to be complete at 22 of the 27 AOPIs (excluding Building 6975, Building 1285, FH-001, the Active Fort Hood Landfill, and Building 88038).
- There are 19 AOPIs at which the groundwater exposure pathways for off-post receptors were considered to be potentially complete. This conclusion is presented based on the potential for surface water to enter the alluvial aquifer of off-post streams and rivers. Due to a lack of land use controls off-installation and downgradient of Fort Hood, alluvial aquifers are potential drinking water resources for off-installation receptors.
- Surface water on Fort Hood is not used as a drinking water resource for on-installation receptors. However, surface water from two lakes downstream of the installation are used for the primary drinking water resource for Fort Hood and for several nearby communities. In addition, recreational users could contact constituents in surface water and sediment via incidental ingestion and dermal contact. Therefore, the surface water and/or sediment exposure pathways were considered to be potentially complete for on-post and/or off-post receptors for 25 of the 27 AOPIs.

Although the CSMs indicate complete or potentially complete exposure pathways may exist, the recommendation for future study in a remedial investigation or no action at this time is based on the comparison of the SI analytical results for PFOS, PFOA, PFBS, PFNA, and PFHxS to the OSD risk screening levels (**Table 6-2**). **Table 8-1** below summarizes the AOPIs identified at Fort Hood, PFOS, PFOA, PFBS, PFNA, and PFHxS sampling and recommendations for each AOPI; further investigation is warranted at Fort Hood. In accordance with CERCLA, site-specific risk will be assessed during a future phase to evaluate whether remedial actions are required.

Table 8-1 Summary of AOPIs Identified during the PA, PFOS, PFOA, PFBS, PFNA, and/or PFHxS Sampling at Fort Hood, and Recommendations

AOPI Name	PFOS, PFOA, PFBS, PFNA, and/or PFHxS detected greater than OSD Risk Screening Levels? (Yes/No/ND/NS)		Recommendation
	GW	SO	
FH-023 – Old Firefighter Training Area	NS	No	No action at this time
FH-024 – New Firefighter Training Area	Yes	Yes	Further study in a remedial investigation
Building 2455 – Former Fire Station	NS	Yes	Further study in a remedial investigation
Building 90145 – Active Fire Station	NS	Yes	Further study in a remedial investigation
Building 3201 – Former Fire Station	ND	No	No action at this time
Building 7081 – Active Fire Station	Yes	No	Further study in a remedial investigation
Building 23025 – Active Fire Station	NS	No	No action at this time
Building 1285 – Former Fire Station	NS	ND	No action at this time
Building 4335 – Former Fire Station	No	No	No action at this time
Building 7002 – Former Fire Station	NS	Yes	Further study in a remedial investigation
Building 52940 – Active Fire Station	NS	Yes	Further study in a remedial investigation
Building 56326 – Former Fire Station	NS	Yes	Further study in a remedial investigation
Building 56519 – Active Fire Station	ND	No	No action at this time

AOPI Name	PFOS, PFOA, PFBS, PFNA, and/or PFHxS detected greater than OSD Risk Screening Levels? (Yes/No/ND/NS)		Recommendation
	GW	SO	
Building 90050 – Old Fire and Crash Hangar	NS	Yes	Further study in a remedial investigation
Building 6975 – Hangar	NS	ND	No action at this time
Building 90120 – Hangar	NS	No	No action at this time
Building 90033 – Hangar	NS	Yes	Further study in a remedial investigation
Building 90176 – Hangar	NS	No	No action at this time
Building 7027 – Hangar	Yes	No	Further study in a remedial investigation
Building 91039 – Motor Pool	Yes	Yes	Further study in a remedial investigation
Building 90094 – Hangar	NS	No	No action at this time
Building 90108 – Hangar	NS	Yes	Further study in a remedial investigation
Building 90109 – Hangar	NS	No	No action at this time
Building 90101 – Hangar	NS	No	No action at this time
FH-001 – Abandoned Sanitary Landfill No. 1	Yes	NS	Further study in a remedial investigation
Active Fort Hood Landfill	Yes	NS	Further study in a remedial investigation
Building 88038 – Logistics Readiness Center (LRC) Facility[1]	NS	NS	No action at this time

Notes:

[1] Note that although Building 88038 was identified as a AOPI in the PA, sampling was not completed at this AOPI because potential PFAS-containing material was disposed at an indoor location into a sanitary sewer discharging to a municipal wastewater treatment plant; therefore, potentially impacted environmental media (e.g., soil, sediment, or groundwater) was not available for sampling

Light gray shading – detection greater than the OSD residential risk screening levels for tap water and soil
GW – groundwater
ND – non-detect
NS – not sampled
SO – soil

Data collected during the PA (**Sections 3** through **5**) and SI (**Sections 6** through **7**) were sufficient to draw conclusions and recommendations summarized above. The data limitations relevant to the development of this PA/SI for PFOS, PFOA, PFBS, PFNA, and PFHxS at Fort Hood are discussed below.

The PA/SI confirmed the use/release of AFFF at Fort Hood related to Fort Hood Fire Department operations and airfield hangar operations. However, details regarding foam type, approximate volume of AFFF released during specific events or collectively, and exact locations of use/releases at several identified AOPIs were not discernable through historical documents, personnel interviews, or site reconnaissance visits. One specific example of data limitations includes the statement from one HAAF employee, who indicated Building 6975 experienced a release of AFFF that filled the hangar with foam. However, there is no record of this event or other Fort Hood personnel that can corroborate the release event or identify of the type and volume of release.

Eleven wells were historically used as a potable water supply sources at Fort Hood but have been plugged and abandoned. The potential for new potable well installations is improbable considering the Army implements controls, which prevent intrusive work without directorate of public works approval per the installation's master plan and the dig permitting process. However, these Army controls do not prevent future consumption of drinking water for land if the Army no longer controls it. Additionally, the CSMs do not include ecological receptors and exposure pathways. The potential for ecological exposures to PFAS may be evaluated at a future date if those pathways warrant further consideration.

As discussed in NCR-FH-01, 27 samples collected on 27 and 28 July were received by the laboratory outside of the acceptable temperature range for PFAS, TOC, and pH due to high temperatures and a late delivery by the courier service. Consequently, the results were classified as estimated but are considered viable and useable.

Additionally, as discussed in NCR-FH-02, 25 out of 28 planned DPT groundwater samples were not collected during the first mobilization due to conditions during drilling (high temperatures resulting in very little shallow groundwater) and DPT refusal at bedrock. A second mobilization was completed to collect groundwater samples using a rotosonic drill rig at seven AOPIs. After completion of the second mobilization, groundwater samples were able to be collected from 11 of the 20 planned AOPIs. Groundwater samples could not be collected from the remaining 9 AOPIs due to insufficient groundwater recharge above limestone bedrock at the planned sampling locations.

Records gathered for the use, storage and/or disposal of PFAS-containing materials were reviewed during the PA process. Documentation specific to AFFF may have been limited (e.g., each AFFF use; procurement records, documentation of AFFF used during crash responses or fire training activities) due to lack of recordkeeping requirements for the full timeline of common AFFF practices. Anecdotal accounts of AFFF use (and therefore likely PFOS, PFOA, PFBS, PFNA, and PFHxS use) were limited to available installation personnel, whose knowledge of AFFF use may have been restricted by their time spent at the installation or previous roles held that limited their relevant knowledge of potential AFFF (or other PFAS-containing material) use.

A comprehensive well survey was not completed as part of this PA; therefore, the information reviewed regarding off-post wells is limited to what is contained in the off post well search results (**Appendix E**).

The searches for ecological receptors and off-post PFOS, PFOA, PFBS, PFNA, and PFHxS sources were not exhaustive and were limited to easily identifiable and readily available information evaluated during the relevant documents research, installation personnel interviews, and site reconnaissance.

Finally, the available PFOS, PFOA, PFBS, PFNA, and PFHxS analytical data are limited to historical data presented in **Table 2-1** (from samples collected prior to this SI) and the sampling scope of the SI, which focused only on soil and groundwater. Additionally, groundwater data are limited to results from monitoring wells, not residential/potable wells. One DEB sample was collected to determine potential cross-contamination impacts from dedicated sampling equipment in monitoring wells. Available data, including PFOS, PFOA, PFBS, PFNA, and PFHxS, are listed in **Appendix Q**, which were analyzed per the selected analytical method.

Results from this PA/SI indicate further study in a remedial investigation is warranted at Fort Hood in accordance with the guidance provided by the OSD.

9 REFERENCES

III Corps and Fort Hood. 1996. Installation Action Plan. September.

III Corps and Fort Hood. 2001. Installation Action Plan. March.

III Corps and Fort Hood. 2013. Fort Hood Integrated Natural Resource Management Plan, FY 2013-2017. March.

64th Engineer Detachment. 1977. Fort Hood, Texas Terrain Analysis. July.

Ansulite. 2010. Ansulite 3% AFFF (AFC-3-A). Marinette, Wisconsin. August 30.

Arcadis U.S., Inc. (Arcadis). 2018. Accident Prevention Plan: A-E Services, PFASs Contamination in the Cleanup/Restoration Programs at Active Army Installations – Nationwide. Prepared for USACE, Baltimore District. March.

Arcadis. 2019. Final Programmatic Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP), USAEC PFAS PA/SI, Active Army Installations, Nationwide, USA. October.

Arcadis. 2020. Final UFP QAPP Addendum, Revision 1, USAEC PFAS PA/SI, Fort Hood, Texas. June.

Armored Sentinel. 1964. Crash Rescue Class Held at Gray Army Airfield. August 14.

Army. 2018. Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances. September 4. Available online at: https://www.fedcenter.gov/admin/itemattachment.cfm?attachmentid=1150.

Black & Veatch Waste Science, Inc. 1995. Final RCRA Facility Investigation Workplan 35 Solid Waste Management Units Fort Hood, Texas. Volume 1. December.

Buckeye. 2018. Buckeye Platinum Plus C6 3% A.F.F.F. Kings Mountain, North Carolina. May 18.

Chemguard. 2006. Chemguard 3% AFFF C-303 Safety Data Sheet. Mansfield, Texas. January 25.

Chemical Systems Laboratory. 1982. Installation Assessment of Fort Hood, Texas. June.

Department of Defense (DoD). 2017. Fact Sheet: Detection and Quantitation – What Project Managers and Data Users Need to Know. October.

DoD. 2019. Environmental Data Quality Working Group: Final General Data Validation Guidelines. November 4.

DoD. 2020. Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15. May 1.

DoD and Department of Energy. 2019. Consolidated Quality Systems Manual for Environmental Laboratories, Version 5.3. May.

Fort Hood. 2019. Emails from R. Young (Fort Hood) to A. Hermosillo (Arcadis). Re: Fort Hood Follow-up and Re: Fort Hood Site Visit Question. May and June 2019.

Fort Hood Directorate of Public Works, Environmental Division. 2016. Form 1-1. Fort Hood Spill Response Notification Form. December.

Interstate Technology Regulatory Council. 2020. Section 3.1 Firefighting Foams. Updated April 14.

Available online at: https://pfas-1.itrcweb.org/3-firefighting-foams/#3_1

Interstate Technology Regulatory Council. 2017. History and Use of Per-and Polyfluoroalkyl Substances (PFAS). November. Available online at: https://pfas-1.itrcweb.org/wp-content/uploads/2017/11/pfas_fact_sheet_history_and_use__11_13_17.pdf.

Office of the Secretary of Defense (OSD). 2019. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. October.

OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.

OSD. 2022. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. July.

USACE. 2005. Environmental Quality: Guidance for Evaluating Performance-Based Chemical Data, Engineer Manual 200-1-10, CEMP-RA/CECW-E, June 30.

USACE. 2012. Environmental Quality: Conceptual Site Models, Engineer Manual 200-1-12, CEMP-CE, December 28.

United States Army Environmental Hygiene Agency. 1988. Interim Final Report, Hazardous Waste Consultation No. 37-26-0207-88, Evaluation of Solid Waste Management Units. April.

USEPA. 2016a. Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate. EPA-HQ-OW-2014-0138; FRL-9946-91-OW. Federal Register/ Vol. 81. No. 101. May 25. Available online at: https://www.govinfo.gov/content/pkg/FR-2016-05-25/pdf/2016-12361.pdf.

USEPA. 2016b. The Third Unregulated Contaminant Monitoring Rule Fact Sheet for Assessment Monitoring (List 1 Contaminants) (UCMR3). May.

USEPA. 2021. Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3). EPA/600/R-20/345F. Center for Public Health and Environmental Assessment, Office of Research and Development, Washington DC. April.

ACRONYMS

°F	degrees Fahrenheit
%	percent
AFFF	aqueous film forming foam
AOPI	area of potential interest
Arcadis	Arcadis U.S., Inc.
Army	United States Army
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CSM	conceptual site model
DEB	dedicated equipment background
DoD	Department of Defense
DPT	direct-push technology
DQO	data quality objective
DUSR	Data Usability Summary Report
EB	equipment blank
EDR	Environmental Data Resources, Inc.
ELAP	Environmental Laboratory Accreditation Program
GIS	geographic information system
HAAF	Hood Army Airfield
HFPO-DA	hexafluoropropylene oxide dimer acid
HQAES	Headquarters Army Environmental System
IDW	investigation-derived waste
IMCOM	Installation Management Command
installation	United States Army or Reserve installation
IRP	Installation Restoration Program
LOD	limit of detection
LRC	Logistics Readiness Center
LOQ	limit of quantitation
MS/MSD	matrix spike/matrix spike duplicate

mg/kg	milligrams per kilogram (parts per million)
NCR	non-conformance report
ng/L	nanograms per liter (parts per trillion)
OSD	Office of the Secretary of Defense
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POC	point of contact
POTW	publicly owned treatment works
ppm	parts per million
ppt	parts per trillion
PQAPP	Programmatic Uniform Federal Policy-Quality Assurance Project Plan
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RGAAF	Robert Gray Army Airfield
RSL	Regional Screening Level
SDS	safety data sheet
SI	site inspection
SOP	standard operating procedure
SSHP	Site Safety and Health Plan
TGI	technical guidance instruction
TOC	total organic carbon
UCMR3	third Unregulated Contaminant Monitoring Rule
U.S.	United States
USACE	United States Army Corps of Engineers

USAEC	United States Army Environmental Command
USEPA	United States Environmental Protection Agency

TABLES

Table 2-1 Historical PFAS Analytical Results
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, Texas

PFAS			Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonate (PFOS)
Units			ng/L	ng/L
OSD risk screening level* in ng/L			40	40
Location	Sample ID	Sample Date		
Building 34133	29246201	4/13/2015	< 20	< 20
Building 34133	29246201	5/14/2015	< 20	< 40
Building 57130	Q1654893	12/19/2016	< 20	< 20

Notes:

The samples were collected from water taps within the Buildings 34133 and 57130.

Data and qualifiers are as provided by Installation Management Command PFOA/PFOS Water System Testing data.

* risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for this Army PFAS PA/SI program.

< = less than

ID = Identification

ng/L = nanograms per liter (parts per trillion)

OSD = Office of the Secretary of Defense

PFAS = per- and polyfluoroalkyl substances

Table 6-1 Monitoring Well Construction Details
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, TEXAS

Area of Potential Interest	Sampling Location ID[1]	Total Well Depth (ft btoc)	Measuring Point Elevation (ft amsl)	Measuring Point	July 2020 Depth to Groundwater from MP (ft)	July 2020 Groundwater Elevation (ft amsl)	Screened Interval (ft btoc)	Casing Diameter (inches)	Dedicated Bladder Pump (Y/N)
Active Fort Hood Landfill	P-5	52.45	NA	TOC	44.4	NC	NA	2	Y*[2]
	P-7	41.88	NA	TOC	33.2	NC	NA	2	Y
	MW-2	35.32	874.61	TOC	20.3	854.3	25.25 - 35.25	4	Y
	MW-6	46.65	896.48	TOC	33.9	862.5	35.5 - 45.5	4	Y*[2]
	MW-8	43.35	910.04	TOC	37.9	872.1	35.35 - 45.35	4	Y
	MW-14A	64.81	NA	TOC	49.4	NC	NA	4	Y
B90108 - Hangar	B90108-4	5	NM	TOC	dry	NC	0 - 5	1	N
B90109 - Hangar	B90109-4	5	NM	TOC	dry	NC	0 - 5	1	N
FH-023 - Old Firefighter Training Area	FH-023-1	5	NM	TOC	dry	NC	1 - 5	1	N
	FH-023-2	5	NM	TOC	dry	NC	2 - 5	1	N
B91039 - Motor Pool	B91039-4	2	NM	TOC	dry	NC	0 - 2	1	N
FH-001 - Abandoned Sanitary Landfill No. 1	FH-001-1	10	NM	TOC	dry	NC	5 - 10	1	N
	FH-001-2	14	NM	TOC	13.5	NC	4 - 14	1	N
	FH-001-3	17	NM	TOC	dry	NC	12-17	1	N
	FH-001-4	13	NM	TOC	dry	NC	8 - 13	1	N
	FH-001-5	8	NM	TOC	dry	NC	3 - 8	1	N
	FH-001-6	11	NM	TOC	dry	NC	6 - 11	1	N
B52940 - Active Fire Station	B52940-4	9	NM	TOC	dry	NC	4 - 9	1	N
B56519 - Active Fire Station	B56519-4	16	NM	TOC	dry	NC	6 - 16	1	N
	B56519-5	16	NM	TOC	dry	NC	6 - 16	1	N
B56326 - Former Fire Station	B56326-4	8	NM	TOC	dry	NC	3 - 8	1	N
B1285 - Former Fire Station	B1285-4	8	NM	TOC	dry	NC	3 - 8	1	N
B23025 - Active Fire Station	B23025-5	16	NM	TOC	dry	NC	6 - 16	1	N
B3201 - Former Fire Station	B3201-2	20	NM	TOC	dry	NC	15 - 20	1	N
	B3201-4	16	NM	TOC	dry	NC	11 - 16	1	N
B7002 - Former Fire Station	B7002-5	14	NM	TOC	dry	NC	9 - 14	1	N
B7081 - Active Fire Station	B7081-4	13	NM	TOC	12.5	NC	8 - 13	1	N
B7027 - Hangar	B7027-4	11	NM	TOC	dry	NC	6 - 11	1	N
B4335 - Former Fire Station	B4335-5	9	NM	TOC	dry	NC	4 - 9	1	N

Table 6-1 Monitoring Well Construction Details
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, TEXAS

Area of Potential Interest	Sampling Location ID[1]	Total Well Depth (ft btoc)	Measuring Point Elevation (ft amsl)	Measuring Point	July 2020 Depth to Groundwater from MP (ft)	July 2020 Groundwater Elevation (ft amsl)	Screened Interval (ft btoc)	Casing Diameter (inches)	Dedicated Bladder Pump (Y/N)
B2455 - Former Fire Station	B2455-3	9	NM	TOC	dry	NC	4 - 9	1	N
B90120 - Hangar	B90120-1	10	NM	TOC	dry	NC	5 - 10	1	N
FH-024 - New Firefighter Training Area	FH-024-3	14	NM	TOC	dry	NC	9 - 14	1	N
	FH-024-4	14	NM	TOC	13.5	NC	9 - 14	1	N
B90176 - Hangar	B90176-1	18	NM	TOC	dry	NC	8 - 18	1	N

Notes:

1. Permanent wells were not installed at the direct-push technology (DPT) sampling locations. The total depth listed indicates the total depth of the temporary borehole; the screened interval listed for DPT sampling points indicates the interval of temporary well screen
2. Dedicated bladder pumps at Active Landfill Wells P-5 and MW-6 were removed and sampled using new bladder pumps, dedicated pumps were replaced following sample collection

Acronyms/Abbreviations:

amsl - above mean sea level
bgs - below ground surface
btoc - below top of casing
ft - feet
GS - ground surface
ID - identification
MP - measuring point
NA - not available
NC - not calculated
NM - not measured (not surveyed)
TOC - top of casing

* - Dedicated bladder pump was not used for sampling

Table 7-1 Site Inspection Laboratory Analytical Results - Soil
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, Texas

						Analyte	PFOS (mg/kg)		PFOA (mg/kg)		PFBS (mg/kg)		PFHxS (mg/kg)		PFNA (mg/kg)	
						OSD Industrial/Commercial Risk Screening Level	0.16		0.25		25		1.6		0.25	
						OSD Residential Risk Screening Levels	0.013		0.019		1.9		0.13		0.019	
Associated AOPI	Location Type	Location	Sample ID / Parent Sample ID	Sample Date	Sample Type		Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Building 1285	Soil	FH-B1285-01	FH-B1285-01-SO-072720	07/27/2020	N		0.00097	UJ	0.00097	UJ	0.00097	UJ	0.00097	UJ	0.00097	UJ
Building 1285	Soil	FH-B1285-02	FH-B1285-02-SO-072720	07/27/2020	N		0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 1285	Soil	FH-B1285-03	FH-B1285-03-SO-072720	07/27/2020	N		0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
			FH-FD-02-SO-072720 / FH-B1285-03-SO-072720	07/27/2020	FD		0.001	UJ	0.001	UJ	0.001	UJ	0.001	UJ	0.001	UJ
Building 23025	Soil	FH-B23025-01	FH-B23025-01-SO-072820	07/28/2020	N		0.001	UJ	**0.00051**	J	0.001	UJ	0.001	UJ	0.001	UJ
Building 23025	Soil	FH-B23025-02	FH-B23025-02-SO-072820	07/28/2020	N		0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 23025	Soil	FH-B23025-03	FH-B23025-03-SO-072820	07/28/2020	N		**0.0051**	J	**0.0017**	J	0.00097	UJ	**0.00064**	J	**0.0015**	J
Building 23025	Soil	FH-B23025-04	FH-B23025-04-SO-072820	07/28/2020	N		0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 2455	Soil	FH-B2455-01	FH-B2455-01-SO-073020	07/30/2020	N		**0.0031**	--	**0.00075**	J	0.0013	U	**0.00089**	J	0.0013	U
Building 2455	Soil	FH-B2455-02	FH-B2455-02-SO-073020	07/30/2020	N		**0.0027**	--	0.0011	U	0.0011	U	0.0011	U	0.0011	U
Building 2455	Soil	FH-B2455-03	FH-B2455-03-SO-072820	07/28/2020	N		**0.91**	J	**0.011**	--	0.0011	U	**0.048**	--	**0.0017**	--
Building 3201	Soil	FH-B3201-01	FH-B3201-01-SO-072820	07/28/2020	N		**0.00072**	J	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 3201	Soil	FH-B3201-02	FH-B3201-02-SO-072820	07/28/2020	N		0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 3201	Soil	FH-B3201-03	FH-B3201-03-SO-072820	07/28/2020	N		**0.0006**	J	0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 4335	Soil	FH-B4335-01	FH-B4335-01-SO-072820	07/28/2020	N		**0.0021**	J	0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 4335	Soil	FH-B4335-02	FH-B4335-02-SO-072820	07/28/2020	N		0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 4335	Soil	FH-B4335-03	FH-B4335-03-SO-072820	07/28/2020	N		**0.0038**	J	**0.00082**	J	0.0013	UJ	**0.0022**	J	0.0013	UJ
Building 4335	Soil	FH-B4335-04	FH-B4335-04-SO-072820	07/28/2020	N		**0.0034**	J	**0.00087**	J	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 52940	Soil	FH-B52940-01	FH-B52940-01-SO-072420	07/24/2020	N		**0.021**	--	0.00092	U	0.00092	U	**0.00055**	J	0.00092	U
Building 52940	Soil	FH-B52940-02	FH-B52940-02-SO-072420	07/24/2020	N		**0.0029**	--	0.00091	U	0.00091	U	**0.00066**	J	0.00091	U
Building 52940	Soil	FH-B52940-03	FH-B52940-03-SO-072420	07/24/2020	N		**0.79**	J	**0.0016**	--	0.00099	U	**0.0033**	--	**0.007**	--
Building 56326	Soil	FH-B56326-01	FH-B56326-01-SO-072720	07/27/2020	N		**0.71**	J	**0.004**	--	**0.0049**	J	**0.043**	J	**0.0098**	J
			FH-FD-03-SO-072720 / FH-B56326-01-SO-072720	07/27/2020	FD		**0.07**	J	**0.0016**	--	0.0012	U	**0.012**	J	**0.0011**	J
Building 56326	Soil	FH-B56326-02	FH-B56326-02-SO-072720	07/27/2020	N		**0.014**	--	**0.0022**	--	0.0012	U	**0.0071**	--	**0.0007**	J
Building 56326	Soil	FH-B56326-03	FH-B56326-03-SO-072720	07/27/2020	N		**0.0017**	J+	**0.0012**	J+	0.0011	U	**0.0037**	J-	0.0011	U
Building 56519	Soil	FH-B56519-01	FH-B56519-01-SO-072720	07/27/2020	N		0.0011	U	**0.0014**	--	0.0011	U	0.0011	U	**0.00057**	J
Building 56519	Soil	FH-B56519-02	FH-B56519-02-SO-072720	07/27/2020	N		0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
Building 56519	Soil	FH-B56519-03	FH-B56519-03-SO-072720	07/27/2020	N		0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
Building 6975	Soil	FH-B6975-01	FH-B6975-01-SO-072920	07/29/2020	N		0.0012	U	0.0012	U	0.0012	U	0.0012	U	0.0012	U
Building 6975	Soil	FH-B6975-02	FH-B6975-02-SO-072920	07/29/2020	N		0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
Building 7002	Soil	FH-B7002-01	FH-B7002-01-SO-072920	07/29/2020	N		**4.8**	J	**0.0052**	J+	**0.0018**	J+	**0.068**	--	**0.0041**	J+
Building 7002	Soil	FH-B7002-02	FH-B7002-02-SO-072920	07/29/2020	N		**0.049**	--	**0.003**	--	0.0014	U	**0.0054**	--	**0.00083**	J
Building 7002	Soil	FH-B7002-03	FH-B7002-03-SO-072920	07/29/2020	N		**0.02**	--	0.0011	U	0.0011	U	**0.0015**	--	0.0011	U
Building 7002	Soil	FH-B7002-04	FH-B7002-04-SO-072920	07/29/2020	N		**0.25**	J	**0.0047**	--	**0.002**	--	**0.037**	--	**0.0044**	--
Building 7027	Soil	FH-B7027-01	FH-B7027-01-SO-072920	07/29/2020	N		**0.0022**	--	**0.00063**	J	0.0011	U	0.0011	U	0.0011	U
Building 7027	Soil	FH-B7027-02	FH-B7027-02-SO-072920	07/29/2020	N		0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
Building 7027	Soil	FH-B7027-03	FH-B7027-03-SO-072920	07/29/2020	N		**0.0065**	--	**0.0024**	--	0.001	U	0.001	U	**0.0017**	--
Building 7081	Soil	FH-B7081-01	FH-B7081-01-SO-073020	07/30/2020	N		**0.0024**	--	0.0013	U	0.0013	U	**0.00067**	J	0.0013	U
Building 7081	Soil	FH-B7081-02	FH-B7081-02-SO-073020	07/30/2020	N		**0.0011**	--	0.001	U	0.001	U	0.001	U	0.001	U
Building 7081	Soil	FH-B7081-03	FH-B7081-03-SO-072920	07/29/2020	N		**0.0023**	--	**0.002**	--	0.0013	U	0.0013	U	**0.0017**	--
Building 7081	Soil	FH-B7081-04	FH-B7081-04-SO-072920	07/29/2020	N		**0.0023**	--	**0.0018**	--	0.0012	U	**0.0011**	J	**0.00073**	J
Building 90033	Soil	FH-B90033-01	FH-B90033-01-SO-072120	07/21/2020	N		**0.62**	J	**0.0089**	--	**0.0029**	--	**0.037**	--	0.0012	U
Building 90033	Soil	FH-B90033-02	FH-B90033-02-SO-072120	07/21/2020	N		**0.0036**	--	0.001	U	0.001	U	0.001	U	0.001	U
Building 90033	Soil	FH-B90033-03	FH-B90033-03-SO-072120	07/21/2020	N		**0.0014**	--	**0.00091**	J	0.00098	U	**0.00051**	J	0.00098	U
Building 90050	Soil	FH-B90050-01	FH-B90050-01-SO-072120	07/21/2020	N		**0.0039**	--	0.001	U	0.001	U	0.001	U	0.001	U
Building 90050	Soil	FH-B90050-02	FH-B90050-02-SO-072120	07/21/2020	N		**0.065**	--	**0.0013**	--	0.001	U	**0.0086**	--	**0.00092**	J
Building 90050	Soil	FH-B90050-03	FH-B90050-03-SO-072120	07/21/2020	N		**0.22**	--	**0.0019**	--	0.0011	U	**0.0042**	--	**0.0014**	--
Building 90050	Soil	FH-B90050-04	FH-B90050-04-SO-072120	07/21/2020	N		**0.13**	--	**0.0029**	--	0.001	U	**0.0074**	--	**0.0031**	--
Building 90094	Soil	FH-B90094-01	FH-B90094-01-SO-072120	07/21/2020	N		**0.0029**	--	0.001	U	0.001	U	0.001	U	0.001	U

Table 7-1 Site Inspection Laboratory Analytical Results - Soil
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, Texas

Building 90094	Soil	FH-B90094-02	FH-B90094-02-SO-072120	07/21/2020	N	**0.0021**	--	0.00099	U	0.00099	U	**0.00054**	J	0.00099	U
			FH-FD-04-SO-072120 / FH-B90094-02-SO-072120	07/21/2020	FD	**0.0029**	--	0.001	U	0.001	U	**0.00052**	J	0.001	U
Building 90094	Soil	FH-B90094-03	FH-B90094-03-SO-072120	07/21/2020	N	**0.0082**	--	**0.0011**	--	0.00095	U	**0.00086**	J	0.00095	U
Building 90101	Soil	FH-B90101-01	FH-B90101-01-SO-072720	07/27/2020	N	**0.00095**	J	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 90101	Soil	FH-B90101-02	FH-B90101-02-SO-072720	07/27/2020	N	**0.0012**	J	**0.00055**	J	0.0011	UJ	0.0011	UJ	0.0011	UJ
Building 90101	Soil	FH-B90101-03	FH-B90101-03-SO-072720	07/27/2020	N	**0.0013**	J	**0.00066**	J	0.0011	UJ	0.0011	UJ	**0.00055**	J
Building 90108	Soil	FH-B90108-01	FH-B90108-01-SO-072720	07/27/2020	N	**0.018**	J	**0.0018**	J	0.0012	UJ	**0.0019**	J	0.0012	UJ
Building 90108	Soil	FH-B90108-02	FH-B90108-02-SO-072720	07/27/2020	N	**0.0015**	J	0.0012	UJ	0.0012	UJ	0.0012	UJ	0.0012	UJ
Building 90108	Soil	FH-B90108-03	FH-B90108-03-SO-072720	07/27/2020	N	**0.0018**	J	**0.00048**	J	0.0009	UJ	0.0009	UJ	0.0009	UJ
Building 90109	Soil	FH-B90109-01	FH-B90109-01-SO-072720	07/27/2020	N	**0.0033**	J	**0.0035**	J	0.0011	UJ	**0.00073**	J	**0.0019**	J
Building 90109	Soil	FH-B90109-02	FH-B90109-02-SO-072720	07/27/2020	N	**0.0016**	J	**0.00078**	J	0.001	UJ	0.001	UJ	0.001	UJ
Building 90109	Soil	FH-B90109-03	FH-B90109-03-SO-072720	07/27/2020	N	**0.0029**	J	**0.00068**	J	0.001	UJ	0.001	UJ	0.001	UJ
Building 90120	Soil	FH-B90120-01	FH-B090120-01-SO-072320	07/23/2020	N	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
Building 90120	Soil	FH-B90120-02	FH-B090120-02-SO-072320	07/23/2020	N	**0.00073**	J	**0.0012**	--	0.0011	U	0.0011	U	**0.00077**	J
Building 90145	Soil	FH-B90145-01	FH-B90145-01-SO-072120	07/21/2020	N	**0.013**	--	**0.0014**	--	0.00099	U	**0.0014**	--	**0.00062**	J
Building 90145	Soil	FH-B90145-02	FH-B90145-02-SO-072120	07/21/2020	N	**0.018**	--	**0.00093**	J	0.001	U	**0.00052**	J	**0.00088**	J
Building 90145	Soil	FH-B90145-03	FH-B90145-03-SO-072120	07/21/2020	N	**0.0021**	--	**0.0008**	J	0.00098	U	**0.00054**	J	0.00098	U
Building 90145	Soil	FH-B90145-04	FH-B90145-04-SO-072120	07/21/2020	N	**0.33**	J	**0.0049**	J-	0.001	UJ	**0.012**	--	**0.004**	J-
Building 90176	Soil	FH-B90176-01	FH-B90176-01-SO-072220	07/22/2020	N	**0.00089**	J	**0.002**	--	0.0011	U	0.0011	U	**0.0018**	--
Building 91039	Soil	FH-B91039-01	FH-B91039-01-SO-072320	07/23/2020	N	0.00093	U	0.00093	U	0.00093	U	0.00093	U	0.00093	U
Building 91039	Soil	FH-B91039-02	FH-B91039-02-SO-072320	07/23/2020	N	**0.059**	--	**0.0012**	--	0.00089	U	**0.0018**	--	**0.00057**	J
Building 91039	Soil	FH-B91039-03	FH-B91039-03-SO-072320	07/23/2020	N	**0.033**	--	0.001	U	0.001	U	**0.0013**	--	**0.00064**	J
FH-023	Soil	FH-FH023-01	FH-FH023-01-SO-072220	07/22/2020	N	**0.0015**	--	0.00095	U	0.00095	U	**0.0013**	--	0.00095	U
			FH-FH023-01-SO-120221	12/02/2021	N	**0.0054**	--	**0.011**	--	0.001	U	**0.0013**	--	**0.0026**	--
FH-023	Soil	FH-FH023-02	FH-FH023-02-SO-072220	07/22/2020	N	**0.0017**	--	0.001	U	0.001	U	**0.00058**	J	0.001	U
			FH-FD-01-SO-072220 / FH-FH023-02-SO-072220	07/22/2020	FD	**0.0017**	--	**0.00061**	J	0.0011	U	**0.00076**	J	0.0011	U
FH-023	Soil	FH-FH023-03	FH-FH023-03-SO-072720	07/27/2020	N	**0.00063**	J	0.001	UJ	0.001	UJ	0.001	UJ	0.001	UJ
FH-024	Soil	FH-FH024-01	FH-FH024-01-SO-072320	07/23/2020	N	**0.037**	--	**0.0023**	--	0.0012	U	**0.0098**	--	0.0012	U
FH-024	Soil	FH-FH024-02	FH-FH024-02-SO-072320	07/23/2020	N	**0.055**	--	**0.0038**	--	**0.00063**	J	**0.017**	J+	**0.001**	--
FH-024	Soil	FH-FH024-03	FH-FH024-03-SO-072320	07/23/2020	N	**0.2**	--	**0.0018**	--	0.0011	U	**0.0073**	--	**0.0047**	--
FH-024	Soil	FH-FH024-04	FH-FH024-04-SO-072320	07/23/2020	N	**0.031**	--	0.001	U	0.001	U	**0.0035**	--	0.001	U
FH-024	Soil	FH-FH024-05	FH-FH024-05-SO-072320	07/23/2020	N	**0.032**	--	**0.0049**	--	0.0013	U	**0.0039**	--	**0.0019**	--

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection
2. All laboratory reported results in nanograms per gram (ng/g) were converted to milligrams per kilogram (mg/kg).
3. Data are compared to the 2022 Office of the Secretary of Defense (OSD) residential and industrial/commercial risk screening levels for soil, (OSD. 2022. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. July).
4. Grey shaded values indicate the result was detected greater than or equal to the OSD risk screening level for the residential scenario. Italicized values indicate the result was detected greater than the OSD risk screening level for the industrial/commercial and residential scenario.

Acronyms/Abbreviations:
-- = not applicable
AOPI = Area of Potential Interest
DPT = Direct-Push Technology
FD = field duplicate sample
ID = identification
mg/kg = milligrams per kilogram (parts per million)
N = primary sample
PFAS = per- and polyfluoroalkyl substances
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
PFNA = perfluorononanoic acid
PFHxS = perfluorohexane sulfonate
Qual = qualifier

Table 7-1 Site Inspection Laboratory Analytical Results - Soil
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, Texas

Qualifier	Description
U	The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).
UJ	The analyte was analyzed for but was not detected. The reported limit of quantitation (LOQ) is approximate and may be inaccurate or imprecise.
J	The analyte was positively identified; however the associated numerical value is an estimated concentration only
J+	The result is an estimated quantity; the result may be biased high.
J-	The result is an estimated quantity; the result may be biased low.

Table 7-2 Site Inspection Laboratory Analytical Results - Groundwater
USAEC PFAS Preliminary Assessment/Site Inspection
Fort Hood, Texas

					Analyte	PFOS (ng/L)		PFOA (ng/L)		PFBS (ng/L)		PFHxS (ng/L)		PFNA (ng/L)	
					OSD Tapwater Risk Screening Level	4		6		601		39		6	
Associated AOPI	Location Type	Location	Sample ID / Parent Sample ID	Sample Date	Sample Type	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Active Fort Hood Landfill	Monitoring Well	FH-MW-14A	FH-MW-14A-072220	07/22/2020	N	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
Active Fort Hood Landfill	Monitoring Well	FH-MW-2	FH-MW-2-072220	07/22/2020	N	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
Active Fort Hood Landfill	Monitoring Well	FH-MW-6	FH-MW-6-072920	07/29/2020	N	3.5	U	3.5	U	3.5	U	3.5	U	3.5	U
Active Fort Hood Landfill	Monitoring Well	FH-MW-8	FH-MW-8-072220	07/22/2020	N	**5.8**	--	**16**	--	**2.6**	J	**3.2**	J	**2.1**	J
Active Fort Hood Landfill	Monitoring Well	FH-P-5	FH-P-5-072920	07/29/2020	N	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U
Active Fort Hood Landfill	Monitoring Well	FH-P-7	FH-P-7-072220	07/22/2020	N	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U
Building 3201	Monitoring Well	FH-B3201-03	FH-B3201-03-GW-111921	11/19/2021	N	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
Building 4335	Monitoring Well	FH-B4335-02	FH-B4335-02-GW-112021	11/20/2021	N	**3.0**	J	**2.8**	J	3.8	U	3.8	U	3.8	U
Building 56519	Monitoring Well	FH-B56519-03	FH-B56519-03-GW-112121	11/21/2021	N	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U
Building 7027	Monitoring Well	FH-B7027-02	FH-B7027-02-GW-111721	11/17/2021	N	**310**	--	**35**	--	**20**	--	**210**	--	**7.8**	--
			FH-FD-03-GW-111721 / FH-B7027-02-GW-111721	11/17/2021	FD	**290**	--	**36**	--	**18**	--	**200**	--	**9.1**	--
Building 7081	Monitoring Well	FH-B7081-01	FH-B7081-01-GW-072920	07/29/2020	N	**200**	J	**50**	--	**180**	--	**500**	J	**3.0**	J
Building 91039	Monitoring Well	FH-B91039-02	FH-B91039-02-GW-112221	11/22/2021	N	**25**	--	**2.5**	J	4.0	U	**7.2**		4.0	U
FH-001	Monitoring Well	FH-FH001-02	FH-FH001-02-GW-072420	07/24/2020	N	**56**	J+	**130**	J-	**22**	J-	**32**	J-	4.5	UJ-
			FH-FD-02-GW-072420 / FH-FH001-02-GW-072420	07/24/2020	FD	**71**	J+	**150**	J-	**25**	J-	**36**	J-	**2.8**	J-
FH-024	Monitoring Well	FH-FH024-02	FH-FH024-02-GW-072420	07/24/2020	N	**260**	--	**10**	--	**9.6**	--	**49**	--	**4.6**	--

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection.
2. Grey shaded values indicate the result was detected greater than the 2022 Office of the Secretary of Defense (OSD) residential risk screening levels for tap water, (OSD. 2022. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. July).

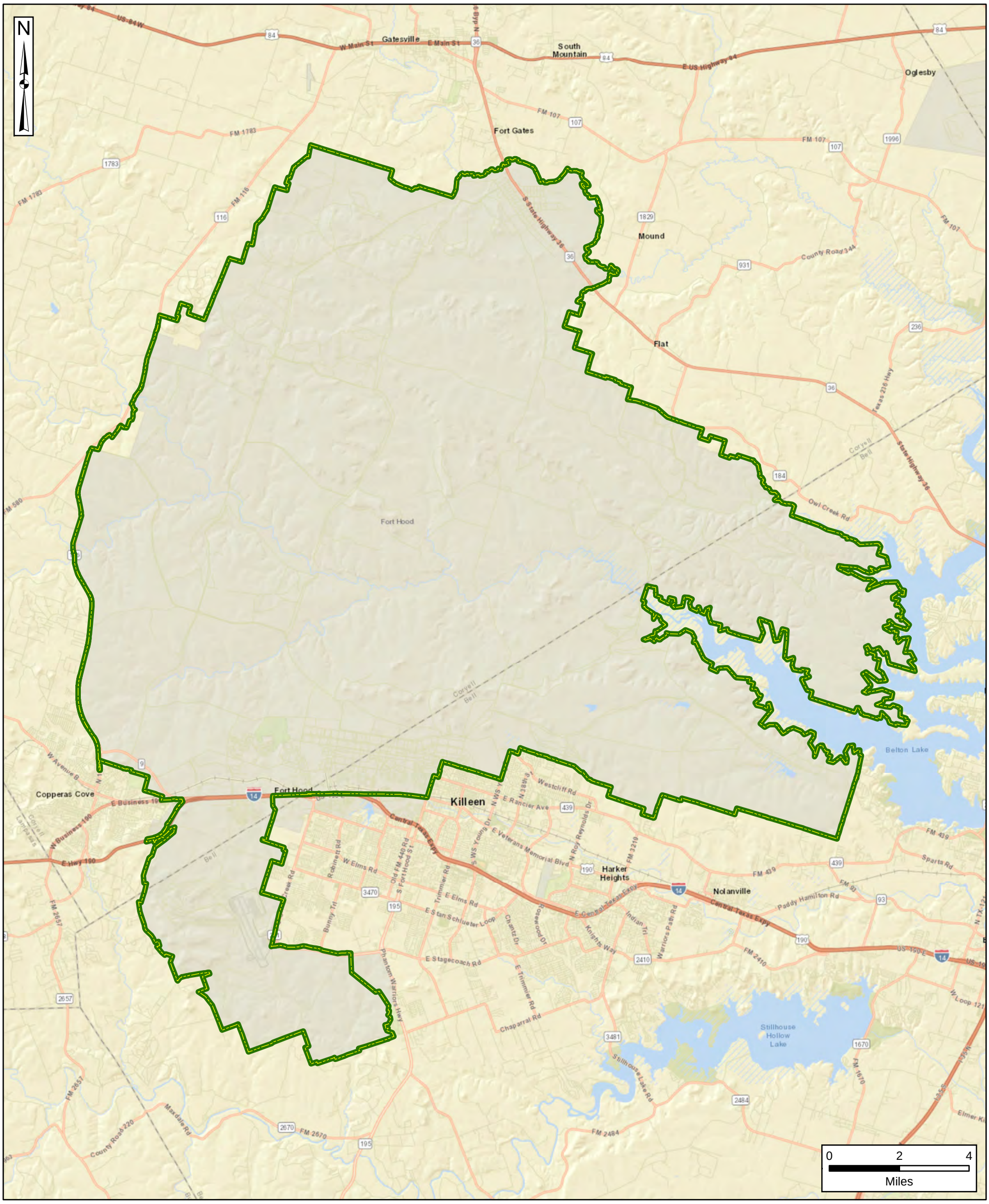
Acronyms/Abbreviations:
-- = not applicable
AOPI = Area of Potential Interest
FD = field duplicate sample
ID = identification
N = primary sample
ng/L = nanograms per liter (parts per trillion)
PFAS = per- and polyfluoroalkyl substances
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
PFNA = perfluorononanoic acid
PFHxS = perfluorohexane sulfonate
Qual = qualifier

Qualifier	Description
U	The analyte was analyzed for but the result was not detected above the limit of quantitation (LOQ).
J	The analyte was positively identified; however the associated numerical value is an estimated concentration only
UJ-	The analyte was not detected, however, the associated numerical value is approximate and may be biased low.
J+	The result is an estimated quantity; the result may be biased high.
J-	The result is an estimated quantity; the result may be biased low.

FIGURES

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 2-1
Site Location



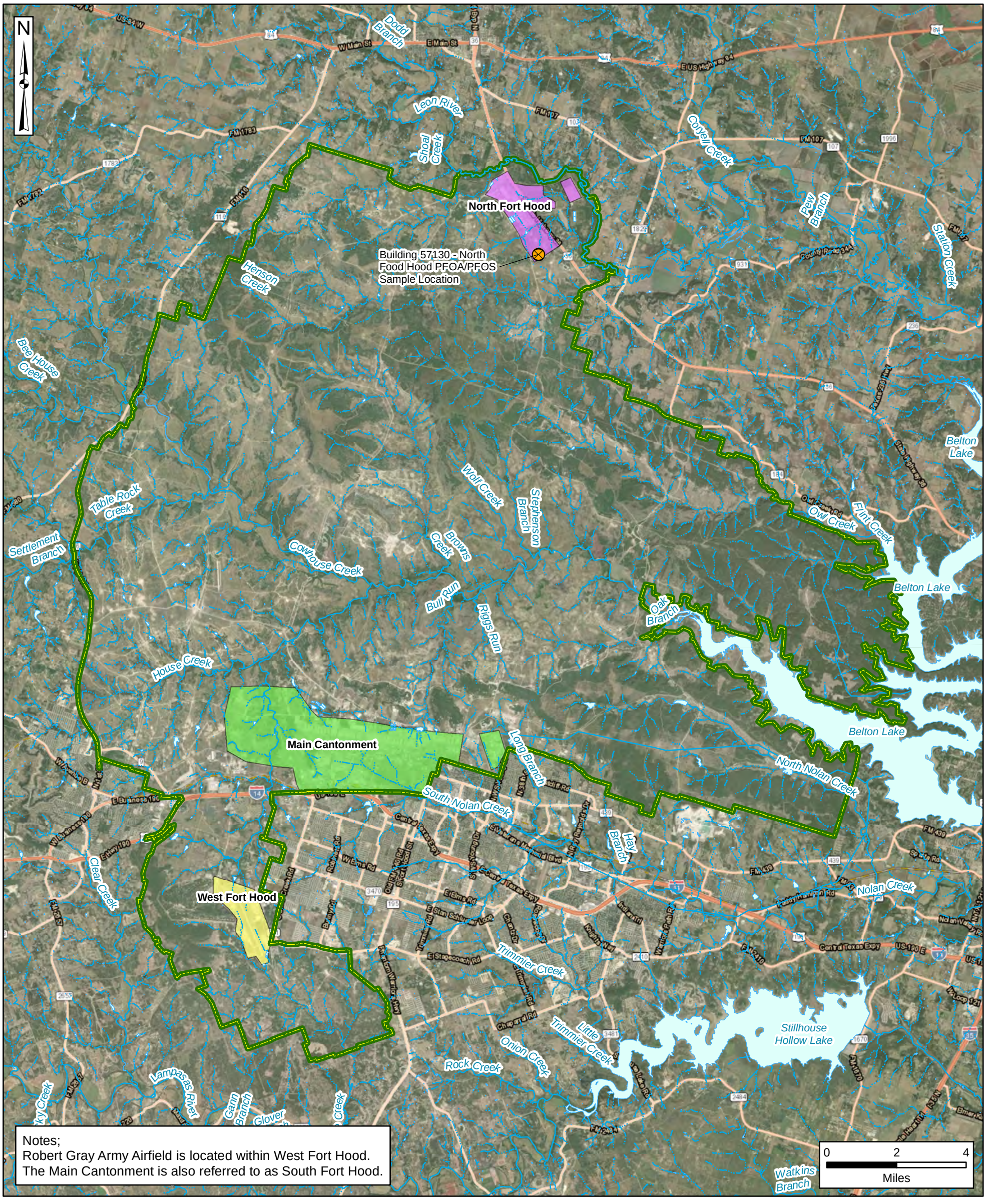
Installation Boundary

Data Sources:
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 14 North

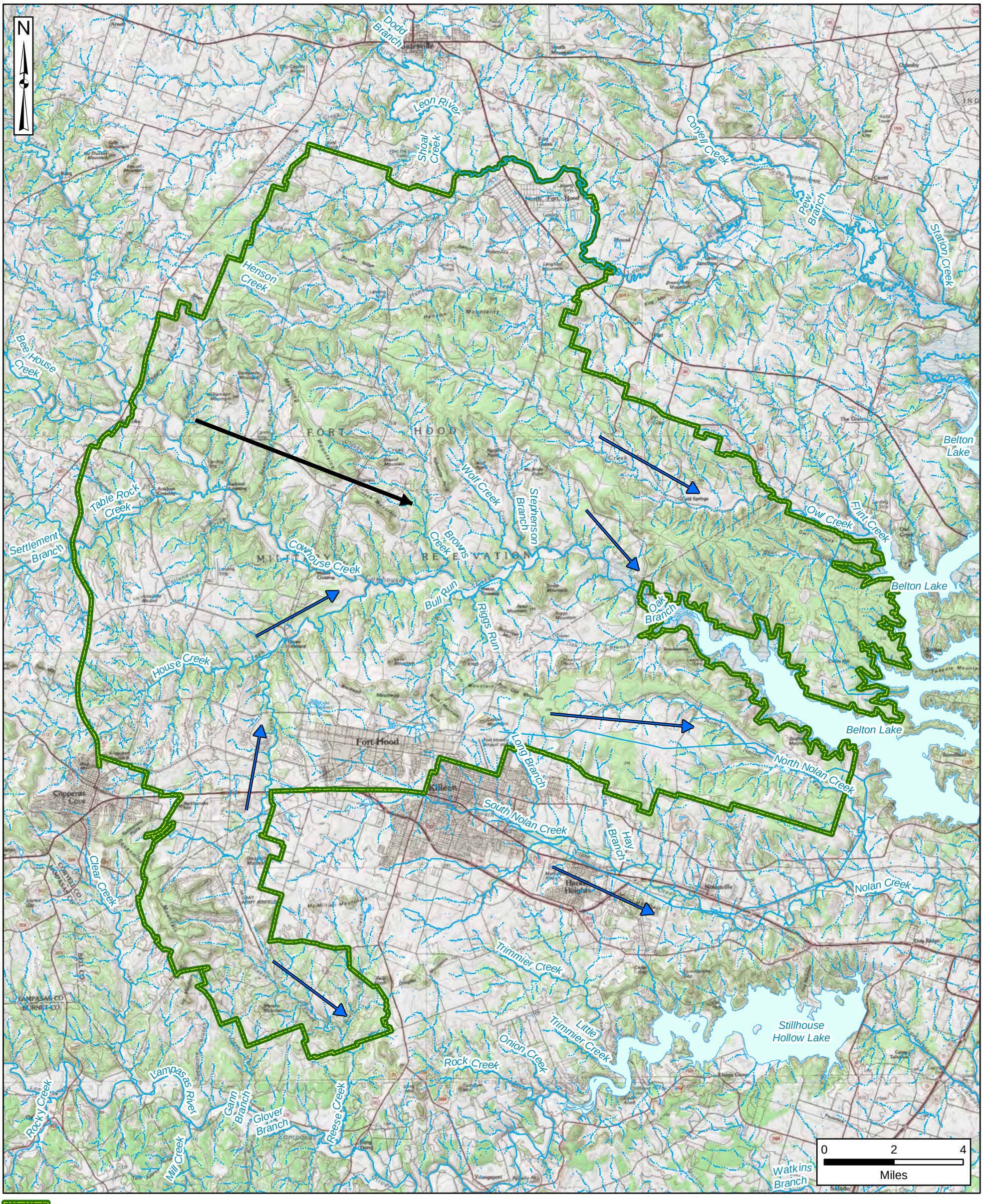
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 2-2
Site Layout



USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 2-3
Topographic Map



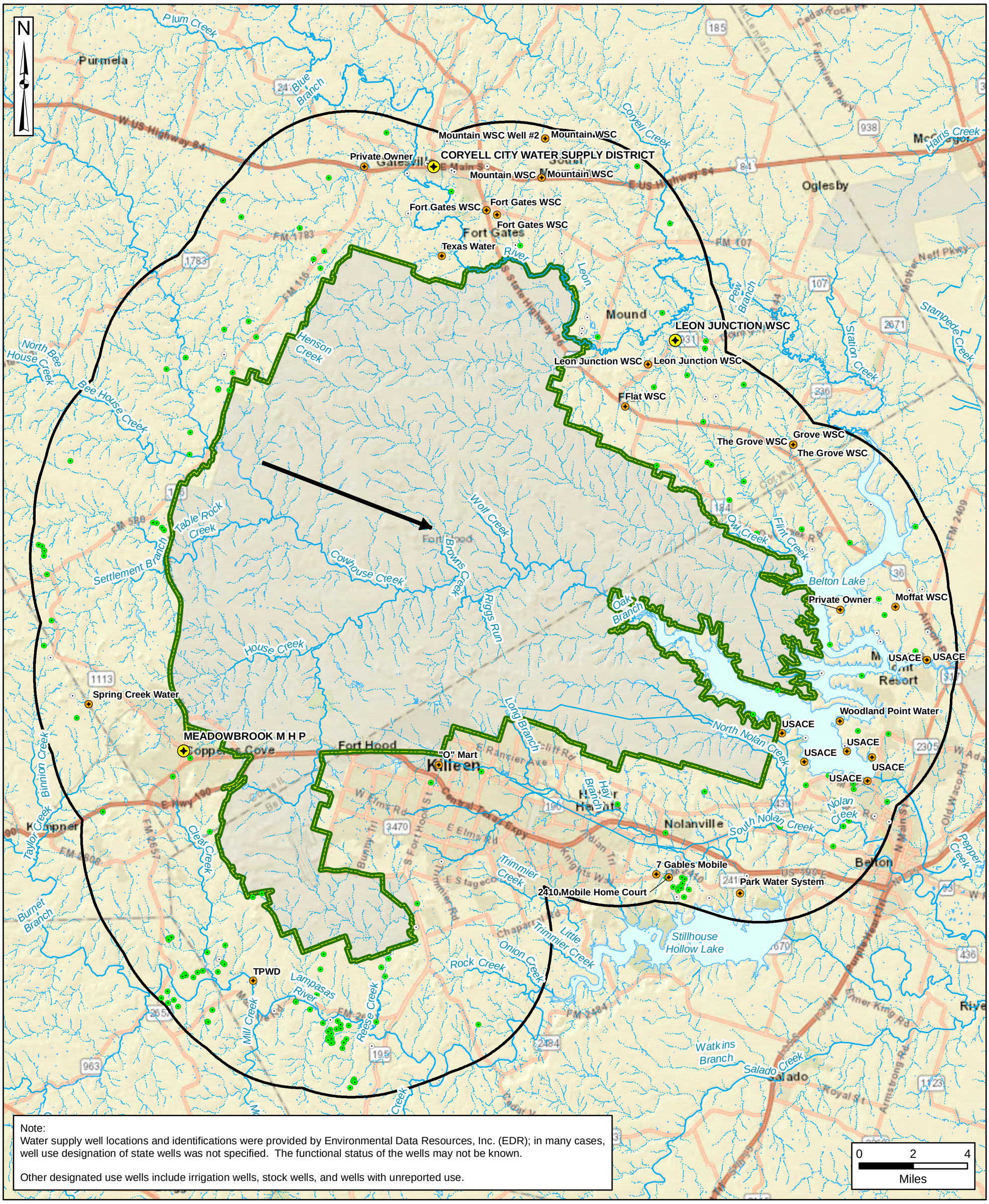
Installation Boundary
River/Stream (Perennial)
Stream (Intermittent)
Water Body
Surface Water Flow Direction
Groundwater Flow Direction

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory,
Installation Assessment of Fort Hood,
Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 2-4
Off-Post Potable Wells



Note:
Water supply well locations and identifications were provided by Environmental Data Resources, Inc. (EDR); in many cases, well use designation of state wells was not specified. The functional status of the wells may not be known.

Other designated use wells include irrigation wells, stock wells, and wells with unreported use.

- Installation Boundary
- 5-Mile Radius
- River/Stream (Perennial)
- Stream (Intermittent)
- Water Body
- Public Water System Supply Well
- Other Public Supply Well
- Domestic Well
- Other Designated Use Water Well
- Groundwater Flow Direction

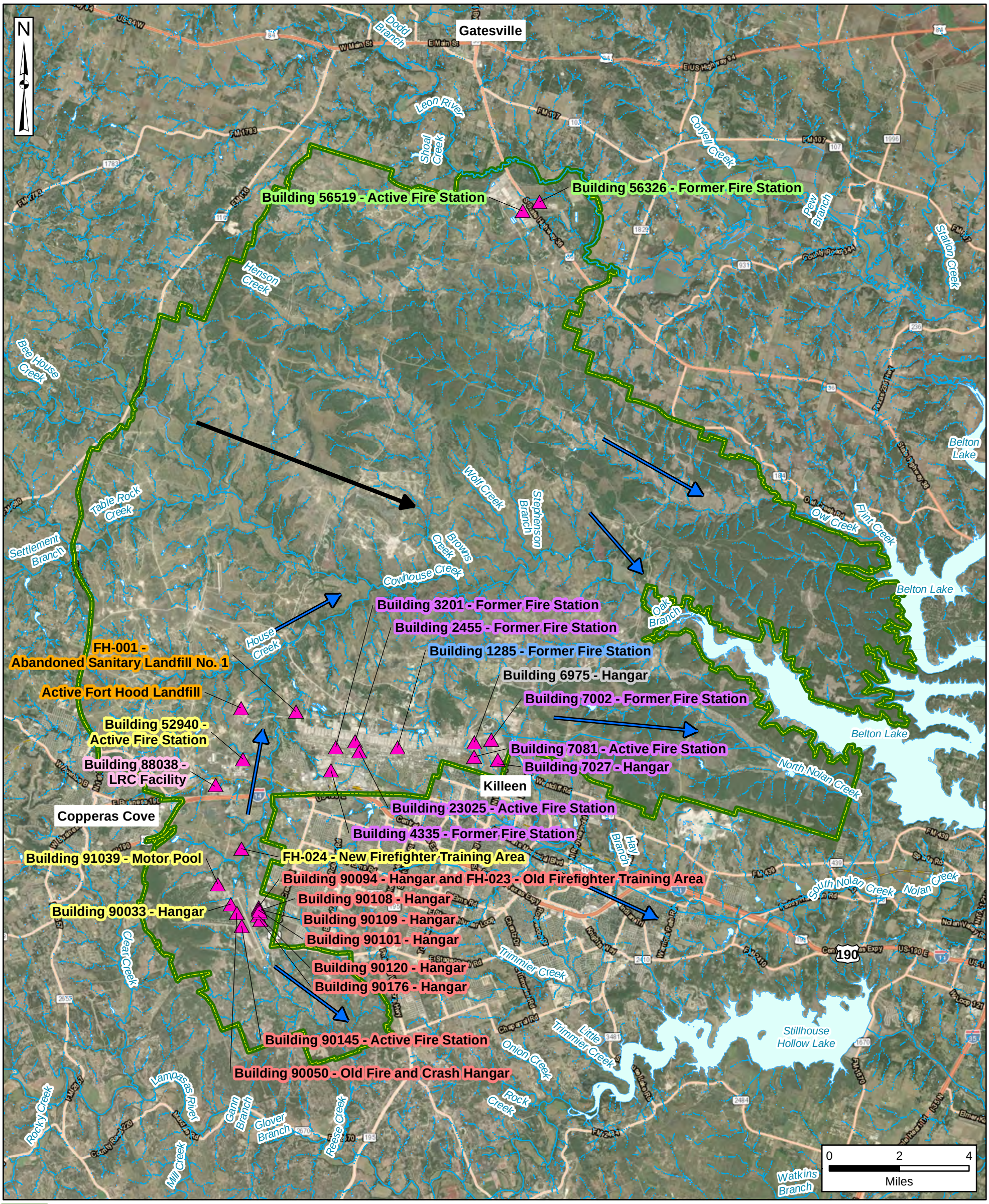
M H P = Mobile Home Park
TPWD = Texas Parks and Wildlife Department
USACE = United States Army Corps of Engineers
WSC = Water Supply Corporation

Data Sources:
EDR, Well Data, 2018
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Street Map

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-2
AOPI Locations



Installation Boundary
AOPI Location
River/Stream (Perennial)
Stream (Intermittent)
Water Body

Groundwater Flow Direction
Surface Water Flow Direction

Yellow = Conceptual Site Model Figure 7-17
Green = Conceptual Site Model Figure 7-18
Red = Conceptual Site Model Figure 7-19
Purple = Conceptual Site Model Figure 7-20
Gray = Conceptual Site Model Figure 7-21
Blue = Conceptual Site Model Figure 7-22
Orange = Conceptual Site Model Figure 7-23
Pink = Conceptual Site Model Figure 7-24

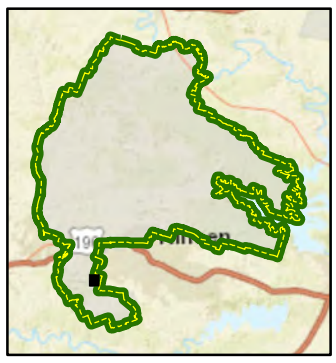
AOPI = area of potential interest
LRC = Logistics Readiness Center

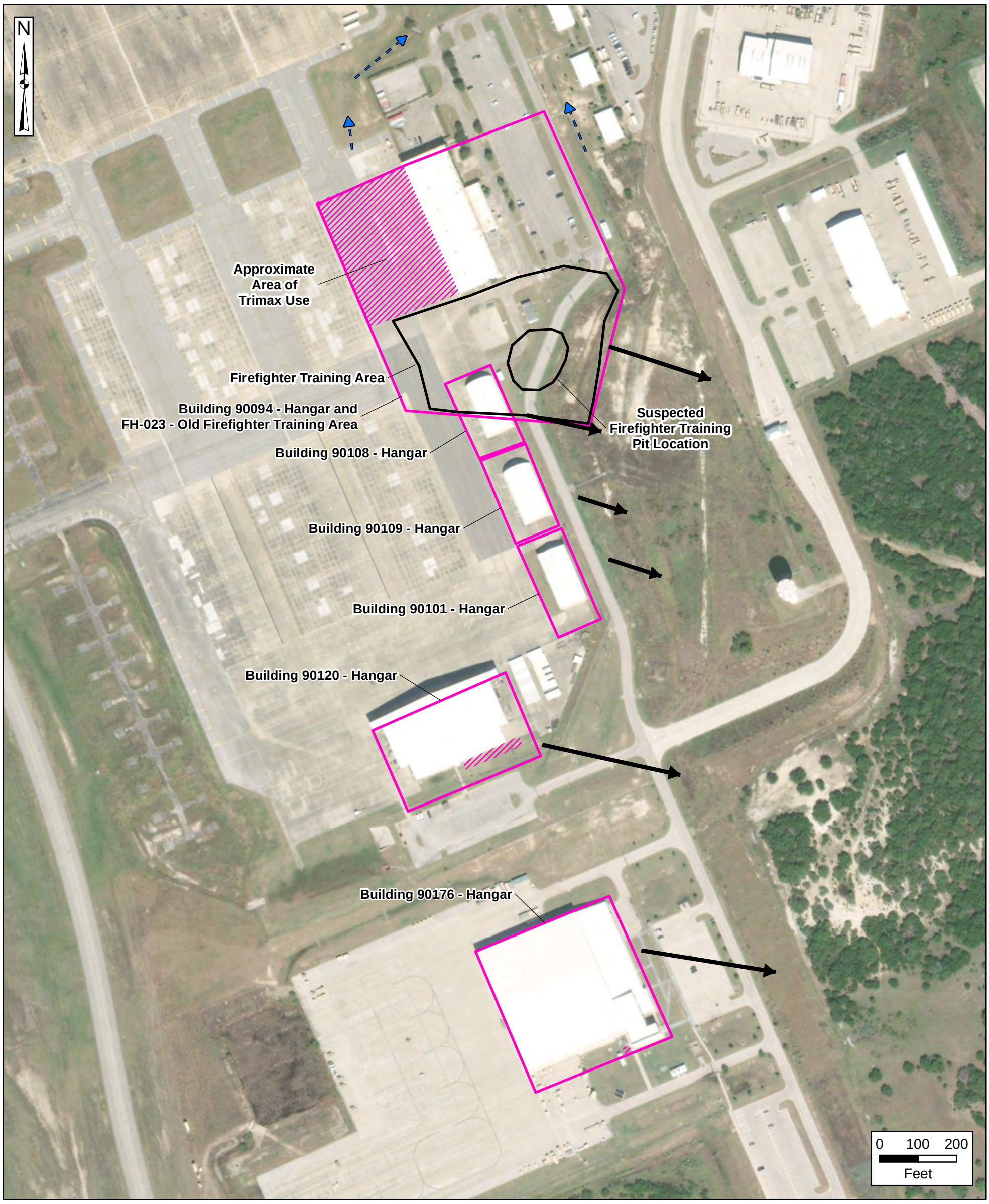
Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-3
Aerial Photo of FH-023, Building 90094, Building 90101, Building 90108, Building 90109, Building 90120, and Building 90176





Installation Boundary
AOPI
AFFF Use Area
Surface Runoff Flow Direction
Groundwater Flow Direction

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

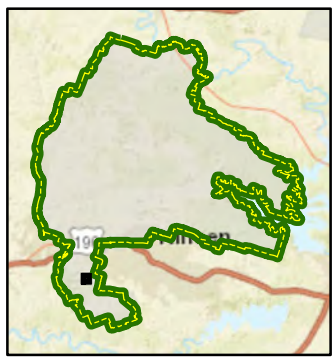


Figure 5-4
Aerial Photo of Building 90033 and Building 90050

Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction

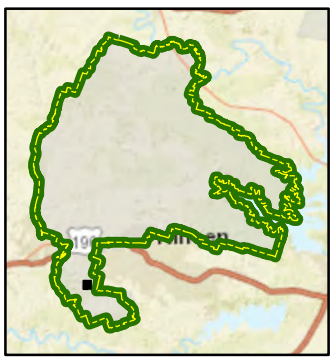
AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-5
Aerial Photo of Building 90145



Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Water Flow Direction
Groundwater Flow Direction

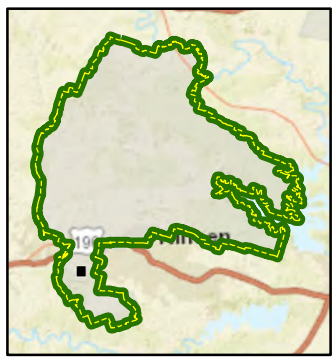
AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-6
Aerial Photo of Building 91039



Installation Boundary

AOPI

Stream (Intermittent)

Surface Runoff Flow Direction

Groundwater Flow Direction

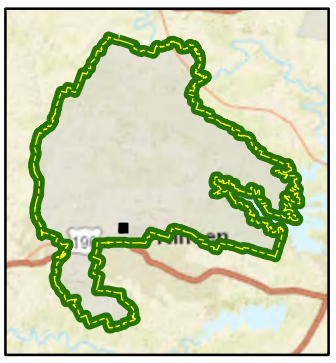
AOPI = area of potential interest

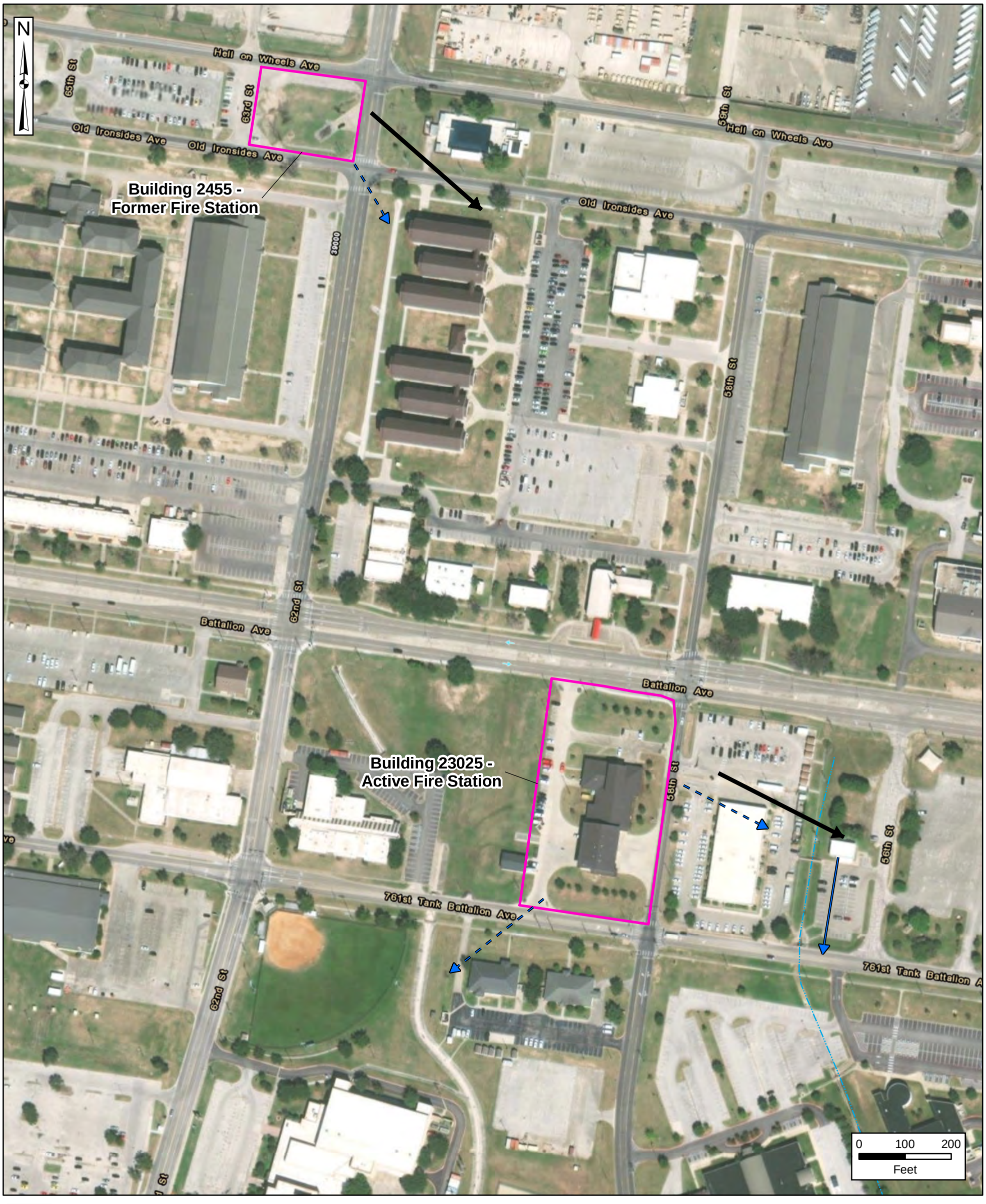
Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-7
Aerial Photo of
Building 2455 and Building 23025





Installation Boundary

AOPI

Stream (Intermittent)

Surface Runoff Flow Direction

Surface Water Flow Direction

Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

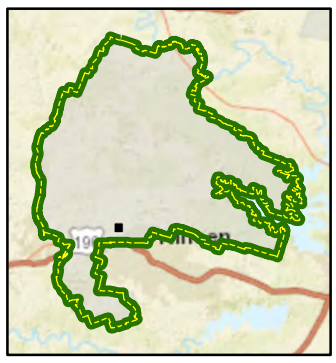
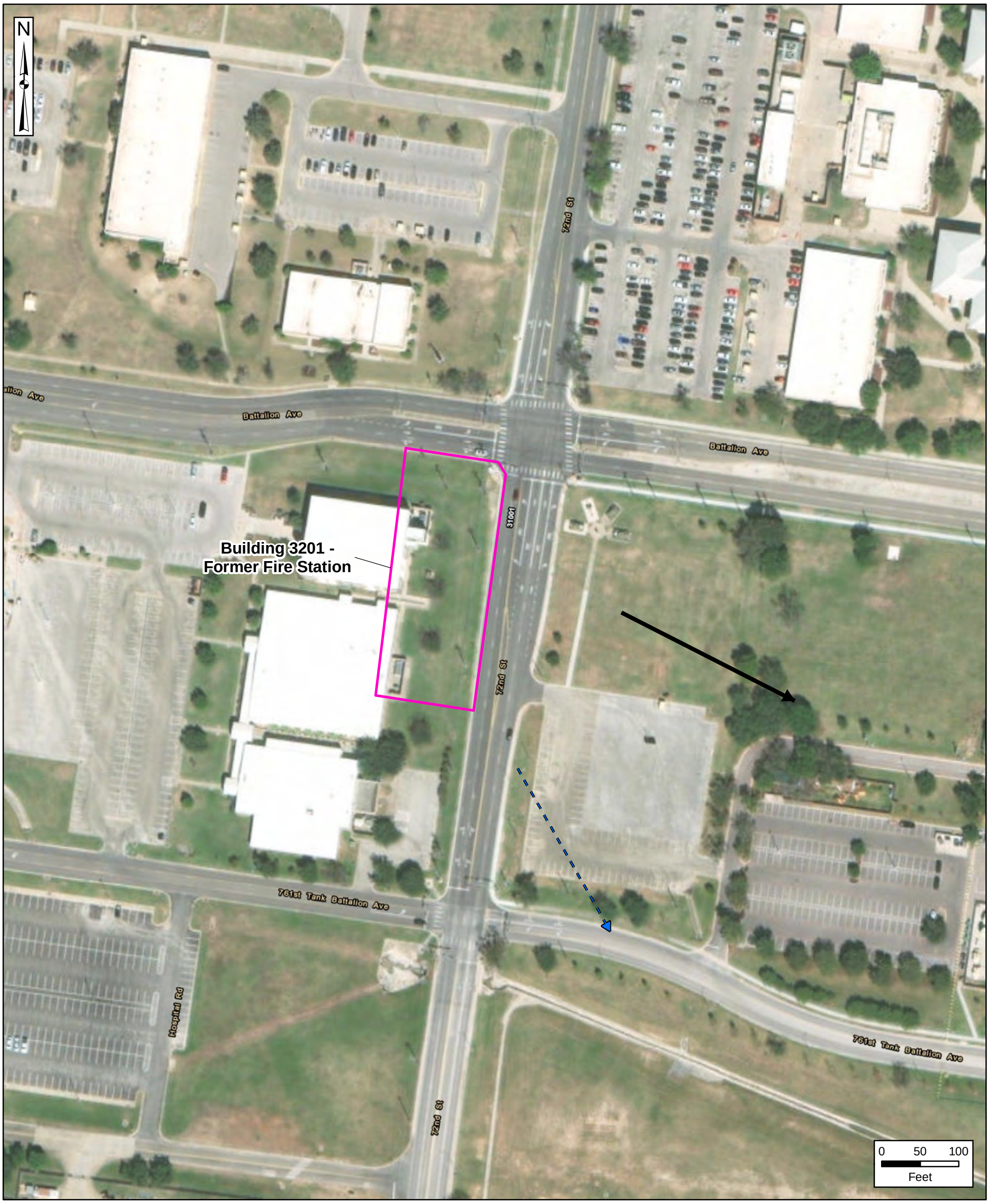


Figure 5-8
Aerial Photo of Building 3201



Installation Boundary

AOPI

Surface Runoff Flow Direction

Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

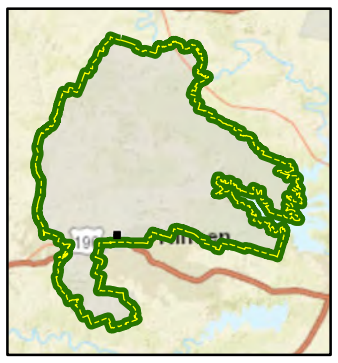
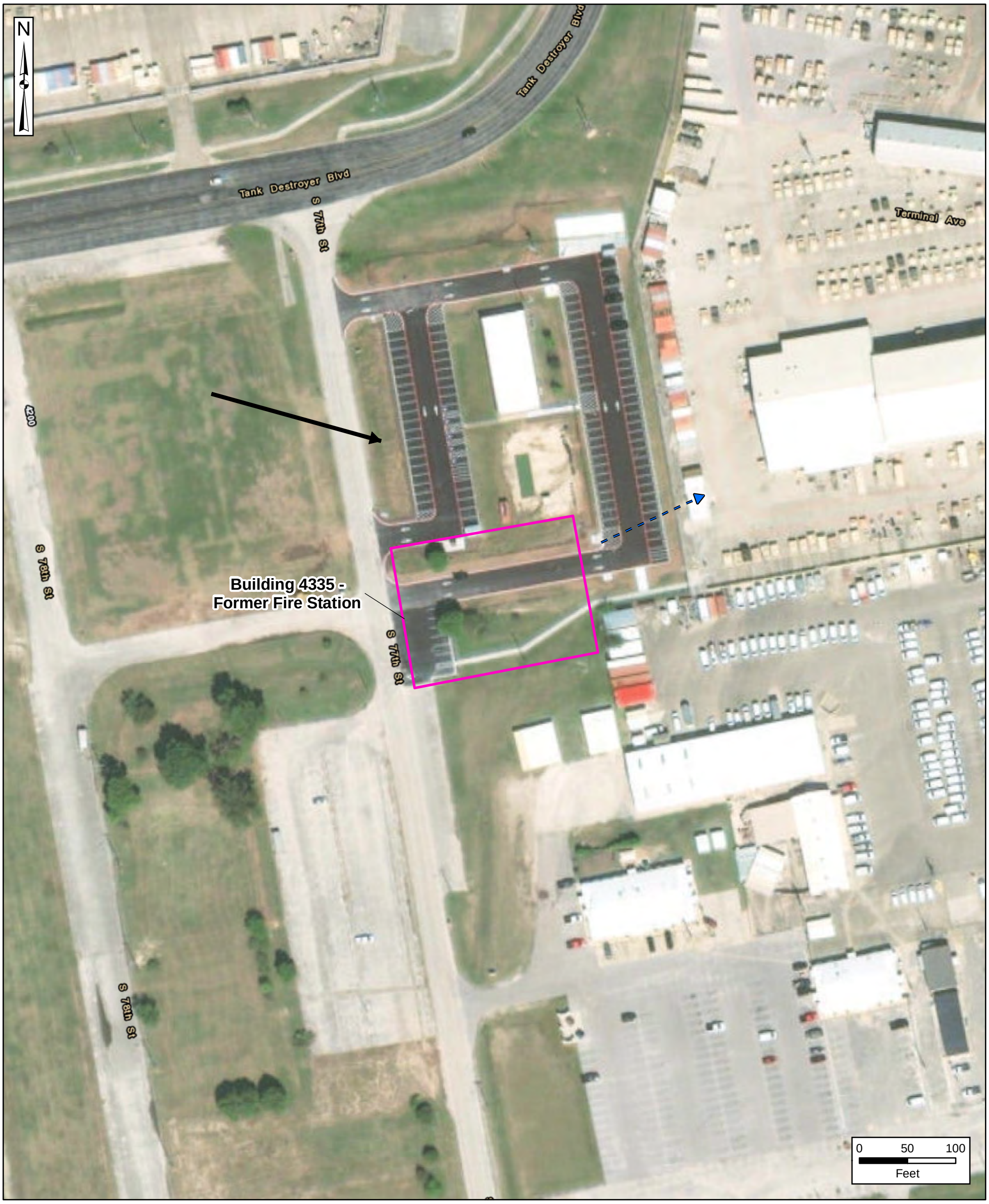


Figure 5-9
Aerial Photo of Building 4335



Installation Boundary

AOPI

Surface Runoff Flow Direction

Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

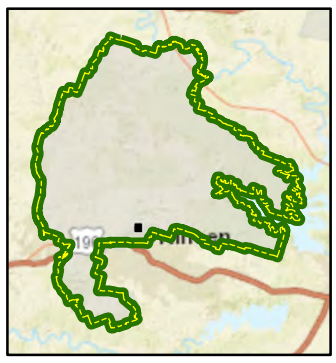


Figure 5-10
Aerial Photo of Building 1285

Installation Boundary

AOPI

Surface Runoff Flow Direction

Groundwater Flow Direction

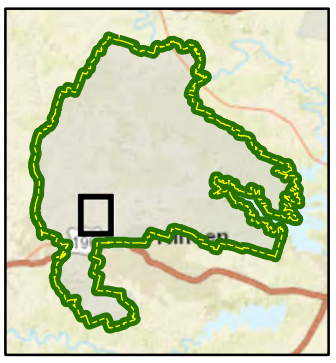
AOPI = area of potential interest

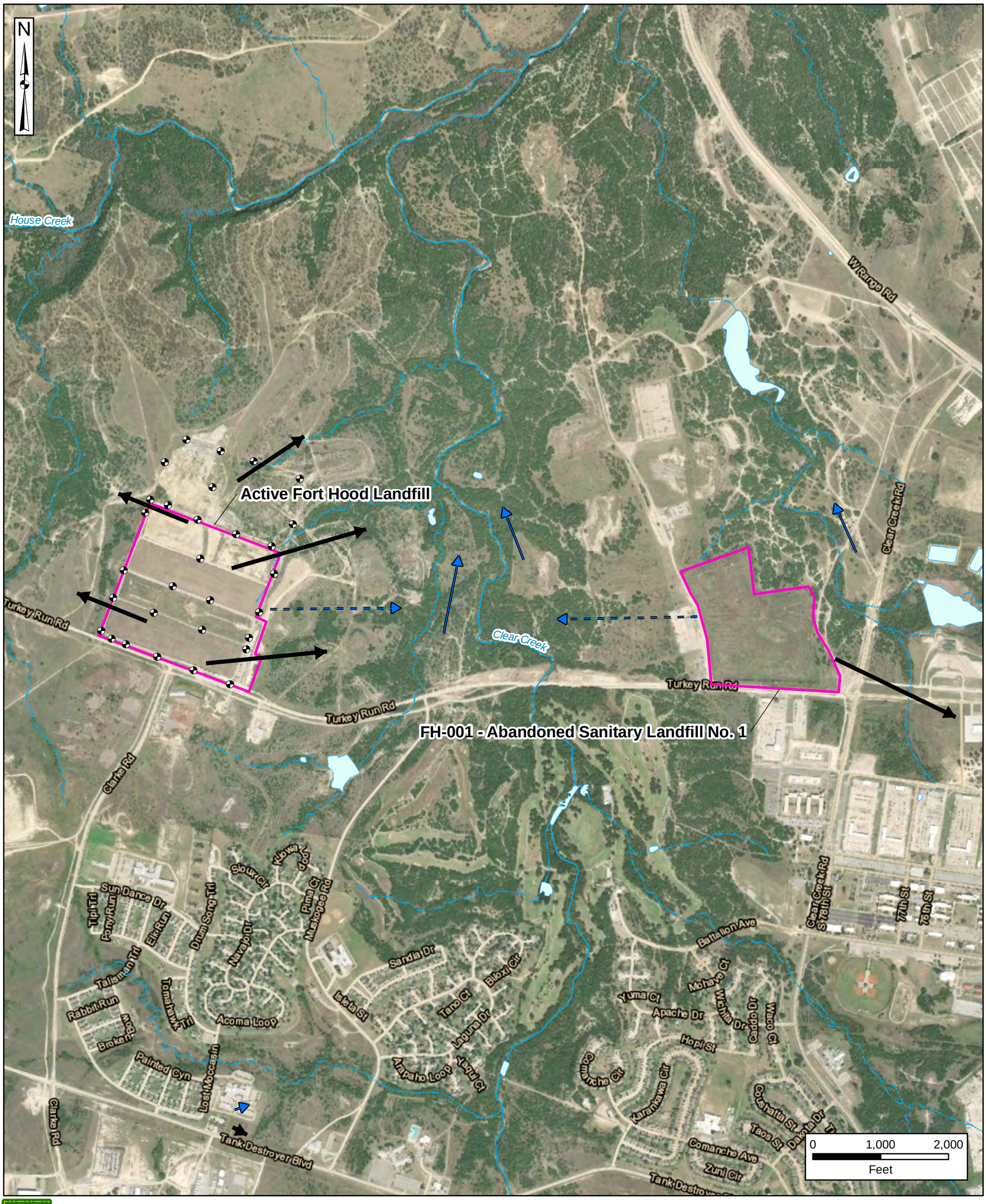
Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-11
Aerial Photo of
FH-001 and Active Fort Hood Landfill





Installation Boundary
AOPI
Monitoring Well / Piezometer
River/Stream (Perennial)
Stream (Intermittent)
Water Body
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
Freese and Nichols, Fort Hood Landfill Potentiometric Surface Map, 2019
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

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Fort Hood, TX

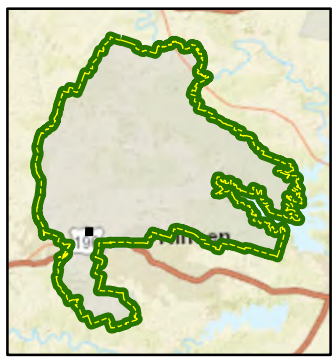


Figure 5-12
Aerial Photo of Building 52940

Installation Boundary

AOPI

Surface Runoff Flow Direction

Groundwater Flow Direction

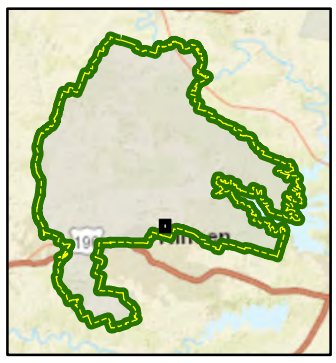
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-13
Aerial Photo of
Building 6975 and Building 7002



Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

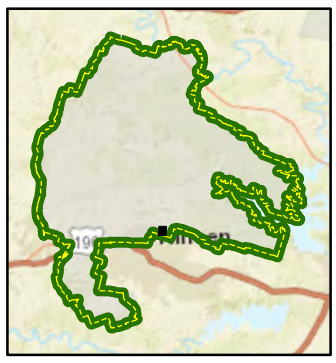


Figure 5-14
Aerial Photo of Building 7081

Installation Boundary
AOPI
Stream (Intermittent)
Surface Water Flow Direction
Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

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Fort Hood, TX

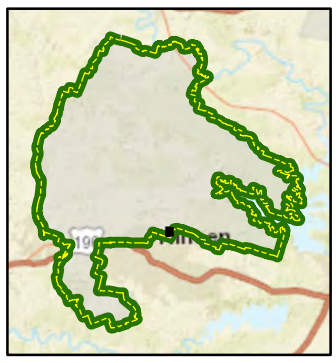


Figure 5-15
Aerial Photo of Building 7027

Installation Boundary
AOPI
Stream (Intermittent)
Surface Water Flow Direction
Surface Runoff Flow Direction
Groundwater Flow Direction

AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

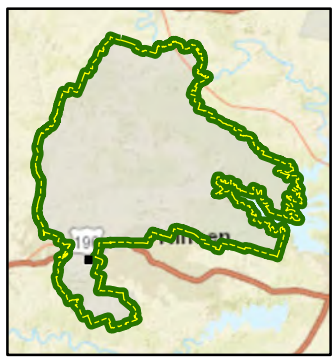


Figure 5-16
Aerial Photo of FH-024

Installation Boundary
AOPI
AFFF Use Area
River/Stream (Perennial)
Surface Water Flow Direction
Surface Runoff Flow Direction
Groundwater Flow Direction

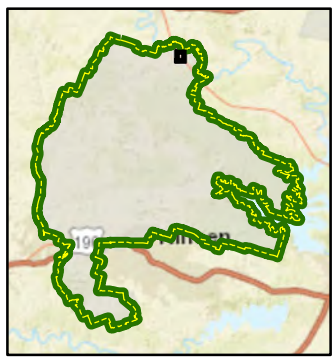
AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 5-17
Aerial Photo of
Building 56326 and Building 56519



Installation Boundary
AOPI
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction

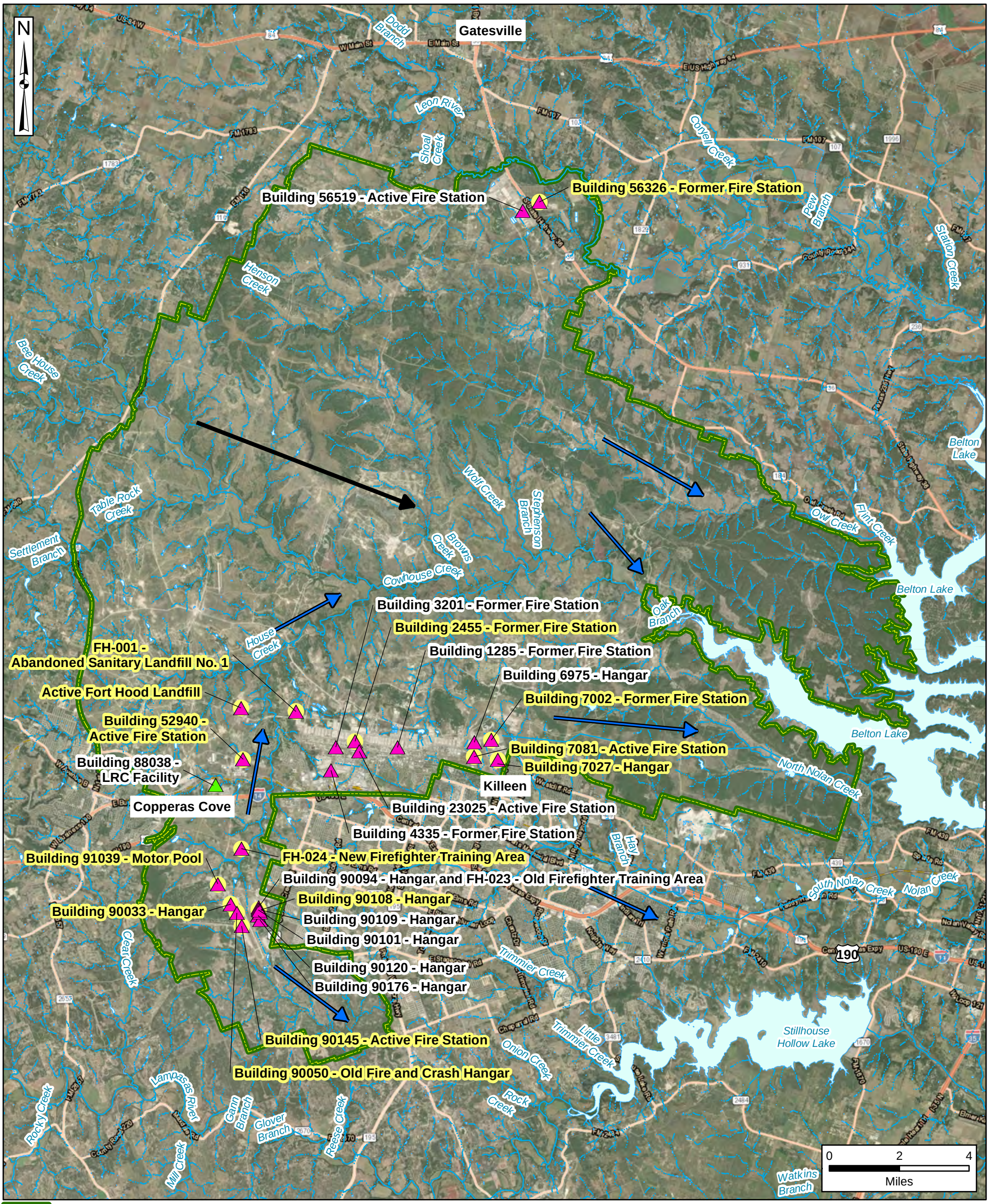
AOPI = area of potential interest

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-1
AOPI Locations and
OSD Risk Screening Level Exceedances



Installation Boundary
Sampled AOPI
AOPI with OSD Risk Screening Level Exceedance
AOPI Not Sampled
River/Stream (Perennial)
Stream (Intermittent)
Water Body
Groundwater Flow Direction
Surface Water Flow Direction

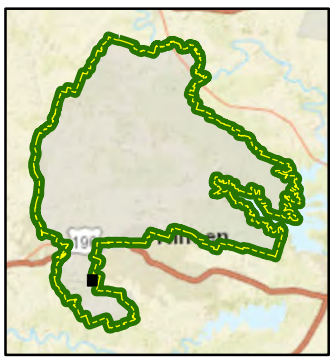
AOPI = area of potential interest
LRC = Logistics Readiness Center
OSD = Office of the Secretary of Defense

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-2
FH-023, Building 90094, Building 90101, Building 90108, Building 90109, Building 90120, and Building 90176
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B90094-01-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0029**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	0.0010 U

FH-B90094-02-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0021 [0.0029]**
PFOA	0.00099 U [0.0010 U]
PFBS	0.00099 U [0.0010 U]
PFHxS	**0.00054 J [0.00052 J]**
PFNA	0.00099 U [0.0010 U]

FH-B90094-03-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0082**
PFOA	**0.0011**
PFBS	0.00095 U
PFHxS	**0.00086 J**
PFNA	0.00095 U

FH-FH023-02-SO	
Date	7/22/2020
Depth	0-2 ft
PFOS	**0.0017 [0.0017]**
PFOA	**0.0010 U [0.00061 J]**
PFBS	0.0010 U [0.0011 U]
PFHxS	**0.00058 J [0.00076 J]**
PFNA	0.0010 U [0.0011 U]

FH-FH023-01-SO-072220	
Date	7/22/2020
Depth	0-2 ft
PFOS	**0.0015**
PFOA	0.00095 U
PFBS	0.00095 U
PFHxS	**0.0013**
PFNA	0.00095 U

FH-FH023-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.00063 J**
PFOA	0.0010 UJ
PFBS	0.0010 UJ
PFHxS	0.0010 UJ
PFNA	0.0010 UJ

FH-B90109-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0033 J**
PFOA	**0.0035 J**
PFBS	0.0011 UJ
PFHxS	**0.00073 J**
PFNA	**0.0019 J**

FH-B90109-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0016 J**
PFOA	**0.00078 J**
PFBS	0.0010 UJ
PFHxS	0.0010 UJ
PFNA	0.0010 UJ

FH-FH023-01-SO-120221	
Date	12/2/2021
Depth	0-2 ft
PFOS	**0.0054**
PFOA	**0.011**
PFBS	0.0010 U
PFHxS	**0.0013**
PFNA	**0.0026**

FH-B90109-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0029 J**
PFOA	**0.00068 J**
PFBS	0.0010 UJ
PFHxS	0.0010 UJ
PFNA	0.0010 UJ

FH-B90108-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.018 J**
PFOA	**0.0018 J**
PFBS	0.0012 UJ
PFHxS	**0.0019 J**
PFNA	0.0012 UJ

FH-B90101-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.00095 J**
PFOA	0.0012 UJ
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

FH-B90108-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0015 J**
PFOA	0.0012 UJ
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

FH-B90101-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0013 J**
PFOA	**0.00066 J**
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	**0.00055 J**

FH-B90101-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0012 J**
PFOA	**0.00055 J**
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B90108-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0018 J**
PFOA	**0.00048 J**
PFBS	0.00090 UJ
PFHxS	0.00090 UJ
PFNA	0.00090 UJ

FH-B90120-02-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.00073 J**
PFOA	**0.0012**
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	**0.00077 J**

FH-B90120-01-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	0.0010 U
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	0.0010 U

FH-B90176-01-SO	
Date	7/22/2020
Depth	0-2 ft
PFOS	**0.00089 J**
PFOA	**0.0020**
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	**0.0018**

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. Duplicate sample results are shown in brackets.
3. **Bolded** values indicate detections.
4. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation is approximate and may be inaccurate or imprecise.

Installation Boundary
AOPI
AFFF Use Area
Surface Runoff Flow Direction
Groundwater Flow Direction

Shallow Soil Sampling Location
Soil and Groundwater Boring *
Groundwater Boring *

AFFF = aqueous film-forming foam
AOPI = area of potential interest
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* The groundwater borings were all dry; no groundwater samples were collected.

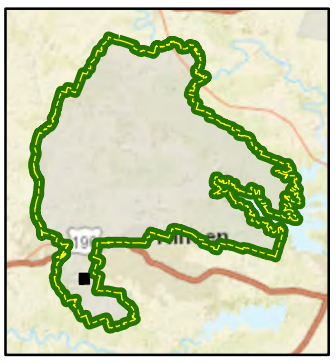
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-3
Building 90033 and Building 90050
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



FH-B90033-01-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.62 J**
PFOA	**0.0089**
PFBS	**0.0029**
PFHxS	**0.037**
PFNA	0.0012 U

FH-B90033-02-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0036**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	0.0010 U

FH-B90033-03-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0014**
PFOA	**0.00091 J**
PFBS	0.00098 U
PFHxS	**0.00051 J**
PFNA	0.00098 U

Chemical	Residential Scenario Risk Screening Level Soil (mg/kg)	Industrial/Commercial Scenario Risk Screening Level Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

Building 90033 - Hangar

Approximate AFFF Cannon Discharge Area

FH-B90050-01-SO	
Date	7/21/2020
Depth	7/21/2020
PFOS	**0.0039**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	0.0010 U

FH-B90050-02-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.065**
PFOA	**0.0013**
PFBS	0.0010 U
PFHxS	**0.0086**
PFNA	**0.00092 J**

Approximate Area of Nozzle Testing and Tank Flushing

Building 90050 - Old Fire and Crash Hangar

FH-B90050-03-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.22**
PFOA	**0.0019**
PFBS	0.0011 U
PFHxS	**0.0042**
PFNA	**0.0014**

FH-B90050-04-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.13**
PFOA	**0.0029**
PFBS	0.0010 U
PFHxS	**0.0074**
PFNA	**0.0031**

0 200 400
Feet

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. **Bolded** values indicate detections.
3. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location

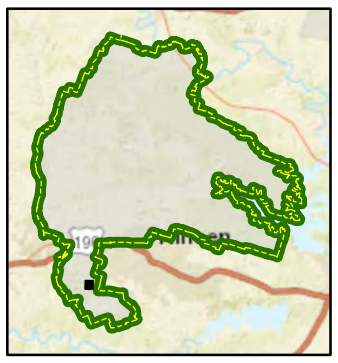
AFFF = aqueous film-forming foam
AOPI = area of potential interest
ft = feet
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-4
Building 90145
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level	Industrial/Commercial Scenario Risk Screening Level
	Soil (mg/kg)	Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

FH-B90145-01-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.013**
PFOA	**0.0014**
PFBS	0.00099 U
PFHxS	**0.0014**
PFNA	**0.00062 J**

FH-B90145-02-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.018**
PFOA	**0.00093 J**
PFBS	0.0010 U
PFHxS	**0.00052 J**
PFNA	**0.00088 J**

FH-B90145-03-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.0021**
PFOA	**0.00080 J**
PFBS	0.00098 U
PFHxS	**0.00054 J**
PFNA	0.00098 U

FH-B90145-04-SO	
Date	7/21/2020
Depth	0-2 ft
PFOS	**0.33 J**
PFOA	**0.0049 J-**
PFBS	0.0010 UJ
PFHxS	**0.012**
PFNA	**0.0040 J-**

Building 90145 - Active Fire Station

Grey Dr

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. **Bolded** values indicate detections.
3. Results that equal or exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
J- = The result is an estimated quantity; the result may be biased low.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation is approximate and may be inaccurate or imprecise.

0 100 200
Feet

Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Water Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location

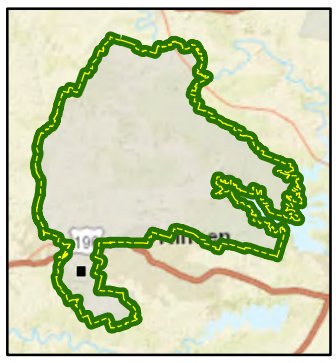
AFFF = aqueous film-forming foam
AOPI = area of potential interest
ft = feet
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-5
Building 91039
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B91039-01-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	0.00093 U
PFOA	0.00093 U
PFBS	0.00093 U
PFHxS	0.00093 U
PFNA	0.00093 U

FH-B91039-02-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.059**
PFOA	**0.0012**
PFBS	0.00089 U
PFHxS	**0.0018**
PFNA	**0.00057 J**

FH-B91039-02-GW	
Date	11/22/2021
Depth	70.39 ft btoc
PFOS	**25**
PFOA	**2.5 J**
PFBS	4.0 U
PFHxS	**7.2**
PFNA	4.0 U

FH-B91039-03-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.033**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	**0.0013**
PFNA	**0.00064 J**

Building 91039 - Motor Pool

Engineer Ave

Clarke Rd

FH-B91039-01-GW

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. **Bolded** values indicate detections.
4. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

0 100 200
Feet

Installation Boundary
AOPI
Stream (Intermittent)
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* FH-B91039-01-GW was dry; no groundwater sample was collected.

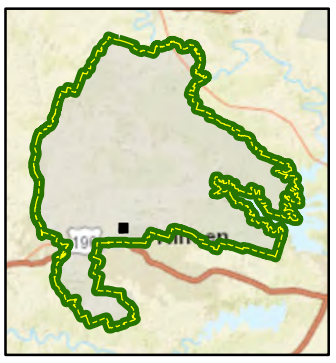
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-6
Building 2455 and Building 23025
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



FH-B2455-01-SO	
Date	7/30/2020
Depth	0-2 ft
PFOS	**0.0031**
PFOA	**0.00075 J**
PFBS	0.0013 U
PFHxS	**0.00089 J**
PFNA	0.0013 U

Building 2455 - Former Fire Station

FH-B2455-03-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.91 J**
PFOA	**0.011**
PFBS	0.0011 U
PFHxS	**0.048**
PFNA	**0.0017**

FH-B2455-02-SO	
Date	7/30/2020
Depth	0-2 ft
PFOS	**0.0027**
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

Chemical	Residential Scenario Risk Screening Level Soil (mg/kg)	Industrial/Commercial Scenario Risk Screening Level Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

FH-B23025-01-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	0.0010 UJ
PFOA	**0.00051 J**
PFBS	0.0010 UJ
PFHxS	0.0010 UJ
PFNA	0.0010 UJ

FH-B23025-02-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	0.0012 UJ
PFOA	0.0012 UJ
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

FH-B23025-03-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.0051 J**
PFOA	**0.0017 J**
PFBS	0.00097 UJ
PFHxS	**0.00064 J**
PFNA	**0.0015 J**

Building 23025 - Active Fire Station

FH-B23025-02-GW

FH-B23025-01-GW

FH-B23025-04-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	0.0012 UJ
PFOA	0.0012 UJ
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. **Bolded** values indicate detections.
3. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation.
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation is approximate and may be inaccurate or imprecise.

0 100 200 Feet

Installation Boundary
AOPI
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction

Shallow Soil Sampling Location
Soil and Groundwater Boring *
Groundwater Boring *

AOPI = area of potential interest
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* The groundwater borings were dry; no groundwater samples were collected.

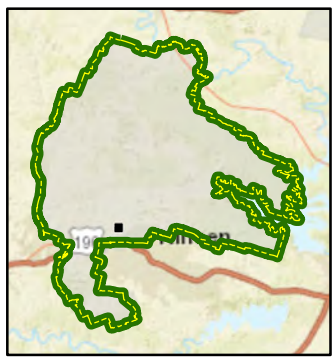
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-7
Building 3201
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B3201-01-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.00072 J**
PFOA	0.0012 UJ
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

FH-B3201-03-GW	
Date	11/19/2021
Depth	70.31 ft btoc
PFOS	3.6 U
PFOA	3.6 U
PFBS	3.6 U
PFHxS	3.6 U
PFNA	3.6 U

Building 3201 - Former Fire Station

FH-B3201-02-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	0.0011 UJ
PFOA	0.0011 UJ
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B3201-03-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.00060 J**
PFOA	0.0011 UJ
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B3201-01-GW

FH-B3201-02-GW

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. **Bolded** values indicate detections.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation is approximate and may be inaccurate or imprecise.

0 50 100 Feet

Installation Boundary
AOPI
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* FH-B3201-01-GW and H-B3201-02-GW were dry; no groundwater samples were collected at these locations.

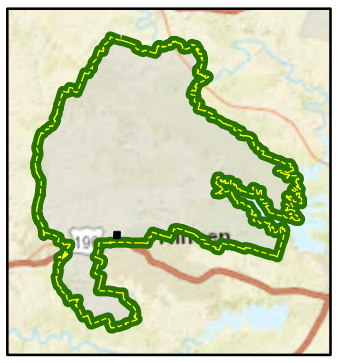
PFHxS = perfluorohexane sulfonic acid
PFNA = perfluorononanoic acid
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-8
Building 4335
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B4335-01-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.0021 J**
PFOA	0.0011 UJ
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B4335-02-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	0.0011 UJ
PFOA	0.0011 UJ
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B4335-03-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.0038 J**
PFOA	**0.00082 J**
PFBS	0.0013 UJ
PFHxS	**0.0022 J**
PFNA	0.0013 UJ

FH-B4335-02-GW	
Date	11/20/2021
Depth	70.53 ft btoc
PFOS	**3.0 J**
PFOA	**2.8 J**
PFBS	3.8 U
PFHxS	3.8 U
PFNA	3.8 U

FH-B4335-04-SO	
Date	7/28/2020
Depth	0-2 ft
PFOS	**0.0034 J**
PFOA	**0.00087 J**
PFBS	0.0012 UJ
PFHxS	0.0012 UJ
PFNA	0.0012 UJ

FH-B4335-01-GW

Building 4335 - Former Fire Station

Tank Destroyer Blvd
Terminal Ave
S 74th St
S 76th St
4200

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. **Bolded** values indicate detections.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation is approximate and may be inaccurate or imprecise.

0 50 100
Feet

Installation Boundary
AOPI
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* FH-B4335-01-GW was dry; no sample was collected.

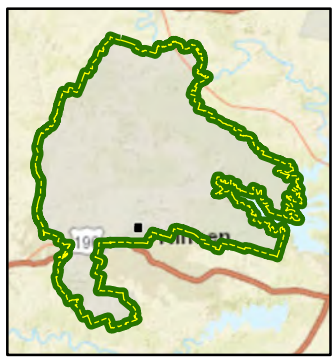
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-9
Building 1285
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level	Industrial/Commercial Scenario Risk Screening Level
	Soil (mg/kg)	Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

FH-B1285-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.00097 UJ
PFOA	0.00097 UJ
PFBS	0.00097 UJ
PFHxS	0.00097 UJ
PFNA	0.00097 UJ

FH-B1285-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.0011 UJ
PFOA	0.0011 UJ
PFBS	0.0011 UJ
PFHxS	0.0011 UJ
PFNA	0.0011 UJ

FH-B1285-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.0012 UJ [0.0010 UJ]
PFOA	0.0012 UJ [0.0010 UJ]
PFBS	0.0012 UJ [0.0010 UJ]
PFHxS	0.0012 UJ [0.0010 UJ]
PFNA	0.0012 UJ [0.0010 UJ]

Building 1285 - Former Fire Station

37th St
Park Ave
Central Ave
FH-B1285-01-GW

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. Duplicate sample results are shown in brackets.

Qualifiers:
UJ = The analyte was analyzed for but was not detected. The reported limit of quantitation (LOQ) is approximate and may be inaccurate or imprecise.

0 50 100
Feet

Installation Boundary
AOPI
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

* The groundwater boring was dry; no groundwater sample was collected.

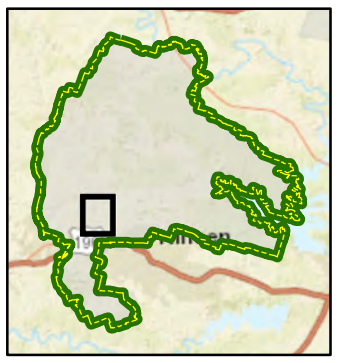
AOPI = area of potential interest
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-10
FH-001 and Active Fort Hood Landfill
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level Tap Water (ng/L)
PFOS	4
PFOA	6
PFBS	601
PFHxS	39
PFNA	6

FH-MW-6	
Date	7/29/2020
Depth	40 ft btoc
PFOS	3.5 U
PFOA	3.5 U
PFBS	3.5 U
PFHxS	3.5 U
PFNA	3.5 U

FH-P-5	
Date	7/29/2020
Depth	50 ft btoc
PFOS	3.3 U
PFOA	3.3 U
PFBS	3.3 U
PFHxS	3.3 U
PFNA	3.3 U

FH-P-7	
Date	7/22/2020
Depth	33.18 ft btoc
PFOS	3.3 U
PFOA	3.3 U
PFBS	3.3 U
PFHxS	3.3 U
PFNA	3.3 U

FH-MW-2	
Date	7/22/2020
Depth	22.21 ft btoc
PFOS	3.4 U
PFOA	3.4 U
PFBS	3.4 U
PFHxS	3.4 U
PFNA	3.4 U

FH-FH001-02-GW	
Date	7/24/2020
Depth	14 ft btoc
PFOS	**56 J+ [71 J+]**
PFOA	**130 J- [150 J-]**
PFBS	**22 J- [25 J-]**
PFHxS	**32 J- [36 J-]**
PFNA	**4.5 UJ- [2.8 J-]**

FH-MW-8	
Date	7/22/2020
Depth	34.19 ft btoc
PFOS	**5.8**
PFOA	**16**
PFBS	**2.6 J**
PFHxS	**3.2 J**
PFNA	**2.1 J**

FH-MW-14A	
Date	7/22/2020
Depth	49.37 ft btoc
PFOS	3.4 U
PFOA	3.4 U
PFBS	3.4 U
PFHxS	3.4 U
PFNA	3.4 U

House Creek
Active Fort Hood Landfill
FH-001 - Abandoned Sanitary Landfill No. 1
Turkey Run Rd
W Range Rd
Clear Creek Rd
FH-FH001-04-GW (dry)
FH-FH001-03-GW (dry)
FH-FH001-05-GW (dry)
FH-FH001-06-GW (dry)
FH-FH001-01-GW (dry)
Sun Dance Dr
Tipi Trl
Pony Run
Elk Run
Drum Sorg Trl
Navajo Dr
Pima
Muskogee
Sandia Dr
Biloxi Cir
Talisman Trl
Battalion Ave
Mohave Ct
Yuma Ct
Apache Dr
Wichita Dr
Waco Ct
Hopi St
Dakota Dr
77th St
76th St
S 76th St

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Duplicate sample results are shown in brackets.
3. **Bolded** values indicate detections.
4. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
J+ = The result is an estimated quantity; the result may be biased high.
J- = The result is an estimated quantity; the result may be biased low.
U = The analyte was analyzed for but was not detected above the limit of quantitation.

AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

0 1,000 2,000
Feet

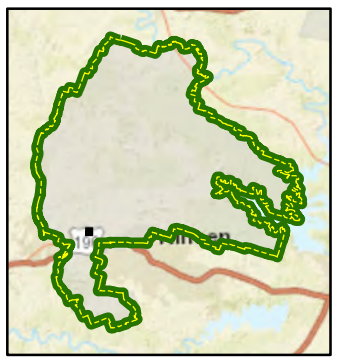
- Installation Boundary
- AOPI
- Monitoring Well / Piezometer
- River/Stream (Perennial)
- Stream (Intermittent)
- Water Body
- Surface Runoff Flow Direction
- Surface Water Flow Direction
- Groundwater Flow Direction
- Groundwater Boring
- Groundwater Sampling Location (Existing Well / Piezometer)

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
Freese and Nichols, Fort Hood Landfill Potentiometric Surface Map, 2019
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-11
Building 52940
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level Soil (mg/kg)	Industrial/Commercial Scenario Risk Screening Level Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

FH-B52940-01-SO	
Date	7/24/2020
Depth	7/24/2020
PFOS	**0.021**
PFOA	0.00092 U
PFBS	0.00092 U
PFHxS	**0.00055 J**
PFNA	0.00092 U

FH-B52940-02-SO	
Date	7/24/2020
Depth	0-2 ft
PFOS	**0.0029**
PFOA	0.00091 U
PFBS	0.00091 U
PFHxS	**0.00066 J**
PFNA	0.00091 U

FH-B52940-03-SO	
Date	7/24/2020
Depth	0-2 ft
PFOS	**0.79 J**
PFOA	**0.0016**
PFBS	0.00099 U
PFHxS	**0.0033**
PFNA	**0.0070**

Building 52940 - Active Fire Station

FH-B52940-01-GW

Bear Run
Lost Moccasin
Tank Destroyer Blvd
53201
53265

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. **Bolded** values indicate detections.
3. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

0 100 200
Feet

Installation Boundary
AOPI
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

* The groundwater boring was dry; no groundwater samples were collected.

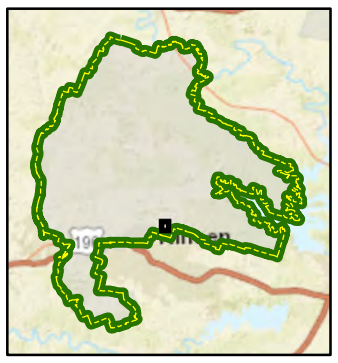
AOPI = area of potential interest
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-12
Building 6975 and Building 7002
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level Soil (mg/kg)	Industrial/Commercial Scenario Risk Screening Level Soil (mg/kg)
PFOS	0.013	0.16
PFOA	0.019	0.25
PFBS	1.9	25
PFHxS	0.13	1.6
PFNA	0.019	0.25

FH-B7002-02-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.049**
PFOA	**0.0030**
PFBS	0.0014 U
PFHxS	**0.0054**
PFNA	**0.00083 J**

FH-B7002-03-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.020**
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	**0.0015**
PFNA	0.0011 U

FH-B7002-01-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**4.8 J**
PFOA	**0.0052 J+**
PFBS	**0.0018 J+**
PFHxS	**0.068**
PFNA	**0.0041 J+**

FH-B7002-04-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.25 J**
PFOA	**0.0047**
PFBS	**0.0020**
PFHxS	**0.037**
PFNA	**0.0044**

FH-B6975-01-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	0.0012 U
PFOA	0.0012 U
PFBS	0.0012 U
PFHxS	0.0012 U
PFNA	0.0012 U

FH-B6975-02-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	0.0011 U
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

Murphy Rd

Building 6975 - Hangar

Building 7002 - Former Fire Station

FH-B7002-01-GW

Notes:
1. Soil results are reported in milligrams per kilogram (mg/kg).
2. **Bolded** values indicate detections.
3. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
J+ = The result is an estimated quantity; the result may be biased high.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

0 200 400
Feet

Installation Boundary
AOPI
AFFF Use Area
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

* The groundwater boring was dry; no groundwater sample was collected.

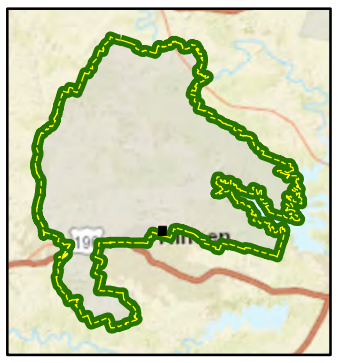
AOPI = area of potential interest
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-13
Building 7081
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

Building 7081 - Active Fire Station

Warrior Way

FH-B7081-01-SO	
Date	7/30/2020
Depth	0-2 ft
PFOS	**0.0024**
PFOA	0.0013 U
PFBS	0.0013 U
PFHxS	**0.00067 J**
PFNA	0.0013 U

FH-B7081-02-SO	
Date	7/30/2020
Depth	0-2 ft
PFOS	**0.0011**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	0.0010 U

FH-B7081-03-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.0023**
PFOA	**0.0020**
PFBS	0.0013 U
PFHxS	0.0013 U
PFNA	**0.0017**

FH-B7081-01-GW	
Date	7/29/2020
Depth	13.5 ft btoc
PFOS	**200 J**
PFOA	**50**
PFBS	**180**
PFHxS	**500 J**
PFNA	**3.0 J**

FH-B7081-04-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.0023**
PFOA	**0.0018**
PFBS	0.0012 U
PFHxS	**0.0011 J**
PFNA	**0.00073 J**

0 100 200
Feet

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. Groundwater results are shaded blue and soil results are shaded orange in title rows of the result tables.
4. **Bolded** values indicate detections.
5. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
Stream (Intermittent)
Surface Water Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring

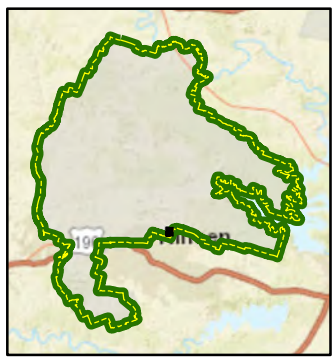
AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-14
Building 7027
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B7027-01-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.0022**
PFOA	**0.00063 J**
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

FH-B7027-02-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	0.0011 U
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

FH-B7027-03-SO	
Date	7/29/2020
Depth	0-2 ft
PFOS	**0.0065**
PFOA	**0.0024**
PFBS	0.0010 U
PFHxS	0.0010 U
PFNA	**0.0017**

FH-B7027-02-GW	
Date	11/17/2021
Depth	20.33 ft btoc
PFOS	**310 [290]**
PFOA	**35 [36]**
PFBS	**20 [18]**
PFHxS	**210 [200]**
PFNA	**7.8 [9.1]**

Murphy Rd

Building 7027 - Hangar

FH-B7027-01-GW

0 100 200
Feet

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. Duplicate sample results are shown in brackets.
4. **Bolded** values indicate detections.
5. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
Stream (Intermittent)
Surface Water Flow Direction
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid

* FH-B7027-01-GW was dry; no groundwater sample was collected.

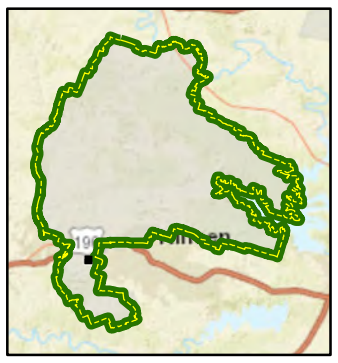
PFOS = perfluorooctane sulfonate
PFBS = perfluorobutane sulfonic acid
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-15
FH-024
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-FH024-03-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.20**
PFOA	**0.0018**
PFBS	0.0011 U
PFHxS	**0.0073**
PFNA	**0.0047**

FH-FH024-02-GW	
Date	7/24/2020
Depth	13.5 ft btoc
PFOS	**260**
PFOA	**10**
PFBS	**9.6**
PFHxS	**49**
PFNA	**4.6**

FH-FH024-02-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.055**
PFOA	**0.0038**
PFBS	**0.00063 J**
PFHxS	**0.017 J+**
PFNA	**0.0010**

FH-FH024-01-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.037**
PFOA	**0.0023**
PFBS	0.0012 U
PFHxS	**0.0098**
PFNA	0.0012 U

FH-FH024-04-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.031**
PFOA	0.0010 U
PFBS	0.0010 U
PFHxS	**0.0035**
PFNA	0.0010 U

FH-FH024-05-SO	
Date	7/23/2020
Depth	0-2 ft
PFOS	**0.032**
PFOA	**0.0049**
PFBS	0.0013 U
PFHxS	**0.0039**
PFNA	**0.0019**

FH-024 - New Firefighter Training Area

Approximate Burn Pit Location

Outfall Area

Old Copperas Cove Rd

6298

Clear Creek

271

AFFF = aqueous film-forming foam
AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. Groundwater results are shaded blue and soil results are shaded orange in title rows of the result tables.
4. **Bolded** values indicate detections.
5. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).
J+ = The result is an estimated quantity; the result may be biased high.

0 100 200
Feet

Installation Boundary
AOPI
AFFF Use Area
River/Stream (Perennial)
Surface Water Flow Direction
Surface Runoff Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Soil and Groundwater Boring *

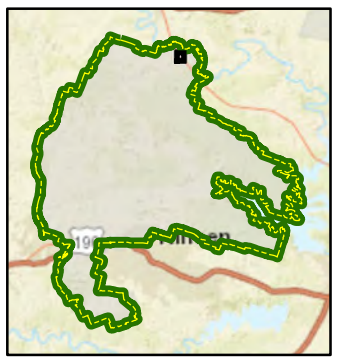
* The groundwater boring co-located with FH-024-04-SO was dry; no groundwater sample was collected.

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North

USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, TX

Figure 7-16
Building 56326 and Building 56519
PFOS, PFOA, PFBS, PFHxS, and PFNA Analytical Results



Chemical	Residential Scenario Risk Screening Level		Industrial/Commercial Scenario Risk Screening Level
	Tap Water (ng/L)	Soil (mg/kg)	Soil (mg/kg)
PFOS	4	0.013	0.16
PFOA	6	0.019	0.25
PFBS	601	1.9	25
PFHxS	39	0.13	1.6
PFNA	6	0.019	0.25

FH-B56326-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.014**
PFOA	**0.0022**
PFBS	0.0012 U
PFHxS	**0.0071**
PFNA	**0.00070 J**

FH-B56326-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.71 J [0.070 J]**
PFOA	**0.0040 [0.0016]**
PFBS	**0.0049 J** [0.0012 U]
PFHxS	**0.043 J [0.012 J]**
PFNA	**0.0098 J [0.0011 J]**

FH-B56326-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	**0.0017 J+**
PFOA	**0.0012 J+**
PFBS	0.0011 U
PFHxS	**0.0037 J-**
PFNA	0.0011 U

FH-B56519-01-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.0011 U
PFOA	**0.0014**
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	**0.00057 J**

FH-B56519-03-GW	
Date	11/21/2021
Depth	70.48 ft btoc
PFOS	3.6 U
PFOA	3.6 U
PFBS	3.6 U
PFHxS	3.6 U
PFNA	3.6 U

FH-B56519-03-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.0011 U
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

FH-B56519-02-SO	
Date	7/27/2020
Depth	0-2 ft
PFOS	0.0011 U
PFOA	0.0011 U
PFBS	0.0011 U
PFHxS	0.0011 U
PFNA	0.0011 U

Building 56326 - Former Fire Station

Building 56519 - Active Fire Station

B56326-01-GW

B56519-01-GW

B56519-02-GW

21st St
18th St
17th St
16th St
15th St
Headquarters Ave
Central Ave
Avenue D
Avenue F
36

0 200 400
Feet

Notes:
1. Groundwater results are reported in nanograms per liter (ng/L).
2. Soil results are reported in milligrams per kilogram (mg/kg).
3. Duplicate sample results are shown in brackets.
4. **Bolded** values indicate detections.
5. Results that exceed Office of the Secretary of Defense (OSD) residential scenario risk screening levels (OSD 2022) are highlighted gray.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
J+ = The result is an estimated quantity; the result may be biased high.
J- = The result is an estimated quantity; the result may be biased low.
U = The analyte was analyzed for but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
Stream (Intermittent)
Surface Runoff Flow Direction
Surface Water Flow Direction
Groundwater Flow Direction
Shallow Soil Sampling Location
Groundwater Boring *

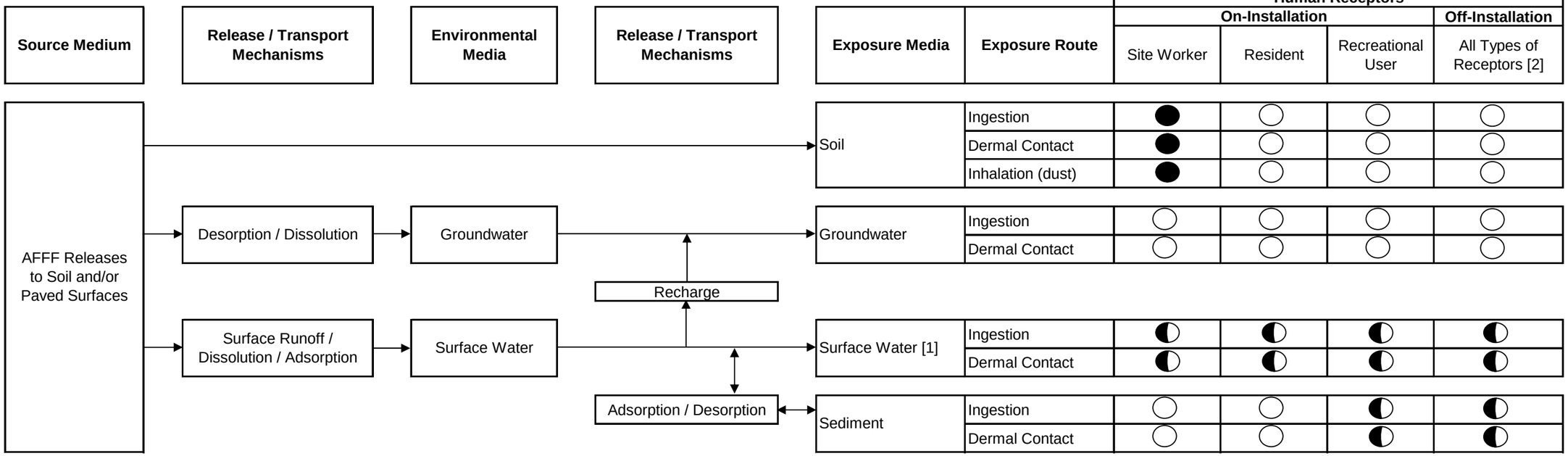
AOPI = area of potential interest
btoc = below top of casing
ft = feet
GW = groundwater
PFBS = perfluorobutane sulfonic acid
PFHxS = perfluorohexane sulfonate
PFNA = perfluorononanoic acid

* FH-B56519-01-GW, FH-B56519-02-GW, and FH-B56326-01-G were dry; groundwater samples were not collected at these locations.

PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
SO = soil

Data Sources:
USGS, NHD Data, 2019
Chemical Systems Laboratory, Installation Assessment of Fort Hood, Groundwater Flow Direction, 1982
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 14 North



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

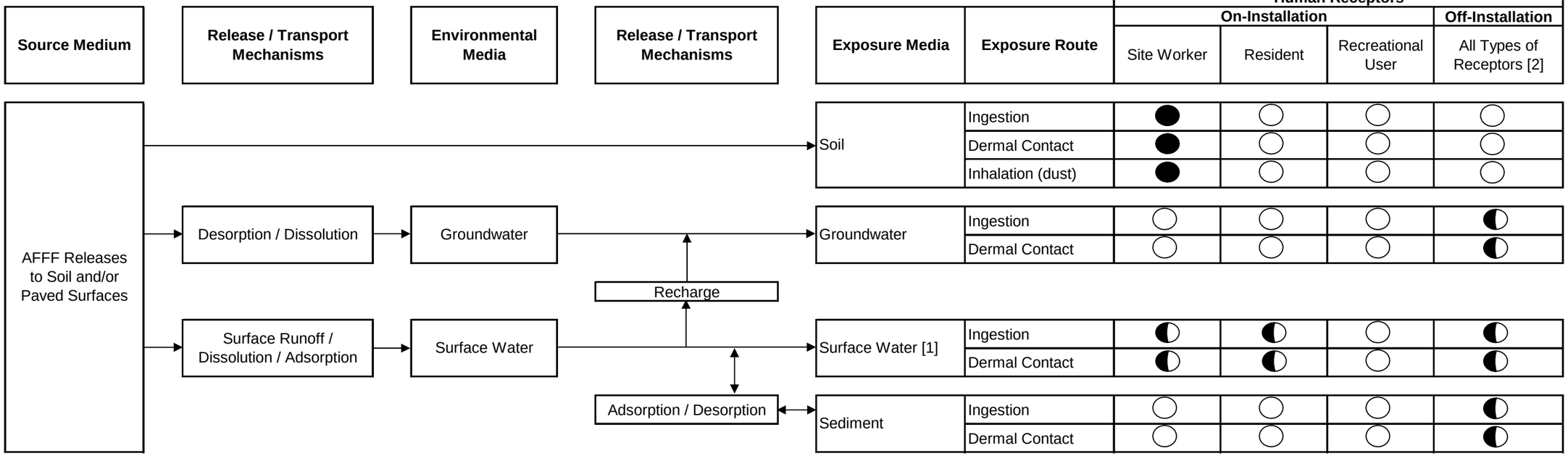
Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

ARCADIS

Conceptual Site Model for Building 90033, Building 91039, Building 52940, and FH-024
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-17



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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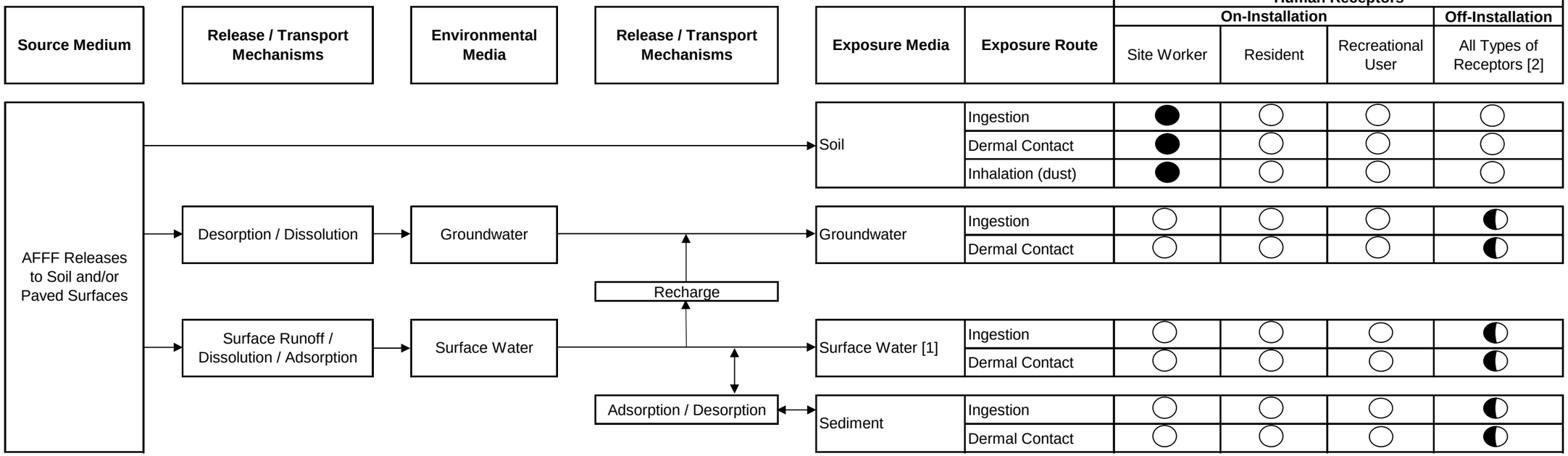
Conceptual Site Model for Building 56326 and Building 56519
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-18



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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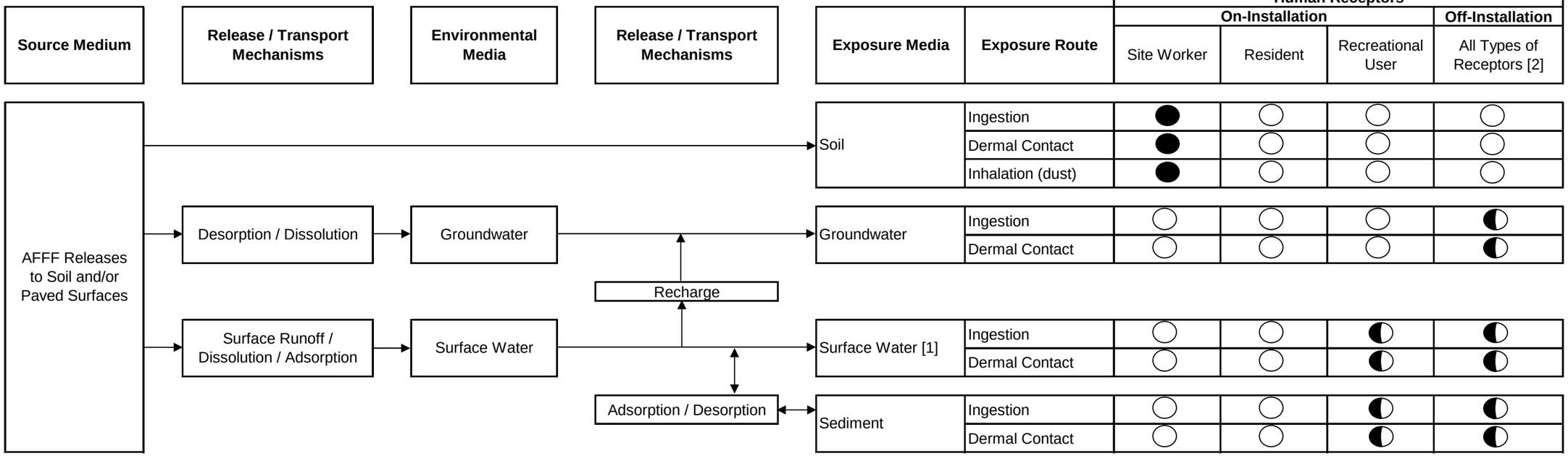
Conceptual Site Model for FH-023, Building 90094, Building 90101, Building 90108, Building 90109, Building 90120, Building 90176, Building 90145, and Building 90050
USAEC PFAS Preliminary Assessment / Site Inspection

Figure 7-19



Legend:

- = Complete Exposure Pathway
- = Potentially Complete Exposure Pathway
- = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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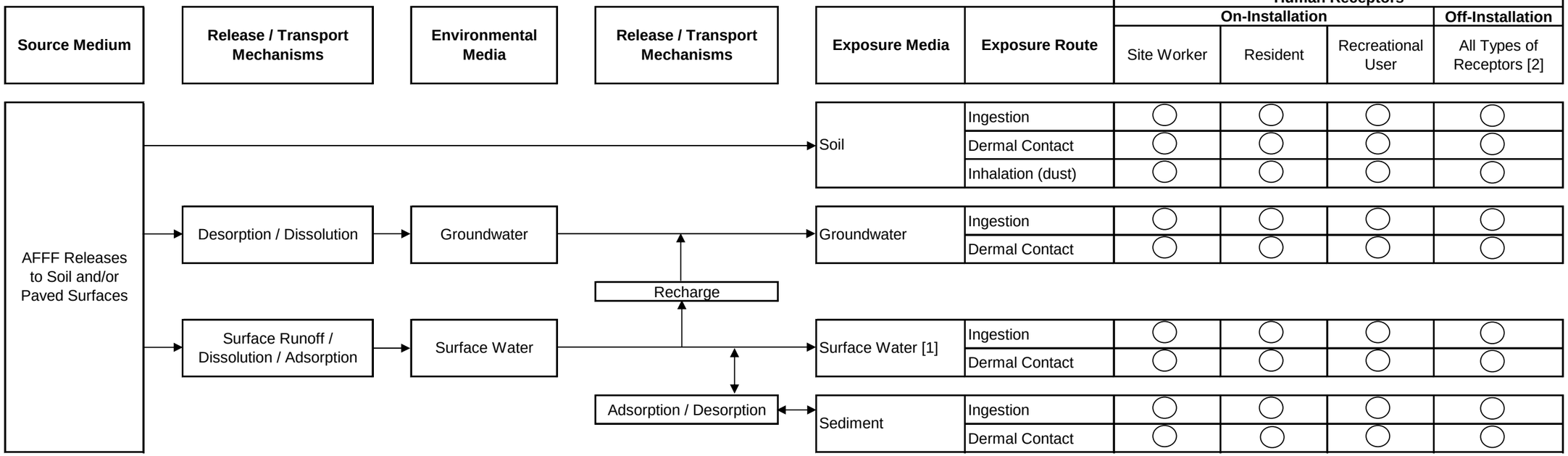
Conceptual Site Model for Building 2455, Building 3201, Building 4335, Building 23025, Building 7002, Building 7027, and Building 7081
USAEC PFAS Preliminary Assessment / Site Inspection

Figure 7-20



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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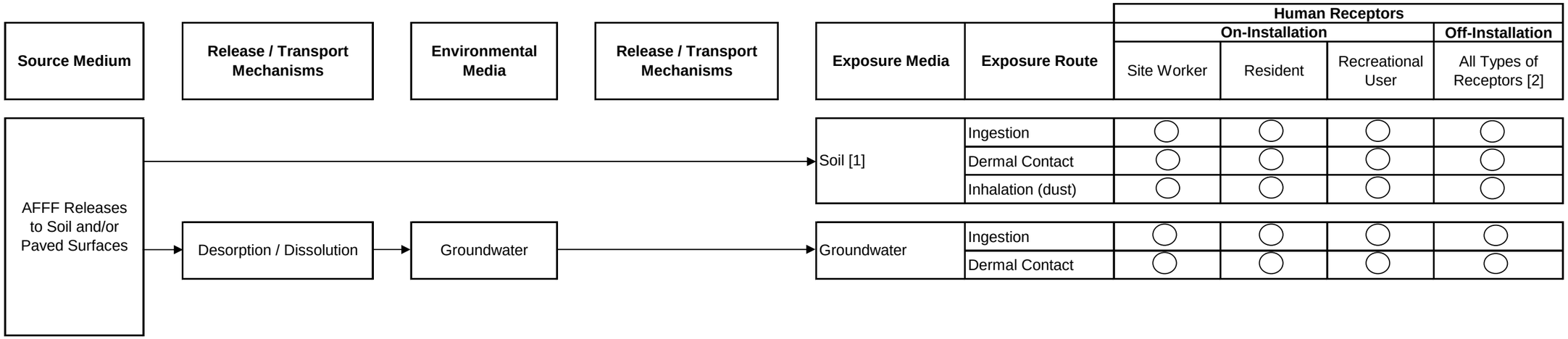
Conceptual Site Model for Building 6975
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-21



Exposure Media	Exposure Route	Human Receptors: On-Installation: Site Worker	On-Installation: Resident	On-Installation: Recreational User	Off-Installation: All Types of Receptors [2]
Soil [1]	Ingestion	◯	◯	◯	◯
	Dermal Contact	◯	◯	◯	◯
	Inhalation (dust)	◯	◯	◯	◯
Groundwater	Ingestion	◯	◯	◯	◯
	Dermal Contact	◯	◯	◯	◯

Legend:

● = Complete Exposure Pathway

◐ = Potentially Complete Exposure Pathway

◯ = Incomplete Exposure Pathway

Notes:
[1] PFAS was not detected in soil samples collected for the SI. The former fire station was closed in the 1990s, subsequently demolished, and the area converted to a parking lot. Therefore, the soil exposure pathway is incomplete for Site Workers under a potential future exposure scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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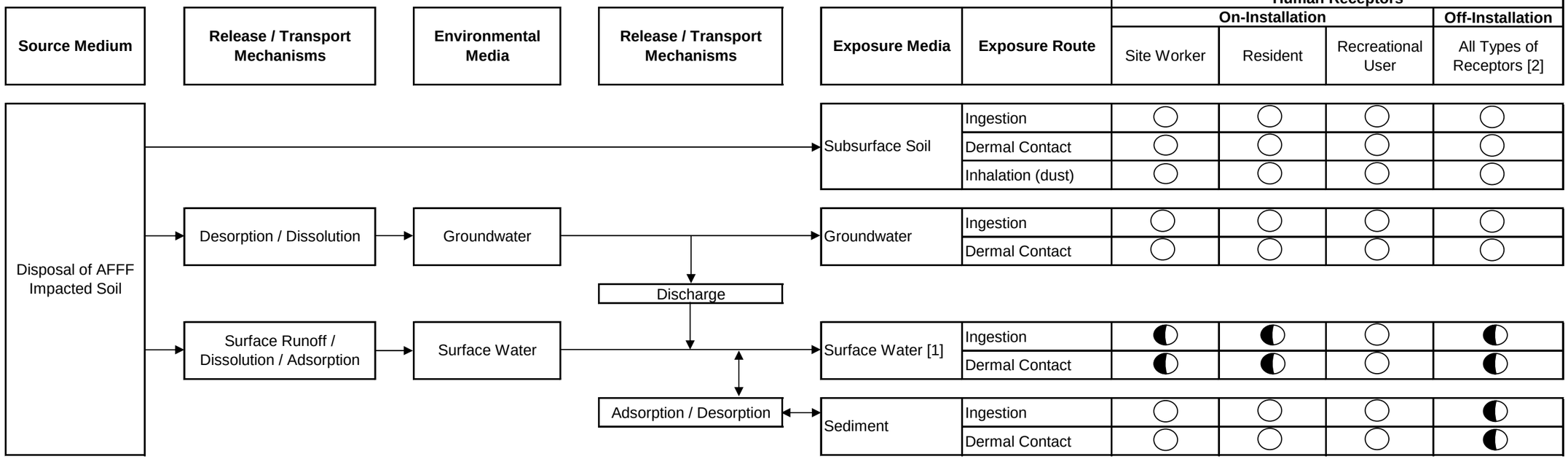
Conceptual Site Model for Building 1285
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-22



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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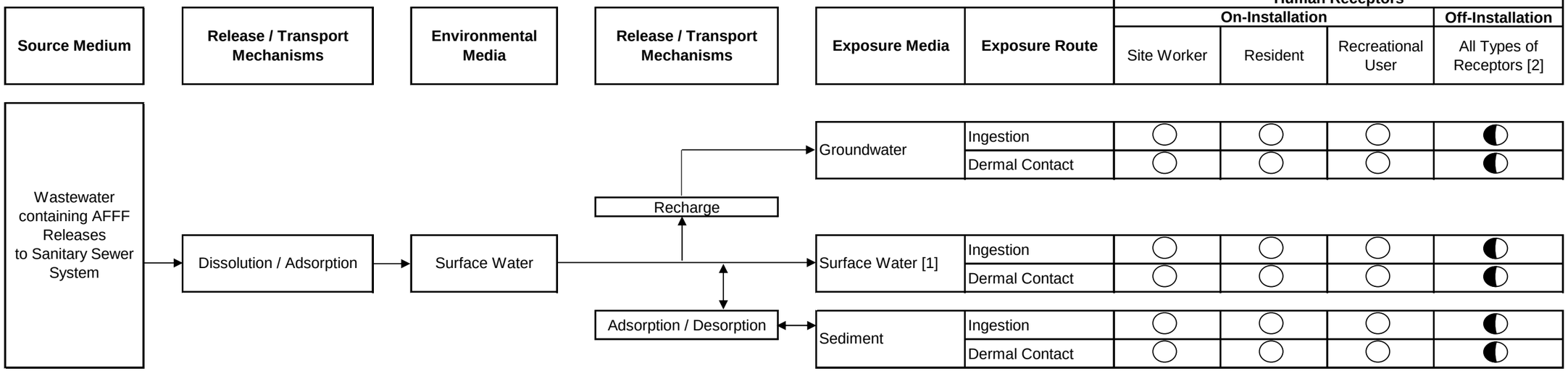
Conceptual Site Model for FH-001 and Active Fort Hood Landfill
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-23



Legend:

- = Complete Exposure Pathway
- = Potentially Complete Exposure Pathway
- = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

AFFF = aqueous film forming foam

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Conceptual Site Model for Building 88038
USAEC PFAS Preliminary Assessment / Site Inspection
Fort Hood, Texas

Figure 7-24

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