FINAL
Preliminary Assessment Report
Allendale Armory,
Allendale, South Carolina

Perfluorooctanesulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

October 2020

Prepared for:

Army National Guard Bureau
111 S. George Mason Drive
Arlington, VA 22204

UNCLASSIFIED

Table of Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
EDR™	Environmental Data Resources, Inc.™
FEMA	Federal Emergency Management Agency
FTA	fire training area
HA	Health Advisory
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SCARNG	South Carolina Army National Guard
SI	Site Inspection
UCMR3	Unregulated Contaminant Monitoring Rule 3
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VSI	visual site inspection

Executive Summary

The Army National Guard (ARNG) is performing *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. A PA for per- and polyfluoroalkyl substances (PFAS)-containing materials was completed for Allendale Armory (also referred to as the "facility") in Allendale, South Carolina, to assess potential PFAS release areas and exposure pathways to receptors. Allendale Armory is on property co-owned by the South Carolina ARNG (SCARNG) and Allendale County. SCARNG occupation of the facility's vehicle maintenance bay began in 1950 (Environmental Resources Center, 2009), and the remaining property was purchased in 1957 (**Appendix A**). The performance of this PA included the following tasks:

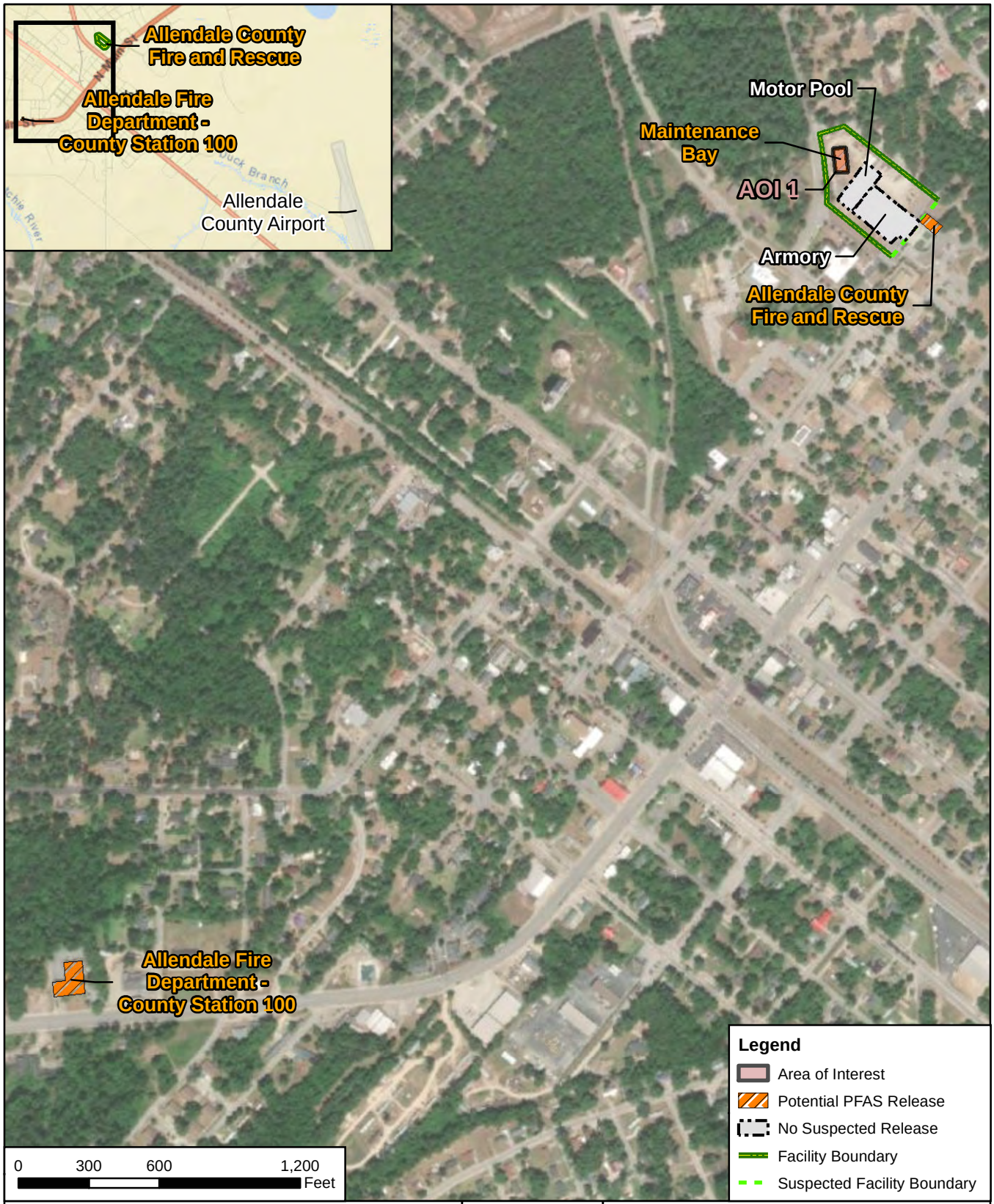
- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a site visit on 2 October 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current and retired SCARNG Allendale Armory personnel and Allendale County Fire Department personnel during the site visit;
- Identified area(s) of interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

One AOI related to a potential PFAS release was identified at Allendale Armory during the PA. The AOI is shown on **Figure ES-1** and in **Table ES-1** below:

Table ES-1: AOIs at Allendale Armory

Area of Interest	Name	Used by	Potential Release Date
AOI 1	Maintenance Bay	SCARNG	Unknown

Based on potential PFAS releases at the AOI, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for Allendale Armory, which presents the potential receptors and media impacted, is shown on **Figure ES-2**. Based on the United States (US) Environmental Protection Agency (USEPA) Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS were detected in a public water system above the USEPA lifetime Health Advisory (HA) within 20 miles of the facility. The HA is 70 parts per trillion for PFOS and PFOA, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.



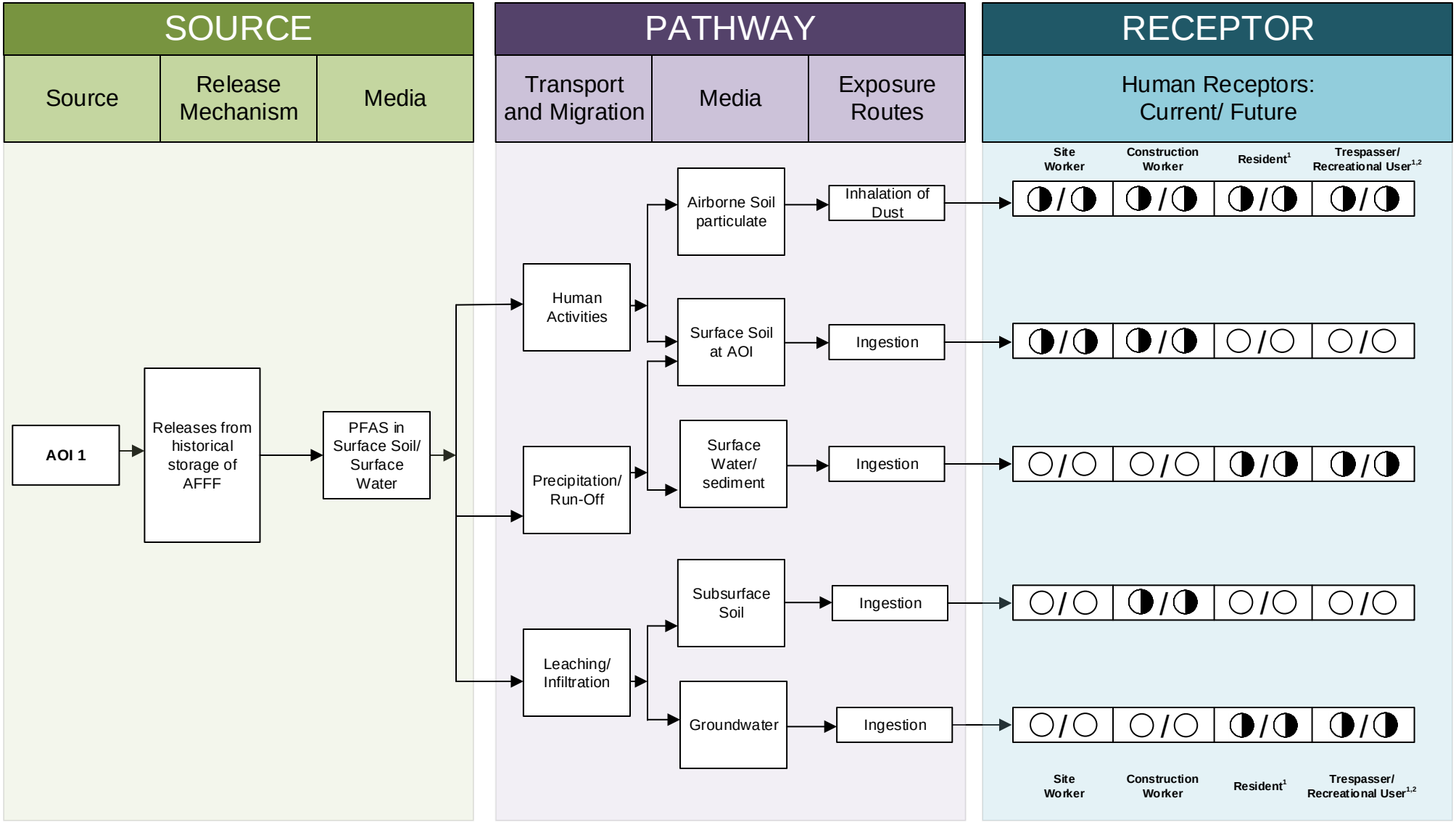
CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	10/12/2020	GIS BY	MS	10/12/2020
SCALE	1:7,200	CHK BY	ST	10/12/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/12/2020

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_ES-1_Allendale_Armory_Summary.mxd



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Human consumption of fish potentially affected by PFAS is possible.

Figure ES-2
Preliminary Conceptual Site Model
Allendale Armory, SC

1. Introduction

1.1 Authority and Purpose

The Army National Guard (ARNG) G9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) for *Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) at Impacted Sites at ARNG Facilities Nationwide*. This work is supported by the United States (US) Army Corps of Engineers (USACE) Baltimore District and their contractor AECOM Technical Services, Inc. (AECOM) under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017.

The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued lifetime Drinking Water Health Advisories (HAs) for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. The HA is 70 parts per trillion for PFOS and PFOA, individually or combined.

This report presents the findings of a PA for PFAS-containing materials at the Allendale Armory (also referred to as the "facility") in Allendale, South Carolina, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and Army requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as other locations where PFAS may have been released into the environment at Allendale Armory. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a site visit on 2 October 2019 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current and retired South Carolina ARNG (SCARNG) Allendale Armory personnel and Allendale County Fire Department personnel during the site visit;

- Identified area(s) of interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are as follows:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA.
- **Section 2** – **Fire Training Areas:** describes the FTAs at the facility identified during the site visit.
- **Section 3** – **Non-Fire Training Areas:** describes other locations of potential PFAS releases at the facility identified during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of potential PFAS release at the facility, specifically in response to emergency situations.
- **Section 5** – **Adjacent Sources:** describes sources of potential PFAS release adjacent to the facility that are not under the control of ARNG.
- **Section 6** – **Preliminary Conceptual Site Model:** describes the pathways of PFAS transport and receptors for the AOIs and the facility.
- **Section 7** – **Conclusions:** summarizes the data findings and presents the conclusions of the PA.
- **Section 8** – **References:** provides the references used to develop this document.
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

The facility is a SCARNG armory, occupying approximately 3.97 acres in the City of Allendale, South Carolina (**Figure 1-1**). The facility address is 368 Courthouse Square, Allendale, South Carolina 29810. SCARNG occupation of the facility's vehicle maintenance bay began in 1950 (Environmental Resources Center, 2009), and the remaining property was purchased in 1957 from Lucy Vance D. McCrady and Claudio D. Todd on behalf of Lucy O'H. Darlington. The 1957 land deed is included in **Appendix A**.

The main armory building was constructed in 1959 (Environmental Resources Center, 2009). Renovations to expand the main armory building were completed in 2014; the Federal Emergency Management Agency (FEMA) and the Allendale County Fire and Rescue moved into the property following completion of the renovations. According to SCARNG staff knowledge, the FEMA and Allendale County Fire and Rescue properties are separately owned by Allendale County. However, a 2011 topographic map and boundary survey, provided by SCARNG, shows that a portion (approximately 0.067 acres) of the Allendale County Fire and Rescue fire station falls within SCARNG property limits. SCARNG is pursuing a survey to confirm ownership. An operating agreement between SCARNG and Allendale County is included in **Appendix A**.

The facility was home to the 264th and 268th Engineer Detachments (firefighting units). According to interviewed SCARNG personnel, the two engineer detachments moved around 2001 to 2003 from Allendale Armory to SCARNG's McCrady Training Center, where the units currently reside. The facility is currently used by the SCARNG primarily as an armory but also for vehicle maintenance and administration.

1.5 Facility Environmental Setting

The facility lies near the Orangeburg Scarp, which marks the boundary between the Upper and Lower Coastal Plain and represents a paleoshoreline. The Lower Coastal Plain is characterized by flat topography and meandering streams, and the Upper Coastal Plain is characterized by hilly, dissected topography from stream erosion (Cain et al., 2000). The facility is at a topographic high point and sits at an elevation of 189 feet above mean sea level (amsl). There is a slight topographic gradient to the east/northeast. The facility is primarily surrounded to the north and south by residential properties, with some commercial and light industrial areas. Light industrial areas are located to the west, and residential, commercial, and agricultural properties are located to the east.

1.5.1 Soil

As indicated in the 2019 EDR™ report (**Appendix A**), the soils of the facility belong to three major soil classification groups: Goldsboro, Blanton, and Rains. The soils of the Goldsboro and Blanton associations have a sandy loam and sand texture, respectively, and are moderately well drained. The soils of the Rains association have a loamy fine sand texture and are poorly drained.

1.5.2 Geology

The facility sits on the Atlantic Coastal Plain, a geologic province defined by passive continental margin Tertiary and Quaternary sedimentation. The coastal plain consists of a thick, eastward-dipping wedge of clastic and carbonate strata sourced from the Appalachian Mountains in the west (Katuna et al., 1997). These strata were deposited from the late Cretaceous to the present, the type of coastal deposition over time being controlled by periodic sea level rise and fall (Cooke, 1936). Due to the facility's location along a paleoshoreline, deposits in the area are diverse, ranging from fine- to coarse-grained clays and sands and occasional limestone, all indicative of a lower delta plain to shallow marine shelf depositional environment (Denham, 1999) (**Figure 1-2**).

1.5.3 Hydrogeology

The coastal plain has gently dipping layered aquifers separated by confining units. The water bearing units consist of unconsolidated sand and occasionally permeable limestone. The Floridian aquifer is the major aquifer under Allendale County; in this location, it is the "clastic phase" of the Floridian formation. The Floridian aquifer is thick and made up of sands with small amounts of gravel and clay. The upper portion is the unconfined Upper Three Runs Aquifer, and the lower portion is the semi-confined to confined Gordon aquifer. These aquifers define up to 400 feet of the near-surface groundwater (Denham, 1999).

An EDR™ report conducted a well search for a 1-mile radius surrounding the facility (**Appendix A**). Using additional online resources, such as state and local Geographic Information System databases, wells were researched to a 4-mile radius of the facility. The facility receives potable water from the Allendale Water Department. It is unknown where Allendale Water Department sources its potable water, but multiple public water supply wells, domestic wells, and irrigation wells are located in the surrounding area within a 4-mile radius. Based on the USEPA Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS were detected in a

public water system above the HA within 20 miles of the facility. The HA is 70 parts per trillion for PFOS and PFOA, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.

The facility is situated at a topographic high point and is near the convergence of three watersheds; therefore, local groundwater is inferred to flow in a radial direction. Regional groundwater is presumed to flow southeasterly, following the general surface water drainage patterns. The depth to groundwater averages about 40 feet below ground surface, based on historical water level readings of surrounding wells (SCDNR Hydrology, 2020). Groundwater features are presented in **Figure 1-2**.

1.5.4 Hydrology

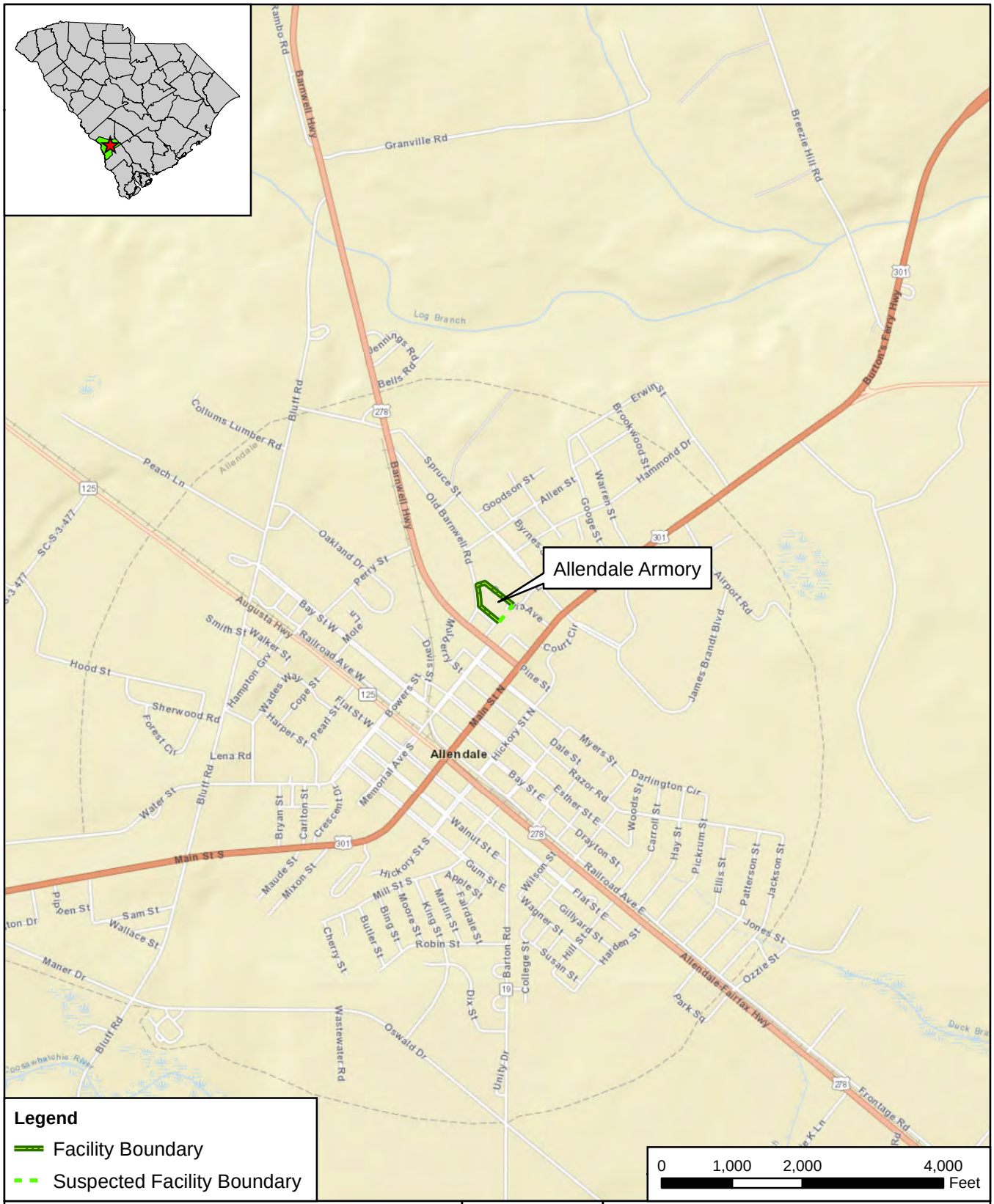
The facility is located primarily within the Duck Branch Watershed but is near the convergence of three watersheds: Duck Branch, Coosawhatchie River, and Jackson Branch. There is no ponding of water or wetlands present at the facility. The closest surface water feature to the facility is a small unnamed pond located 0.3 miles to the east. All stormwater at the facility is conveyed to stormwater drains located on the property, but it is unknown where the drains lead to. Surface water features are presented in **Figure 1-3**.

1.5.5 Climate

The facility is in a humid subtropical climate zone characterized by long, warm summers and short, mild winters. Rainfall is generally greater during the summer months but otherwise well distributed year-round, with a normal annual precipitation of 46.3 inches. Summer temperatures peak in July, with an average high temperature of 93 degrees Fahrenheit (°F) and an average low temperature of 69 °F. Winter temperatures are lowest in January, with an average high temperature of 58 °F and an average low temperature of 33 °F (US Climate Data, 2020).

1.5.6 Current and Future Land Use

The facility is an SCARNG armory, occupying approximately 3.97 acres. Related infrastructure includes a vehicle maintenance bay, a main armory building, a motor pool, and general storage buildings. Daily operations include vehicle maintenance and administration. Both FEMA and Allendale County Fire and Rescue have an established presence on the property and occupy a portion of the main armory building. Reasonably anticipated future land use is not expected to change from the current land use.



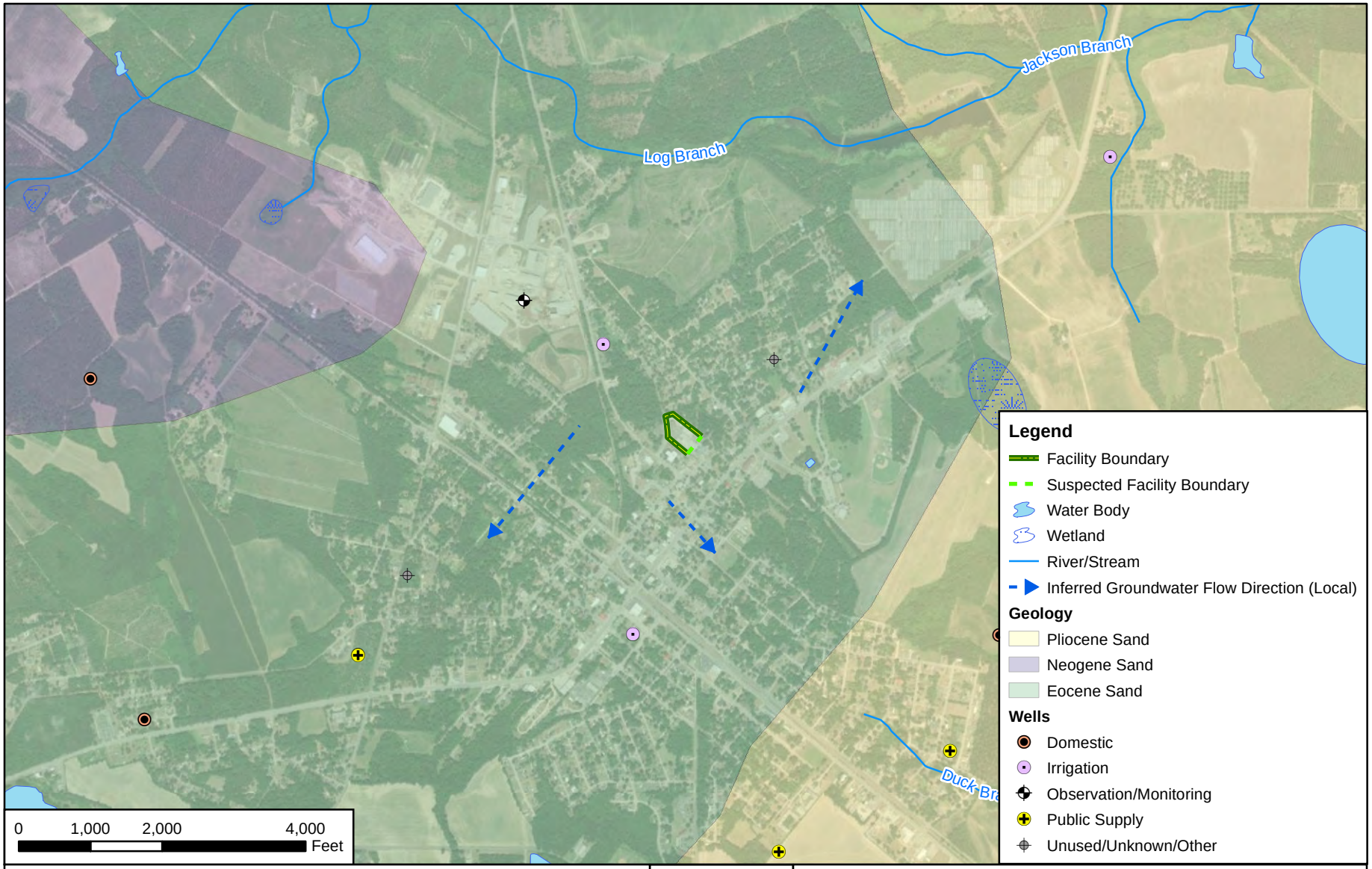
CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	9/23/2020	GIS BY	MS	9/23/2020
SCALE	1:24,000	CHK BY	ST	9/23/2020
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	9/23/2020

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_1-1_Allendale_Armory_Facility_Location.mxd



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Allendale Armory, SC			
REVISED	9/23/2020	GIS BY	MS	9/23/2020
SCALE	1:24,000	CHK BY	ST	9/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	9/23/2020

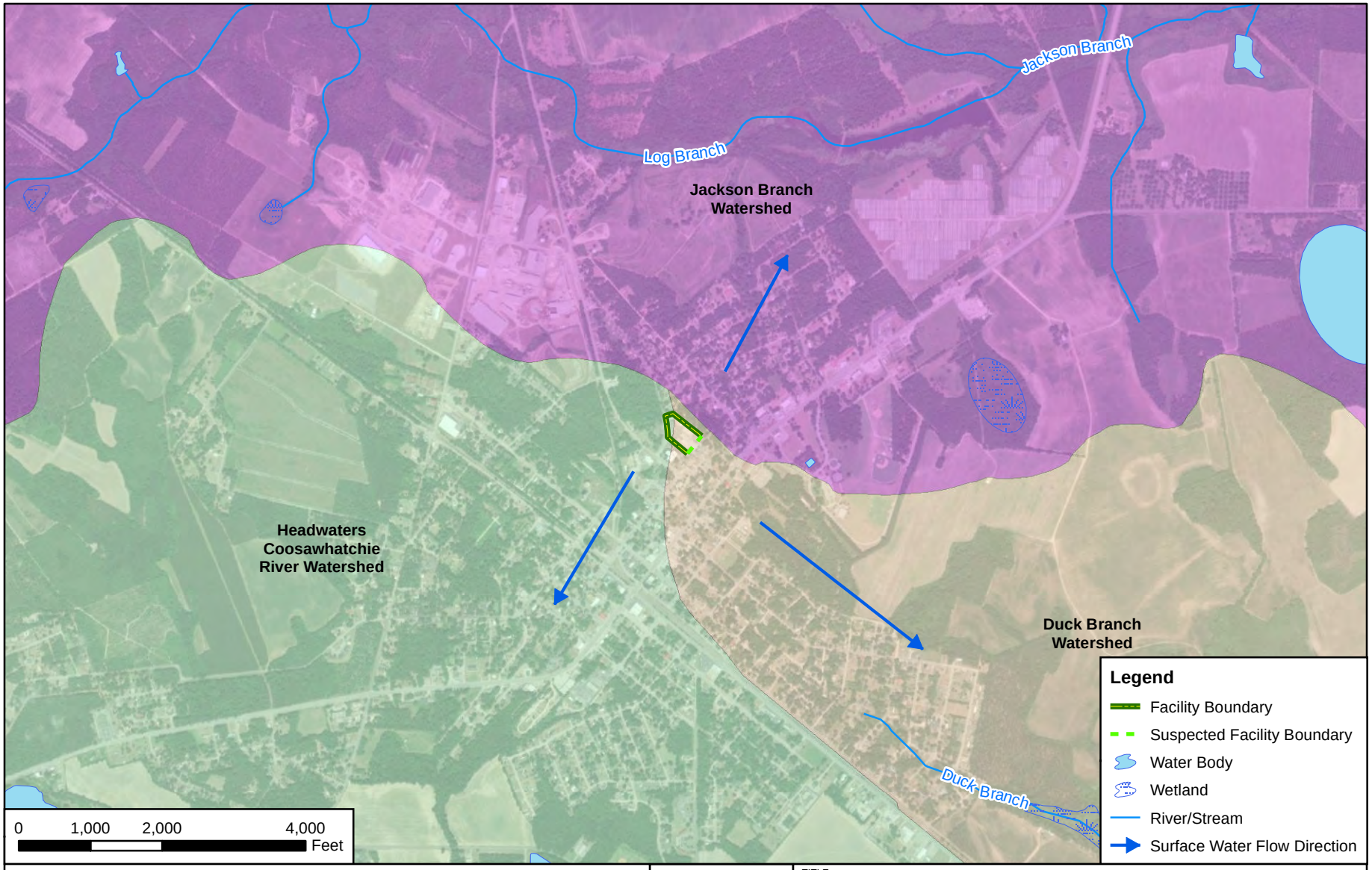
TITLE

Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-2

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_1-2_Allendale_Armory_Groundwater.mxd



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Allendale Armory, SC			
REVISED	9/23/2020	GIS BY	MS	9/23/2020
SCALE	1:24,000	CHK BY	ST	9/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	9/23/2020

N

TITLE

Surface Water Features

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-3

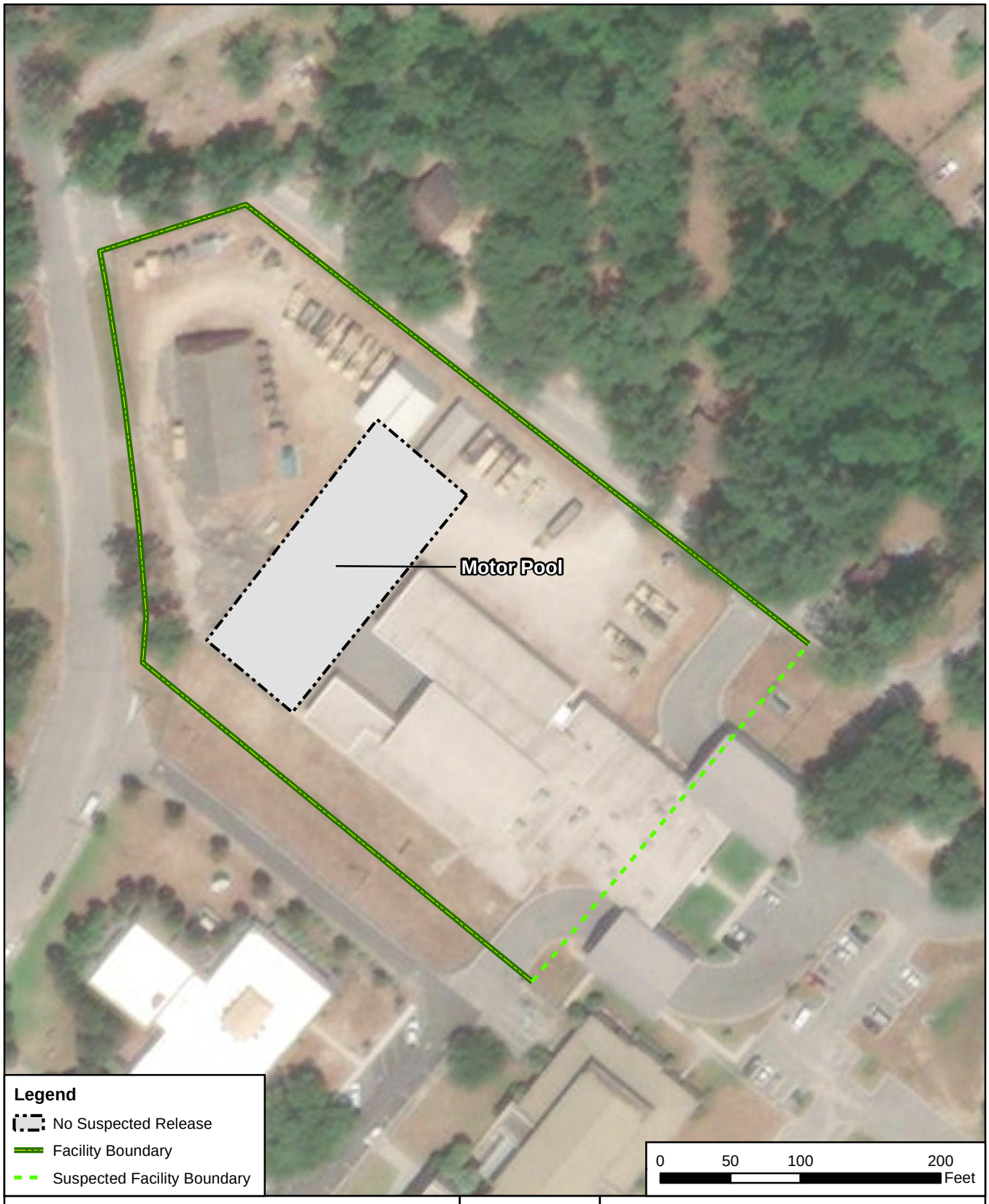
C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_1-3_Allendale_Armory_Surface_Water.mxd

2. Fire Training Areas

One FTA was identified through record reviews and interviews during the PA as described below. The FTA is shown on **Figure 2-1**.

2.1 Motor Pool

Fire training activities involving portable ABC fire extinguishers (non-AFFF) by SCARNG have taken place at the motor pool. Training fires are created by igniting either paper or diesel in a pan; ABC extinguishers are then used to extinguish the fires. No exact dates for when the fire training took place could be recalled by interviewees; however, the interviewed SCARNG personnel recalled at least one fire training event occurring during his tenure of 24 years at the facility.



CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	9/23/2020	GIS BY	MS	9/23/2020
SCALE	1:1,200	CHK BY	ST	9/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	9/23/2020

N

Fire Training Area

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_2-1_Allendale_Armory_Fire_Training_Area.mxd

3. Non-Fire Training Areas

In addition to FTAs, the PA evaluated areas where PFAS-containing materials may have been broadly used, stored, or disposed. This may include buildings with fire suppression systems, paint booths, AFFF storage areas, and areas of compliance demonstrations. Information on these features obtained during the PA are included in **Appendices A** and **B**. Two non-FTAs where AFFF was stored and/or potentially released were identified during the PA. A description of each non-FTA is presented below, and the non-FTAs are shown on **Figure 3-1**.

3.1 Armory

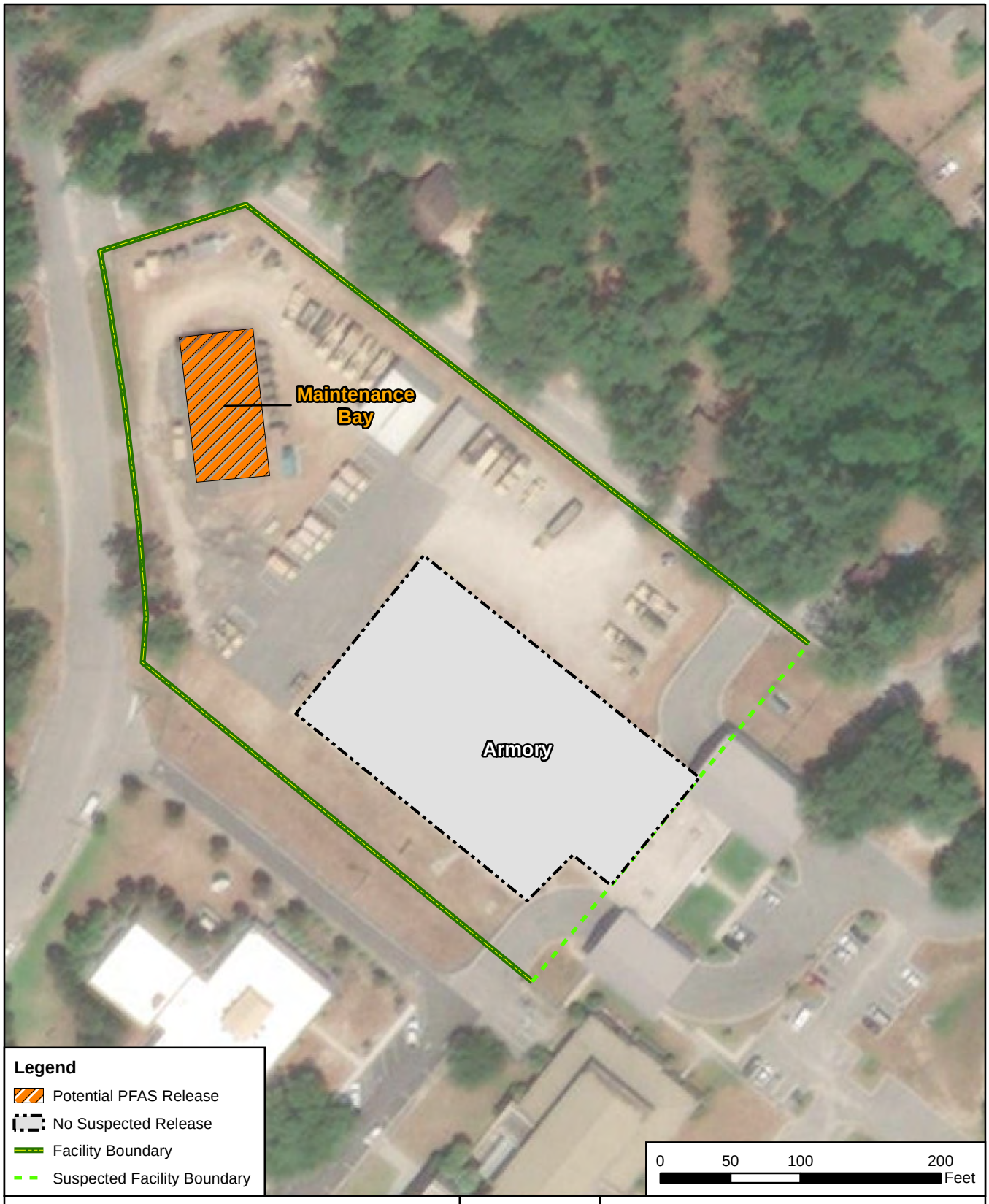
The main armory building was renovated to expand the main building in 2014. Following the 2014 renovations, both FEMA and Allendale County Fire and Rescue have occupied the extensions of the renovated armory. The Allendale County Fire and Rescue currently resides at a fire station within the armory. This fire station is described separately in **Section 5.1** and shown in **Figure 5-1.**

The kitchen within the armory is equipped with an Ansul R-102 wet chemical fire suppression system. The wet chemical agent used in the system is composed of a mixture of organic salts and reportedly does not contain PFAS. The data sheet for the fire suppression system is included in **Appendix A**. According to interviewed SCARNG personnel, the fire suppression system has never been triggered. Only portable ABC fire extinguishers (non-AFFF) are stored within the armory. The armory is not considered a potential PFAS release area.

3.2 Maintenance Bay

Prior to the 264th and 268th Engineer Detachments (firefighting units) moving to McCrady Training Center in the early 2000s, firetrucks and 5-gallon buckets of AFFF were stored in the vehicle maintenance bay at the facility. According to interviewed SCARNG personnel, the firetrucks were foam capable but never leaked AFFF, and AFFF was never otherwise spilled during the personnel's years of experience at the facility (1986 to 2005). Fire training and nozzle testing of the firetrucks were only conducted with water, although the exact location of these activities was not specified. Older firetrucks were historically present at the facility prior to 1990 but were not foam capable. However, newer firetrucks with foam tanks were received around 1990 but were reportedly never used to expel AFFF. Currently, the only fire extinguishing agents located within the maintenance bay are portable ABC fire extinguishers (non-AFFF).

It is unknown when the 264th and 268th Engineer Detachments were established at the facility; interviewed SCARNG personnel's knowledge dates back to 1986. A data gap exists between the establishment of the facility in 1950 and the earliest tenure of PA interviewees in 1986. The maintenance bay is considered a potential PFAS release area.



CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	9/23/2020	GIS BY	MS	9/23/2020
SCALE	1:1,200	CHK BY	ST	9/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	9/23/2020

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_3-1_Allendale_Armory_Non-Fire_Training_Areas.mxd

4. Emergency Response Areas

Emergency responses to crashes sometimes require flame suppression, which may result in the release of PFAS to the environment in the form of AFFF. No emergency response areas were identified within the facility during the PA through interviews with SCARNG personnel. The Allendale County Fire Department, collocated with SCARNG on the property, is the designated first responder for the facility, although no formal mutual aid agreements were made available during the PA.

5. Adjacent Sources

Two potential sources of PFAS adjacent to the facility, not under the control of the SCARNG, were identified during the PA. A description of each adjacent source is presented below, and the adjacent sources are shown on **Figure 5-1**.

5.1 Allendale County Fire Department

The Allendale County Fire Department is located at two fire stations. One fire station (Allendale County Fire and Rescue) is located in the County-owned portion of the SCARNG armory building (**Section 3.1**), and the other fire station (County Station 100) is located at address 1296 South Main Street, Allendale, South Carolina 29810, approximately 1 mile to the southwest of the facility.

Allendale County Fire and Rescue was previously located with County Station 100 but moved to the armory building extension following the 2014 renovation of the facility. The Allendale County Fire and Rescue fire station was built over a former SCARNG paved parking lot. Segments of the renovated armory building were designated for Allendale County ownership and use, and the current fire station was believed to be entirely County-owned. However, a 2011 topographic map and boundary survey, provided by SCARNG, shows that a portion (approximately 0.067 acres) of the Allendale County Fire and Rescue fire station falls within SCARNG property limits. SCARNG is pursuing a survey to confirm ownership.

A VSI was conducted at the Allendale County Fire and Rescue fire station during the PA; four 5-gallon buckets of AFFF were found in storage at the fire station. According to the Allendale County Fire and Rescue personnel, the AFFF has never been used or carried within the firefighting vehicles in her 23 years of experience. The fire department also has two pumper stations with foam capabilities and one rescue firetruck. None of the firefighting vehicles currently carry AFFF. Only an unknown formulation of Flame Freeze™, a firefighting wetting agent, is stored within the firefighting vehicles and is used for vehicle washing in front of the fire station. It is unclear if Flame Freeze contains PFAS, as certain formulations of the product describe it as fluorine-free, while others describe it as a C6 Class B foam in compliance with 2010/2015 USEPA PFOA/PFOS Stewardship Requirements (Momar, Inc., 2020). Safety data sheets for various formulations of Flame Freeze are included in **Appendix A**.

Although County Station 100 was not visited during the VSI, because the Allendale County Fire and Rescue was previously located with the station and has historically had AFFF, County Station 100 was also identified as a potential adjacent source of PFAS by association.

5.2 Allendale County Airport

Allendale County Airport is located approximately 2.5 miles southeast of the facility. Allendale County Airport personnel were not interviewed during the PA because the focus of the assessment was to evaluate potential PFAS-related activities and sources at SCARNG properties. Therefore, it is not known if AFFF is used or stored at the airport currently or historically.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	10/12/2020	GIS BY	MS	10/12/2020
SCALE	1:7,200	CHK BY	ST	10/12/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/12/2020

N

Adjacent Sources

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_5-1_Allendale_Armory_Adjacent_Sources.mxd

6. Preliminary Conceptual Site Model

Based on the PA findings, there was one area identified at the facility where AFFF may have been stored or expended: AOI 1 Maintenance Bay. As such, this area is determined to be an AOI and may be a potential PFAS source area. The AOI location is shown in **Figure 6-1**.

The following section describe the CSM components and the specific preliminary CSM developed for AOI 1. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete. The preliminary CSM for AOI I is shown in **Figure 6-2**.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of PFAS toxicological studies (National Ground Water Association, 2018). Receptors at the facility include site workers, construction workers, residents, recreational users, and trespassers. The preliminary CSM for the facility indicates which specific receptors could potentially be exposed to PFAS.

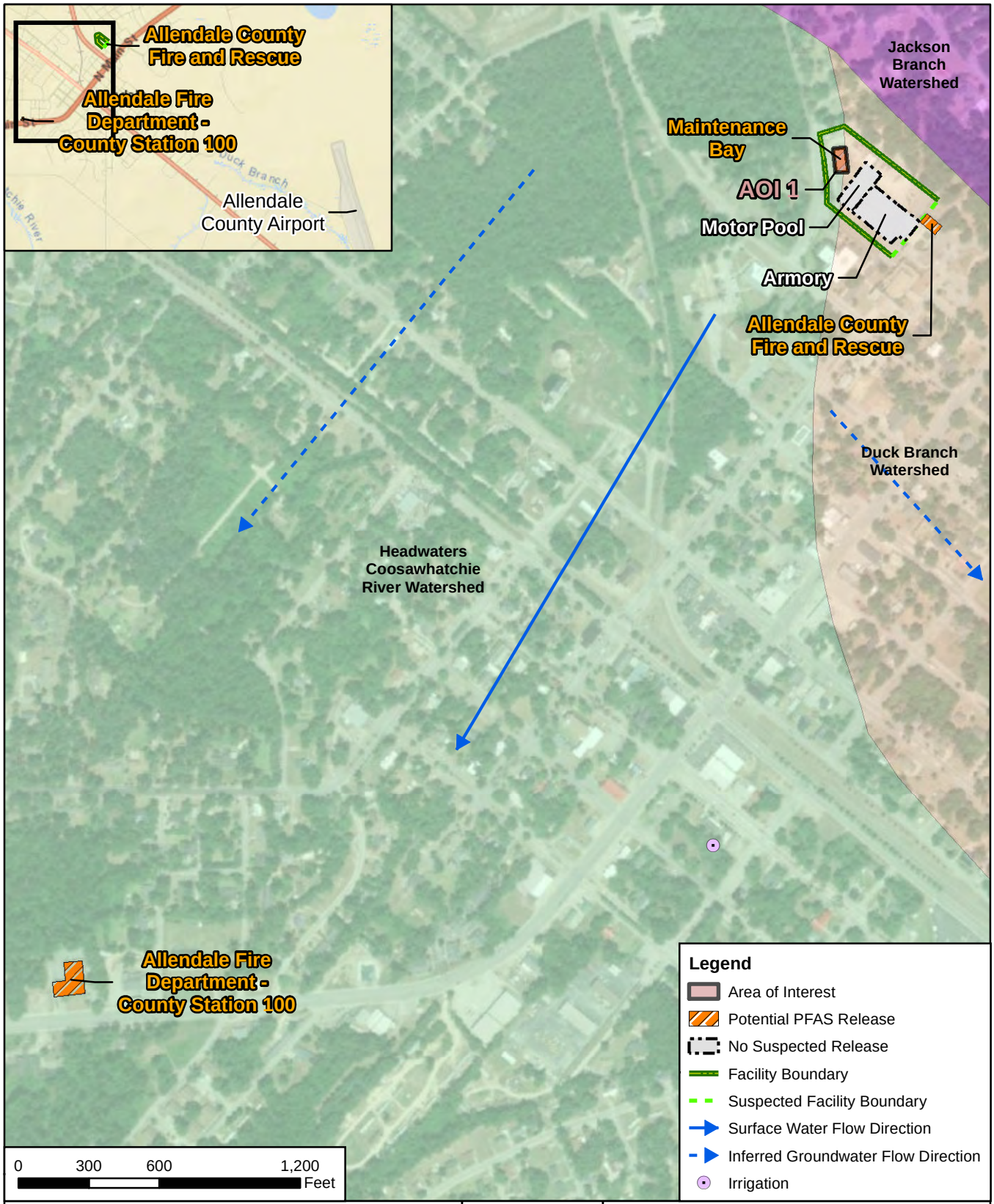
6.1 AOI 1: Maintenance Bay

AOI 1 includes comprises the facility maintenance bay. Although there are no known AFFF releases at the facility, AFFF was historically stored in 5-gallon buckets and in firetrucks located at the vehicle maintenance bay.

Accidental AFFF releases from storage would have occurred on either paved or unpaved surfaces. PFAS releases carried by run-off into surface soil may have infiltrated the subsurface soil. PFAS releases may have also infiltrated the subsurface soil via cracks in the pavement or in joints between areas that are paved with different materials. Ground-disturbing activities to soil at AOI 1 could result in construction worker exposure to potential PFAS contamination via inhalation of dust or ingestion of surface and subsurface soil. Inhalation of dust or ingestion of surface soil may also occur during the routine activities of site workers. Therefore, the inhalation and ingestion pathways for these receptors are considered potentially complete for both surface and subsurface soil. Additionally, residential areas surround the facility, so residents and/or trespassers may be potentially exposed to PFAS contamination via inhalation of dust.

Since it is unknown where stormwater drains lead to, PFAS releases in stormwater run-off may be conveyed to either the Duck Branch Watershed or Headwaters Coosawhatchie River Watershed. If stormwater is conveyed to these waterways, then off-facility receptors such as residents and recreational users may be exposed to PFAS via ingestion of surface water and sediment in Duck Branch or Coosawhatchie River or via the ingestion of fish affected by PFAS.

PFAS are water soluble and can migrate readily from soil to groundwater via leaching. No groundwater wells exist at the facility, and the facility receives potable water from Allendale Water Department, so site workers are unlikely to be exposed to PFAS through the shallow groundwater ingestion pathway. Multiple public water supply wells, domestic wells, and irrigation wells are located in the surrounding area within a 4-mile radius and may be hydraulically downgradient from AOI 1. Therefore, the groundwater ingestion pathways are potentially complete for residents and recreational users. The depth to groundwater averages about 40 feet below ground surface, based on historical water level readings of surrounding wells (SCDNR Hydrology, 2020). Therefore, construction workers in trenching scenarios are unlikely impacted by shallow groundwater. The preliminary CSM for AOI 1 is shown on **Figure 6-2**.



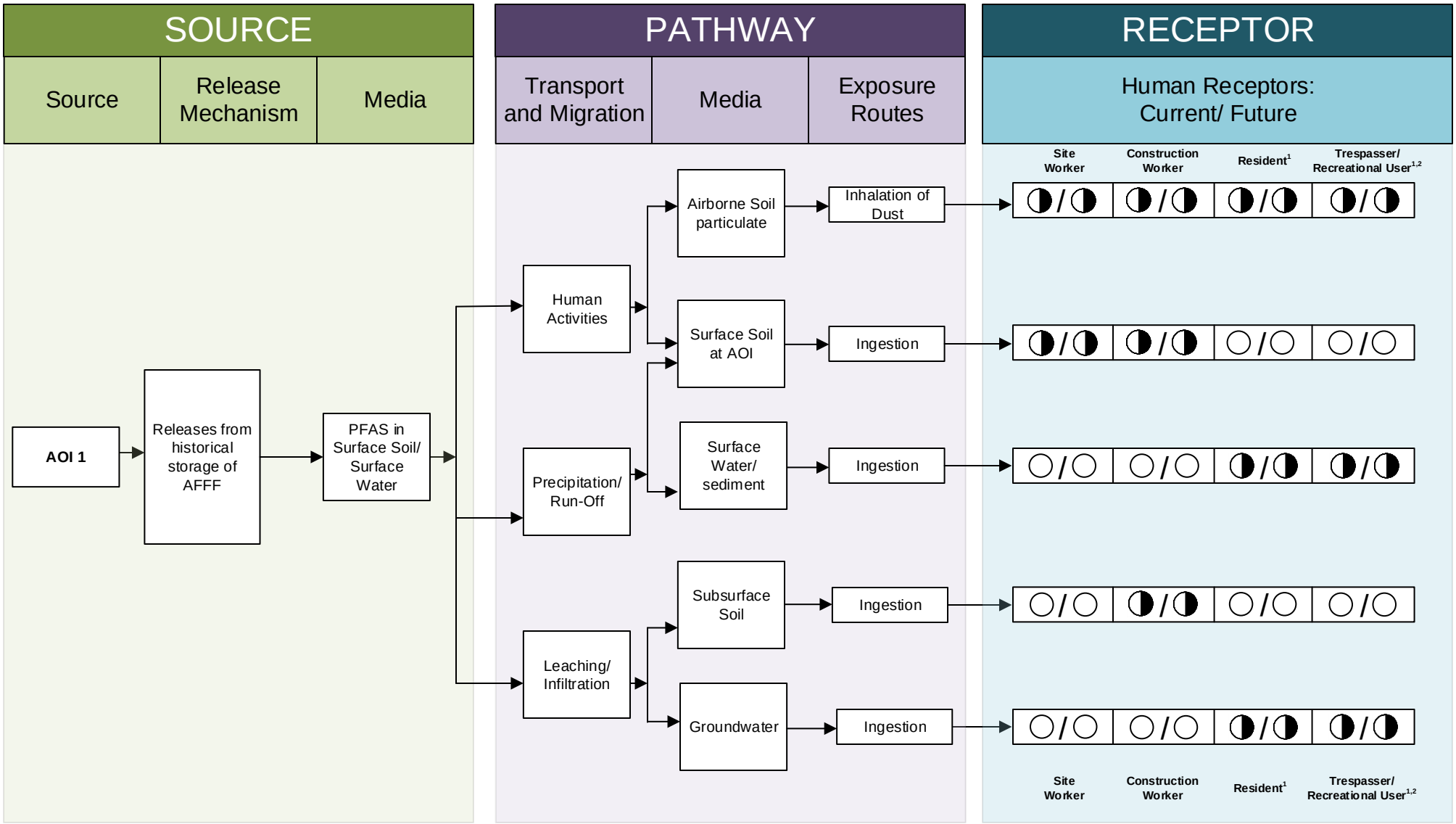
CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	10/12/2020	GIS BY	MS	10/12/2020
SCALE	1:7,200	CHK BY	ST	10/12/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/12/2020

Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_6-1_Allendale_Armory_AOIs.mxd



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Human consumption of fish potentially affected by PFAS is possible.

Figure 6-2
Preliminary Conceptual Site Model
Allendale Armory, SC

7. Conclusions

This report presents a summary of available information gathered during the PA on the use and storage of AFFF and other PFAS-related activities at the facility. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS release was identified (**Table 7-1**) at the facility during the PA (**Figure 7-1**):

Table 7-1: AOIs at Allendale Armory

Area of Interest	Name	Used by	Potential Release Date
AOI 1	Maintenance Bay	SCARNG	Unknown

Based on potential PFAS releases at the AOIs, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for the facility, which presents the potential receptors and media impacted, is shown on **Figure 6-2**.

The following areas discussed in **Section 2** and **Section 3** were determined to have no suspected activity-based release:

Table 7-2: No Suspected Releases, Allendale Armory

No Suspected Release Area	Used by	Rationale for No Suspected Release Determination
Motor Pool	SCARNG	Interviewees indicated that only ABC fire extinguishers (non-AFFF) were used during training events.
Armory	SCARNG	The building contained ABC fire extinguishers and a wet chemical fire suppression system, both of which are non-AFFF.

Three potential off-facility or non-ARNG related sources of PFAS were considered in the local area surrounding Allendale Armory through interviews. One potential source, the Allendale County Fire and Rescue, is located immediately adjacent to the facility and may have significant impact on environmental media at the Allendale Armory. The other potential sources include the Allendale Fire Department – County Station 100 and Allendale County Airport.

7.2 Uncertainties

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, or other non-traditional activities, or on its disposition.

The conclusions of this PA are based on all available information, including: previous environmental reports, EDRs™, observations made during the VSI, and interviews. Interviews of personnel with direct knowledge of a facility generally provided the most useful insights regarding

a facility's historical and current PFAS-containing materials. Sometimes the provided information was vague or conflicted with site observations. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS were first used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, current personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected.

The following **Table 7-3** summarizes the uncertainties associated with the PA:

Table 7-3: Summary of Uncertainties

Area of Interest	Source of Uncertainty
AOI 1: Maintenance Bay	It is unknown if storage of AFFF in 5-gallon buckets and firetrucks within the maintenance bay has historically led to releases of AFFF.
Allendale County Fire and Rescue	The potential adjacent source of PFAS, Allendale County Fire and Rescue, is located at the former location of an SCARNG paved parking lot and what is now currently an extension of the armory. The actual property boundary is unknown, but it is suspected that a portion of the Allendale County Fire and Rescue fire station is located within SCARNG property limits. Due to the uncertainty in whether the material Flame Freeze, used by Allendale County Fire and Rescue, contains PFAS, it is unknown if the adjacent source has had an impact on environmental media at the facility.
General	A large data gap exists between when the facility was first occupied by SCARNG in 1950 and the extent of interviewee knowledge (1986). There was also a lack of institutional knowledge regarding the establishment of the 264th and 268th Engineer Detachments (firefighting units) at Allendale Armory. It is unknown if historical firefighting activities or training may have resulted in the expenditure of AFFF at the facility, based on limited interviewee knowledge.

7.3 Potential Future Actions

Interviews and records (covering 1986 to present) indicate that current or former ARNG activities may have resulted in potential PFAS releases at one AOI identified during the PA. Based on the preliminary CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at the AOI. **Table 7-4** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

Table 7-4: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1: Maintenance Bay	33°00'50.6"N; 81°18'21.8"W	AFFF was stored at the facility's maintenance bay and on firetrucks parked at the facility.	Proceed to an SI, focus on soil, groundwater, surface water, sediment

ARNG will evaluate the need for an SI at Allendale Armory based on the potential receptors, the potential migration of PFAS contamination off the facility, and the availability of resources.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Allendale Armory, SC				
REVISED	10/12/2020	GIS BY	MS	10/12/2020
SCALE	1:7,200	CHK BY	ST	10/12/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/12/2020

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

C:\Users\stankevichm\OneDrive - AECOM Directory\ARNG_PFAS_GIS_60552172\MXDs\SC\Allendale_Armory_Figures\Allendale_Armory_PA_Figures\Fig_7-1_Allendale_Armory_Summary.mxd

8. References

Cain, P. W., Wagner, J. R., & Berry, J. B. 2000. *South Carolina Maps and Aerial Photographic Systems (Sc Maps) Teaching Manual* (4th ed.).

Cooke, C. W. 1936. *Geology of the Coastal Plain of South Carolina.* United States Department of the Interior. doi: 10.3133/b867

Denham, M. E. 1999. *SRS Geology & Hydrogeology Environmental Information Document.*

Environmental Resources Center, South Carolina Army National Guard (Environmental Resources Center), 2009. *Pre-Construction Site Assessment, Allendale Armory Ad/At, 1 Court House Square, Allendale, SC 29810, P/N: 450403, ERC#: 593.* November.

Katuna, M. P., Geisler, J. H., & Colquhoun, D. J. 1997. *Stratigraphic correlation of oligocene marginal marine and fluvial deposits across the middle and lower coastal plain, South Carolina*. Sedimentary Geology, 108(1-4), 181–194. doi: 10.1016/s0037-0738(96)00053-x

Momar, Inc., 2020. *Momar® Solutions for the World Since 1947.* https://momar.com/flamefreeze (Accessed January 2020).

National Ground Water Association, 2018. *Groundwater and PFAS: State of Knowledge and Practice*. January.

SCDNR Hydrology, 2020. *Coastal Plain Water Well Database.* http://hydrology.dnr.sc.gov/well-database.html (Accessed January 2020).

United States Environmental Protection Agency (USEPA). 1991. *Guidance for Performing Preliminary Assessments under CERCLA.* September.

U.S. Climate Data, 2020. *Temperature – Precipitation – Sunshine – Snowfall, Climate Allendale – South Carolina.* https://www.usclimatedata.com/climate/allendale/south-carolina/united-states/ussc0005 (Accessed January 2020).

Appendix A
Data Resources

Data resources will be provided separately on CD. Data resources for Allendale Armory include:

Environmental Data Resources, Inc.™ Geocheck Report

- 2019 Environmental Data Resources, Inc.™ Geocheck Report for Allendale Armory, South Carolina

Previous Environmental Investigations

- 2009 Pre-Construction Site Assessment, Allendale Armory Ad/Alt, 1 Court House Square, Allendale, SC 29810

Miscellaneous Information

- Ansul R-102 Restaurant Fire Suppression Systems Data Sheet

Safety Data Sheet

- Flame Freeze™ 3x3% AR-AFFF Safety Data Sheet
- Flame Freeze™ Wetting Agent Safety Data Sheet
- Flame Freeze™ Training Foam Safety Data Sheet

SCARNG Property Agreements and Real Estate

- 1957 Title to Real Estate, State of South Carolina, County of Allendale, Lucy Vance D. McCrady and Claudia D. Todd to State of South Carolina
- 2015 Readiness Center/County Emergency Services Operating Agreement

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

Interviewee:__(see below)_____ **Title:_____** **Phone Number:_____** **Email:_____**	Can your name/role be used in the PA Report? **Y** or N Can you recommend anyone we can interview? Y or N _____

1. Roles or activities with the Facility/years working at the Facility.

[redacted] – Vehicle maintenance, 24 years

SSG [redacted] – Readiness NCO, 18 years

2. Where can I find previous facility ownership information?

ARNG and the county co-own this facility and there is no leasing. About 5 years ago, renovations were done to the facility, where it was completely gutted and additional rooms were added. Daily operations consist of admin and vehicle maintenance. In the early 90s, there was a Quarter Masters present (platoon of firefighters and water purification company).

3. What can you tell us about the history of PFAS including aqueous film forming foam (AFFF) at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

   Maintenance
   Fire Training Areas
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management
   Metals Plating Facility
   Waterproofing Uniforms (Laundry Facilities)
   Other

   No known releases.

4. Fill out CSM Information worksheet with the Environmental Manager.

5. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing the AFFF/suppression system? Do you have "As Built" drawings for the buildings?

The kitchen has a fire suppression system hood but this is wet-chemical, not AFFF. There are portable fire extinguishers (ABC) in the maintenance bay.

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

6. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? If retrofitted, when was that done?

No

7. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

N/A

8. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

N/A

9. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

N/A

10. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

Could recall at least on year where they conducted fire training in the motorpool outside. Otherwise, they might go to McCrady Training Center, and the MTC firefighters will oversee the training. Fire training involves lighting paper on fire and then performing fire extinguisher checks to dispense the fire. Sometimes, they use diesel in a pan. This occurs occasionally and coincides with when they have another training course going on.

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

11. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

N/A

12. Can you recall specific times when city, county, and/or state personnel came on-post for training? If so, please state which state/county agency or military entity? Do you have any records, including photographs to share with us?

No

13. Did military routinely or occasionally fire train off-post? List the units that you can recall used/trained at various areas.

MTC as mentioned previously

14. Did individual units come with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

Allendale Fire and Emergency Services is next door on same property and will handle emergencies.

15. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?

No

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

16. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?

No

17. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?

No

18. Are there mutual aid/use agreements between county, city, and local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement?

Informal agreement (to their knowledge) with Allendale County over usage of property. Otherwise, they don't have much interaction with them.

19. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste treatment plants, and AFFF ponds)?

No

20. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved?

No

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

21. Are there past studies you are aware of with environmental information on plants/animals/ groundwater/soil types, etc., such as Integrated Cultural Resources Management Plans or Integrated Natural Resources Management Plans?

No

22. What other records might be helpful to us (environmental compliance, investigation records, admin record) and where can we find them?

Only past safety inspection forms

23. Do you have or did you have a chrome plating shop on base? What were/are the years of operation of that chrome plating shop?

No

24. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control? If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

No

25. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?

N/A

PA Interview Questionnaire - Environmental Manager

Facility:__Allendale Armory__
Interviewer:__[redacted]_____
Date/Time:__10/2/19_____

26. Do you recommend anyone else we can interview? If so, do you have contact information for them?

Interview [redacted] from Allendale Fire and EMS

PA Interview Questionnaire - Other

Facility:__Allendale_____
Interviewer:____[redacted]_____
Date/Time:____10/18/19_____

Interviewee:__1SG [redacted]**_____** **Title:_____** **Phone Number:__**[redacted]**_____** **Email:_____**	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? **Y** or N 1SG [redacted]

Roles or activities with the Facility/Years working at the Facility:

Was part of the fire departments at Allendale Armory and McCrady Training Center

@Allendale Armory from 1986 to 2005

@McCrady Training Center from 2005-2010

PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?

At McCrady Training Center, never used foam because the environmental person ([redacted]) would not allow them to use it.	**Known Uses**
At Allendale, historically there were four units. 264th Engineer Detachment (firefighting), 265th-267th Water Purification Company. The 268th Engineer Detachment was stationed at McCrady Training Center. Around 2001-2003, the 264th Engineer Detachment combined with the 268th Engineer Detachment and moved over to MTC. Then they split into more engineer detachments (264th – 268th). The water purification companies stayed in Allendale.	Use
At Allendale, never used AFFF. The old firetrucks they had didn't even have foam capacity. They got newer firetrucks around 1990, which did have foam tanks but were never used. They stored firetrucks and AFFF in 5-gallon buckets in the maintenance bay. Firetrucks never leaked and AFFF never spilled. Only fire trained and nozzle tested with water. AFFF was also stored in fire department at MTC.	Procurement
Older firetrucks were turned over to Columbia National Guard facility and hauled away. The newer firetrucks may be currently in Fort Rucker, Alabama.	Disposition
	Storage (Mixed)
	Storage (Solution)
	Inventory, Off-Spec
	Containment
	SOP on Filling
	Leaking Vehicles

PA Interview Questionnaire - Other

Facility:__Allendale_____
Interviewer:___[redacted]_____
Date/Time:____10/18/19_____

	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

PA Interview Questionnaire - Other

Facility:__Allendale County Fire and Rescue_
Interviewer:_[redacted] _____
Date/Time:__10/2/19_____

Interviewee:_[redacted] _____ **Title:_____** **Phone Number:_____** **Email:_____**	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N _____

Roles or activities with the Facility/Years working at the Facility:	
Has been working at Allendale County Fire and Rescue for 23 years	
PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?	
They have 4 x 5-gal buckets of AFFF in storage but have never used them.	**Known Uses**
They usually keep concentrated soap and water, termed "wet water". Brand name is Flame Freeze.	Use
They use Flame Freeze for brush fires and house fires. There are 2 pumper stations with foam capabilities and 1 rescue firetruck. None of the vehicles carry AFFF, only Flame Freeze.	Procurement
Flame Freeze is used to wash the vehicles. They wash at the wash bay and in the front of the station.	Disposition
Allendale County Fire and Rescue don't handle fuel spills. They just call HAZMAT in the event of a fuel spill.	Storage (Mixed)
They used to be located on Main Street near the Town Hall.	Storage (Solution)
It wasn't sure where the drains in the fire station lead to. Believes the drains outside in the driveway lead to storm sewer.	Inventory, Off-Spec
	Containment
	SOP on Filling
	Leaking Vehicles
	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing

PA Interview Questionnaire - Other

Facility:__Allendale County Fire and Rescue_
Interviewer:_[redacted] _____
Date/Time:__10/2/19_____

	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted]

Recorded by:

ARNG Contact:

Date and Time: 10/2/19

Method of visit (walking, driving, adjacent): walking

Source/Release Information

Site Name / Area Name / Unique ID: kitchen, Allendale Armory

Site / Area Acreage:

Historic Site Use (Brief Description): kitchen used for cooking, has exhaust hood for fire suppression ~~System~~ SY over stove

Current Site Use (Brief Description):

Physical barriers or access restrictions: doors need key card access

1. Was PFAS used (or spilled) at the site/area? **Y / (N)**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):

2. Has usage been documented? **Y / (N)**

2a. If yes, keep a record (place electronic files on a disk):

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**

3a. Indicate what businesses are located near the site

4. Is this site located at an airport/flightline? **Y / (N)**

4a. If yes, provide a description of the airport/flightline tenants:

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? (Y) / N — exhaust hood

1a. If yes, indicate which type of AFFF has been used:

not AFFF, it's a wet chemical or potassium carbonate

1b. If yes, describe maintenance schedule/leaks:

1c. If yes, how often is the AFFF replaced:

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? (Y) / N

1a. If so, note observation and location:

drains connect to storm sewer or sanitary sewer

2. Is there channelized flow within the site/area? Y / (N)

2a. If so, please note observation and location:

3. Are monitoring or drinking water wells located near the site? Y / (N)

3a. If so, please note the location:

4. Are surface water intakes located near the site? Y / (N)

4a. If so, please note the location:

5. Can wind dispersion information be obtained? Y / (N)

5a. If so, please note and observe the location.

6. Does an adjacent non-ARNG PFAS source exist? Y / (N)

6a. If so, please note the source and location.

6b. Will off-site reconnaissance be conducted? Y / (N)

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? **Y / N**

1a. If so, please describe change (ex. Structures no longer exist):

Completely remediated in 2014 and then EMS and County Fire Station were constructed over former motor pool

2. Is the site/area vegetated? **Y / N**

2a. If not vegetated, briefly describe the site/area composition:

3. Does the site or area exhibit evidence of erosion? **Y / N**

3a. If yes, describe the location and extent of the erosion:

4. Does the site/area exhibit any areas of ponding or standing water? **Y / N**

4a. If yes, describe the location and extent of the ponding:

Receptor Information

1. Is access to the site restricted? **Y / N**

1a. If so, please note to what extent:

facility needs keycard access

2. Who can access the site? **Site Workers / Construction Workers / Trespassers / Residential / Recreational Users / Ecological**

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? **Y / N**

3a. If so, please note the location/distance:

within 1000 ft in all directions

4. Are any schools/day care centers located near the site? **Y / N**

4a. If so, please note the location/distance/type:

5. Are any wetlands located near the site? **Y / N**

5a. If so, please note the location/distance/type:

Visual Survey Inspection Log

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted]

Recorded by:

ARNG Contact:

Date and Time: 10/2/19

Method of visit (walking, driving, adjacent): walking

Source/Release Information

Site Name / Area Name / Unique ID: Allendale County Fire Station

Site / Area Acreage:

Historic Site Use (Brief Description): fire station since 2014

Current Site Use (Brief Description):

Physical barriers or access restrictions: key card access

1. Was PFAS used (or spilled) at the site/area? Y / (N)

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):

has 4 x 5-gal buckets of AFFF but never used

2. Has usage been documented? Y / (N)

2a. If yes, keep a record (place electronic files on a disk):

3. What types of businesses are located near the site? Industrial / Commercial / Plating / Waterproofing / Residential

3a. Indicate what businesses are located near the site

4. Is this site located at an airport/flightline? Y / (N)

4a. If yes, provide a description of the airport/flightline tenants:

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? Y / (N)

1a. If yes, indicate which type of AFFF has been used:

1b. If yes, describe maintenance schedule/leaks:

1c. If yes, how often is the AFFF replaced:

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? (Y) / N

1a. If so, note observation and location:

drains in fire station and driveway, unknown if leads to storm or sanitary

2. Is there channelized flow within the site/area? Y / (N)

2a. If so, please note observation and location:

3. Are monitoring or drinking water wells located near the site? Y / (N)

3a. If so, please note the location:

4. Are surface water intakes located near the site? Y / (N)

4a. If so, please note the location:

5. Can wind dispersion information be obtained? (Y) / N

5a. If so, please note and observe the location.

6. Does an adjacent non-ARNG PFAS source exist? Y / (N)

6a. If so, please note the source and location.

6b. Will off-site reconnaissance be conducted? Y / (N)

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? Y / (N)

1a. If so, please describe change (ex. Structures no longer exist):

2. Is the site/area vegetated? Y / (N)

2a. If not vegetated, briefly describe the site/area composition:

3. Does the site or area exhibit evidence of erosion? Y / (N)

3a. If yes, describe the location and extent of the erosion:

4. Does the site/area exhibit any areas of ponding or standing water? Y / (N)

4a. If yes, describe the location and extent of the ponding:

Receptor Information

1. Is access to the site restricted? (Y) / N

1a. If so, please note to what extent:

keycard access required

2. Who can access the site? Site Workers / ~~Construction Workers~~ / Trespassers / Residential / Recreational Users / Ecological

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? (Y) / N

3a. If so, please note the location/distance:

within 1000 ft in all directions

4. Are any schools/day care centers located near the site? Y / N

4a. If so, please note the location/distance/type:

5. Are any wetlands located near the site? Y / (N)

5a. If so, please note the location/distance/type:

Visual Survey Inspection Log

Additional Notes Fire station keeps concentrated soap & water (referred as "wet water"), brand name Flame Freeze. Flame Freeze used for brush fires and house fires. Two of three firetrucks have foam capabilities but have never put AFFF in them, only Flame Freeze. They also use Flame Freeze to wash firetrucks on driveway.

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Allendale Armory

Why has this location been identified as a site?

The facility was home to the 264th and 268th Engineer Detachments (firefighting units) before the units were moved to McCrady Training Center around 2001 to 2003

Are there any other activities nearby that could also impact this location?

The property is shared with Allendale County Fire and Rescue fire station

Training Events

Have any training events with AFFF occurred at this site? None known

If so, how often? N/A

How much material was used? Is it documented? N/A

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction? Away from facility

Average rainfall? 46 inches yearly

Any flooding during rainy season? No

Direct or indirect pathway to ditches? No

Direct or indirect pathway to larger bodies of water? No

Does surface water pond any place on site? No

Any impoundment areas or retention ponds? No

Any NPDES location points near the site? No

How does surface water drain on and around the flight line? No flight line, drainage is away from facility via surface water runoff or storm drains

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Unknown, but most likely influenced by surface water drainage

Depth to groundwater? > 15 ft bgs

Uses (agricultural, drinking water, irrigation)? Public water supply, irrigation, and domestic wells within 4 mile radius

Any groundwater treatment systems? No

Any groundwater monitoring well locations near the site? No

Is groundwater used for drinking water? Yes, in surrounding property

Are there drinking water supply wells on installation? No

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient? Yes

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No

If so, do we understand the process and which water is/was treated at the plant? N/A

Do we understand the fate of sludge waste? N/A

Is surface water from potential contaminated sites treated? N/A

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go?

At Allendale County Fire and Rescue, vehicles are washed with Flame Freeze outside fire station or in wash bay and then drains into stormwater drains

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles?

N/A

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker - Yes

Construction Worker - Yes

Recreational User – Yes

Residential - Yes

Child – Yes

Ecological - Yes

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?

Residential and commercial areas to the north and south, light industrial areas to the west, and farmlands to the east

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur?

Appendix C
Photographic Log

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Allendale Armory	Allendale, South Carolina

Photograph No. 1

Date 10/2/2019

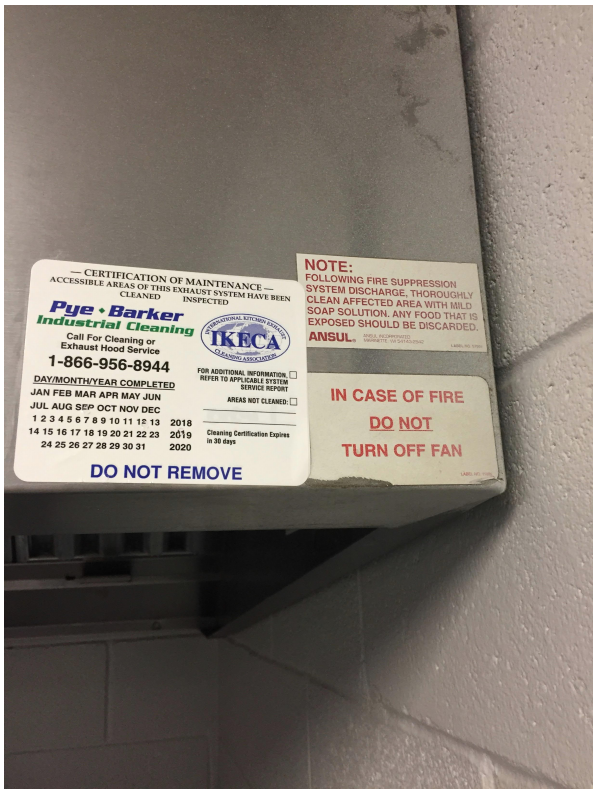
Time 9:28

Description:

An Ansul R-102 wet chemical fire suppression system is located in the kitchen of the armory. The ventilation hood where the wet chemical agent is discharged is shown.

Orientation:

Northeast



Photograph No. 2

Date 10/2/2019

Time 9:30

Description:

An Ansul R-102 wet chemical fire suppression system is located in the kitchen of the armory. The enclosure where the wet chemical agent is contained is shown.

Orientation:

Northeast

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Allendale Armory	Allendale, South Carolina

Photograph No. 3

Date 10/2/2019

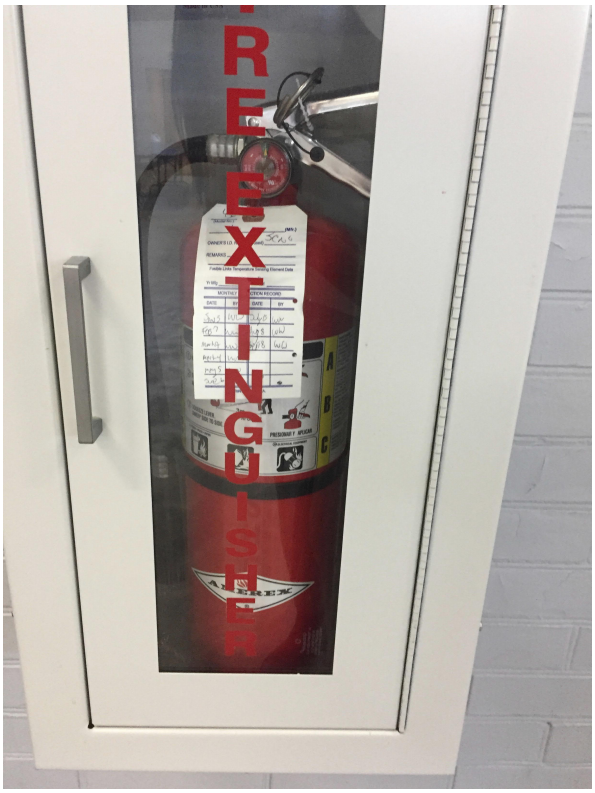
Time 10:38

Description:

Portable ABC fire extinguishers (non-AFFF) are stored within the armory.

Orientation:

Southwest



Photograph No. 4

Date 10/2/2019

Time 10:41

Description:

Four 5-gallon buckets of AFFF are stored at the adjacent Allendale County Fire and Rescue.

Orientation:

Northeast

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Allendale Armory	Allendale, South Carolina

Photograph No. 5

Date 10/2/2019

Time 10:42

Description:

Flame Freeze™ is used by the Allendale County Fire and Rescue as a firefighting agent and is used for vehicle washing outside of the fire station.

Orientation:

Southeast

Photograph No. 6

Date 10/2/2019

Time 10:51

Description:

Allendale County Fire and Rescue firetruck is shown. The firetruck has a foam tank but only Flame Freeze™ is used.

Orientation:

West