Final
Preliminary Assessment Report
South Burlington Army Aviation Support Facility/Readiness Center
Burlington, Vermont

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

April 2019

Prepared for:

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Contract Number: W912DR-12-D-0014
Delivery Order: W912DR17F0192

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Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
AR	Administrative Record
AST	above ground storage tank
bgs	below ground surface
CCC	Champlain Cable Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and LiabilityAct
Champlain Lowland	Champlain Lowland Physiographic Province
CSM	conceptual site model
EDR	Environmental Data Resources, Inc.
EM	Environmental Manager
F	Fahrenheit
FD	Fire Department
FTA	Fire Training Areas
ft	feet
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PHAL	provisional health advisory levels
POL	Petroleum, oil, and lubricants
ppt	parts per trillion
RC	Readiness Center
SI	Site Inspection
So. Burlington AASF/RC	South Burlington Army Aviation Support Facility/Readiness Center
sqft	square foot
UCMR 3	Third Unregulated Contaminant Monitoring Rule
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VTANG	Vermont Air National Guard
VTARNG	Vermont Army National Guard
WWTP	Waste water treatment plant

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Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible.

AECOM completed a PA for PFAS at the Vermont Army National Guard (VTARNG) South Burlington Army Aviation Support Facility/Readiness Center (So. Burlington AASF/RC) in South Burlington, Vermont, to assess potential PFAS release areas and possible exposure pathways to receptors. The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day PA site visit on 16 May 2018
- Interviewed current VTARNG personnel and individuals with the US Air Force Fire and Emergency Services, Vermont Air National Guard (VTANG) Fire Department, and VTANG Environmental Management Office
- Completed visual site inspections at known or suspected PFAS release locations and documented with photographs
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Areas of Interest (AOIs) and the facility

During the PA, one AOI related to PFAS release was identified at So. Burlington AASF/RC based on PA data. The AOI is shown on **Figure ES-1** and described in the table below:

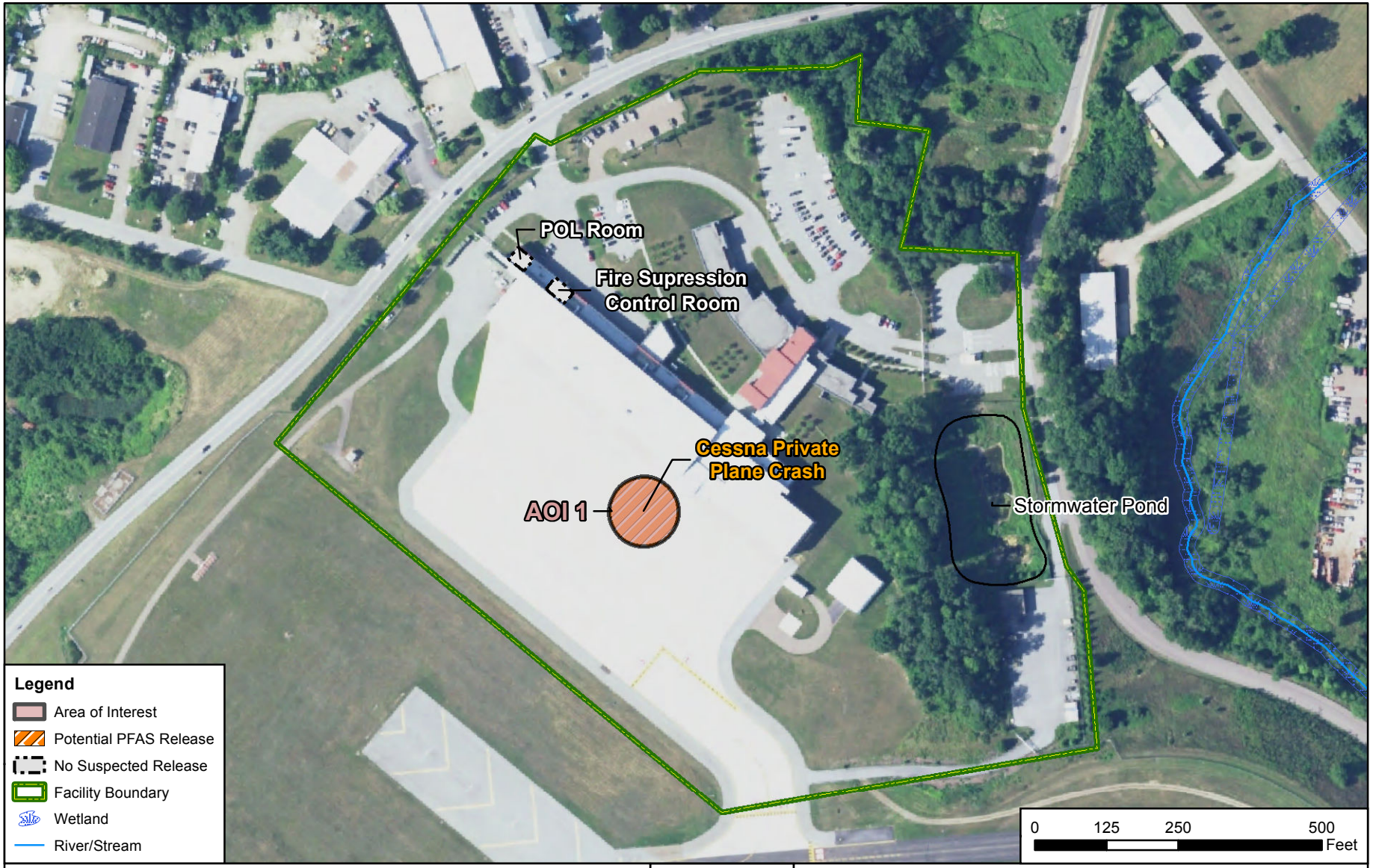
Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Cessna Private Plane Crash	Burlington International Airport	1988

Interviews with VTARNG staff whose first-hand knowledge span the entire history of the So. Burlington AASF/RC (2007-present) indicate that VTARNG activities have not contributed PFAS contamination to the environment; however, VTANG activities may have resulted in potential PFAS releases at AOI 1 and the off-facility Burlington Air National Guard Base. An unknown quantity of AFFF was used by the VTANG Fire Department in response to a 1988 plane crash at AOI1, potentially resulting in PFAS release to the environment.

Based on the documented PFAS releases at AOI 1, there is potential for So. Burlington AASF/RC site and construction worker exposure to PFAS contamination in subsurface soils via inhalation and ingestion. Drinking water for VTARNG is provided by the Champlain Water District. Although several drinking water wells exist downgradient within 4 miles of the facility, the Winooski River acts as a natural hydraulic barrier between the facility and those wells. If PFAS is present in groundwater at the facility and migrates beyond the Winooski River, or unregistered private wells exist within the vicinity of the facility, residential use of groundwater for domestic purposes may expose residents to PFAS via ingestion. PFAS may be present in groundwater beneath the So. Burlington AASF/RC facility, but groundwater is not considered a complete pathway for PFAS to

site and construction workers due to depth to groundwater. A summary of PA findings is shown on **Figure ES-1**. The CSM for So. Burlington AASF/RC is shown on **Figure ES-2**.

The VTANG PFAS PA Report for the adjacent Burlington Air National Guard Base recommended initiating an SI at the Cessna private plane crash location on VTARNG property (CH2M HILL, 2015). The 2018 Final SI Report for the Burlington Air National Guard Base did not include an investigation of the Cessna private plane crash location (Aerostar SES LLC, 2018); the forthcoming expanded SI will investigate the area. As such, future actions under the CERCLA process will be performed by the VTANG, not the VTARNG.



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REVISED	3/14/2019	GIS BY	MS	3/14/2019
SCALE	1:3,000	CHK BY	JW	3/14/2019
Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

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Summary of Findings

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Figure ES-1

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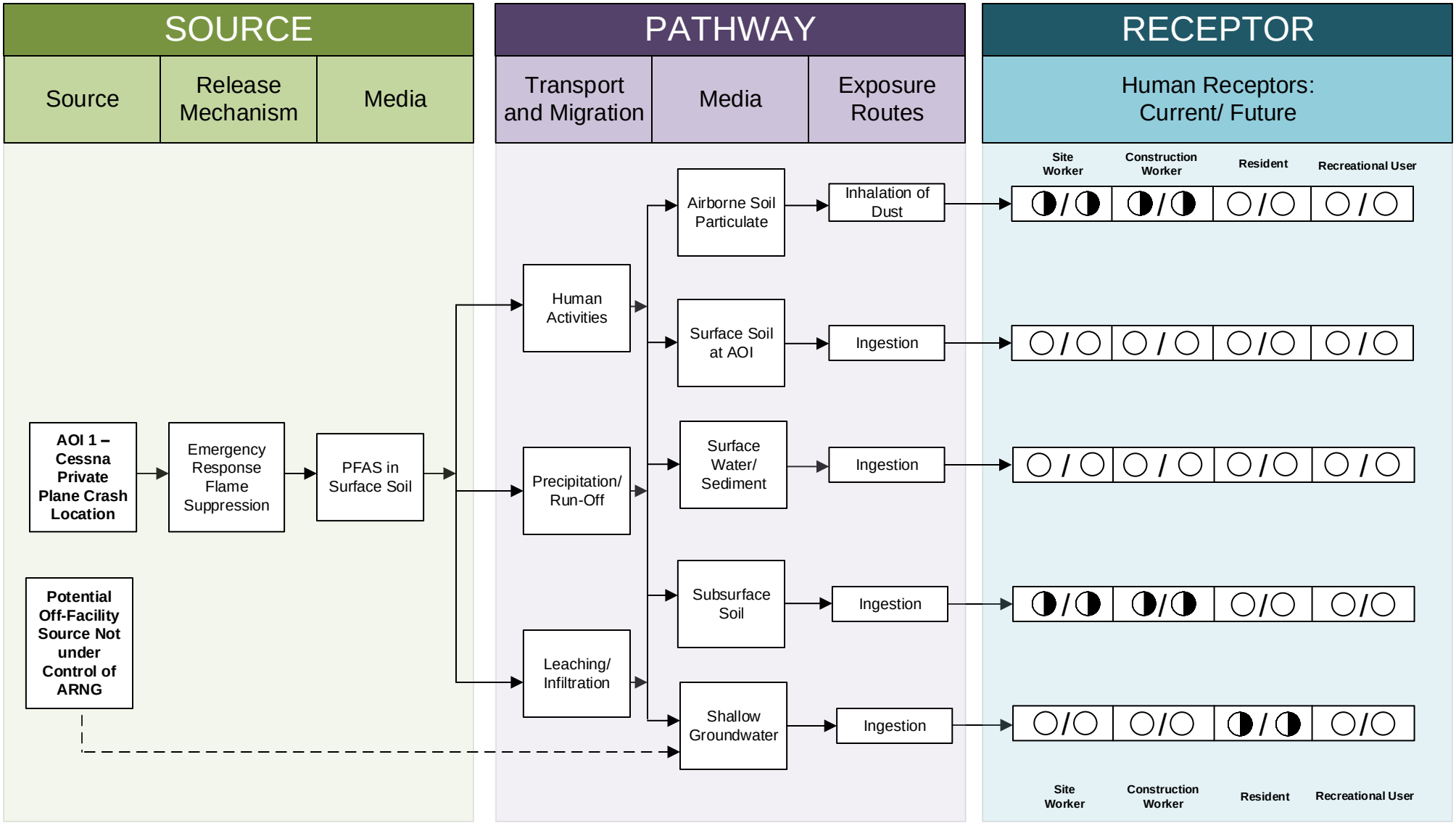


LEGEND

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

Figure ES-2
Conceptual Site Model
So. Burlington AASF/RC

1. Introduction

1.1 Authority and Purpose

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide* 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 their facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily releases of aqueous film forming foam (AFFF) although other sources of PFAS 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 these PFAS compounds in the environment will vary. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued Drinking Water Health Advisories for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. In the absence of federal maximum contaminant levels, some states have adopted their own drinking water standards for PFAS. On 10 July 2018 the Vermont Department of Health issued a Drinking Water Health Advisory level of 20 parts per trillion (ppt) combined for five PFAS chemicals (PFOA, PFOS, perfluorohexane sulfonic acid, perfluoroheptanoic acid, and perfluorononanoic acid) (Vermont Department of Health, 2018).

As a result of this Health Advisory and several known PFAS exposures, the Agency of Natural Resources adopted two emergency rules to regulate these substances. The Investigation and Remediation of Contaminated Properties Rule was amended to list these five PFAS chemicals as hazardous materials, and the Groundwater Protection Rule and Strategy was amended to adopt an enforcement standard of 20 ppt for these substances. Like the standard for PFOA and PFOS, the 20 ppt enforcement standard applies to the sum of these substances (Vermont Agency of Natural Resources, 2018).

This report presents findings of a PA for PFAS at the Vermont Army National Guard (VTARNG) South Burlington Army Aviation Support Facility/Readiness Center (So. Burlington AASF/RC) in South Burlington, Vermont 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 Part 300), and USACE requirements and guidance.

This PA documents locations where PFAS may have been released to the environment at So. Burlington AASF/RC. 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 data resources to obtain information relevant to suspected PFAS releases.
- Conducted a 1-day PA site visit on 16 May 2018.
- Interviewed current VTARNG personnel and individuals with the US Air Force Fire and Emergency Services, and Vermont Air National Guard (VTANG) Fire Department.
- Completed visual site inspections at locations where AFFF is stored at the facility and documented with photographs.
- Developed a conceptual site model (CSM) to outline the potential release, pathway, and receptors of PFAS for So. Burlington AASF/RC.

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:

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 fire training areas (FTAs) at the facility identified during the site visit

Section 3 – **Non-Fire Training Areas:** describes other locations of PFAS releases at the facility identified during the site visit

Section 4 – **Emergency Response Areas:** describes areas of AFFF release at the facility, specifically in response to emergency situations

Section 5 – **Adjacent Sources:** describes sources of PFAS release adjacent to the facility that are not under the control of ARNG

Section 6 – **Conceptual Site Model:** describes the pathways of PFAS transport and receptors at 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 So. Burlington AASF/RC occupies approximately 27 acres in central Chittenden County, Vermont, in the northwest corner of Burlington International Airport, which lies in the northeast portion of the City of South Burlington, and is situated approximately 3 miles east of Lake Champlain (**Figure 1-1**). The facility is bound by Airport Parkway and commercial properties to the north and northwest, a mix of industrial and commercial properties and the southern extension

of Shamrock Road to the east, and by the Burlington International Airport to the south and southwest.

VTARNG began using the facility in 2007. The property is licensed to the VTARNG through the USACE from Burlington International Airport. The property deed is included in **Appendix A**. The facility includes a 95,000 square foot Army Aviation Support Facility with five hangar bays used for the maintenance of rotary wing aircraft and a 49,000 square foot facility that includes the Civil Support Team and a Readiness Center northeast and connected to the hangar. The property is largely developed with buildings, roads, parking lots, and a tarmac used for aircraft parking. The relatively flat concrete tarmac is connected to a Burlington International Airport taxi-way.

1.5 Facility Environmental Setting

The So. Burlington AASF/RC is in central Chittenden County, Vermont, within the City of South Burlington. Surface topography in the eastern and northeastern portions of the site slopes towards an unnamed drainage feature in the northern portion of the property at an elevation of approximately 242 feet above mean sea level (amsl). The majority of the site is developed with buildings, concrete, or asphalt features. There are no naturally occurring surface waterways located on the So. Burlington AASF/RC property, but terrain in the west and northwest portions of the site slope downwards towards an offsite unnamed drainage that directly feeds the Winooski River.

1.5.1 Geology

The So. Burlington AASF/RC is on the eastern edge of the Champlain Lowland Physiographic Province (Champlain Lowland). The Champlain Lowland consists of a north-to-south-trending structural trough located between the Green Mountains to the east, the Adirondack Mountains to the west, and the Taconic Mountains to the southeast. The Champlain Lowland is 12 to 15 miles wide and contains the north-to-south-trending Lake Champlain bounded by flat and gently rolling lands, most of which lie below 1,500 feet amsl.

The So. Burlington AASF/RC is approximately 4 miles east of the Champlain Thrust Fault and approximately 3.5 miles west of the Hinesburg-Oak Hill Thrust Fault. Bedrock beneath the facility is composed of carbonate platform rocks of the Shelburne Marble, an informal member of the Lower Ordovician Beekmantown Group. Shelburne Marble is predominantly light-gray- to white- and bluish-gray-streaked calcite marble and massive white- and green-streaked calcite marble that locally contains intermediate dolostone and gray limestone beds. Rocks of the Beekmantown Group below the surface of the facility occur just east of the fold axis within the western limb of the recumbent, isoclinal, south-southeastward plunging Hinesburg synclinorium (Ratcliffe et al., 2011), resulting in variable bedding attitudes beneath the site. Depths to bedrock range locally from surface outcrop to greater than 200 feet below ground surface (bgs) (AFCEC, 2015). Overburden materials consist of medium fine sand (Wright et al., 2009), and artificial fill (Marin Environmental Inc., 2001a). The bedrock geology beneath the So. Burlington AASF/RC and adjacent areas is presented in **Figure 1-2**.

1.5.2 Hydrogeology

The So. Burlington AASF/RC is in an area with good to moderate water supply potential. Unconsolidated sand and gravel deposits and, to a lesser extent, underlying fractured bedrock provide usable quantities of groundwater, with yields reportedly ranging from low to high. Areas of greatest potential occur proximal to the Winooski River (AFCEC, 2015).

Recoverable groundwater primarily resides within the carbonate solution features and faults and fractures in the marble. Wells screened in the bedrock formation have water yields ranging from 6 to 40 gallons per minute. The Vermont Department of Water Resources has classified the bedrock groundwater in the area of VTANG, upgradient of the facility, as a Class III water resource, which is characteristic of a groundwater aquifer suitable for domestic water supply, irrigation, agricultural use, and general industrial and commercial use.

There are no potable groundwater supply wells at the So. Burlington AASF/RC (AFCEC, 2015). The facility purchases potable water from the Champlain Water District (CWD), which obtains its public water supply from Lake Champlain (AFCEC, 2015). There are no known public water supply wells within a 1-mile radius of the facility. There are 6 water wells within 1-mile; four of which are hydraulically upgradient and two are cross-gradient of the facility. The well depths range from 128 to 498 feet bgs and are reported to be domestic in use. **Figure 1-2** presents the location of these wells. There are no monitoring wells at the facility.

Groundwater flow beneath the site presumably flows to the northwest, consistent with topography and surface water drainage patterns. Groundwater beneath the site occurs within unconsolidated sand and gravel deposits and, to a lesser extent, underlying fractured bedrock (Marin Environmental Inc., 2001a, 2001b). Depth to groundwater in an area adjacent to the Burlington International Airport is approximately 10 feet bgs.

1.5.3 Hydrology

The So. Burlington AASF/RC is on the south side of the Winooski River, within the Winooski River Watershed. The Winooski River flows 90 miles from its headwaters in the town of Cabot, Vermont to Lake Champlain in Colchester, Vermont. The Winooski River drains approximately 1,080 square miles in central Vermont. The watershed encompasses all of Washington County, about half of Chittenden County, and portions of Lamoille and Orange counties (AFCEC, 2015).

Several small, unnamed drainages located west of the site within approximately 1,000 feet flow generally northwestward and enter the Winooski River approximately 0.5 miles northwest of the facility boundary. Another small, unnamed drainage located less than 500 feet east of the facility flows generally northward and enters the Winooski River approximately 0.3 miles northeast of the facility boundary (AFCEC, 2015). Several wetlands areas have been designated to the east and west within approximately 1,000 feet of the facility (USFWS, 2018). Surface drainage features do not originate on the facility. Regional watersheds and surface drainage features from the surrounding area are presented in **Figure 1-3**.

The USEPA collects occurrence data for potential contaminants that may be present in drinking water, but do not have enforceable drinking water standards under the Third Unregulated Contaminant Monitoring Rule (UCMR 3). The UCMR 3 data for local water purveyors within a 10-mile radius of So. Burlington AAFF/RC was searched for PFAS-specific chemical data results. **Appendix A** includes the UCMR 3 2013 tabulated data, which indicated that PFAS and associated compounds were not reported above the laboratory method detection limits.

No naturally occurring surface water features are located on So. Burlington AASF/RC (Marin Environmental Inc., 2001a); however, one artificial stormwater pond is situated along the eastern boundary of the facility. The stormwater pond was presumably constructed at the same time as the AASF/RC facility. The pond is divided into two sections and is fed by stormwater runoff from the AASF building, parking areas, and helipad via drainage ditches and a network of catch basins. The majority of surface water runoff from the facility drains to the stormwater pond, which drains

to an unnamed tributary of the Winooski River (VTARNG, 2018). A stormwater drainage map from the facility's Stormwater Pollution Prevention Plan is included in **Appendix A**.

Additionally, stormwater drainage grates are located along the western edge of Shamrock Road adjacent to the eastern boundary of the facility, and on both sides of Airport Parkway at the northwestern corner of the facility.

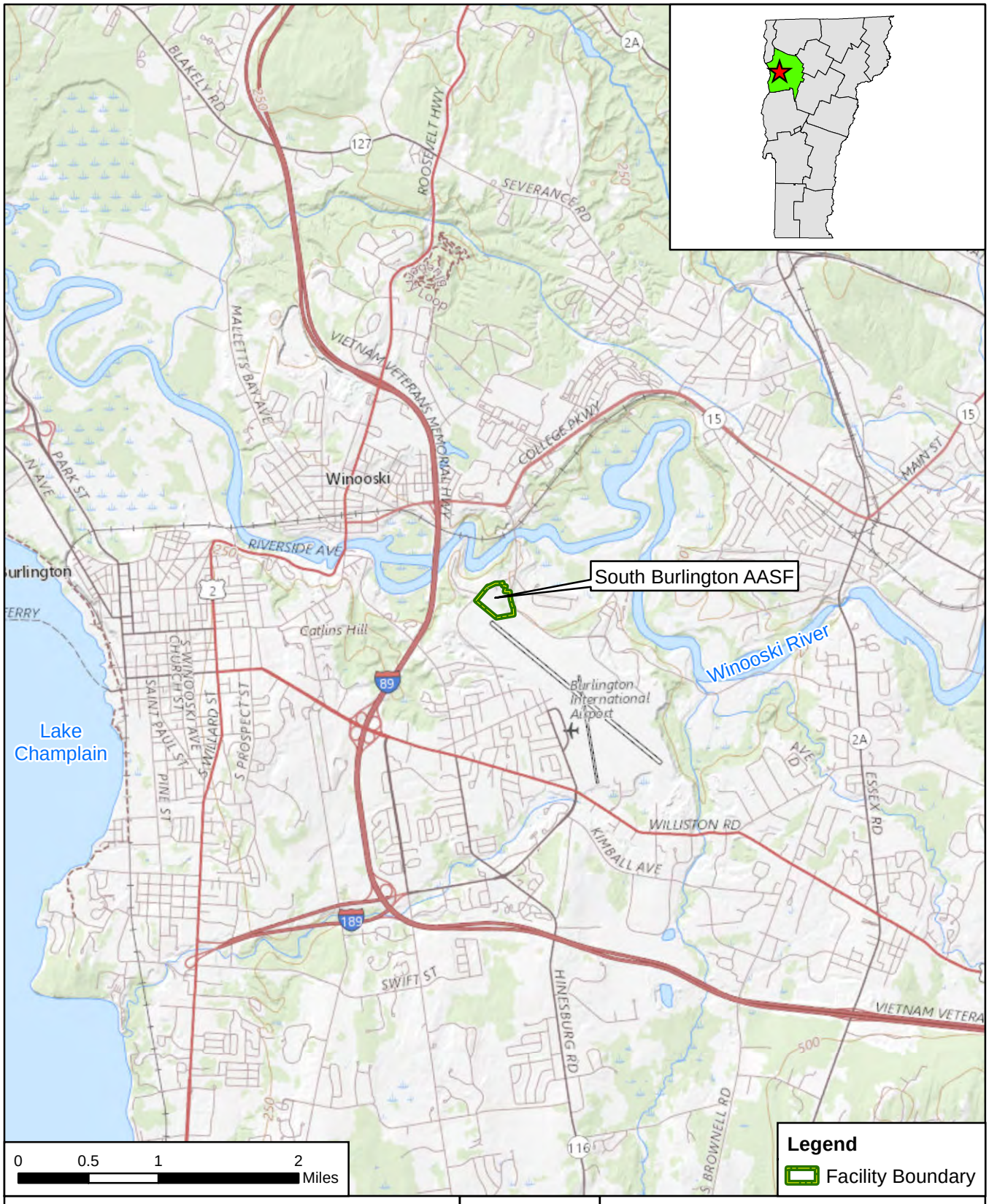
1.5.4 Current and Future Land Use

The So. Burlington AASF/RC serves the ARNG 86th Air Medical Company, the Operational Support Airlift, and the 15th Civil Support Team. The So. Burlington AASF/RC is an operating support and maintenance facility for rotary wing aircraft. In addition, the facility has administrative space for the 86th Air Medical Company, the Operational Support Airlift, and the 15th Civil Support Team. Reasonably anticipated future land use is not expected to change from the current land use.

1.5.5 Climate

So. Burlington AASF/RC is within the Vermont Lowlands physiographic region. The region is bound by the Adirondack Mountains to the west in New York and the Green Mountains to the east, both of which rise high enough to afford protection from storms. Temperatures are moderated year round by the proximity of Lake Champlain to the west. Cool breezes blow inland off the lake in the summer; in the winter, the Lake acts as a heat reservoir that moderates local land temperature. Air temperature highs in July and lows in January average 80° Fahrenheit (F) and 18°F, respectively (NOAA, 2018).

Rainfall data indicates an average of approximately 38 inches of precipitation per year. Precipitation is well distributed throughout the year but typically heavier in the summer than in the winter. Strong thunderstorms in the summer produce the heaviest local rainfall intensities (NOAA,2018).



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Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	RG	2/7/2019

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Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

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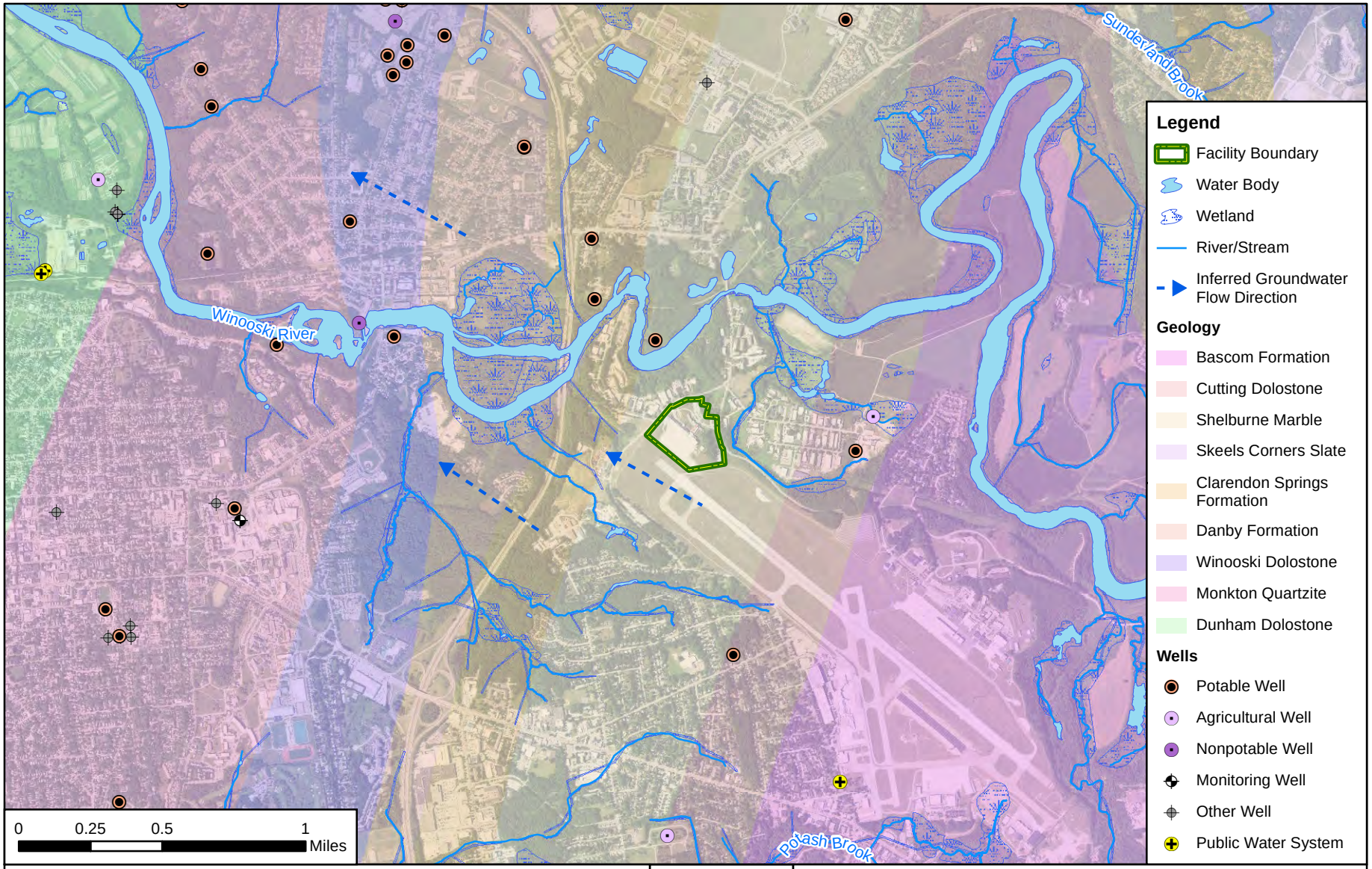

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TITLE

Groundwater Features

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Figure 1-2

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

During the site visit interviews, the VTARNG Environmental Manager confirmed that there are no FTAs at So. Burlington AASF/RC. FTAs are considered a primary potential release area for PFAS because of the common use of AFFF in training events. The VTANG Fire Department serves as the first responder to emergencies at So. Burlington AASF/RC. FTAs associated with the VTANG Fire Department are discussed in **Section 5**. The Colchester Fire Department also responds to fires at the facility.

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3. Non-Fire Training Areas

Locations that are considered non-FTA include but are not limited to, hangars, fire stations, landfills, and other locations where AFFF may have been released or had potential to be released to the environment. One non-FTA was identified during the PA where AFFF is stored as part of a fire suppression system: the Maintenance and Storage Hangar. Two AFFF above ground storage tanks (ASTs) are stored within the hangar; one is situated in the fire suppression control room, and one is situated in the petroleum, oils, and lubricants (POL) storage room. A description of the ASTs and fire suppression system is presented below and shown on **Figure 3-1**. Interview records with relevant information appear in **Appendix B**, and site visit photographs are presented in **Appendix C**.

3.1 Maintenance and Storage Hangar

The Maintenance and Storage Hangar is in the center of the facility property, northwest of Runway 15 and the approximate center of flightline. The geographic coordinates and surface elevation at the approximate center of the hangar structure are 44°28’58.9” N, 73°09’55.9” W, and 305 feet amsl, respectively. The area is accessible only to So. Burlington AASF/RC personnel. The hangar has been in continuous use since its construction in 2007 and is used for aircraft maintenance and storage. The hangar is surrounded by flat paved, concreted surfaces to the west, north, and south, and a mix of paved and grassy areas that slope gently downhill to the east/northeast. Groundwater flow beneath the hangar is to the northwest.

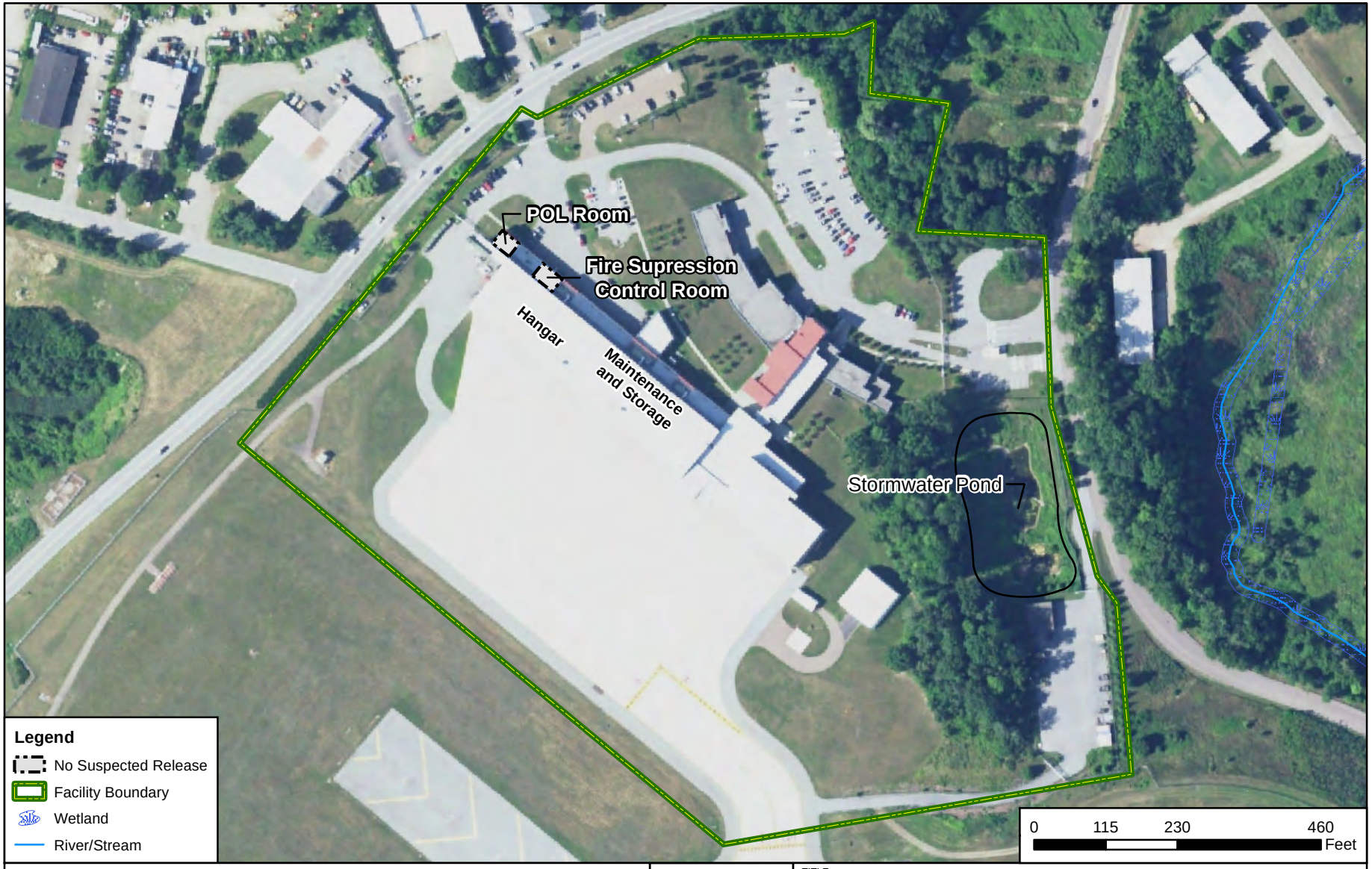
The Maintenance and Storage Hangar has an automatic fire suppression system that uses AFFF. The ASTs, located within the fire suppression control room and POL storage room (**Figure 3-1**), are charged with a solution of water and Buckeye Platinum 3% Alcohol Resistant AFFF. Additionally, Chemguard 3% AFFF C-301MS concentrate is stored in three 55-gallon containers in the hangar fire suppression control room. Material safety data sheets for AFFF products currently or historically stored at the facility are included in **Appendix A**. According to the VTARNG Facilities Maintenance Manager, no AFFF releases have occurred in the fire suppression control room or POL storage room. Additionally, no AFFF has been released from this fire suppression system elsewhere in the hangar. Testing of the fire suppression system is completed by contractors regularly but does not require the release of fire suppression materials. AFFF at the facility has been procured through Firetech Sprinkler Corporation, and FireProTec provide the AFFF and test the fire suppression system on a regular basis without releasing fire suppression materials. According to VTARNG personnel, AFFF has not been disposed of to date.

3.2 Waste Water Treatment Plant

There is no Waste Water Treatment Plant (WWTP) at So. Burlington AASF/RC. Surface water runoff from the building, parking areas, and helipad is part of a closed system draining to a stormwater pond that discharges to an unnamed tributary to the Winooski River. Stormwater runoff from the parking and roadway enters a grass channel to an existing swale that eventually drains to a wetland near the Winooski River. Sewer water is directed to an off-facility municipal WWTP. WWTPs are not usually a primary potential release area of PFAS, but sludges and liquids from areas of potential release that area treated at WWTPs may create a secondary source of contamination. No information obtained during the PA that indicated PFAS-related materials from the facility were treated at a WWTP.

3.3 Landfills

There are no landfills at So. Burlington AASF/RC. Landfills are not usually a primary potential release area of PFAS, but materials disposed of in landfills may create a secondary source of contamination. Such materials, to name a few, may include sludge from a WWTP that processes PFAS-laden water, used AFFF storage containers, or products associated with waterproofing uniforms or boots. At So. Burlington AASF/RC facility, no information obtained indicates PFAS-related materials were disposed of in a landfill.



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Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

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TITLE

Non-Fire Training Area

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Figure 3-1

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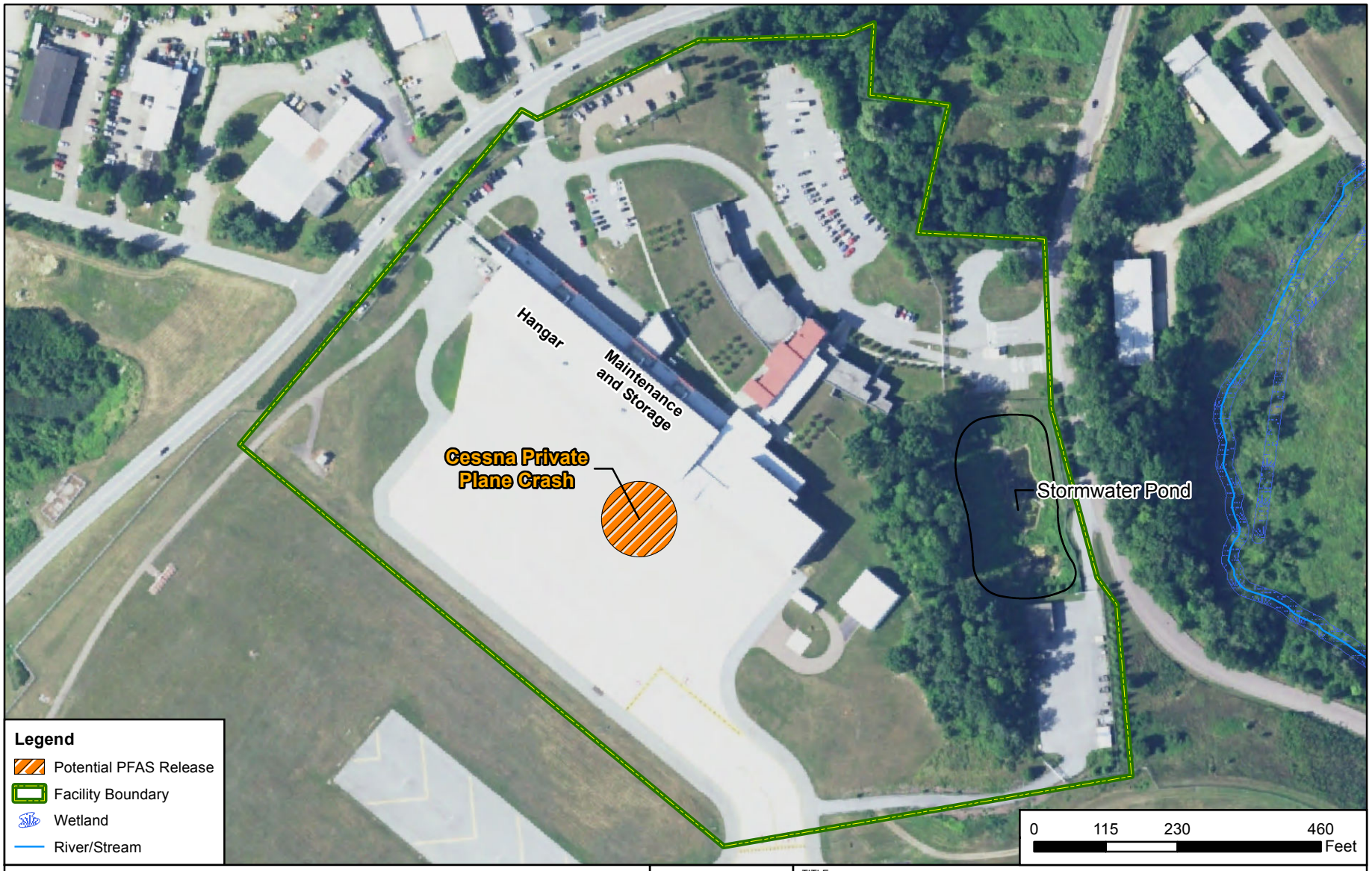
4. Emergency Response Areas

The VTARNG Environmental Compliance Manager confirmed that no crashes or other emergencies resulting in AFFF use have occurred at So. Burlington AASF/RC since its use began in 2007; however, a private plane crash did occur within the current VTARNG facility footprint before the facility's construction in 2005 and 2006.

4.1 Cessna Private Plane Crash

A Cessna private plane crash occurred in 1988 within the current VTARNG facility footprint before its construction. The VTANG Fire Department responded to the crash and used AFFF to extinguish the crash flames. VTARNG construction activities in 2005 and 2006 may have resulted in the removal and regrading of some of the potentially contaminated soil, and a concrete slab now covers the former crash location (CH2M HILL, 2015). The approximate crash location is now the paved parking area southwest of the AASF/RC Maintenance and Storage Hangar. The type, volume, and concentration of AFFF used during the emergency response is unknown. The crash location is shown on **Figure 4-1**. Historical aerial imagery indicates that no surface water existed in the vicinity of the crash in 1988. AFFF used in response to the crash would likely have been sprayed directly onto the crashed aircraft and surrounding ground surface.



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SCALE	1:2,760	CHK BY	JW	3/14/2019
Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

TITLE

Emergency Response Area

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 4-1

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\ Fig_4-1_South_Burlington_AASF_Emergency_Response_Areas.mxd

5. Adjacent Sources

Several off-facility PFAS sources adjacent to the So. Burlington AASF/RC were identified during the PA and are discussed below. **Figure 5-1** presents the location of the potential adjacent PFAS sources.

5.1 Vermont Air National Guard Fire and Non-Fire Training Areas

The Burlington Air National Guard Base property borders the So. Burlington AASF/RC to the east. The VTANG property occupies approximately 281 acres of the 942-acre Burlington International Airport property since 1951. Use of AFFF during training exercises and emergency responses, and accidental spills of AFFF have resulted in multiple releases of PFAS to the environment. In June 2015, the US Air Force Civil Engineer Center ordered the cease of all AFFF use except in the case of emergencies. The VTANG has conducted a PA (CH2M HILL, 2015) and an SI for PFAS and reported findings in 2018 (Aerostar SES LLC, 2018) (**Appendix A**). Based on the VTANG PA results, AFFF was released to the environment in six areas on or near the Burlington Air National Guard Base. Concentrations of PFAS in groundwater and surface water were detected above screening levels. Concentrations of PFAS in groundwater exceeded the 20 ppt Vermont Department of Health Drinking Water Health Advisory; there is no promulgated screening value for PFAS in surface water. The Cessna private plane crash, which the VTANG responded to with AFFF, is discussed in **Section 4**. A brief summary of the PFAS releases are summarized below and shown on **Figure 5-1**.

Potential VTANG Release Area	Nature of Release
Former FTA-1	Fire training area with no known engineered containment where AFFF likely used as extinguishing agent. The type, volume, and concentration of AFFF used during the training activities is unknown.
Building 90 (Former Fire Station)	Small quantity of AFFF storage and area in which fire department trucks are filled and washed.
Building 60 (Current Fire Station)	Engineered containment area in which fire trucks are filled and washed with less than 0.5-gallon confirmed release of AFFF in one area.
Fire Department Equipment Testing Area	Non-engineered containment area where equipment containing AFFF testing performed annually for several years. The type, volume, and concentration of AFFF used is unknown.
Bird Strike Emergency Response at North End of Runway	AFFF was used to extinguish flames on the tail end of an F-16 after a bird strike incident in 1995 or 1996. The specific location is unknown, likely on runway north of North Barrier Road. The type, volume, and concentration of AFFF used during the emergency response is unknown.

Potential VTANG Release Area	Nature of Release
Private Plane Crash Emergency Response at North End of Runway	Discussed in Section 4.

Additionally, the VTANG currently stores AFFF in 5-gallon buckets in their Supply Building 70, located northeast of the current fire station. At the time of the VTANG PA site visit in 2015, a total of 515 gallons of 3% AFFF was stored in Building 70. There have been no reported spills or releases of AFFF in Building 70 (CH2M HILL, 2015). The VTANG PFAS PA report for the Burlington Air National Guard Base recommended initiating an SI for several of the areas identified in the table above, including the Cessna private plane crash location. The 2018 Final SI Report for the Burlington Air National Guard Base did not include an investigation of the Cessna private plane crash location (Aerostar SES LLC, 2018); the forthcoming expanded SI will investigate the area.

The VTANG is currently undergoing construction to accommodate for new aircrafts. Earth moving activities are occurring at VTANG facilities adjacent to the main Burlington International Airport flight line.

5.2 Champlain Cable Corporation

The 39-acre Champlain Cable Corporation (CCC) property is located approximately 2 miles northwest of the So. Burlington AASF/RC. Founded in 1955, the CCC facility manufactures wire and cable coatings for the aircraft, computer, and energy industries. Industrial processes include metal cleaning and degreasing operations, thermoplastic extrusion of wire insulation, lacquer coating, tape wrapping, and cold drawing of wire to produce wire of various sizes. The waste products have historically contained lubricating solutions, degreasing solvents and liquid corrosives, and have been found to contain PFAS.

Between 1966 and 1977, liquid wastes were poured onto the ground outside of the building, including along the roadway east of the facility and in an area northeast of the facility, referred to as the “sand pit” (USEPA, 1995). Groundwater samples collected in August 2018 showed PFAS detections in 23 of 24 wells sampled, with PFAS compounds exceeding the 20 ppt Vermont Department of Health Drinking Water Health Advisory in 22 samples. The highest total concentration of the five state-regulated compounds (7,065 ppt) was detected in the “sand pit” area, where state investigators are focusing their attention (ATC Group Services, LLC, 2018). PFAS has also been detected in surface water on the adjacent VTARNG Camp Johnson property, with the source as yet undetermined (see Preliminary Assessment Report, Camp Johnson, Colchester, Vermont, February 2019). Although documented releases have occurred at the CCC facility, they are unlikely to affect the So. Burlington AASF/RC due to distance, groundwater flow direction, and their separation by the Winooski River.
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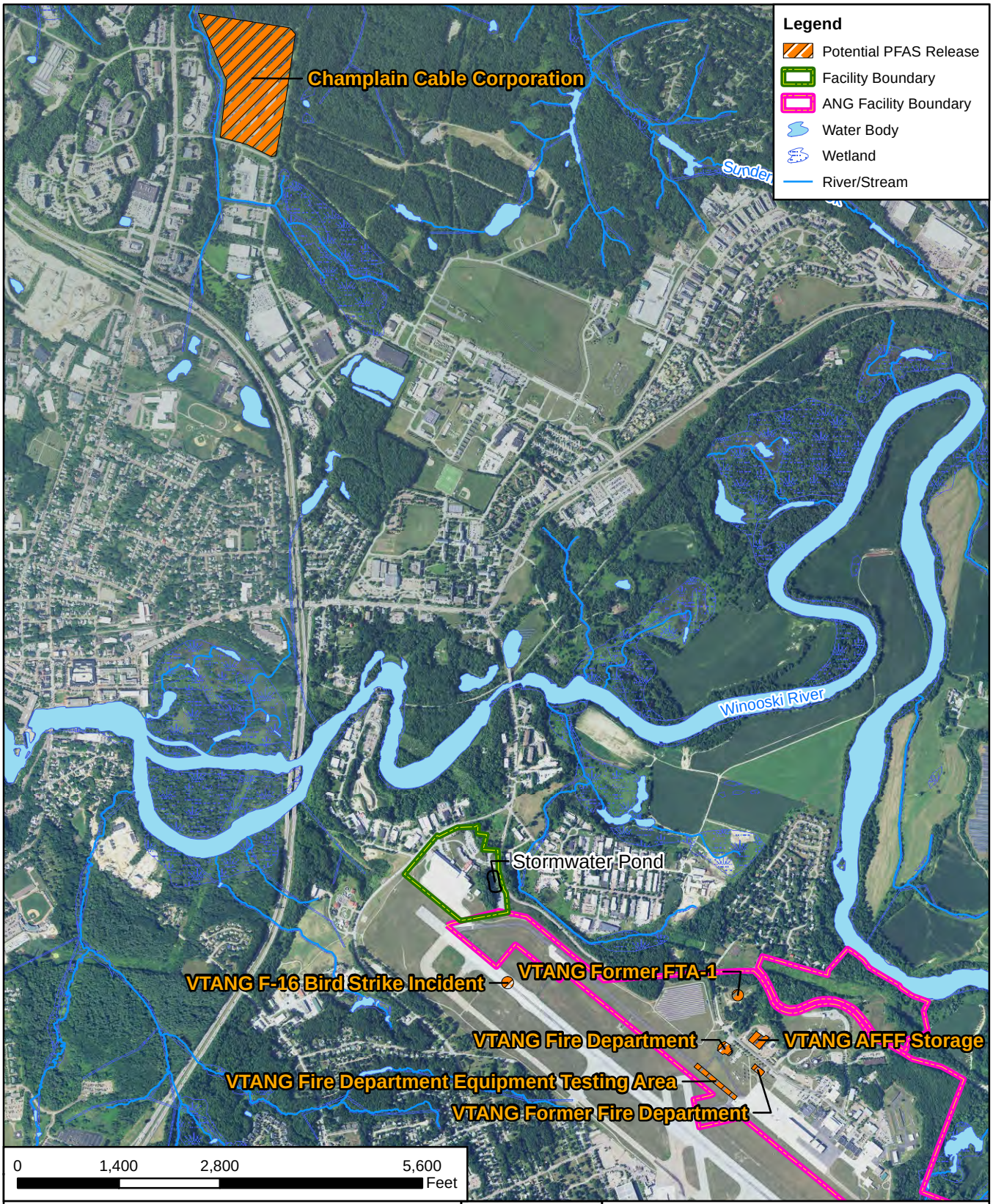

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at South Burlington AASF, VT			
REVISED	3/14/2019	GIS BY	MS	3/14/2019
SCALE	1:23,385	CHK BY	JW	3/14/2019
Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

N

Adjacent Sources

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\South_Burlington_AASF\Fig_5-1_South_Burlington_AASF_Adjacent_Sources.mxd

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6. Conceptual Site Model

Based on the PA findings, one AOI was identified at the So. Burlington AASF/RC: AOI 1 Cessna Private Plane Crash. The AOI location is shown on **Figure 6-1**. The following section describes the CSM components and the specific CSM developed for the AOI. 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.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Dermal contact is not considered to be a potential exposure pathway as studies have shown very limited absorption of PFAS through the skin (National Ground Water Association, 2018). Receptors for the So. Burlington AASF/RC include site workers, construction workers, residents, and recreational users/trespassers. The CSM indicates which specific receptors could potentially be exposed to PFAS.

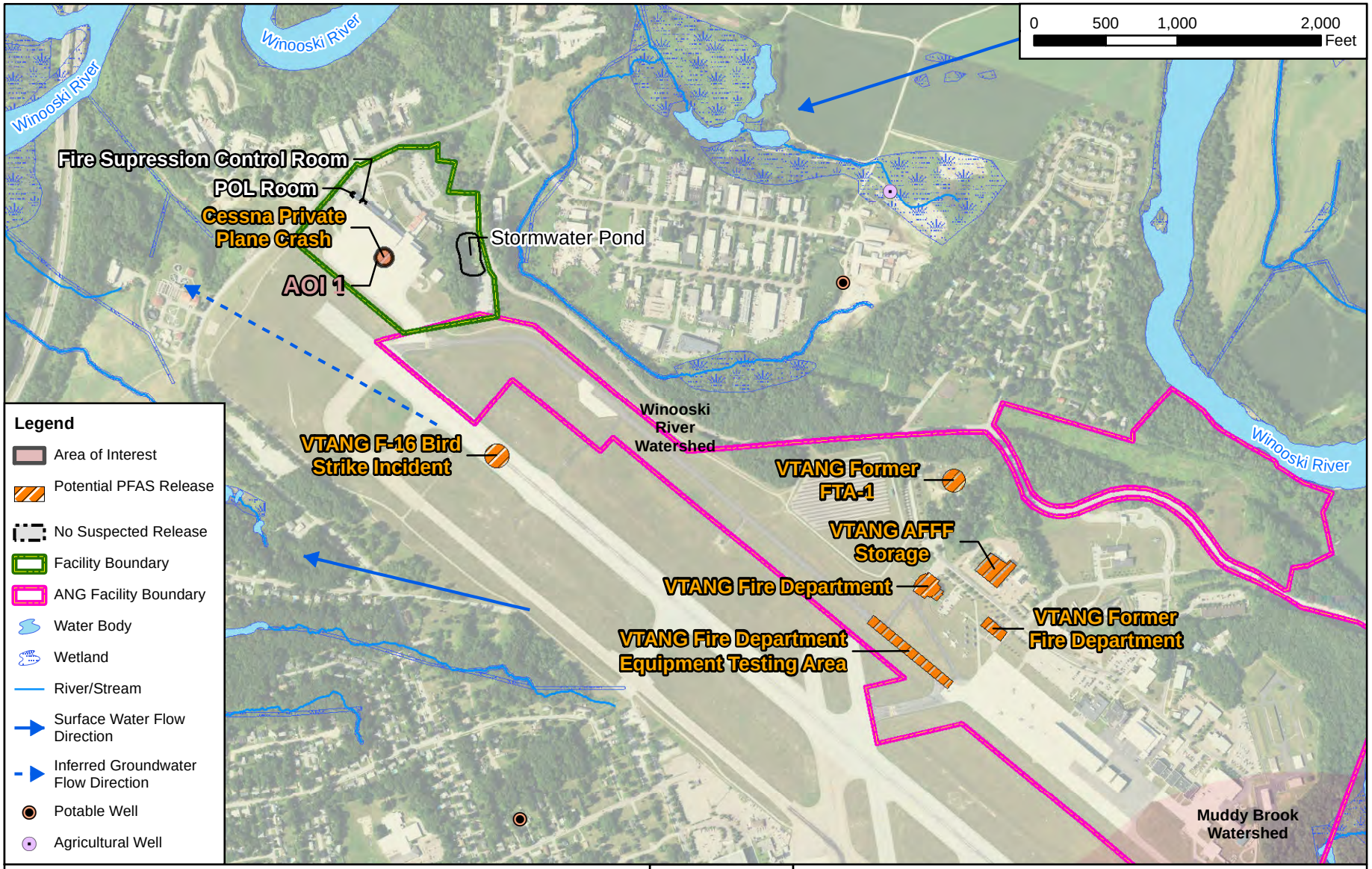
6.1 AOI 1 Cessna Private Plane Crash

AOI 1 is the location of the 1988 Cessna private plane crash. The VTANG Fire Department responded to the crash and used an unknown quantity of AFFF to extinguish the crash flames. VTARNG construction activities in 2005 and 2006 may have resulted in the removal and regrading of some of the potentially contaminated soil, and a concrete slab now covers the former crash location (CH2M HILL, 2015). The approximate crash location is now the paved parking area southwest of the facility maintenance and storage hangar.

At the time of the crash, the area was unpaved, and AFFF may have infiltrated the ground. PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. Groundwater beneath the facility is classified by the Vermont Department of Water Resources as a Class III water resource (EarthTech, 1997), which is suitable for domestic water supply, irrigation, agricultural use, and general industrial and commercial use. Drinking water for VTANG and surrounding areas is provided by the CWD. Several drinking water wells, owned by private or local government entities, exist downgradient within 4 miles of the facility, but they are located beyond the Winooski River which acts as a natural hydraulic barrier (CH2M HILL, 2015). If PFAS is present in groundwater at the facility and migrates beyond the Winooski River, or unregistered private wells exist within the vicinity of the facility, residential use of groundwater for domestic purposes may expose residents to PFAS via ingestion.

Stormwater drainage at the facility primarily occurs as sheet flow towards the artificial stormwater pond and tributaries of the Winooski River. Current migration of PFAS from the crash area to surface water is unlikely based on the paved surface. At the time of the crash, no surface water existed at the property. Additionally, the nearest unnamed tributary of the Winooski River is ephemeral in nature, with no known water intakes or collection points. As such, the pathway for site and construction workers, as well as recreational users and off-facility residents, to PFAS in the surface water and sediment at the facility is incomplete.

Surface soil at the AOI is paved over, resulting in an incomplete pathway for PFAS contamination in surface soil to all receptors; however, ground-disturbing activities beneath the pavement to subsurface soil could result in site and construction worker exposure to potential PFAS contamination in soil via ingestion and inhalation. Accidental ingestion of groundwater is not considered a complete pathway for exposure to PFAS during construction activities due to the depth to groundwater beneath the facility. The CSM for AOI is shown on **Figure 6-2**.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at South Burlington AASF, VT			
REVISED	3/14/2019	GIS BY	MS	3/14/2019
SCALE	1:12,000	CHK BY	JW	3/14/2019
Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

N

TITLE

Areas of Interest

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

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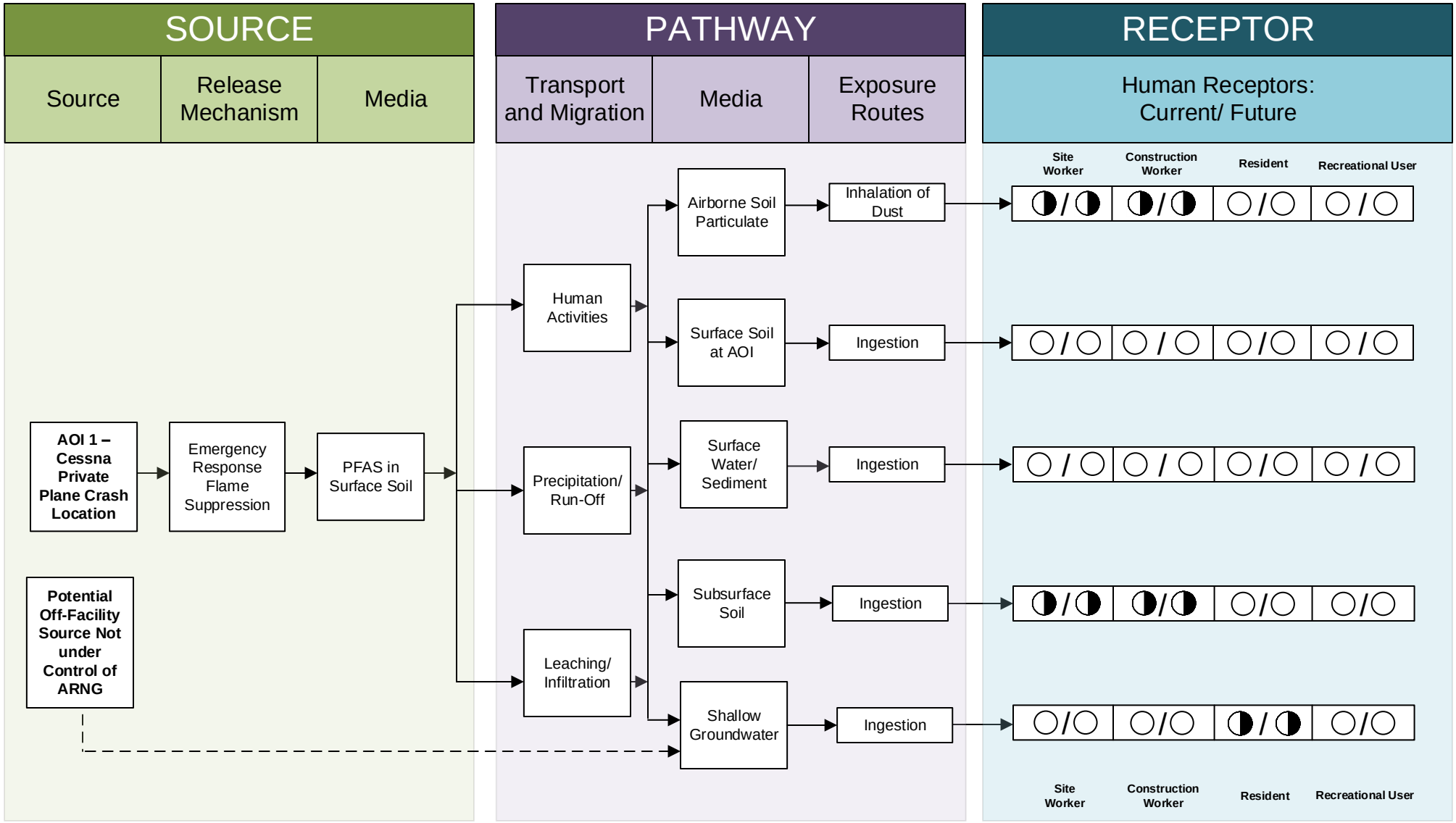

LEGEND

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

Figure 6-2
Conceptual Site Model
AOI 1 Cessna Private Plane Crash Location

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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 So. Burlington AASF/RC. The PA findings are based on personnel interviews, environmental investigations and reports, historical documents, and the visual site inspection (**Appendix A** and **Appendix B**).

7.1 Findings

One AOI related to potential PFAS release was identified at So. Burlington AASF/RC during the PA (**Figure 7-1**):

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Cessna Private Plane Crash	Burlington International Airport	1988

AOI 1 is the location of a 1988 Cessna private plane crash that the VTANG Fire Department responded to with an unknown quantity of AFFF. Based on the known PFAS release at AOI 1, there is potential for exposure to PFAS contamination in subsurface soils to site and construction workers via inhalation and ingestion, and in groundwater to residents via ingestion if PFAS is present in groundwater at the facility and migrates beyond the Winooski River, or unregistered private wells exist within the vicinity of the facility.

Additionally, the adjacent Burlington Air National Guard Base has documented releases of PFAS to the environment. According to the 2018 SI Report, AFFF releases at the adjacent Burlington Air National Guard Base have resulted in PFAS concentrations in groundwater and surface water above screening levels; however, no potential receptor pathways with immediate impacts to human health were identified. No exceedances were observed in soil or sediment. A forthcoming, expanded SI will include the investigation of the Cessna private plane crash location (AOI 1). Documented releases have also occurred at the CCC facility approximately 2 miles northwest, but these releases are unlikely to affect the So. Burlington AASF/RC.

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 VTARNG or available during the PA on the use of PFAS in training, firefighting, other non-traditional activities, or on its disposition.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of PFAS use at the facility. Sometimes the provided information was vague. 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 was first used at the Burlington Air National Guard Base (1970 to June 2015). 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 was reviewed, multiple personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected.

The following table summarizes the uncertainties associated with the PA:

Area of Interest	Source of Uncertainty
AOI 1 (Cessna Private Plane Crash)	The type, volume, and concentration of AFFF released during the emergency response is unknown. Drainage pathways for the area prior to the construction of the VTARNG facility are unclear. The volume, if any, of PFAS-containing materials removed during the construction of the facility is unknown. It is unclear whether potential PFAS at AOI 1 could be from adjacent sources.

Non-AOIs	Source of Uncertainty
F-16 Bird Strike Incident	The precise location of the incident is unknown. The type, volume, and concentration of AFFF released during the emergency response is unknown. Drainage pathways for the area prior to the construction of the VTARNG facility are unclear.
VTANG Fire Department Equipment Testing Area	The type, volume, and concentration of AFFF and duration released during nozzle testing is unknown. Runoff at this location flows northwest along the taxiway in the direction of the So. Burlington AASF/RC, it is unknown if runoff from the equipment testing area could migrate to the VTARNG facility.
VTANG Facilities	Significant construction and earth moving on VTANG properties could have moved potential PFAS sources (i.e. soil) their original location. Identification of PFAS source areas could be obscured by recent and/or ongoing construction activities.
Burlington International Airport	Recent construction of a large underground stormwater collection system on the west side of the Burlington International Airport flight line could have moved potential PFAS sources (i.e. soil) from their original location. Identification of PFAS source areas could be obscured by recent and/or ongoing construction activities at the airport.

7.3 Potential Future Actions

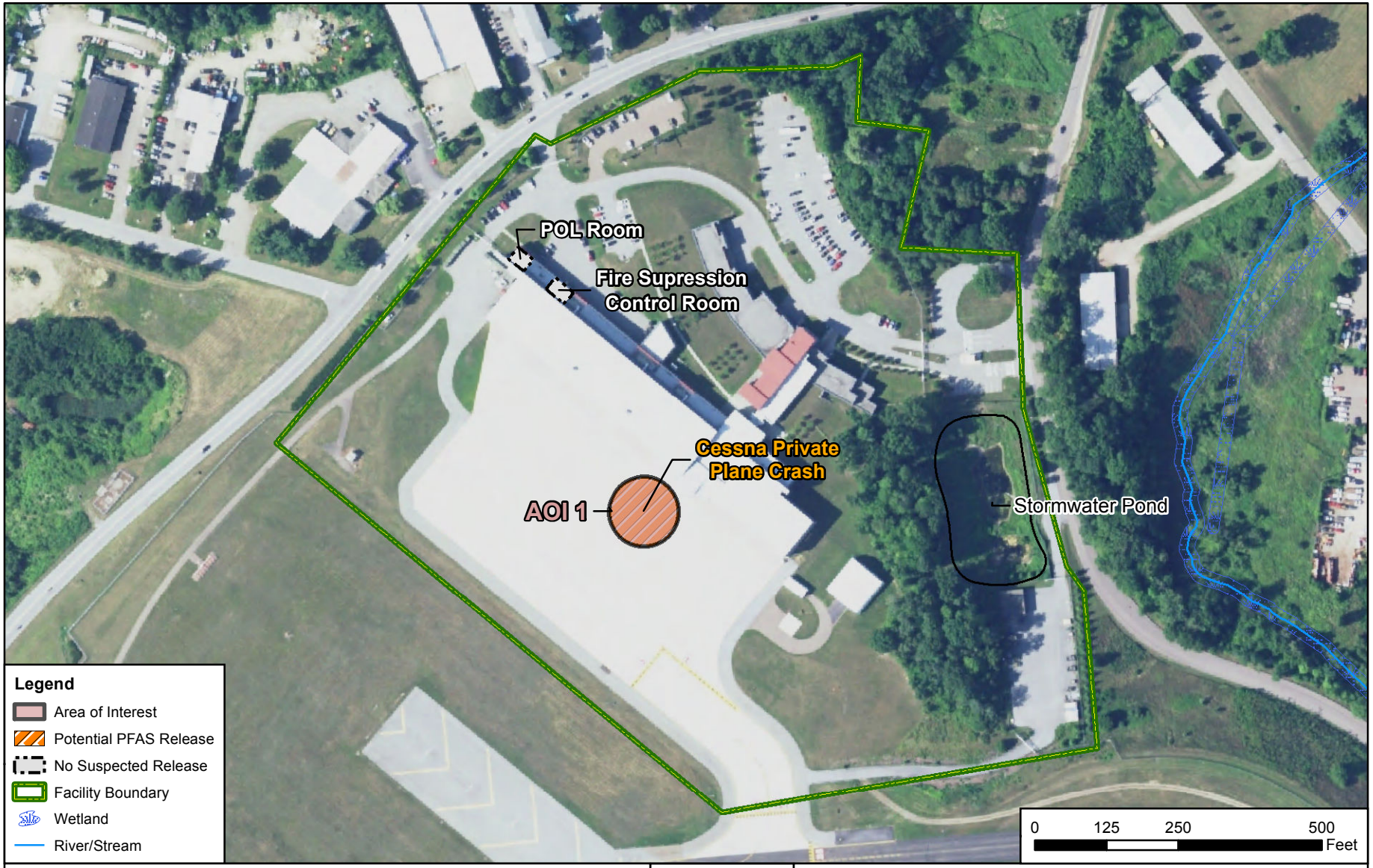
Interviews with VTARNG facility staff whose first-hand knowledge span the entire history of the So. Burlington AASF/RC (2007-present) indicate that neither current nor past ARNG activities contributed PFAS contamination to soil, groundwater, surface water, or sediment at the facility or adjacent areas.

Records and interviewees (whose first-hand facility knowledge span approximately 1988-present) indicate that VTANG Fire Department support may have resulted in potential PFAS releases at AOI 1 at the time of the crash. Based on the CSM developed for AOI 1, there is potential for site and construction workers to be exposed to PFAS contamination in subsurface soil. If PFAS is present in groundwater at the facility and migrates beyond the Winooski River, or unregistered private wells exist within the vicinity of the facility, residential use of groundwater for domestic purposes may expose residents to PFAS via ingestion. **Table 7-1** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a Site Inspection (SI).

The VTANG PFAS PA Report for the adjacent Burlington Air National Guard Base recommended initiating an SI at the Cessna private plane crash location on VTARNG property (CH2M HILL, 2015). The 2018 Final SI Report for the Burlington Air National Guard Base did not include an investigation of the Cessna private plane crash location (Aerostar SES LLC, 2018). Further assessment of PFAS impacts at each of the AFFF release areas already investigated may be warranted (via expanded SI or remedial investigation). The forthcoming expanded SI will investigate the Cessna private plane crash location. As such, future actions under the CERCLA process will be performed by the VTANG, not the VTARNG.

Table 7-1 PA Findings Summary

Area of Interest	AOI Location	Rational	VTANG Potential Future Action
AOI 1 Cessna Private Plane Crash	44°48'24.3"N and 73°16'56.1"W	Unknown quantity of AFFF used to extinguish the crash flames	Proceed to an SI, focus on soil and groundwater



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at South Burlington AASF, VT			
REVISED	3/14/2019	GIS BY	MS	3/14/2019
SCALE	1:3,000	CHK BY	JW	3/14/2019
Base Map: USGS The National Map: Imagery		PM	RG	3/14/2019

N

TITLE

Summary of Findings

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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Appendix A
Data Resources

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Data Resources will be provided separately on CD. Data Resources for South Burlington Army Aviation Support Facility/ Readiness Center includes:

South Burlington Army Aviation Support Facility/ Readiness Center Deed Information

- 1968 South Burlington AASF/ RC Deed

Previous Investigations at South Burlington Army Aviation Support Facility/ Readiness Center

- 2001 Phase I Environmental Baseline Study
- 2001 Phase II Environmental Baseline Study
- 2015 Final Preliminary Assessment Report For Perfluorinated Compounds at Vermont Air National Guard South Burlington, Vermont
- 2015 South Burlington Army Aviation Support Facility/ Readiness Center Stormwater Pollution Prevention Plan Drainage Map
- 2018 Final Site Inspections Report of Fire Fighting Foam Usage at Vermont Air National Guard Burlington Air National Guard Base, Chittenden County, Vermont

South Burlington Army Aviation Support Facility/ Readiness Center Stored AFFF Information

- 2006 CHEMGUARD 3% AFFF C-301MS Material Safety Data Sheet
- 2015 BUCKEYE PLATINUM 3%-3% ARAFFF Safety Data Sheet
- 2015 BUCKEYE 3% MIL SPEC AFFF Safety Data Sheet
- 2017 ANSULITE 3% AFFF (AFC-3MS-C) Safety Data Sheet

South Burlington Army Aviation Support Facility/ Readiness Center EDR Report

- 2018 South Burlington Army Aviation Support Facility/ Readiness Center EDR Report 5385364

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Appendix B
Preliminary Assessment Documentation

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Appendix B.1
Interview Records

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PA Interview Questionnaire - Environmental Manager

Facility: VTARNG SO. BURLINGTON
Interviewer: GVS R.
Date/Time: 5/16/18/2pm

Interviewee: LT. COL. ROY, LEEANN B. **Title:** COL / ENV. MANAGER & JACKIE **Phone Number:** 802.338.3306 **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.

2. Where can I find previous facility ownership information?

BASELINE SURVEY JAN 2007
LAND IN SO. BURLINGTON OWNED BY SO. BURLINGTON, LEASED TO USACE & LICENSED TO ARMY GUARD

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) CURRENTLY CHARGED W/ 3%. NO KNOWN RELEASES
Fire Protection at Fueling Stations
Non-Technical/Recreational/ Pest Management
Metals Plating Facility
Waterproofing Uniforms (Laundry Facilities)
Other

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?

HANGAR HAS AFFF FIRE SUPPRES. SYSTEM. -

PA Interview Questionnaire - Environmental Manager

Facility: VTARNG SO. BURLINGTON
Interviewer: GVS R.
Date/Time: 5/16/18

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?

FSS's CURRENTLY CHARGED W/AFFF (FOR HANGAR EQUIPPED W/ OVERHEAD NOZZLES)
3% BUCKEYE PLATINUM
55-GALLON AST
5 BAYS 3 ZONE SYSTEM

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

OUTSIDE VENDOR FOR SERVICE - "FIRETECH SPRINKLER" SERVICE COLCHESTER, VT
LRS LOGISTICS
& "FIREPROTEC" COLCHESTER, VT.

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)?

BUCKEYE PLATINUM 3% IN AST (55-GAL)
(3) 55 GAL CONT. CHEMGUARD 3% AFFF STORED

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?

IN FIRE SPRINKLER CLOSET INSIDE HANGAR
→ 55-GAL CONT.
STORED AS CONCENTRATE

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? NO FTA'S ON FACILITY

PA Interview Questionnaire - Environmental Manager

Facility: VT. ARNG SO. BURLINGTON
Interviewer: GJSR
Date/Time: 5/10/18

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

PA Interview Questionnaire - Environmental Manager

Facility: VTARNG 50. BURLINGTON
Interviewer: GJSR
Date/Time: 5/16/18

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? N/A

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

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?

COLCHESTER FIRE DEPT.

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)? N/A

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

PA Interview Questionnaire - Environmental Manager

Facility: VTANG SO BURLINGTON
Interviewer: GUS R
Date/Time: 5/10/18

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? N/A

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

PHASE I & II FACILITY REPORTS
KNEELAND EBS

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.? N/A

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? NONE DISPOSED BASED ON RECOLLECTION

PA Interview Questionnaire - Environmental Manager

Facility: VT ARNG SO. BURLINGTON
Interviewer: GVSR
Date/Time: 5/12/10

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

VT AIR NG FIRE DEPT

PA Interview Questionnaire – Fire Station AIR GUARD FD INTERVIEW

Facility: VT ARNG SO. BURLINGTON
Interviewer: GUS R.
Date/Time: 5/16/18

Interviewee: VT AIRNG FIRE DEPT **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.

   1ST RESPONDERS FOR VTARNG — FD TRAINING
   3RD ALARM FOR CITY OF BURLINGTON
   COUNTY TANKER TASK FORCE
   FIRESUPPRESS. @ BURLINGTON AIRPORT

VTARNG Interviewees:
Don Morrisseau
Tom Moore
LTC Rick Trayah

2. What can you tell us about the history of 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 (e.g., ramp washing)
   Fire Training Areas — BEHIND FIRE DEPARTMENT
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management

3. 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 at the AFFF/suppression systems?

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? HANGARS 3 & 4

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

Notes from the interview with VTANG FD are included on the following pages.

VT AIR NG INTERVIEW

PA Interview Questionnaire – Fire Station

5 PALLATS
18 TO PALLET

SINGLE TANK CRASH TRUCKS

Facility: SO. BURLINGTON
Interviewer: GUS R.
Date/Time: 5/16/18

(802) 578-0963 MORISSEAU DON FAIRIS

Interviewee: **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

SO. BURLINGTON AIR GUARD

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

8' OF SOIL EXCAV. NEXT TO FLIGHTLINE FOR RUNWAY

TESTED SOIL?

2. What can you tell us about the history of 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 (e.g., ramp washing)
Fire Training Areas
Firefighting (Active Fire)
Crash
Fire Suppression Systems (Hangers/Dining Facilities)
Fire Protection at Fueling Stations
Non-Technical/Recreational/ Pest Management

RICK MAYE EXTINGUISHERS 50 lb or (2) 120 lb or

INSPECTED ONCE

3. 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 at the AFFF/suppression systems?

(5)

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?

SUMMER 2017 SWITCHED TO SINGLE FROM TRI-MAX

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

READ. SQUAD.

HANGAR 3 & 4

COMPANY TESTED TO DRAIN

(DRIPS)

(LRS)

FOAM TRAILER 500GALS BLDG 7 & HERE

LOGISTICS – BACKSTOCK

~~THERE ARE~~ HANGARS 6 – ~~HIGH EXPANSION FOAM~~

10 – 20 YEARS

EACH TESTED – MOST BLEW AWAY

5/16/18

~ MUTUAL AID – OFF BASE

AIRGUARD DOES WINUSKI

INTER CITY 3RD ALARM
COUNTY TANKER
~~TASK FORCE~~

GW BASE

AMB.
FIRE
WILLIS
WINUSKI
SO. BURL.

PHASE 5

~ SO. BURLINGTON AROUND BASE

~ ALL WELLS HAD EXCEEDENCES TO FOX TROT

~ NO SOIL VALUES

– 1,200 (EPA) SCREENING USED

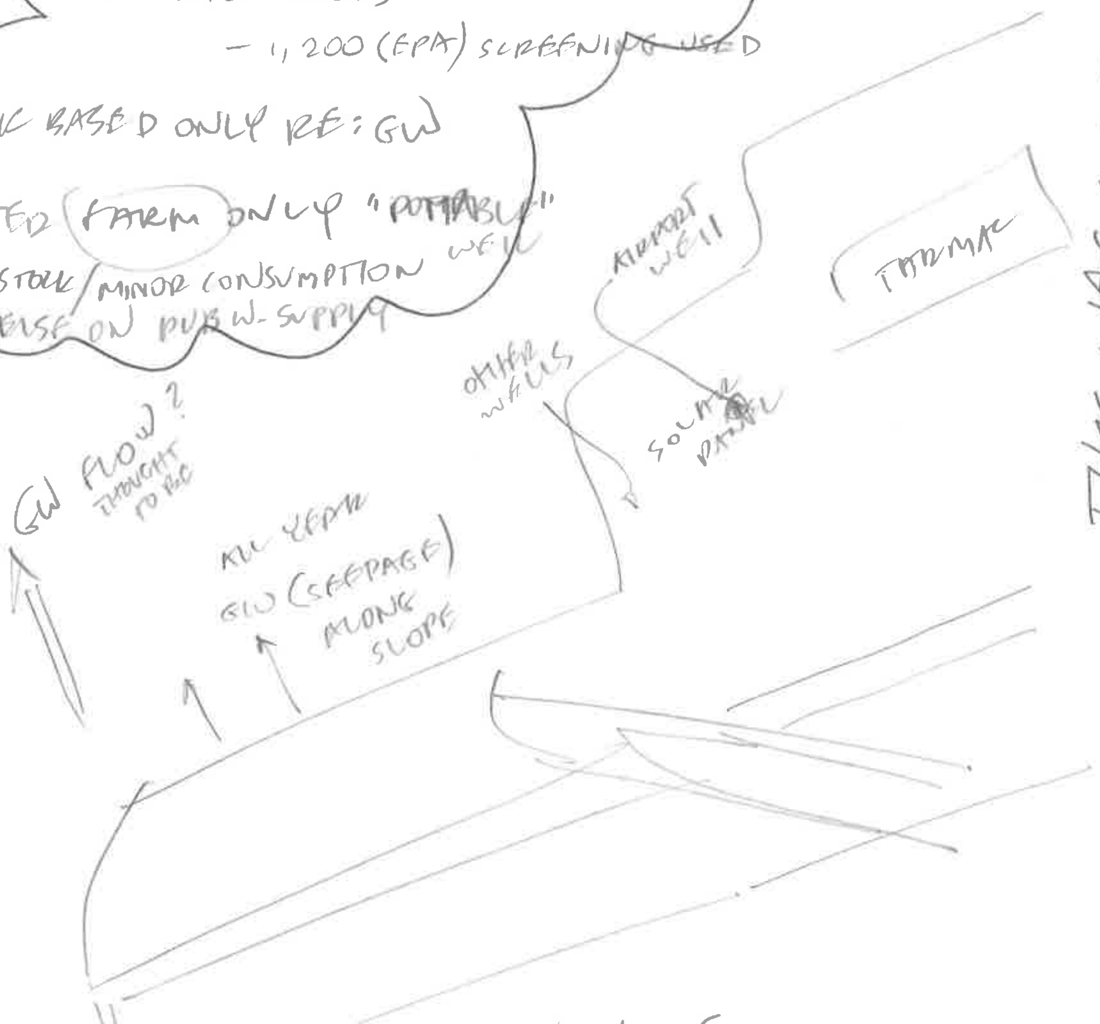
~ RISK BASED ONLY RE: GW

~ BELTER FARM ONLY "POTABLE" WELL

LIVESTOCK / MINOR CONSUMPTION

ALL ELSE ON PUB W. SUPPLY

THIS WAS INTERVIEWS WITH AIRGUARD FIRE DEPARTMENT



→ ~~1ST RESPOND FOR GUARD~~

→ UP TO 15 MIN FOR MUT.

FOR CRASH TRUCK

4 CRASH TRUCKS

~ INSIDE

'87 PLANE 3%

CESSNA

95-96 BARRIER ENGAGEMENT WHEEL BRAKE (F-16)

~ ~~FD TRAINING~~

~ ~~BEHIND FD~~ (FTA)

→ 20+ YEARS AGO STOPPED AFFF

FIRE

AIR QUALITY BOARD

JP-8 USED

URS

FIELD REPORT

Project No. & Name SO. BURLINGTON

Date

Reported By

CONTINUED

ARMY AVIATION SUPPORT FACILITY
(AASF)

2007 YEAR OF CONSTR.

SHARED W/ BURLINGTON AIRPORT
HISTORIC REPORTS AVAIL. TOO

NEXT / OLD 1954 ATC?
BAKERY SHOP —
METAL MARKING
- QUALITY BAKE SHOP - ALLEN NYE
VT ANG → CHIEF IS FEDERAL EMPLOYEE

NO VOLUNTEERS → SO. BURLINGTON
STATE AGENCY
AIRGUARD → 1ST RESPONDERS
NO ARMY GUARD

NO TESTING OF AFFF AT THIS FACILITY

VIA LT. COL. PAY
VIA PAY
RICKY - NO SPRINKLER SYSTEM
COL. JOHNSTON - (890 BLDG)
JOHN
LT. COLONEL TRAPATT

80's, 90's
3%
BUCKEYE AFFF 3% → NON-PFOA

RECHARGE OF SYSTEM?

TO M-MOORE

15,000 WATER & AFFF

AECOM

JOB TITLE _____

JOB NO. _____ CALCULATION NO. _____

ORIGINATOR _____ DATE _____

REVIEWER _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

SOUTH BURLINGTON

TOM MOORE

LT COL. RICK TRAYAH → AIR GUARD; SHOWED US AUTOMATIC FIRE SUPPRESSION SYSTEMS IN HANGAR(S) @ SO. BURL. AIR GUARD FACILITY

DON MORRISSEAU (802) 578. 0963

Grid: 5x5 = 1 in

HISTORIC PHOTOS? GO TO CE & AIRPORT CIV ENG.

PA Interview Questionnaire – Fire Station

Facility: CIV ENG.
Interviewer:____________
Date/Time:____________

6. 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)?
7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?
8. 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?
9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated? DRMRS
10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?
11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past? HAND LINE TESTS – TURRETS P19 ONCE A YEAR X5 C-8 FOAM ONGOING EXPAN. (TAXIWAY) EXPAN. dig

BUILDINGS? 100, 150, 360, 385 — W/ HIGH EXP. FOAM

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

12. 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?

ACROSS (87 → 02-03 years?)

13. What types of fuels/flammables were used at the FTAs?

JP-8

SO. BRL. SEWER → STORM DRAIN TO EAST

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was 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?

(POTENT. POND) FOR SED. SETTL.

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us?

FAA - RTR
REPEAT RADAR
NO FIRE AFFF

16. Did individual units come on-post 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?

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

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

18. 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?

19. 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?

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

21. 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 water treatment plants, and AFFF ponds)?

NO AFFF ONLY C-6

PROTEIN FOAM PRE 70's

COUNTY DOES FOAM TRAINING

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved?
23. 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?
24. Do you recommend anyone else we can interview? If so, do you have contact information for them?

AIR GUARD FIRE DEPT SO. BURL.

Redacted Name

802.660.5966

STATE ENV.

Redacted Name

" " .5926

DONT USE NAMES

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Appendix B.2
Visual Site Inspection Checklists

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Visual Site Inspection Checklist

Names(s) of people performing VSI: GUS R. (AECOM)

Recorded by: GUS R.

ARNG Contact: 5/16/18

Date and Time: 5/16/18

Method of visit (walking, driving, adjacent):

Source/Release Information

Site Name / Area Name / Unique ID: VT ARNG AVIATION SUPPORT FACILITY @ SO. BURLINGTON

Site / Area Acreage:

Historic Site Use (Brief Description): USED AS AIRFIELD SINCE 1920, AUGUST

Current Site Use (Brief Description): AVIATION SUPPORT FACILITY & READINESS CENTER
MAINT. OF AIRCRAFT IN HANGAR STRUCTURE, OFFICES

Physical barriers or access restrictions: RESTRICTED

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):

N/A

2. Has usage been documented? Y (N)

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

N/A

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

3a. Indicate what businesses are located near the site

SO. BURLINGTON INTL. AIRPORT
VERMONT AIR NATIONAL GUARD

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

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

BURLINGTON INTL. AIRPORT

1ST FLIGHT = AUGUST 14, 1920
1920 TO 1926 - STREET DEPARTMENT (MANAGED)
1923 - WOODEN TERMINAL
1926 - CIVIL AERONAUTICS AUTHORITY EST.
1928 - NEW RUNWAYS; COMMERCIAL FLIGHTS IN 1931
1929 - NEW HANGAR
1942 - CIVIL AIR PATROL
VTANG } 1946, JULY 1 - VTANG
PROVIDES AIR CRASH RESCUE THROUGH
AT LEAST 1973
1974 "OPERATION ROOSBIRD" (FIRE TRAINING EXERCISE)

Visual Survey Inspection Log # DRY CHEMICAL EXTINGUISHANT (AMMONIUM PHOS.)

Other Significant Site Features:

1. Does the facility have a fire suppression system? Y / N (3) DRUMS LOT NO. 7004B 55-GAL [PACKED 9/06]

1a. If yes, indicate which type of AFFF has been used: AST = BULKEYE PLATINUM 3% AR AFFF

(1) 55-GAL. DRUM CHEMGUARD 3% AFFF ANSULITE 3% AFFF (AFC-3MS) / 5 PALLETS TOTAL / PALLET STORED (18) 5-GAL BUCKETS

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

FIRE TECH SPRINKLER CORP., COLCHESTER, VT INSPECTED/TESTED 3-13-18 (SEE TAG - PHOTOGRAPH)

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

UNK

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

NO

Transport / Pathway Information

Migration Potential:

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

1a. If so, note observation and location:

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:

HANGAR - CONCRETE (HEATED) FLOOR - SEALED

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:

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:

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

Appendix B.3
Conceptual Site Model Information

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Preliminary Assessment – Conceptual Site Model Information

Site Name: South Burlington Army Aviation Support Facility / Readiness Center

Why has this location been identified as a site?

This site is an ARNG facility with aviation assets that commonly use AFFF for fire suppression. It is also located on an airstrip with potential neighboring PFAS sources.

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

The Burlington Air National Guard, Burlington International Airport, and other private aviation Industry facilities

Training Events

Have any training events with AFFF occurred at this site? No fire training has ever occurred at the facility

If so, how often? NA

How much material was used? Is it documented? NA

AFFF is stored on the facility and charged in suppression systems*

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? Generally north/northwest towards the Winooski River

Average rainfall? Approximately 38 inches annually (NOAA, 2018)

Any flooding during rainy season? Unknown

Direct or indirect pathway to ditches? Yes

Direct or indirect pathway to larger bodies of water? Yes

Does surface water pond any place on site? Yes, along the eastern boundary

Any impoundment areas or retention ponds? Unknown

Any NPDES location points near the site? Unknown

How does surface water drain on and around the flight line? Drainage at the facility generally flows east towards ponds and a stream tributary of the Winooski River

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Northeast, consistent with topography

Depth to groundwater? Groundwater in an area adjacent to the airport is approximately 10ft bgs

Uses (agricultural, drinking water, irrigation)? No known use. Champlain Water District (CWD) supplies public water from Lake Champlain

Any groundwater treatment systems? No

Any groundwater monitoring well locations near the site? No known monitoring wells nearby

Is groundwater used for drinking water? No

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? NA

Do we understand the fate of sludge waste? NA

Is surface water from potential contaminated sites treated? NA

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go?
Yes, at a non-engineered containment area and Building 90.

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?
Unknown

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker - Yes

Construction Worker - Yes

Recreational User - Yes

Residential - Potentially

Child

Ecological - Yes

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

Documentation

Ask for Engineering drawings (if applicable).

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

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Appendix C
Photographic Log

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APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	South Burlington Army Aviation Support Facility/ Readiness Center	Vermont

Photograph No. 1

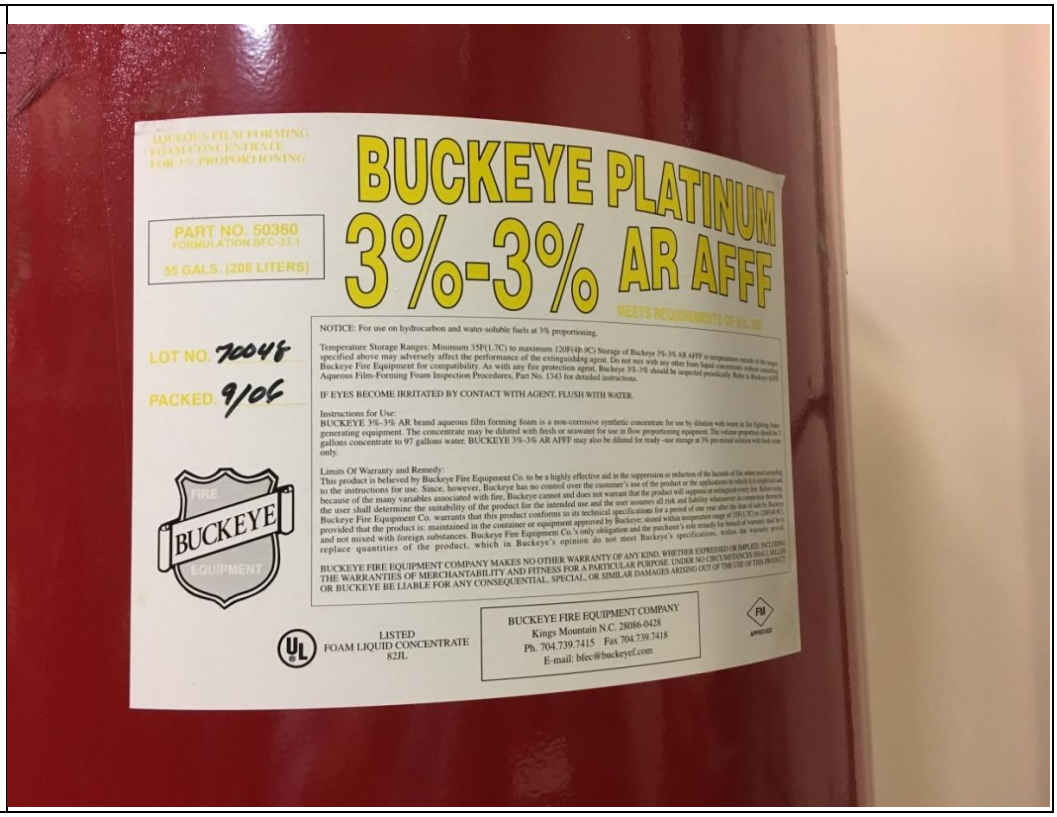
Description:

View of AFFF AST stored in the POL storage room.

Photograph No. 2

Description:

Close-up view of the POL storage room AFFF AST containing 55-gallons of Buckeye Platinum 3% AFFF.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	South Burlington Army Aviation Support Facility/ Readiness Center	Vermont

Photograph No. 3

Description:

View of AST used to pressurize fire suppression system.

Photograph No. 4

Description:

View of three 55-gallon plastic containers stored in the fire suppression system closet.

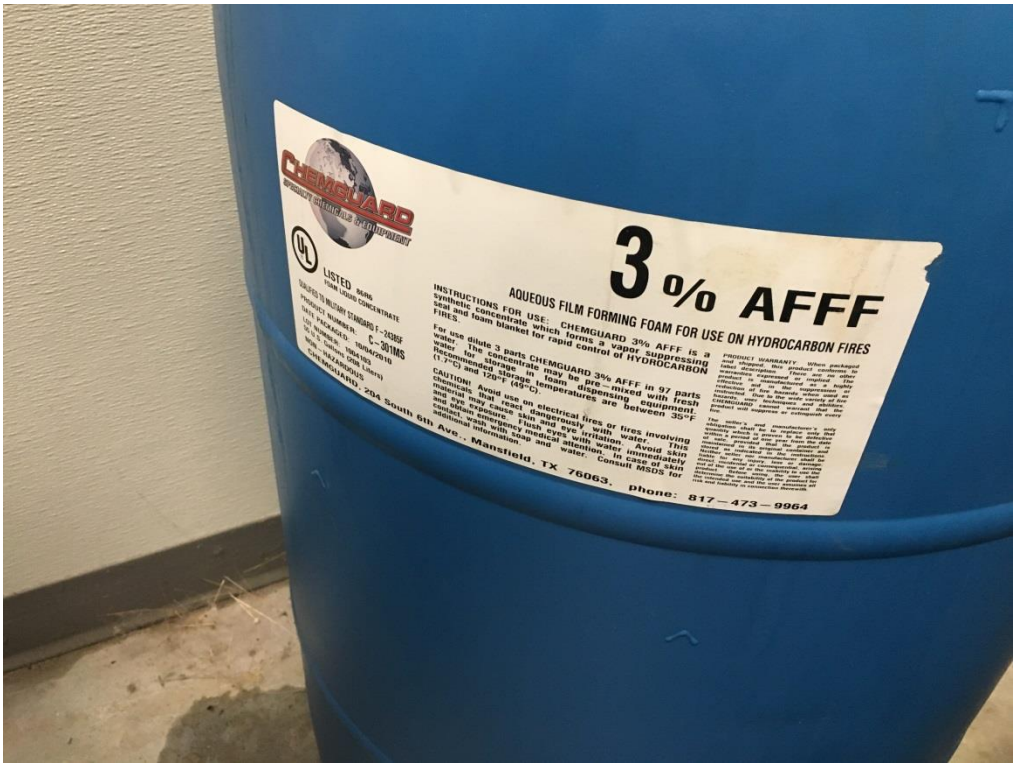
APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	South Burlington Army Aviation Support Facility/ Readiness Center	Vermont

Photograph No. 5

Description:

Close-up view of 55-gallon plastic container containing Chemguard 3% AFFF.



Photograph No. 6

Description:

View of fire suppression system piping at ceiling level.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	South Burlington Army Aviation Support Facility/ Readiness Center	Vermont

Photograph No. 7

Description:

View of the fire suppression control room AFFF AST and fire suppression system piping components. This system serves the hangar.

Photograph No. 8

Description:

View of carts stored in hangar containing dry chemical fire retardant.