Final
Preliminary Assessment Report
Camp Johnson
Colchester, Vermont

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

April 2019

Prepared for:

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

U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, MD 21201

Prepared by:

AECOM
12420 Milestone Center Drive, Suite 150
Germantown, MD 20876
aecom.com

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

THIS PAGE IS INTENTIONALLY BLANK

Table of Contents

Executive Summary.....1
1. Introduction.....5
1.1 Authority and Purpose.....5
1.2 Preliminary Assessment Methods.....6
1.3 Report Organization.....6
1.4 Facility Location and Description.....7
1.5 Facility Environmental Setting.....8
1.5.1 Geology.....8
1.5.2 Hydrogeology.....9
1.5.3 Hydrology.....11
1.5.4 Current and Future Land Use.....12
1.5.4 Climate.....12
2. Fire Training Areas.....17
3. Non-Fire Training Areas.....19
3.1 Former Wood Dump Station.....19
3.2 Building 2908 - Former Hangar.....19
3.3 Former Ethan Allen Army Airfield.....20
3.4 Pond Near Champlain Cable Corporation.....20
3.5 Waste Water Treatment Plant.....21
3.6 Landfills.....21
4. Emergency Response Areas.....23
5. Adjacent Sources.....24
5.1 Champlain Cable Corporation.....24
5.2 Burlington Air National Guard Base.....24
5.3 Fort Ethan Allen Historic District.....25
6. Conceptual Site Model.....29
6.1 Pond Near CCC.....29
7. Conclusions.....33
7.1 Findings.....33
7.2 Uncertainties.....33
7.3 Potential Future Actions.....34
8. References.....37
Appendix A Data Resources.....40
Appendix B Preliminary Assessment Documentation.....41
Appendix B.1 Interview Records.....42
Appendix B.2 Visual Site Inspection Checklists.....43
Appendix B.3 Conceptual Site Model Information.....44
Appendix C Photographic Log.....45

Figures

Figure ES-1 Summary of Findings
Figure ES-2 Conceptual Site Model, Camp Johnson
Figure 1-1 Facility Location
Figure 1-2 Groundwater Features
Figure 1-3 Surface Water Features
Figure 3-1 Non-Fire Training Areas
Figure 5-1 Adjacent Sources, CCC and FEA
Figure 5-2 Adjacent Sources, Burlington ANG Base
Figure 6-1 Potential PFAS Release at CCC
Figure 6-2 Conceptual Site Model, Pond Near CCC
Figure 7-1 Summary of Findings
Figure 7-2 Conceptual Site Model, Camp Johnson

Appendices

Appendix A Data Resources
Appendix B Preliminary Assessment Documentation
B.1 Interview Records
B.2 Visual Site Inspection Checklists
B.3 Conceptual Site Model Information
Appendix C Photographic Log

Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
CCC	Champlain Cable Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and LiabilityAct
CJ	Camp Johnson
CJCA	Camp Johnson Cantonment Area
CJTA	Camp Johnson Training Area
CSM	conceptual site model
CWD	Champlain Water District
EDR	Environmental Data Resources, Inc.
F	Fahrenheit
FEA	Fort Ethan Allen
FTA	Fire Training Areas
IED	Installations & Environment Division
N	north
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
ppt	parts per trillion
SI	Site Inspection
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VSI	visual site inspection
VTARNG	Vermont Army National Guard
W	West
WWTP	Waste water treatment plant

THIS PAGE IS INTENTIONALLY BLANK

Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division (IED), 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 released as part of firefighting activities, although other PFAS sources are possible.

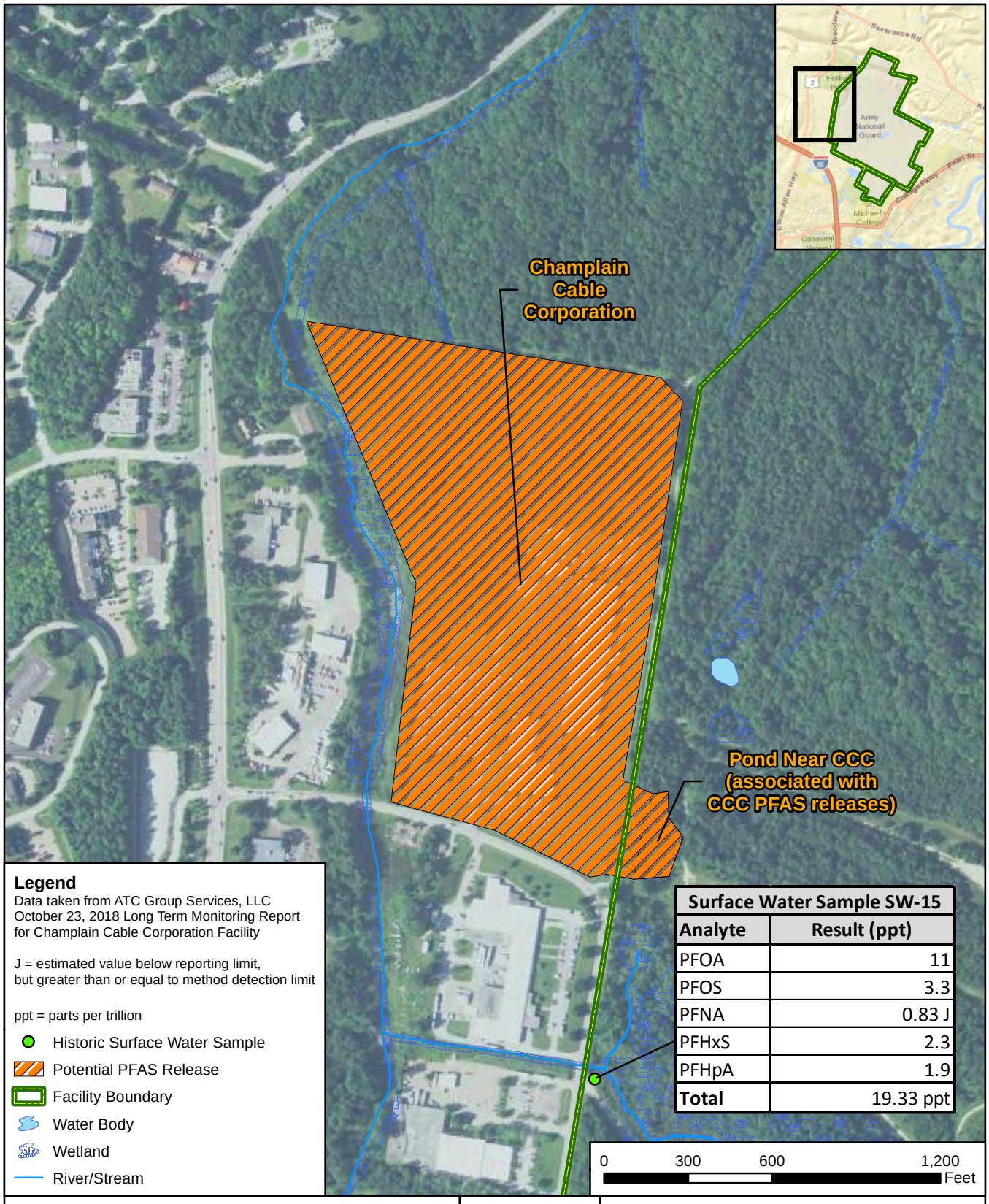
AECOM completed a PA for PFAS at the Vermont Army National Guard (VTARNG) Camp Johnson (CJ) in Colchester, Vermont, to assess potential PFAS release areas and exposure pathways to receptors. The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day PA site visit on 15 May 2018
- Interviewed current and former CJ personnel during the PA site visit including two Environmental Managers, a Facilities Management Officer, a Fire Department Chief
- 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

Based on the documented absence (1988-present) of the use or release of PFAS-containing materials at CJ, no AOIs were identified during the PA. Evidence does not indicate that current or former ARNG activities contributed PFAS contamination to soil, groundwater, surface water, or sediment at the facility or adjacent areas. CJ will not move forward in the CERCLA process.

However, off-facility PFAS releases were confirmed at the adjacent Champlain Cable Corporation (CCC) property. The CCC manufactures wire and cable coatings. These manufacturing processes have been found to use PFAS. Between 1966 and 1977, CCC liquid wastes were poured onto the ground along the roadway to the east of the CCC property and in an area to the northeast of the facility. PFAS was detected in groundwater at the CCC property and in surface water in a small pond at CJ, adjacent to the CCC property. The CCC property adjacent source and affected surface waters on CJ are shown on **Figure ES-1**.

Given the PFAS-laden waste releases by the CCC, it is presumed that PFAS is migrating to CJ in surface water and possibly groundwater. Thus, there is potential for CJ site and construction worker exposure to PFAS contamination in surface and subsurface soils, and recreational user/trespasser exposure to PFAS contamination in surface soil. There is also potential for exposure to PFAS contamination in surface water via the small pond at CJ to site and construction workers, and recreational users/trespassers via ingestion. Although groundwater is not used for drinking water at CJ, groundwater may be used off-facility by residents for drinking water. As such, off-facility residents may be exposed to PFAS contamination in groundwater via ingestion. The CSM for CJ is shown on **Figure ES-2.**



Legend

Data taken from ATC Group Services, LLC October 23, 2018 Long Term Monitoring Report for Champlain Cable Corporation Facility

J = estimated value below reporting limit, but greater than or equal to method detection limit

ppt = parts per trillion

- Historic Surface Water Sample
- Potential PFAS Release
- Facility Boundary
- Water Body
- Wetland
- River/Stream

Surface Water Sample SW-15	
Analyte	**Result (ppt)**
PFOA	11
PFOS	3.3
PFNA	0.83 J
PFHxS	2.3
PFHpA	1.9
Total	19.33 ppt

0 300 600 1,200 Feet

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:6,000	CHK BY	JW	3/19/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	3/19/2019

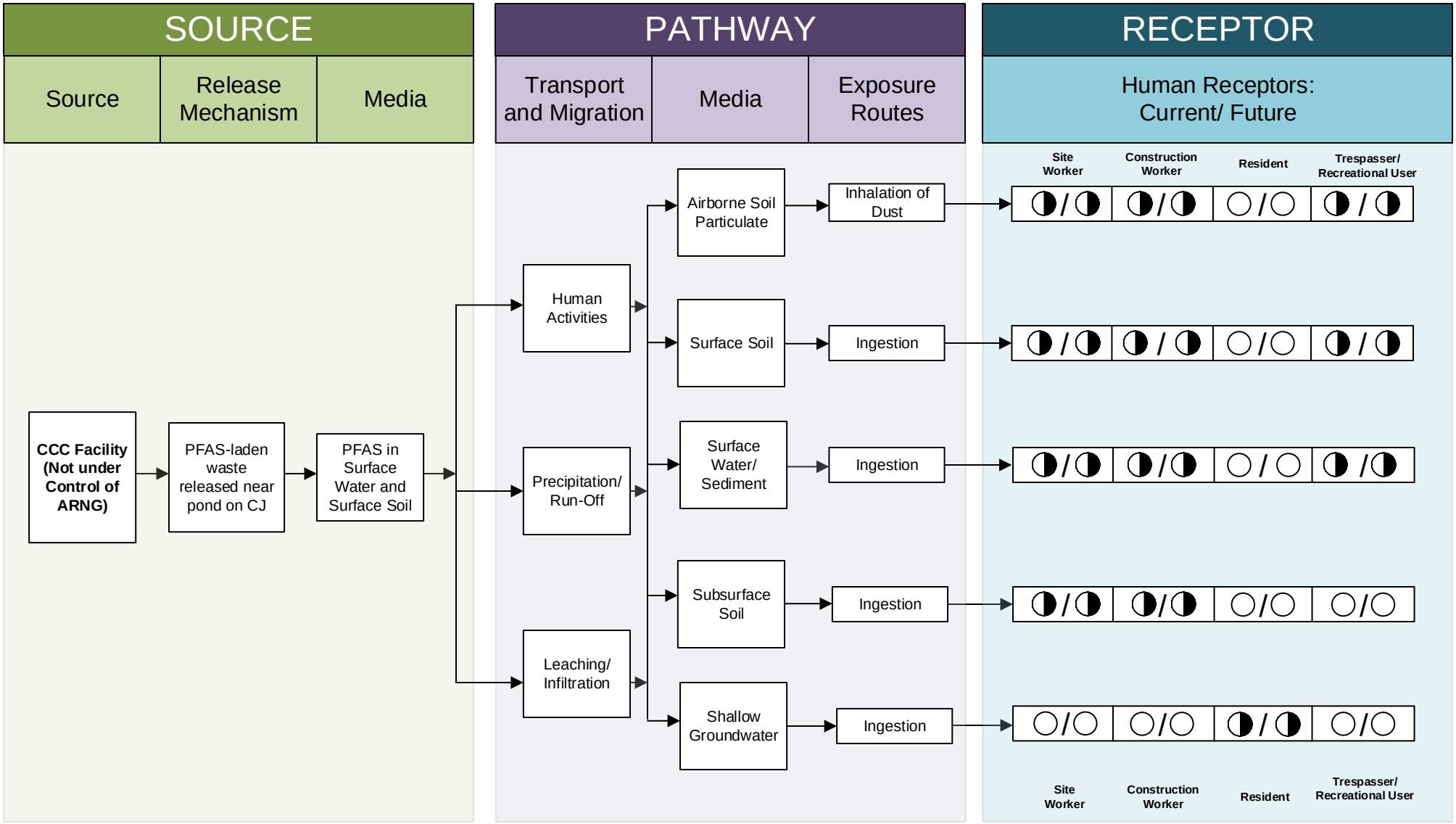
N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\TS_Camp_Johnson\Fig_ES-1_TS-Camp_Johnson_Summary.mxd



LEGEND

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

Figure ES-2
Conceptual Site Model
Camp Johnson

THIS PAGE IS INTENTIONALLY BLANK

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 (IED), 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 receiving increasing regulatory interest due to their potential risks to human health and the environment. 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. The Vermont Department of Health has derived a Drinking Water Health Advisory of 20 parts per trillion (ppt) applicable to the sum of PFOA (perfluorooctanoic acid), PFOS (perfluoro-octane sulfonic acid), PFHxS (perfluorohexane sulfonic acid), PFHpA (perfluoroheptanoic acid) and PFNA (perfluorononanoic acid) (Vermont Department of Health, 2018; VANR, 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 PFAS 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 also applies to the sum of these substances (Vermont Agency of Natural Resources, 2018).

This report presents the findings of a PA for PFAS at Vermont Army National Guard (VTARNG) Camp Johnson (CJ) in Colchester, 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 at CJ where PFAS may have been released to the environment. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components 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 15 May 2018
- Interviewed current CJ personnel during the PA site visit including two Environmental Managers, a Facilities Management Officer, a Fire Department Chief
- Completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs
- If areas of interest (AOIs) were identified, developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS 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:

- **Section 1** – **Introduction** identifies the project purpose and authority and methods used to complete the PA
- **Section 2** – **Site Description** describes the location, description, background and current and future land use of the facility
- **Section 3** – **Environmental Setting** describes the climate, hydrology, geology and hydrogeology at and surrounding the facility
- **Section 4** – **Fire Training Areas** describes locations at the facility where AFFF releases related to fire training were documented or otherwise identified
- **Section 5** – **Non-Fire Training Areas** describes locations at the facility where AFFF releases not related to fire training were documented or otherwise identified
- **Section 6** – **Emergency Response Areas** describes emergency or crash sites at the facility where AFFF releases were documented or otherwise identified
- **Section 7** – **Adjacent Sources** describes potential offsite PFAS sources adjacent to the facility that are not under the control of ARNG
- **Section 8** – **Conceptual Site Model** describes the Source-Pathway-Receptor linkages of PFAS at each AOI
- **Section 9** – **Conclusions** summarizes the findings and presents the conclusions of the PA
- **Section 10** – **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

CJ, the headquarters of the VTARNG, is in western Chittenden County, Vermont, within the southern corner of the City of Colchester, approximately four miles northeast of the City of Burlington and the waters of Lake Champlain, and approximately three miles north of Burlington International Airport (**Figure 1-1**).

CJ is bound to the north by mostly undeveloped land and some residential developments, to the south by State Route 15, residential developments, and Saint Michael's College; to the east by State Route 15, commercial and industrial properties, and residential developments; and to the west by Interstate 89, US Route 2, commercial and industrial properties, and Gilbrook Nature Area. The communities of South Burlington, Winooski, and Essex are situated to the south, east, and west of CJ, respectively.

CJ is divided into CJ Cantonment Area (CJCA) and CJ Training Area (CJTA). The largely developed CJCA is about 60 acres of near-level terrain and occupied by buildings and roads. The remaining 600 acres makes up the CJTA containing an airfield (used between the 1920s and 1960) and forested lands. The reference point and surface elevation at the geographic center of the camp is 44° 31' 18" and 44° 29' 56" North (N) latitude and 73° 10' 18" and 73° 09' 01" West (W) longitude at 315.8 feet above mean sea level (amsl), respectively. The southern and western portions of CJ are fenced. Vehicle traffic enters the facility through the main gate on State Highway 15 to the south, or the back gate near US Route 2 to the west. Access to the property is limited to authorized personnel and is guarded at all hours.

The original land occupied by CJ (600 acres) was purchased by residents and donated to the Army on 5 August 1892. The military post was officially named Fort Ethan Allen (FEA). By the end of 1895, FEA was fully functional with 247 soldiers (Buechler, 1967). In 1896 VTARNG purchased and converted a 50-acre campground adjacent to FEA into a state reservation that gave the troops a permanent location for annual training (Haraty, et al. 1979). After World War I, a permanent water system, a sewage system, latrine and shower buildings, 16 kitchen/mess buildings and a fence around the facility were constructed at the state reservation. A concurrent camp was also constructed just outside the state reservation in the 1930s (UVM, 2001). FEA was declared inactive in 1944. The facility served as a storage depot for searchlights, generators, and other equipment for the next five years (VTSHPO, 1988, rev. 1995).

The state reservation was named Camp Johnson in 1945, and in the 1950s the VTARNG established its headquarters at Camp Johnson. Facilities were improved, and new buildings were built to accommodate the camp's new role. By 1951, CJ covered 90 acres (VTSHPO, 1988, rev. 1995; UVM, 2001).

In 1949, FEA was transferred to the Air Force and re-named the Ethan Allen Air Force Base. The Air Force de-activated the base in 1960 and 787 acres reverted to the Army. Much of this land was eventually annexed to the VTARNG and incorporated into CJ. Helicopter training still occurs at the airfield, but no airplane activity occurs and no airstrip is present. The rest of the base, including 170 buildings, was designated as surplus and turned over to the General Services Administration for disposal (VTSHPO, 1988, rev. 1995; Isham, 1978; Arcuti, 1999).

Historically, FEA and CJ are distinct. The fort played a major role in Vermont as a federal military installation that housed regular Army and Air Force troops. CJ exists where it does today as a result of the establishment of FEA. Members of the VTARNG still use the facility for annual training and call-ups in times of conflict and emergency. Over the years, CJ has expanded in physical and organizational substance. The facility's acreage has increased more than ten-fold and has risen to the role of state headquarters.

1.5 Facility Environmental Setting

CJ is in northwestern Vermont, on a sandy outwash plain between the Green Mountains and Lake Champlain. Situated within the southern corner of the City of Colchester, CJ covers about 660 acres of the City's land surface.

The most prominent feature of CJ is the training area occupying approximately 600 acres of forested lands and ponds. The remaining 60 acres is the cantonment, with a variety of buildings and some areas leased to other entities. Fifteen acres are leased to Saint Michael's College for a recreational field/buffer zone south of the CJCA. Other structures include a racetrack, drill field, and rifle butt (Historic Preservation Plan, 2004).

The surface topography of CJ is generally flat, with an average elevation of 315 feet amsl. Drainage from the north of the property generally slopes north to a series of swales that lead to the Sunderland Brook. Drainage from the main facilities slopes south to the Winooski River. The regional area is considered to have a gently rolling topography.

1.5.1 Geology

Northwestern Vermont is dominated by late Precambrian through early Paleozoic rocks metamorphosed by at least three mountain-building events. The resulting folds and faults yield a north-south trending structural fabric that strongly influences all drainage basins and mountains. CJ is situated within the Vermont Lowlands and the Champlain Valley, the northernmost unit of the greater landform system known as the Great Appalachian Valley. The region is characterized as a rolling topography of hills and valleys that broadly stretches eastward from the Lake Champlain's shore to the base of the Green Mountains. The Vermont Lowlands are primarily underlain by sedimentary rocks, mostly shale and limestone, though metamorphic rocks such as marble and slate are also present. Vermont soils are dominated by glacial till (the material deposited beneath the ice sheet) interspersed with appearances of lacustrine, outwash, alluvium, and organic deposits (Ansley, 2000).

CJ is underlain by the lower Cambrian Winooski Formation, middle Cambrian Danby, the upper Cambrian Clarendon Springs Formation, and the Ordovician Shelburne Formation (**Figure 1-2**). The Winooski Formation consists of weathered pink, buff, and gray dolomite with beds 1 inch to 1 foot thick separated by thin siliceous layers. The Danby formation is comprised of interbedded quartzite and dolomite with massively bedded Potsdam quartzite in western Vermont. The Clarendon Springs Formation is composed of weathered gray dolomite characterized by numerous geodes and knots of white quartz. The Shelburne Formation is composed primarily of marble or gray limestone characterized by raised lines of gray dolomite on the weathered surface (Chapman, 1937; Frazier and Schwimer, 1987; Vermont Geological Survey, 1961, 1964, 1974).

During the Pleistocene, the region was repeatedly covered by advancing and retreating glaciers, the last being the Laurentide Ice Sheet. The last retreat created the Lake Champlain Basin. As the shoreline receded, an extensive sequence of beaches and river deltas were deposited (Wright, 2009). CJ is situated on an upper marine delta deposited by the paleo-Winooski River. This glaciolacustrine delta formed the large plateau, currently 200 feet above Lake Champlain, upon which CJ is sited. This ancient Winooski River delta is composed of well- to poorly-sorted sand sequences with scarce gravel stringers. These sequences thicken from approximately 30 feet near the southeast corner of CJ to approximately 100 feet where Sunderland Brook intersects US 2/7 near the northwest corner of the CJ (Chapman, 1937; Fischer, 1980).

Numerous soil types are present on CJ. Soils on CJ are mostly sandy loams and loamy sands of the Adams, Windsor, Duane, Deerfield, Hartland, Agawam, and Au Gres types. Some soils have already received impacts in the form of cutting and filling activities while some are overlain by pavement or support facilities.

Adams and Windsor soils are somewhat excessively drained, and gently sloping to moderately steep soils form on sandy glaciofluvial deposits. The surface layer consists of 0 to 7 inches of loamy sand. The subsoil consists of loamy fine sand from approximately 7 to 32 inches and gravelly loamy fine sand from approximately 32 to 65 inches. Permeability is high to very high and available water capacity is low (USDA, 2008).

Hartland soils are moderately well drained, and soils form on sandy glaciofluvial deposits. The surface layer consists of 0 to 4 inches of fine sandy loam. The subsoil is comprised of gravelly loamy fine sand from approximately 4 to 15 inches and very gravelly sand from approximately 15 to 52 inches. Permeability is high and available water capacity is low (USDA, 2008).

Duane and Deerfield soils are moderately well drained, and soils form on sandy and gravelly glaciofluvial deposits. The surface layer consists of 0 to 4 inches of fine sandy loam. The subsoil consists of gravelly loamy fine sand from approximately 4 to 15 inches and very gravelly sand from approximately 15 to 52 inches. Permeability is high and available water capacity is very low (USDA, 2008).

1.5.2 Hydrogeology

CJ is located within the Winooski River Watershed of the St. Lawrence River Basin, within which is the Lake Champlain Basin. The Lake Champlain Basin is the entire drainage area for Lake Champlain. Rain, snow, sleet, or any precipitation that falls on the watershed will eventually reach the Lake and flow north to the Richelieu River and on to the St. Lawrence River and Atlantic Ocean. Lake Champlain drains nearly half of Vermont with groundwater flowing to the west.

Groundwater in Vermont is contained in either bedrock fractures or glacial deposits of sand and gravel. In the western parts of Vermont and the Green Mountains, groundwater is contained in carbonate rock aquifers. Outside of the Green Mountains, much of the groundwater is contained in the bedrock itself in what are known as crystalline rock aquifers where water usually flows through fractures and joints in the rock. The Vermont Groundwater Favorability Index generally defines Northwestern Vermont as an area of low groundwater potential, underlain by unstratified glacial drift and bedrock.

Shallow groundwater in the glacial deposits on CJ flows along relatively low horizontal gradients. Localized flow directions and hydraulic gradients can be attributed to the influence of tributaries of the Sunderland Brook to the north of the Site and the Winooski River to the south of the Site. In the northern portion of the Site near Sunderland Brook the flow is likely towards the north. However, the more prominent influence is the Winooski River. The groundwater flow in the developed portion of the site near the Fitness Center is to the south-southwest. The glacial deposit thickness is estimated to be 30 to 100 feet. Groundwater flow direction for shallow wells screened near the sediment bedrock interface may also be influenced by the bedrock topography and by regional fracture patterns. Approximately 75 acres of Class II and III Wetlands occur at CJ (**Figure 1-3**), supported mostly by groundwater. CJ also contains an un-quantified amount of riparian habitat (VTARNG, 2001).

Groundwater data indicate the shallow water table may be 3 feet below ground surface. Shallow groundwater may discharge into surface water bodies at Camp Johnson, such as the wetlands on the western boundary of the facility.

No formal or informal names have been designated for the aquifers and confining units below CJ. Groundwater data indicates strong connectivity exists between the bedrock and the overlying surficial aquifers at CJ.

Approximately 200,000 people get their fresh drinking water supply from Lake Champlain. Water is pumped from the lake to a water treatment plant where it is purified and then pumped throughout the area. However, the Town of Colchester does not operate a water department. Water supply services in Colchester are provided by five distinct water supply entities that are all separate from the Town, including Champlain Water District (CWD), Town of Essex, and Fire Districts #1, #2, and #3 (Town of Colchester 96th Annual Report, 2017).

- Much of the population in Colchester is served by public water distributed by Fire Districts #1, #2, #3 or directly by CWD. Fire District #2 purchases their drinking water from the city of Burlington, which takes it from an inlet 4,200 feet out from the Coast Guard station at the Burlington waterfront, in 50 feet of water. Fire Districts #1 and #3 purchase their drinking water from CWD, a regional municipal organization chartered by the Vermont Legislature to supply drinking water and fire protection to 12 municipal water systems. CWD has an intake in Shelburne Bay, in 75 feet of water, half a mile offshore. Overall, the Town has relatively low withdrawals of groundwater in the range of 1,000-2,000 gallons per day. All residences, institutions and businesses located within the fire districts must obtain their water from the fire district as personal wells are not allowed.
- About 1,000 properties in Colchester rely on individual potable water supplies, such as drilled wells or springs, to supply their drinking water. Private wells generally only yield enough water for domestic or light commercial use. About 80% of privately drilled wells in Vermont draw water from crystalline rock aquifers (Olcott, 1995), and most wells near and north of CJ are completed within the bedrock aquifer system(s) (VDEC, 1995). However, several wells within the vicinity of CJ are constructed within the glacial outwash sediments overlying the Paleozoic bedrock. Groundwater quality throughout Vermont is considered a class III, being suitable for domestic water supply (Cotton, 1986).
- The 2018 Geocheck® Environmental Data Resources, Inc. (EDR) report indicated the presence of the following:
- Five groundwater monitoring wells at Baker Distributing Company within ¼ to ½ mile of CJ to the southeast. Groundwater monitoring wells are not subject to sampling under the Third Unregulated Contaminant Monitoring Rule (UCMR 3). As such, no data for these wells are included in the UCMR 3 data for Vermont. UCMR 3 Data for the state is included in **Appendix A**.
- Twelve groundwater monitoring wells at Champlain Cable Corporation (CCC) within 0 to $^{1}/_{8}$ mile of CJ to the west. No data for these wells is included in the UCMR 3 data for Vermont.
- Five water wells identified by the United States Geological Survey well database within ¼ to ½ mile (southwest) and ½ to 1 mile of CJ (north). No data for these wells are included in the UCMR 3 data for Vermont.
- Twelve water wells identified by State database well information are located within ¼ to ½ mile and ½ to 1 mile of CJ in all directions. No data for these wells are included in the UCMR 3 data for Vermont. Numerous potable, agricultural, and public water system wells exist within 4 miles of CJ; however, no PFAS data is included in the Vermont UCMR 3 data. The EDR report, which includes Vermont UCMR 3 data, is included in **Appendix A**.

The CWD provides daily drinking water to CJ. The area around CJ is served drinking water by Colchester Fire District #2 and #3. Some nearby residences were previously not served by any municipal system and relied on private wells as a drinking water supply.

Monitoring wells maintained for continuing investigations at CJ were observed near Building 2908 and the former wood dump site. All wells are protected with appropriate flush-mount or aboveground casings. There are no irrigation wells on the property.

According to the April 2015 CJ Groundwater Monitoring Report by Stone Environmental, Inc., a total of six wells, located within the south-central portion of the CJ Cantonment Area, are sampled annually for analytical purposes using low flow protocols. The six wells (FD-4, FD-5, FD-6, MW-1, MW-2, MW-4) were installed around Building 2908 near where a former jet fuel underground storage tank (UST) was located. Hydraulic gradient measurements indicated a 0.002 feet/foot gradient flow in the southwesterly direction.

Six groundwater monitoring wells are located around the former wood dump site within the north-central portion of the Camp Johnson Training Area. The wood dump site has since been covered with a clay cap. The wells are positioned within the landfill cap (JWD-GW2), as well as cross gradient (JWD-GW1, JWD-GW3, and JWD-GW4), and downgradient (JWD-GW5 and JWD-GW6) of the landfill cap. All monitoring wells are screened in overburden soils and across the water table according to the September 2017 CJ Groundwater Monitoring Report by Stone Environmental, Inc.

There are multiple perforated dry wells located in the cantonment area of CJ; the exact number of dry wells is currently unknown. Stormwater runoff captured by these wells subsequently soaks into the sandy soils.

Monitoring wells, localized groundwater flow, and detected PFAS concentrations at the adjacent CCC property are shown on Figure 3 and Figure 4 of the ATC Group Services, LLC, October 23, 2018 Long Term Monitoring Report for the Champlain Cable Corporation Facility. This report is included in **Appendix A**.

1.5.3 Hydrology

CJ is within the Winooski River watershed, which drains approximately 1,080 square miles of land in central Vermont. The watershed begins in the town of Cabot and flows 90 miles to Lake Champlain in Colchester. The watershed lies within several north-south oriented mountain chains separated by fertile river valleys. Based on 1997 National Resource Inventory data, the land cover of the drainage area is approximately 72% forested, 12% agricultural and 9% is developed land. Water accounts for 5% of the total acreage and the remaining percentage is miscellaneous land (VANR, 2012).

Regional watersheds and surface drainage features that do not originate on CJ but drain its surface water, as well as waters from Burlington, Essex, and other nearby Cities, is presented in **Figure 1-2**. Surface water features at CJ are presented in **Figure 1-3**.

Two surface water bodies are located close to CJ: Sunderland Brook and the larger Winooski River. The two waterways converge approximately 2 miles west of the western CJ property boundary. The Winooski River then flows west another 8 miles downstream to the edge of Chittenden County were the river flows into Lake Champlain. Nearly 490 square miles in area, Lake Champlain drains nearly half of all Vermont and supplies a third of the drinking water for the state (Curran, 2010).

There are both naturally occurring and manmade surface water features at CJ (**Figure 1-3**). Class II and III wetlands and ponds, including Lilly Pad Pond, exist throughout the training area of CJ. Unnamed tributaries of the Sunderland Brook also extend through the eastern and western portions of CJ, separating the facility from adjacent properties. Two perforated dry wells, located in the CJCA, capture storm water runoff which subsequently soaks into the sandy soils. A catch basin located in the northwest corner of the CJCA funnels water into a small pond located north of Building 2908, and three small stormwater sewers are located in the southeastern portion of the CJTA (USACHPPM, 2009).

Approximately 75 acres of freshwater wetlands occur at CJ (**Figure 1-3**), fed mostly by groundwater to springs at the ground surface. Of the 75 wetland acres located on the property, there are approximately 60 Class II and 15 Class III wetland acres (VTARNG, 2001).

Approximately 8 acres of freshwater ponds occur at CJ (**Figure 1-3**). There are 5 standing ponds with the largest being Lily Pad Pond, which is near the center of the camp (USFWS, 2018).

Stormwater runoff on CJ drains to surface-water bodies by overland flow or through three small storm sewers. The majority of surface water runoff from the western and northern portions of the CJ drains into either the stormwater retention ponds or the two tributaries of the Sunderland Brook. Runoff from the southern portion of the facility drains into the Winooski River. There are three storm sewers on the southern property. The sole culvert for Storm System A is located off post, on Barnes Street and the outfall is located in the southeastern portion of the CJTA. The remaining two storm sewers do not convey water to CJ from off post sources (Otter Creek Engineering, 2001).

1.5.4 Current and Future Land Use

CJ (combined with the former Ethan Allen Air Force Base) covers 660 acres and is the current headquarters for the VTARNG as well as home to the Garrison Support Command.

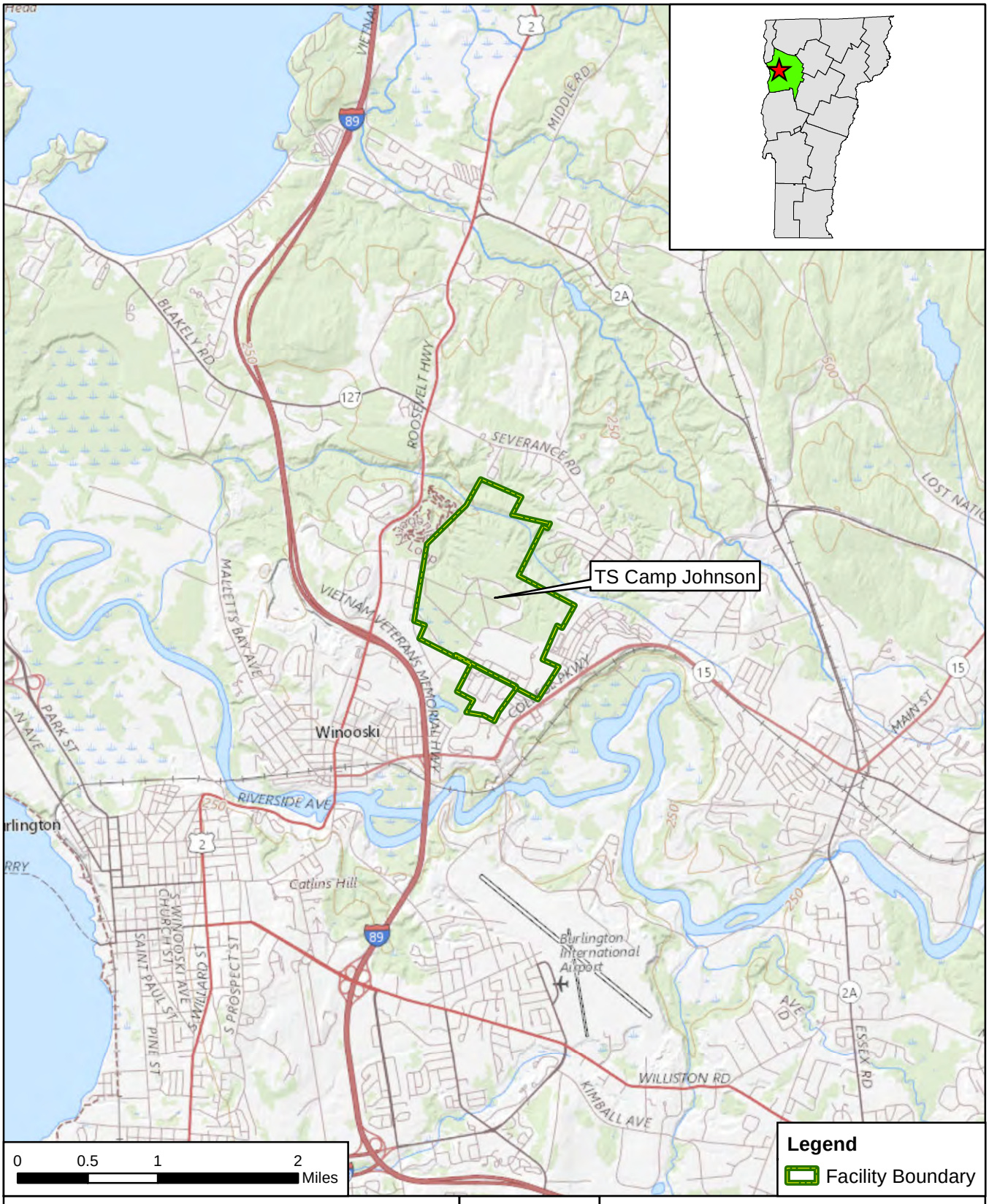
The military facility is currently used for training and administrative activities for the VTARNG. Most of the 72 buildings are concentrated on the original 50 acres of State-owned land. Access to the property is limited to authorized personnel and the property is guarded at all hours. Much of the VTARNG property that was Fort Ethan Allen is used for operational training including small unit maneuvers, bivouacking, orienteering, Command Post exercises, vehicle storage, and helicopter approach maneuvers.

According to the 2014 Town of Colchester General Plan (Town of Colchester, 2014), future land use around the facility is projected to remain residential with some parcels becoming commercial and industrial. The portions of FEA that were not acquired by the military have been deemed a historic district (some of which is within CJ boundaries) and are now used for various commercial and residential purposes. While CJ contains a significant amount of undeveloped land, no change in use for this area is expected.

1.5.4 Climate

CJ is in Climate Zone 5a and is designated as a humid continental climate with cold winters and very warm, moist summers. Topography and elevation have an important influence on local climatic conditions. Offshore breezes from Lake Champlain maintain moderate humidity with frequent rainfall, with average annual precipitation being 34.47 inches. On average, July receives the most precipitation and February the least. Annual snowfall averages 81.2 inches due to localized lake effect snow from Lake Champlain. Air temperature highs in July and lows

in January average 70° Fahrenheit (F) and 25°F, respectively. Climate zone 5a has an average annual extreme minimum temperature of -20°F to -15°F (NCDC, 2004).



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	1/14/2019	GIS BY	MS	1/14/2019
SCALE	1:63,360	CHK BY	JW	1/14/2019
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	RG	1/14/2019

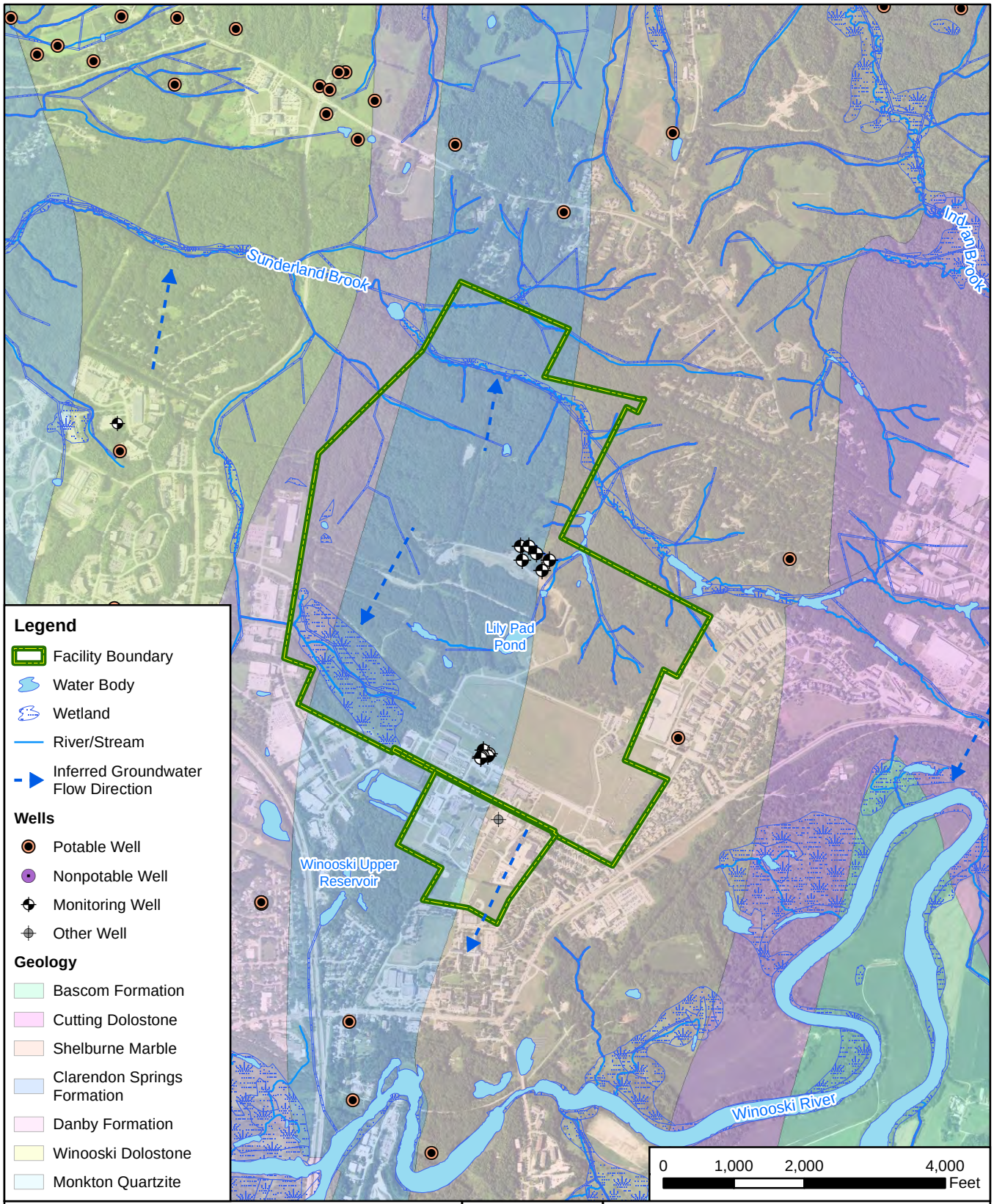
N

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\TS_Camp_Johnson\Fig_1-1_TS_Camp_Johnson_Facility_Location.mxd



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	1/21/2019	GIS BY	MS	1/21/2019
SCALE	1:24,000	CHK BY	AZ	1/21/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	1/21/2019

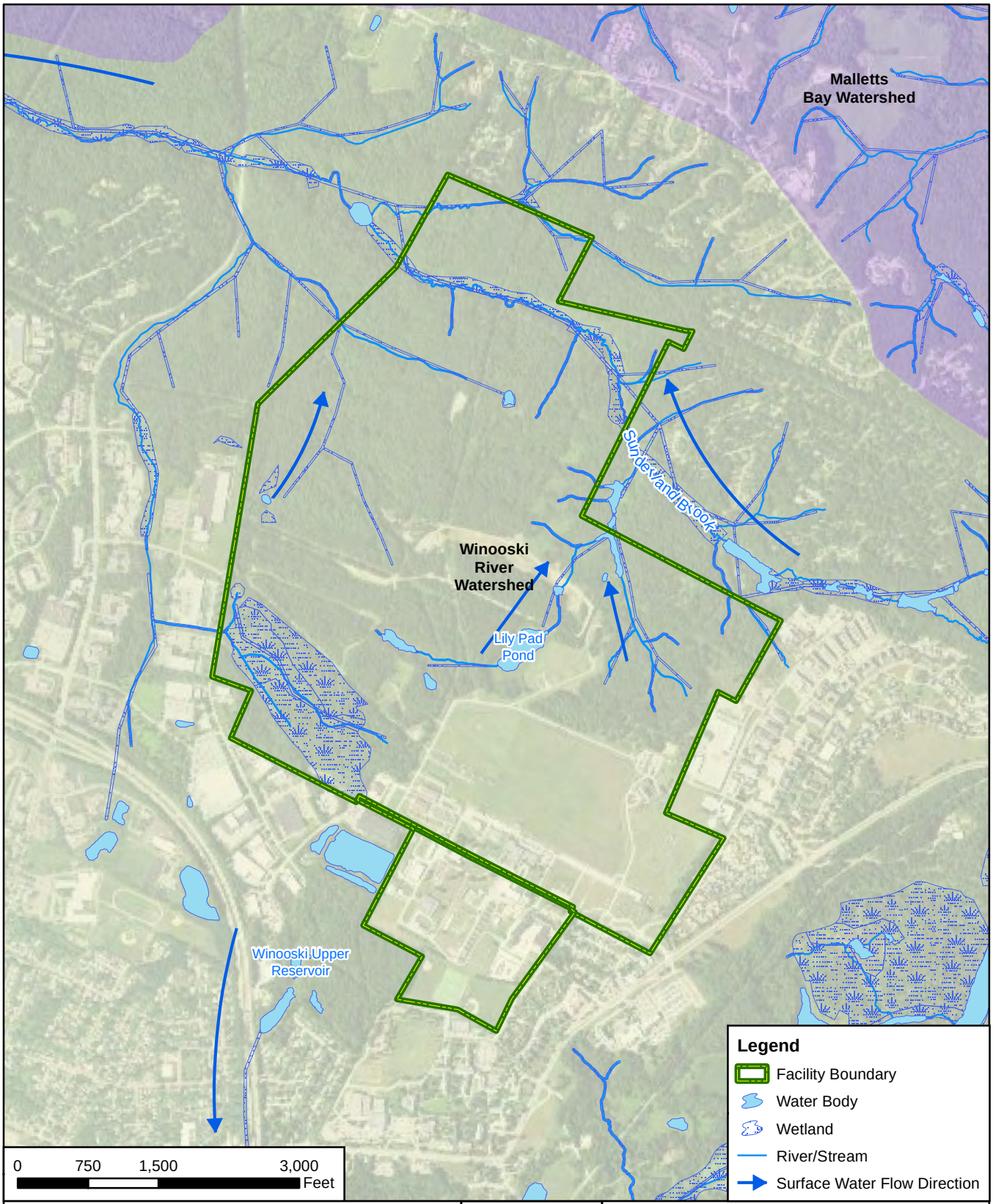
N

Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-2

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\TS_Camp_Johnson\Fig_1-2_TS_Camp_Johnson_Groundwater_Features.mxd



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	1/14/2019	GIS BY	MS	1/14/2019
SCALE	1:18,000	CHK BY	GR	1/14/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	1/14/2019

N

Surface Water Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-3

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\TS_Camp_Johnson\Fig_1-3_TS_Camp_Johnson_Surface_Water_Features.mxd

2. Fire Training Areas

No fire training areas (FTAs) were identified at CJ during the PA. CJ personnel confirmed that there are no FTAs at CJ during interviews and a review of Range Facility Management Support System data did not indicate that fire training takes place on any range at CJ. The Colchester Center Volunteer Firefighter's Association Fire Chief confirmed with first-hand knowledge that no fire training has occurred at CJ in his 30-year tenure.

However, the CJ Natural Resources Conservation Plan establishes a goal to implement a wildfire program that minimizes safety concerns and wildfire risk while promoting pitch pine seedling growth. With almost 175 acres of pitch pine forest, the installation boasts Vermont's largest remaining stretch of this habitat, which supports 15 state-listed rare plants. CJ, along with partnered agencies, pursues that goal by using prescribed fires on forests located in the CJTA. CJ has an in-house burn crew and fire staff that lead their prescribed burns. They were assisted by the City of Colchester and St. Michael's College fire departments (Kropp, 2014). No AFFF is used for wildfire program operations.

THIS PAGE IS INTENTIONALLY BLANK

3. Non-Fire Training Areas

Locations that are considered non-FTA include, but are not limited to, hangars, airfields, fire stations, landfills, and other locations where AFFF may have been stored, released or had potential to be released to the environment, but was not used in fire training.

A description of each non-FTA is presented below, and the non-FTAs are shown on **Figure 3-1**. Photographs of the non-FTAs appear in **Appendix C**.

3.1 Former Wood Dump Station

The former wood dump station is in the north-central portion of the CJTA and is approximately 0.85 acres in size. The area is bounded by forested wetlands with a small unnamed tributary of the Sunderland Brook to the north and east. To the south and west are an access road and a broad deltaic plateau used for training maneuvers. The geographic coordinates of the approximate center of the former wood dump station are 44°30'38.8"N and 73°09'40.7"W.

During the period from 1942 to 1988, the wood dump station received wood construction and demolition debris from the many renovation projects on CJ. Reportedly, it was a common past practice to periodically burn stockpiled debris and bury the residual ash in native soils; however, VTARNG staff stated during interviews that AFFF was never used to put out fires at the wood dump station. In 1999, the wood dump station was covered with a clay cap (Stone Environmental, Inc. 2017). As part of the ongoing monitoring and maintenance requirements, the surface of the cap is to be mown semi-annually to prevent growth of trees and subsequent breaching of the clay cap by tree roots, and groundwater quality is to be assessed annually (USAEHA, 1996).

The area of the former wood dump station is observed to be flat and comprised of an open, grass field. The area is not currently being used by CJ. Periodically, controlled brush fires will be lit in the area by the CJ burn crew to remove undergrowth, but AFFF is never used in association with the controlled fires.

Investigations for metals and polycyclic aromatic hydrocarbons have been conducted in the area of the former wood dump station to characterize soil and groundwater quality and assess aquifer conditions. No investigations for PFAS have occurred.

3.2 Building 2908 - Former Hangar

Building 2908 is located within the northwest corner of the CJCA. The building was constructed in 1940 with brick walls and a concrete foundation and occupies over 10,000 square feet. Building 2908 was considered a potential PFAS release area based on its historical use as a hangar and vehicle maintenance shop; however, Building 2908 does not have a fire suppression system, nor is AFFF stored at the building. The CJ Environmental Compliance Manager confirmed that Building 2908 has not had a fire suppression system in at least 25 years. It is currently used for vehicle, equipment, and non-hazardous material storage. The building is bounded to the north and east by a retention pond and grass fields, as well as Cantonment Circle to the south and west. The geographic coordinates of the approximate center of Building 2908 are 44°30'10.7"N and 73°09'49.9"W.

The building had two floor drains near the west corner of the building that discharged into dry wells located directly below the floor. A third floor drain is suspected to have been located near the north corner in what was once a battery room. The floor drains not discharging into the municipal sanitary sewer were plugged with concrete in 1992. Due to the absence of evidence

indicating AFFF was ever used or stored at Building 2908, it is unlikely PFAS has been released to the environment.

Environmental investigations have been conducted at the building for releases associated with the use of floor drains in the maintenance bay. Analytes sampled for include volatile organic compounds, semivolatile organic compounds, metals, and polychlorinated biphenyls (USAEHA, 1999). The floor drains discharged to a dry well northwest of the building, and two (2) USTs: a fuel oil tank and an aviation fuel tank, both located north of the building. Based on the former use of the building for maintenance activities, contaminants potentially released to the floor drain system may have included waste or motor oil or other petroleum fluids, solvents, and battery fluids (metals) (USAEHA, 1996). In 1990, the former USTs were removed by VTARNG.

3.3 Former Ethan Allen Army Airfield

The former Ethan Allen Army Airfield is the largest open field space on CJ and at its peak was originally 135 acres in size. The geographic coordinates of the approximate center of the airfield are 44°50'28.8"N and 73°15'87.8"W. The airfield was initially considered a potential PFAS release area because airfields can be a common location of crashes or refueling accidents.

The airfield was mostly used in the 1920s and 1930s for operating biplanes. All routine flying at Ethan Allen finished before the 1940s. 1949, the airfield, as part of FEA was transferred to the Air Force and re-named the Ethan Allen Air Force Base. The Air Force used FEA primarily for personnel housing and base station facilities supporting Ethan Allen Air Force Base which was co-located with Burlington International Airport. The Air Force de-activated the base in 1960 and 787 acres reverted to the Army. Helicopter training still occurs at the airfield, but no airplane activity occurs and no airstrip is present. Because AFFF use began in 1969, and VTARNG staff indicated that no known crashes or emergencies have occurred at the airfield, there are no suspected PFAS releases at the airfield. Today, the airfield is inactive, and the land has been divided for various purposes. About 18 acres of the former airfield that are no longer part of the CJ property have been developed as offsite apartment complexes. An additional 6 acres that are not a part of the CJ property hold the US Army Reserve Center. On the CJ property, evidence of the runway is still visible with the paved ramp, and the grass runway area still largely clear. About 30 acres of the former airfield was converted into buildings, roads, parking, and other structures to store equipment and support CJ. Additionally, a one-mile, all-weather running track was recently built in the open field of the former airfield.

3.4 Pond Near Champlain Cable Corporation

The pond near CCC is located on the western boundary of the CJTA. CCC is located just west of the pond. A small park trail called Sunny Hollow Trails separates the two properties. An access road borders the pond on CJ property to the south and east. The pond is less than 0.8 acres in size. The geographic coordinates of the approximate center of the pond are 44°30'37.4"N and 73°10'24.4"W.

The wetland area, including the pond, receives natural surface water runoff, and potentially groundwater discharge from the surrounding area of CJ and CCC properties. It appears that the pond is free standing as it is unconnected to any of the surrounding tributaries.

Surface water in the pond has been tested and confirmed to contain PFAS (ATC Group Services, LLC, 2018). No remedial actions have taken place at the pond. Simultaneously, PFAS has been found in groundwater at the adjacent CCC property and an investigation is ongoing. Although the

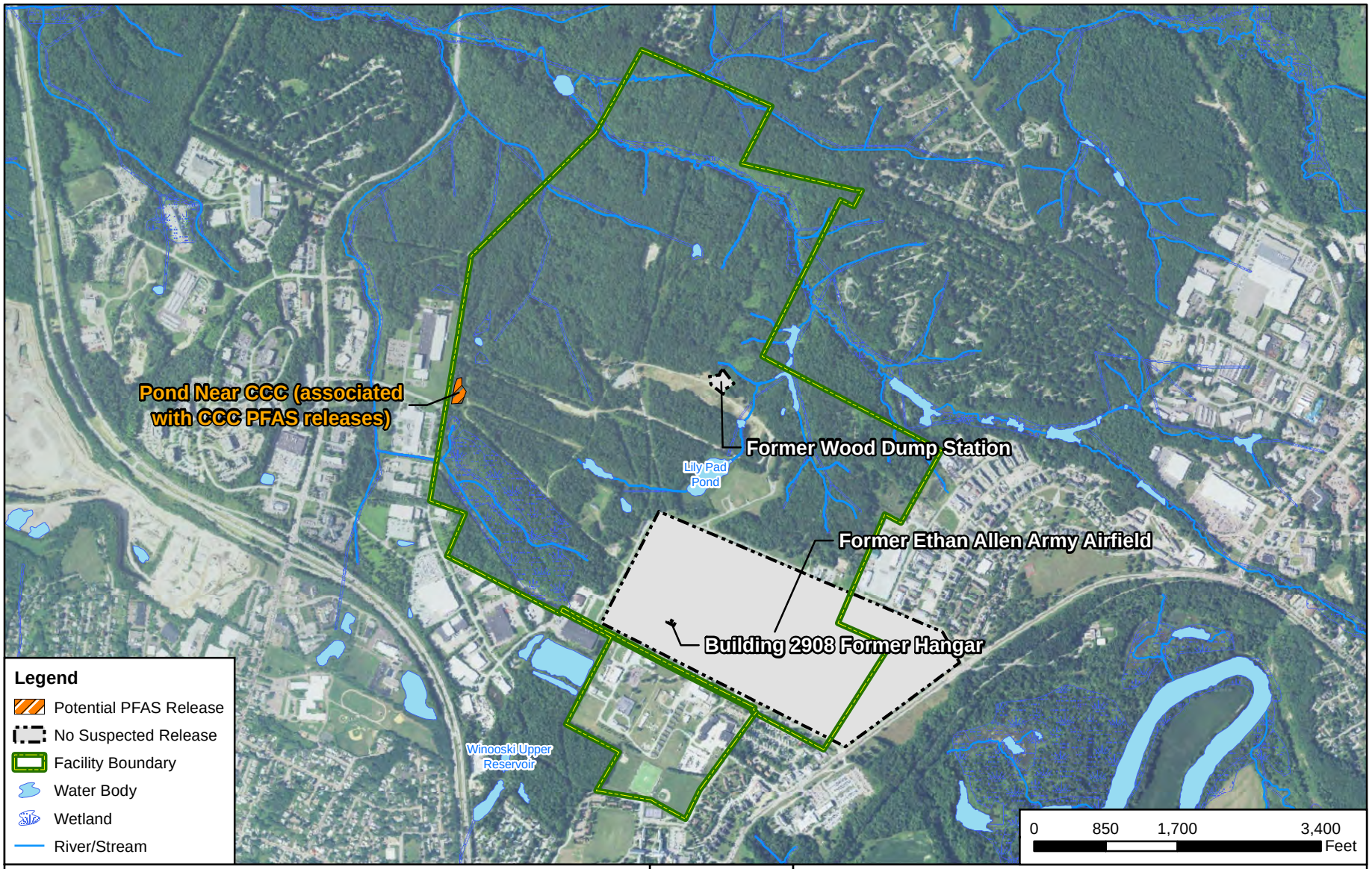
presumed source of PFAS contamination in surface water is the adjacent off-facility CCC property, the pond is located on CJ property. Discussion of the CCC property is included in Section 5.

3.5 Waste Water Treatment Plant

There is no Waste Water Treatment Plant (WWTP) at CJ. Sewer water is directed to an off-facility municipal wastewater treatment plant. WWTPs are not usually a primary potential release area of PFAS, but sludges and liquids from areas of potential release that are treated at WWTPs may create a secondary source of contamination. At CJ, no information obtained indicated PFAS-related materials were treated at a WWTP.

3.6 Landfills

There are no landfills at CJ; however, the former wood dump received construction and demolition debris from renovation projects from 1942 to 1988. The former wood dump station is discussed in Section 3.1. 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 CJ, no information obtained indicates PFAS-related materials were ever disposed of in a landfill or the former wood dump station.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:20,400	CHK BY	JW	3/19/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	3/19/2019

N

TITLE

Non-Fire Training Areas

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\Fig_3-1_TS-Camp_Johnson_NFTAs.mxd

4. Emergency Response Areas

The CJ Environmental Compliance Manager and Safety and Occupational Health Manager confirmed that no crashes or other emergencies resulting in AFFF use have occurred at CJ in the last 25 years. No earlier records were available to indicate whether any crashes or building fires have occurred at CJ. 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 locations involving the potential release of AFFF were identified at the facility during the site visit.

5. Adjacent Sources

According to the EDR report and publicly released notifications, several off-facility properties within a 2-mile radius of CJ with the potential to have stored or released PFAS-containing materials were identified. The western boundary of CJ abuts an industrial area which includes several distribution centers, a lumber store, a stainless steel duct manufacturer (Fab-Tech, Inc.), the CCC property, and several others. Based on the broad spectrum of materials potentially used at off-facility properties, there is potential for PFAS releases to the environment beyond the CJ boundary. A description of several off-facility sources is presented below; off-facility sources are shown on **Figure 5-1** and **Figure 5-2**.

5.1 Champlain Cable Corporation

The CCC occupies a 39-acre property at 175 Hercules Dr, Colchester, VT 05446, which is about 400 feet west of the CJ western property boundary (**Figure 5-1**). Founded in 1955, the CCC manufactures wire and cable coatings for 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. These manufacturing processes have been found to use PFAS.

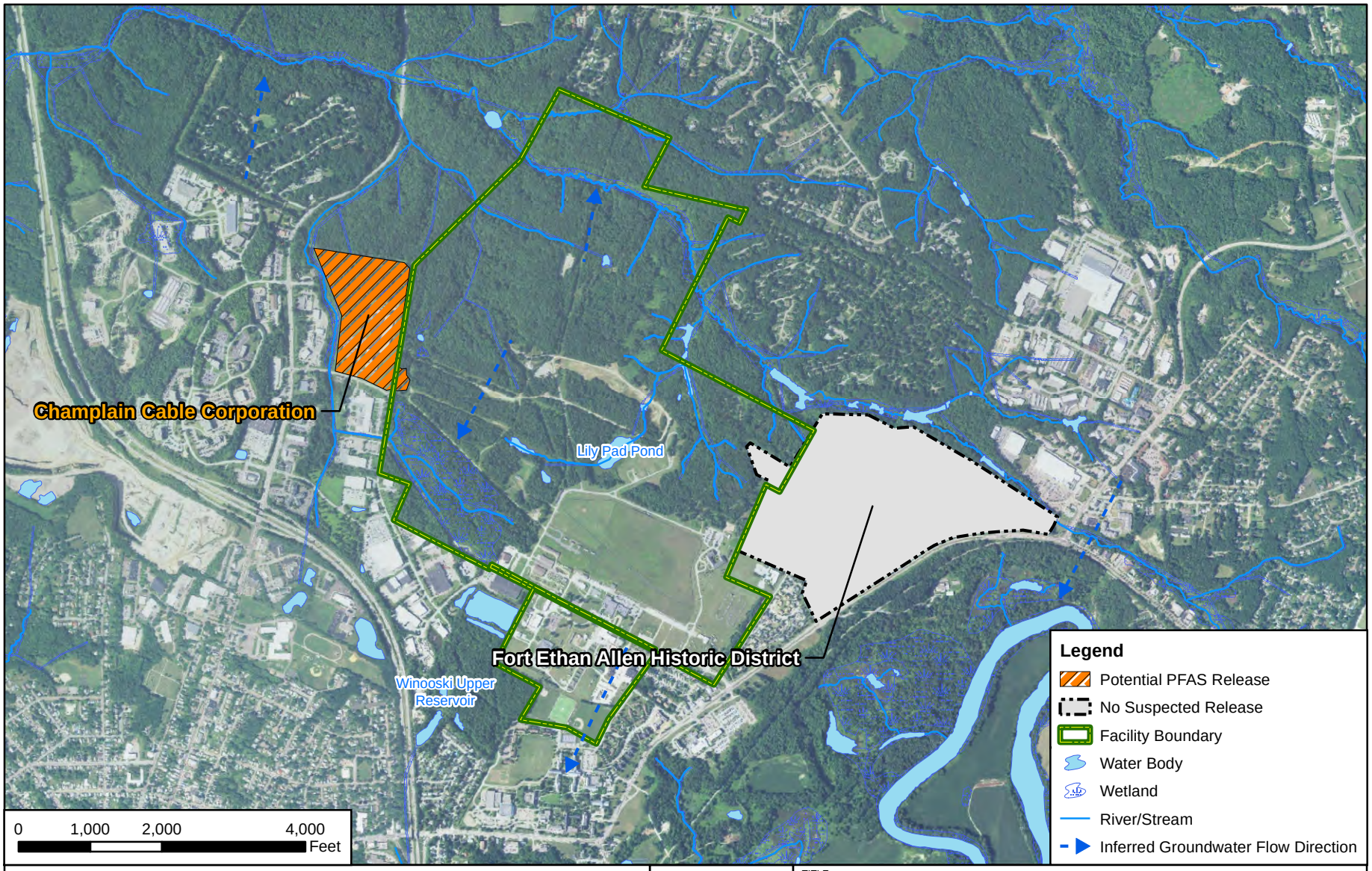
Between 1966 and 1977, liquid wastes were poured onto the ground outside of the building including along the roadway to the east of the facility and in an area to the northeast of the facility, referred to as the “sand pit” (USEPA, 1995). The drainage area surrounding the south and west of the facility topographically slopes southeast towards the CJ property, encouraging surface water runoff towards wetlands in that direction. As confirmed by the EDR report and a local news article (Polhamus, 2016), PFAS has been found in groundwater on the CCC property and an investigation is currently ongoing. Groundwater samples collected in August 2018 showed PFAS detections in 23 of 24 wells sampled at CCC, with PFAS compounds exceeding the 20 ppt 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 now focusing their attention (ATC Group Services, LLC, 2018). The CCC property apparently, sits on one of the oldest hazardous waste sites in the state, as stated by Chuck Schwer, director of the Department of Environmental Conservation’s waste management division, in the *Vermont Digger* 2016 article “PFOA found in groundwater at GlobalFoundries, Champlain Cable plants” (Polhamus, 2016).

5.2 Burlington Air National Guard Base

The Burlington Air National Guard Base is located 1.5 miles south of CJ at 106 Nco Dr, South Burlington, VT 05403 (**Figure 5-2**). It occupies approximately 240 acres of the 942-acre Burlington International Airport property since being assigned in 1951. Use of AFFF during training exercises and emergency responses as well as accidental spillage of AFFF on the base has resulted in multiple releases of PFAS to the environment by the Air National Guard. Concentrations of PFAS in groundwater and surface water were detected above screening levels; however, no potential receptor pathways with immediate impacts to human health were identified (USACE, 2018). The Burlington Air National Guard Base is downgradient from CJ, but beyond the Winooksi River.

5.3 Fort Ethan Allen Historic District

The former FEA comprised over 1,000 acres before its closure and transfer to CJ in 1961. FEA is now a 152-acre historic district under state, town, college, private home, and private business ownerships to the east of CJ (**Figure 5-1**). Also known simply as “The Fort”, the area consists of Officers' Row Condominiums, student housing, college support facilities, broadcast outlets, a community park, state offices and various other businesses. Based on the known usage of AFFF beginning in the 1969, there is no potential for PFAS release in association with historic operations at the former FEA.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:24,000	CHK BY	AZ	3/19/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	3/19/2019

N

TITLE

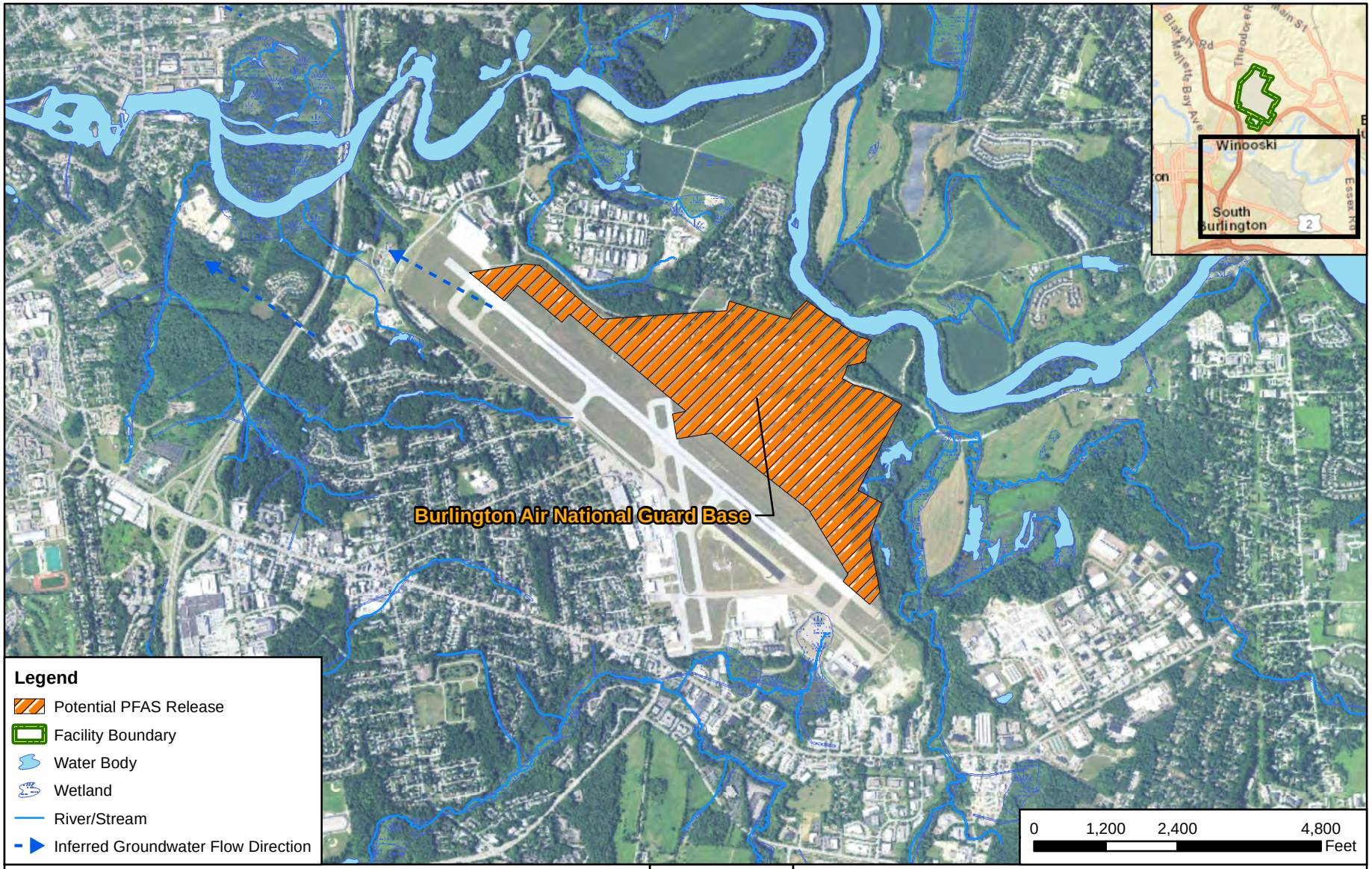
Adjacent Sources

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\ Fig_5-1_TS-Camp_Johnson_Adjacent_Sources.mxd



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:28,800	CHK BY	AZ	3/19/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	3/19/2019

TITLE

Adjacent Sources

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-2

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\ Fig_5-2_TS-Camp_Johnson_Adjacent_Sources_burlington.mxd

THIS PAGE IS INTENTIONALLY BLANK

6. Conceptual Site Model

Based on the PA findings, potential release areas were identified at the Pond Near CCC; however, this area is not considered an AOI because its release is associated with the adjacent CCC property. The pond location is shown on **Figure 6-1**. The following section describes the CSM components and the specific CSM developed for the areas adjacent to the CCC property. 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. Potential PFAS receptors at CJ include site workers, construction workers, and trespassers. Off-facility potential PFAS receptors include residents and public recreation area users. The CSM indicates which specific receptors could potentially be exposed to PFAS.

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).

6.1 Pond Near CCC

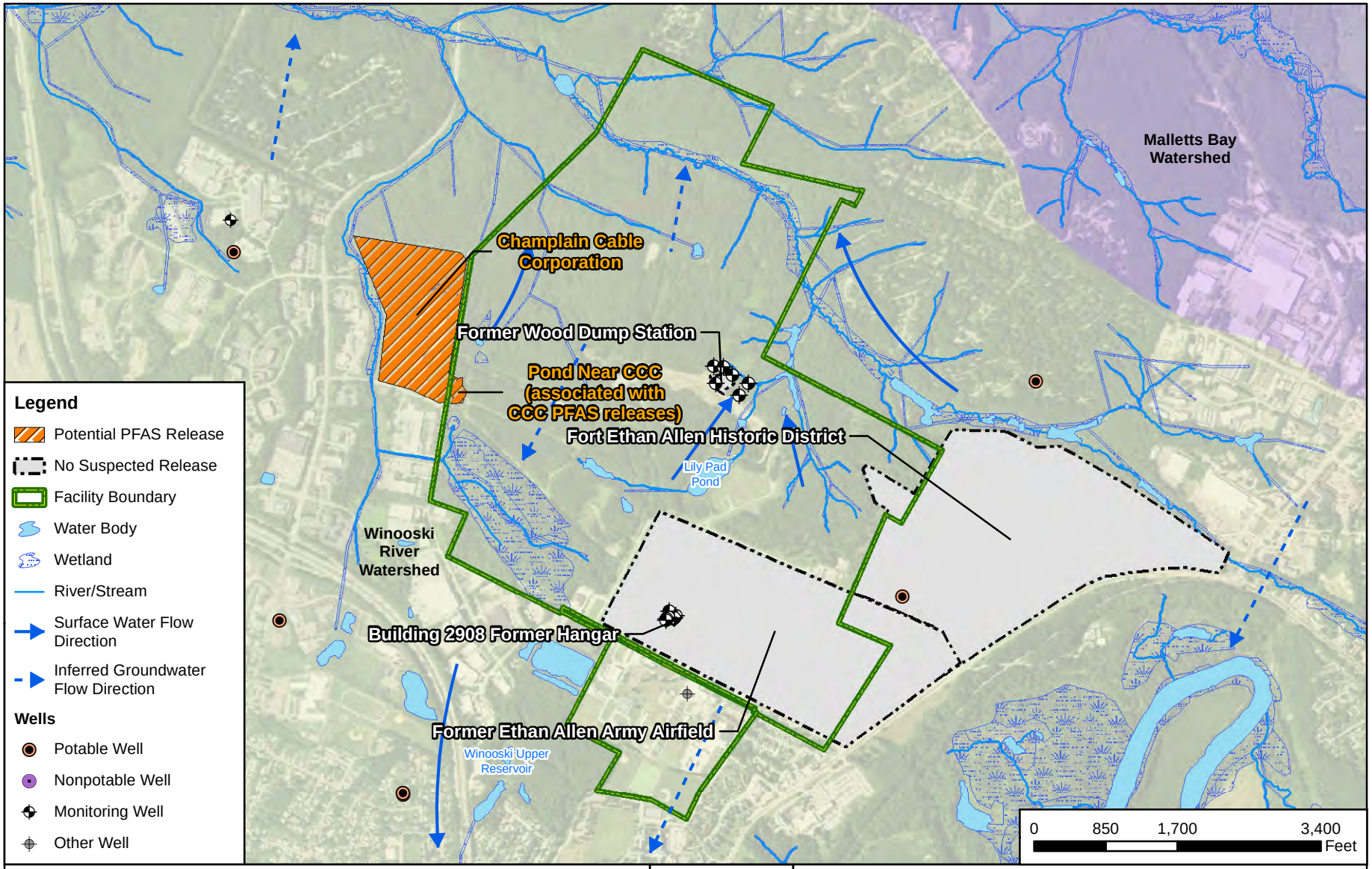
The pond is located on CJ's western boundary with CCC. PFAS in site media at the pond is presumably the result of historical industrial activities at the CCC property. Between 1966 and 1977 liquid wastes containing PFAS were poured onto the ground outside of the CCC property along the roadway to the east and in an area to the northeast of the CCC property. The wetland area, including the pond, receives natural surface water runoff and may also retain stormwater fed by overland flow from the surrounding area of CJ and CCC properties. The pond appears free standing as it is unconnected to any of the surrounding tributaries.

PFAS has been detected in surface water at the pond, with the most recent samples exhibiting a total concentration 19.33 ppt for the five state-regulated compounds (PFOA, PFOS, PFHxS, PFHpA, and PFNA) in surface water (ATC Group Services, LLC, 2018), which is below the 20 ppt Drinking Water Health Advisory. Surface water from precipitation may infiltrate in areas with permeable surface soils. Precipitation on paved surfaces will generally flow overland or be collected by the facility's storm and sewer drain infrastructure, where it exists, and ultimately discharge to the ponds and tributaries of Sunderland brook located on the northern property of CJ. CJ site workers, construction workers, and trespassers may be exposed to PFAS contaminated surface water at or near the pond.

PFAS is also present in groundwater at the adjacent CCC property and may be present in groundwater at CJ as a result. PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. As a result, CJ site workers and construction workers may be exposed to PFAS contamination via ingestion of surface soil near the pond. Additionally, ground-disturbing activities to subsurface soil in the area could result in site and construction worker exposure to potential PFAS contamination via ingestions.

The primary exposure pathway for PFAS from groundwater would be through ingestion of drinking water; however, potable water at CJ is supplied to the facility by the CWD. The distribution system includes a main line that enters the CJ from the south. Groundwater from active CJ monitoring wells has not been analyzed for PFAS; therefore, it is unknown whether PFAS is present in groundwater. Because wells at CJ are not used as a drinking water source, the pathway for potential PFAS in groundwater to receptors via ingestion is incomplete. Although no receptors for PFAS exposure to groundwater via ingestion exist at CJ, residents using private potable wells

near the CCC property may be exposed to PFAS in their drinking water. The CSM for the pond is shown on **Figure 6-2**.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:20,400	CHK BY	JW	3/19/2019
Base Map: National Agricultural Imagery Program, 2016		PM	RG	3/19/2019

N

TITLE

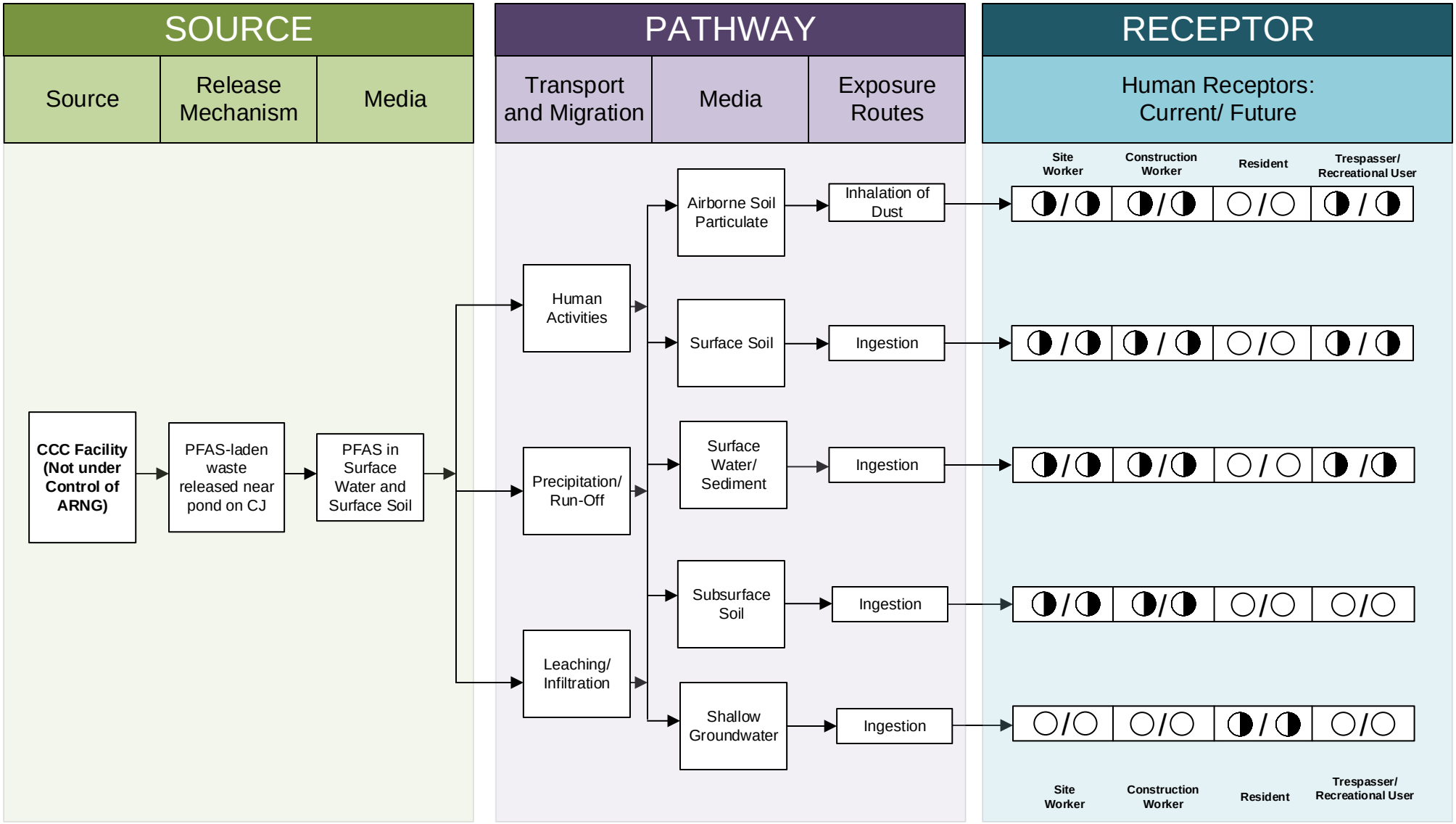
Areas of Interest

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

Q:\Projects\ENV\GEARS\GEO\MAES 2012 Unrestricted\Fort Meade\E. Data Management\GIS\MXDs\Chisholm_6th\March2017\Fig_6-1_TS-Camp_Johnson_AOIs.mxd



LEGEND

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

Figure 6-2
Conceptual Site Model
Camp Johnson

7. Conclusions

This report presents a summary of available information gathered during PA efforts on the use and storage of AFFF and other PFAS related activities at CJ. The PA findings are based on personnel interviews, environmental investigations and reports, historical documents, and the VSI.

7.1 Findings

No PFAS releases relating to current or historical activities at CJ were identified during this PA. Off-facility PFAS releases were confirmed at the adjacent CCC property. Liquid wastes from industrial processes using PFAS were poured onto the ground along the roadway to the east of the CCC property and in an area to the northeast of the facility. Groundwater at the CCC property and surface water near the western boundary of CJ, adjacent to the CCC facility, have since been determined to have PFAS detections. The CCC property adjacent source and affected surface waters on CJ are shown on **Figure 7-1**.

Based on known PFAS-laden waste releases by the CCC and PFAS detections in groundwater at the CCC property and a nearby pond, it is presumed that PFAS is migrating to CJ in surface water and possibly groundwater. Thus, there is potential for CJ site and construction worker exposure to PFAS contamination in surface and subsurface soils, and recreational user/trespasser exposure to PFAS contamination in surface soil. There is also potential for exposure to PFAS contamination in surface water at CJ to site and construction workers, and recreational users/trespassers via ingestion. Although groundwater is not used for drinking water at CJ, groundwater may be used off-facility by residents for drinking water. As such, off-facility residents may be exposed to PFAS contamination in groundwater via ingestion. The CSM for CJ is shown on **Figure 7-2.**

7.2 Uncertainties

Several 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 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 or conflicted with other sources. 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 (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.

To minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, retired and current personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected. The VSI and interview process included inquiries and requests into the existence and availability of documentation that supports the identification of the potential PFAS source areas.

The following table summarizes the uncertainties associated with the PA:

Non-AOIs	Source of Uncertainty
Pond Near CCC	Reports indicate that PFAS-laden wastes were dumped at the CCC property between 1966 and 1977, but the volume of waste released during this period is unknown. It is unknown whether CCC dumped other PFAS-laden wastes at other locations at their facility, or whether any undocumented releases occurred after 1977. It is unclear whether PFAS is migrating to CJ via groundwater flow.
Potential Emergency Response Locations	CJ staff stated with first-hand knowledge that no crashes or emergencies resulting in AFFF use had occurred during their tenure (25 years), but it is unknown whether any crashes occurred before about 1993.
Building 2908	It is unknown whether AFFF was stored at Building 2908 prior to the tenure of the Environmental Compliance Manager beginning 25 years ago.

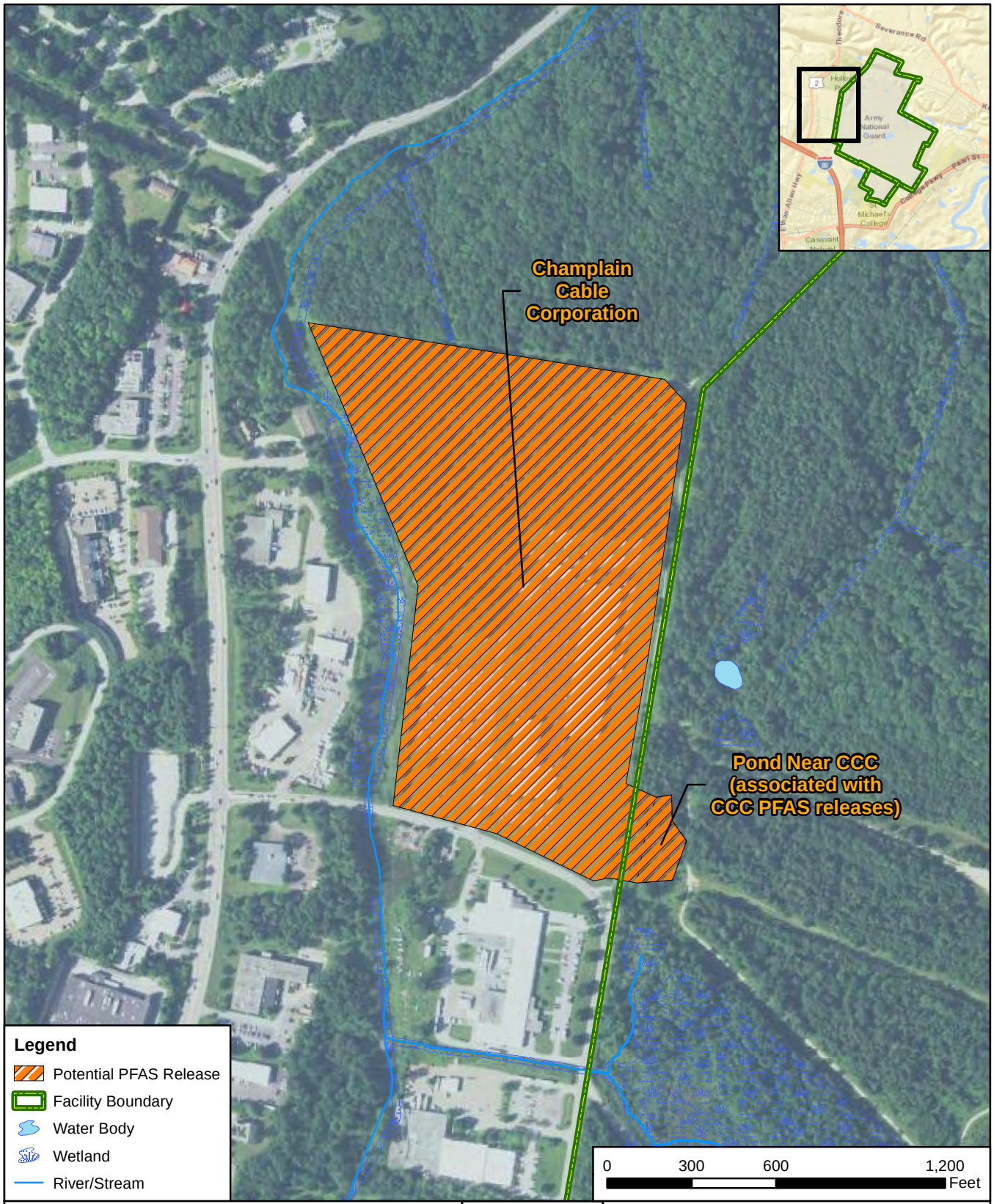
7.3 Potential Future Actions

Based on the documented absence (1988-present) of the use or release of PFAS-containing materials at CJ, no AOIs were identified during the PA. Evidence does not indicate that current or former ARNG activities contributed PFAS contamination to soil, groundwater, surface water, or sediment at the facility or adjacent areas. CJ will not move forward in the CERCLA process.

Environmental investigations at the adjacent CCC property indicate that CCC activities have resulted in PFAS releases along the western boundary of CJ. Based on the CSM developed for CJ, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment.

The table below summarizes the rationale used to determine that CJ should not be considered for further investigation under the CERCLA process and should not undergo a Site Inspection (SI).

Area of Interest	AOI Location	Rationale	Potential Future Action
None Identified	Not Applicable	Based on interviewee knowledge from this PA dating back to the 1980s, visual inspection of the facility, and facility-related document review, no use, storage, or potential release of AFFF or other PFAS-containing materials occurred at this facility.	No Further Action



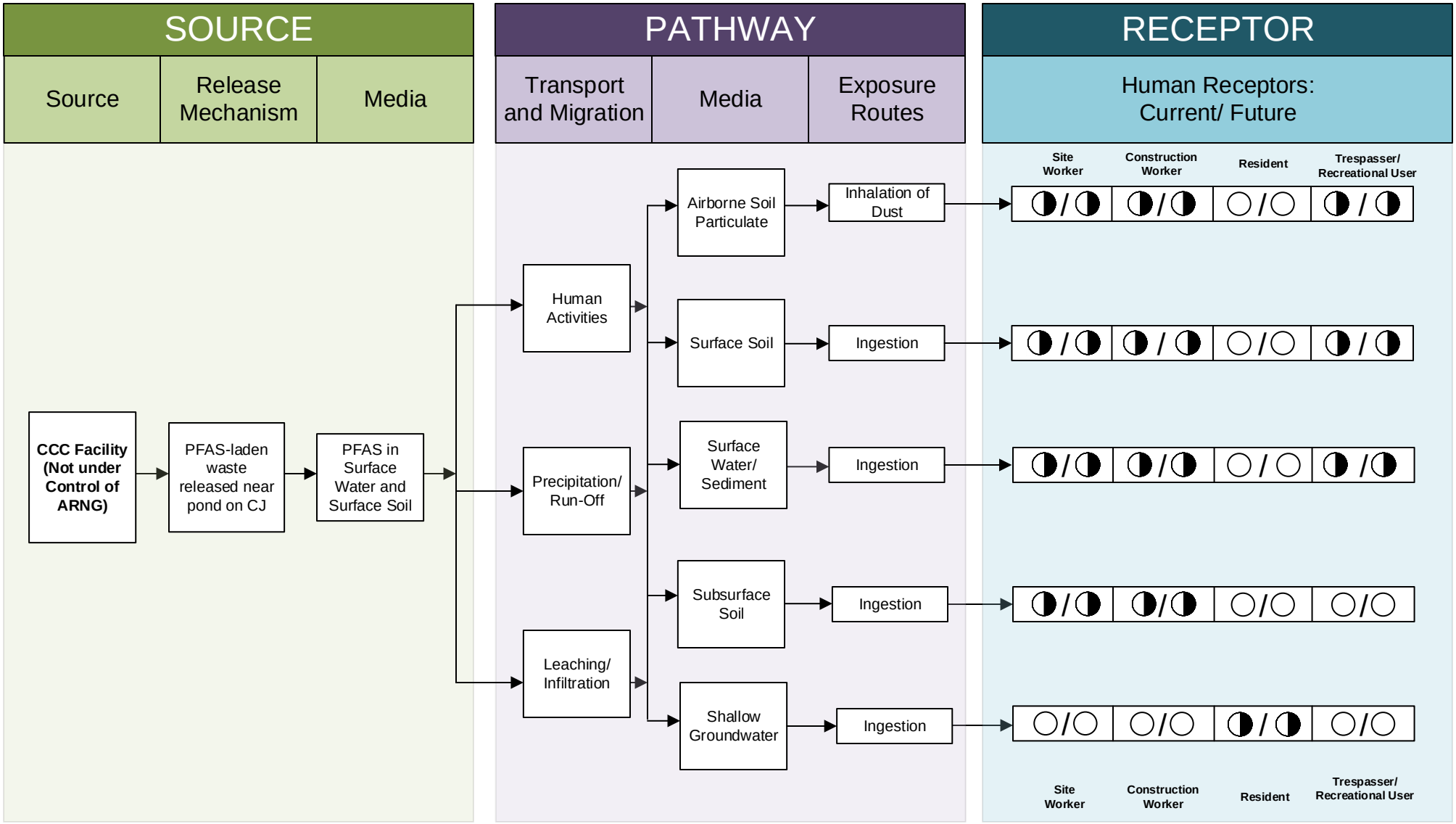
CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at TS Camp Johnson, VT			
REVISED	3/19/2019	GIS BY	MS	3/19/2019
SCALE	1:6,000	CHK BY	JW	3/19/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	3/19/2019

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\VT\TS_Camp_Johnson\Fig_7-1_TS-Camp_Johnson_Summary.mxd



LEGEND

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

Figure 7-2
Conceptual Site Model
Camp Johnson

8. References

Ansley, Jane E. 2000. Topography of the Appalachian/Piedmont. The Paleontological Research Institution. Arnold Printing Corp., Ithaca, NY. P 113-118

Arcuti, Thomas L. 1999. A Report on the Evaluation for Historical Significance and Integrity of Buildings No. 155 and 156, Fort Ethan Allen Historic District, Colchester and Essex Vermont. Vermont Army National Guard. Colchester, VT.

ATC Group Services, LLC, 2018. Long Term Monitoring Report, August 2018 PFAS Sampling; Champlain Cable Corporation Facility. October 23, 2018.

Buechler, John. 1967. “Fort Ethan Allen: A Fort on the Northern Frontier.” Vermont History. 35 (January 1967): 3-18.

Chapman, Donald H. 1937. “Late Glacial and Post-Glacial History of the Champlain Valley.” American Journal of Science. Vol 34, No. 200, p. 89-123.

Consulting Archeology Program, University of Vermont (UVM). 2001. Cultural Resources Inventory and Management Plan Camp Johnson, Vermont Army National Guard, Colchester, Vermont. Report No. 217. Burlington, VT.

Cotton, J.E. 1986. National Water Summery, Groundwater Quality: Vermont. U.S Geological Survey. USGS Water-Supply Paper 2325. P. 507.

Curran, John. 2010. "State seeks dismissal of phosphorus lawsuit." Burlington Free Press. Burlington, Vermont. August 11, 2010.

Frazier, William J. and Schwimer, David R. 1987. Regional Stratigraphy of North America, Plenum Press, New York.

Fischer, R. Montgomery. 1980. Introduction to the Environmental Geology of the Lake Champlain and Shoreland Areas, in Vermont Geology - Geology of Lake Champlain & Vicinity, Proceedings of a Symposium, Vermont Geological Society, Inc, Jeane C. Detenback Ed., Vol. 1.

Haraty, Peter H., Burton M. Rubenstein, Terrill G. Bouricius, Edmund A. Bemis, Jr., and Roger A. Newton. 1979. Put the Vermonters Ahead: A History of the Vermont National Guard, 1764-1978. Queen City Printers, Inc. Burlington, VT.

Historic Preservation Plan for the Vermont Army National Guard. 2004. Camp Johnson. Colchester, Vermont. March 2004.

Isham, Marty. 1978. “Adopted Green Mountain Boys: The 37th Interceptor Squadron, Ethan Allen Air Force Base, 1952–1960.” American Aviation Historical Society Journal. 23:3 (Fall 1978): 204-211.

Kropp, Cathy. 2014. Invaluable ecosystem opportunity found at Camp Johnson. US Army. 7 April 2014

National Climatic Data Center (NCDC). 2004. Climatography of the United States No. 20. Monthly Station Climate Summaries. Burlington International Airport, VT. 1971-2000. February 2004.

National Ground Water Association (NGWA). 2018. Groundwater and PFAS: State of Knowledge and Practice. January 2018.

Olcott, Perry G. 1995. Groundwater Atlas of the United States: Segment 12 - Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. US Geological Survey. HIA 730-M. available at http://capp.water.usgs.gov/gwa/ch_m/index.html.

Otter Creek Engineering. 2001. State of Vermont Military Department, Camp Johnson, Colchester, Vermont, Storm Water and Abandoned Sanitary Sewer Systems Investigation Report. 10 December 2001.

Polhamus, Mike. 2016. PFOA found in groundwater at GlobalFoundries, Champlain Cable plants. The Vermont Journalism Trust. 14 July 2016.

Stone Environmental, Inc. 2017. Camp Johnson Dump Groundwater, Surface Water, and Sediment Monitoring Report. Colchester, Vermont. 8 September 2017.

Town of Colchester, 2014. Town of Colchester. Department of Planning & Zoning.

Town of Colchester 96th Annual Report. 2017. Colchester, Vermont. July 1, 2016-June 30, 2017

US Army Corps of Engineers (USACE). 2018. Final Site Inspection Report of Fire Fighting Foam Usage at Vermont Air National Guard. Burlington Air National Guard Base. Chittenden County, Vermont. January 2018.

US Army Center for Health Promotion and Preventive Medicine (USACHPPM), 2009. Environmental Baseline Survey No. 38-EH-0B4U-09, Camp Johnson Training Area, Colchester, Vermont.

US Army Environmental Hygiene Agency (USAEHA). 1996. Preliminary Assessment 38-EH-2652-96, Camp Johnson Training Area, Colchester, Vermont, 24-28 April 1995, 24 September 1996.

USAEHA, 1999. Narrative Report, Site Inspection No. 38-EH-7386-98, Camp Johnson Training Area, Colchester, Vermont, 3-18 June 1998, 8 March 1999.

US Department of Agriculture (USDA). 2008. Soil Conservation Service, Natural Resources Conservation Service, Web Soil Survey, available on-line at http://websoilsurvey.nrcs.usda.gov/app/ updated 13 November 2008.

US Environmental Protection Agency (USEPA). 1991. Guidance for Performing Preliminary Assessments under CERCLA. EPA/540/G-91/013. September 1991.

USEPA. 1995. Final Site Inspection Prioritization Report. Champlain Cable Corporation. Colchester, Vermont. November 17, 1995.

US Fish and Wildlife Service (USFWS). 2018. National Wetlands Inventory. https://www.fws.gov/wetlands/data/Mapper.html. Accessed July 2018.

Vermont Agency of Natural Resources (VANR). 2012. Winooski River Basin Water Quality Management Plan. Department of Environmental Conservation. May 2012.

VANR, 2018. Department of Environmental Conservation – ANR Adopting Emergency PFAS Rules. July 16, 2018. https://dec.vermont.gov/news/PFAS-emergency-rule. Accessed January 9, 2019.

Vermont Army National Guard (VTARNG). 2001. Integrated Natural Resource Management Plan for 2002-2006 and Environmental Assessment. October 2001.

Vermont Department of Environmental Conservation (VDEC). 1995. Compliance and Licensing Section, Water Supply Division, Summary Well Data for Portions of Burlington, South Burlington, Colchester, Essex Junction, Williston, and Winooski Within 4 Miles of Camp Johnson.

Vermont Department of Health, 2018. Memorandum: Drinking Water Health Advisory for Five PFAS (per- and polyfluorinated alkyl substances). July 10, 2018.

Vermont Geological Survey. 1961. Centennial Geological Map of Vermont, Charles G. Doll, Wallace M. Cady, James B. Thompson, and Marland P. Billings, authors.

Vermont Geological Survey. 1964. The Geology of the Milton Quadrangle, Vermont, Vermont Geological Survey Bulletin No. 26, Solon W. Stone and John G. Dennis, authors.

Vermont Geological Survey. 1974. Geology for Environmental Planning in the Milton-St. Albans Region, Vermont, Water Resources Department, Environmental Geology No. 5, David P. Stewart, author.

Vermont State Historic Preservation Office (VTSHPO). 1995. “National Register of Historic Places Registration Form: Fort Ethan Allen Historic District.” By Meg Greene, Mary Jo Llewellyn, Robert W. Reynolds, Jr., Janet Roberts, and Heather Rudge. Revised by Jane Williamson. Montpellier, VT, 1988, Rev. 1995.

Wright, Stephen F. 2009. “Glacial Geology of the Burlington and Colchester 7.5’ Quadrangles, Northern Vermont.” *Glacial Geology of the Burlington/Colchester Quadrangles.*

Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for Camp Johnson includes:

Previous Investigations Completed at Camp Johnson

- 1995 Final Site Inspection Prioritization Report Champlain Cable Corporation Colchester, Vermont
- 2004 Historic Preservation Plan for the Vermont Army National Guard
- 2007 Environmental Baseline Survey for the VTARNG AASF – Kneeland Flight Facility
- 2009 Environmental Baseline Survey No. 38-EH-0B4U-09 Camp Johnson Training Area Colchester, Vermont
- 2015 Groundwater Monitoring Report Building 2908, Camp Johnson, Colchester Vermont
- 2017 Camp Johnson Wood Dump Groundwater, Surface Water, and Sediment Monitoring Report
- 2018 Final Site Inspections Report of Fire Fighting Foam Usage at Vermont Air National Guard Burlington Air National Guard Base Chittenden County, Vermont
- 2018 ATC Group Services, LLC Long Term Monitoring Report, August 2018 PFAS Sampling; Champlain Cable Corporation Facility

Camp Johnson EDR Report

- 2018 Camp Johnson EDR Reports 5326791 and 5326793

Camp Johnson Installation Maps

- 2018 Camp Johnson Stormwater Discharge Study C1.2A
- 2018 Camp Johnson Stormwater Discharge Study C1.3A

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: Camp Johnson
Interviewer: Gus Raggambi
Date/Time: 5/17/18

Interviewee: Michael Chmielewski **Title:** CCVFC Fire Chief **Phone Number:** Center Station: 802-878-8961 **Email:** chiefccvfc@gmail.com	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:

Colchester Center Volunteer Firefighters' Association (CCVFC) Fire Chief for 30 years

May have held a role with the CCVFC since 1969

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?

No AFFF has been used at Camp Johnson by CCVFC in at least 30 years	**Known Uses**
No Class B foams have been used/stored by CCVFC in at least 10 years	Use
CCVFC training does not occur at Camp Johnson	Procurement
Remaining notes are included on the following page.	Disposition
	Storage (Mixed)
	Storage (Solution)
	Inventory, Off-Spec
	Containment
	SOP on Filling
	Leaking Vehicles
	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

(1)

MICHAEL MIELENSKI
FIRECHIEF
COLCHESTER

PA Interview Questionnaire - Other

Facility: 5/17
Interviewer:
Date/Time:

CHEMGUARD SDS

PURPLE K
CHIEF 30 YEARS AS CHIEF 1969
NO FOAM ON CAMP JOHNSON (IN 30 YEARS)
"CLASS B"
HAVENT HAD FOR 10 YEARS
15 YEARS AGO ⇒ GONE TO SHORTER CHAIN
MAINT. FACILITY - NOT SPRINKLERED
LARGE BUILDING 10K SQ FEET
RECOMMEND PURPLE K
"SAND" HAZARDOUS MATERIAL
TRAINING NOT ON BASE
1ST ALARM / MED & FIRE
ST MIKES

JERICHO
WATER SUPPLY FOR SO. BURLINGTON
FUEL RELATED - NOTHING
CLASS A FOAM ONLY - NOZZLE ON CRASH TRUCKS
NO CORROSIVE → CARRIED IN 5 GAL BUCKETS
2004 ENGINE - ONLY CLASS A NEW

WIN. RIVER
FT. ETHAN ALLEN
RT 7
ETHAN ALLEN
VERMONT MILITARY MUSEUM
HISTORY OF FORT
MUSEUM
ARMY 70's

CHAMPLAIN CABLE

HAZMAT INCIDENT — BLDG. "GRAFFISMENSHED"

VARIOUS CHEMICALS — ~~HEPTANE~~ "HYDROBENE" — "SMOKING" BUILDING

AIRGUARD WAS THERE TOO

— DEMO TEAM —

CALLED IN (DIDN'T COME) THEN THEY CAME

4 PEOPLE CAME

SUITED — PICK-UP & ~~PUT~~ IN 55 GAL DRUM OF WATER

NO FOAM USED

BIOSOLVE FOR AUTO ACCIDENT

COMBINED FIRE TRAINING? → NOT SURE

PROPANE SIMULATION

FORT ETHAN ALLEN — POSSIBLE? USE OF AFFF

< 1 MILE

(3) ALL VOLUNTEER STAFF - NO DAYTIME HOURS

4 - 6 PEOPLE

HAROLD DEGRIE (FORMER CHIEF)

878 - 4539

AFFF STORED INSIDE STATION

PA Interview Questionnaire - Other

Facility: Camp Johnson
Interviewer: Gustav Raggambi
Date/Time: 5/17/2018

Interviewee: Col. Robert Gingras **Title:** Facilities Management Officer **Phone Number:** 802-338-3041 **Email:** robert.gingras@partner.vermont.gov	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N Deupty Chief Noyes

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

Facilities Management Officer

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?

Discussed potential firefighters worth speaking to.	**Known Uses**
Discussed PFAS sampling results from May 2017 on Camp Johnson. Results were	Use
non-detect.	Procurement
Notes for the conversation are attached on the following page.	Disposition
	Storage (Mixed)
	Storage (Solution)
	Inventory, Off-Spec
	Containment
	SOP on Filling
	Leaking Vehicles
	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

5/17/18

CAMP JOHNSON

✓ COL. GINGRAS

CULTURAL RESOURCES?

DEGRAS → RETIRED FIRE FIGHTER

TOWN OF ESSEX/FIRE → DEPUTY CHIEF NOYES 802.878.5308

802.878.8331 "COLE" CHIEF

ON BASE =

CHAMPLAIN WATER DISTRICT

MAY 2017 PFAS → ND

~~HON~~ HARBOUR INDUSTRIES CABLE MANUFACT.

MIKE BLOW → MILCON STRUCT

PA Interview Questionnaire - Environmental Manager

Facility: CAMP JOHNSON
Interviewer: GUS R / BONNIE P.
Date/Time: 5/15/18 - 11:30AM

Interviewee: LT COL. ROY / LEEANN BANKS **Title:** ENV. MANAGERS **Phone Number:** included below **Email:** included below	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.

LT. COL. - 13 - 802 - 338 3306 ; LTC Jacob Roy; jacob.roy@partner.vermont.gov; jacob.b.roy.mil@mail.mil

LEEANN - 25 - 802-338-3327; leeann.banks@vermont.gov; environmental compliance manager

- SAME ROLES

JACKIE - 802 - 338 - 3353 - ENV. ANALYST

2. Where can I find previous facility ownership information?

Jacqueline Anthony; 802-338-3353; jacqueline.anthony@vermont.gov

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 — AIRFIELD 1950's MOVED
Firefighting (Active Fire)
Crash
Fire Suppression Systems (Hangers/Dining Facilities)
Fire Protection at Fueling Stations — COMBINED SUPPORT MAINT. SHOP
Non-Technical/Recreational/ Pest Management
Metals Plating Facility — CSMS ← PAINT BOOTH (HALON)
N/A Waterproofing Uniforms (Laundry Facilities) — N/A
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?

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

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?

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

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)?

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?

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?

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

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

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

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?

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

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?

SEE NOTES

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)?

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

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

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?

CHECK BACK W/ JACKIE → SLDG 15 ⇒ GEOT.
LDF 29B → ENV.
EIS/EIR →

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

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?

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.?

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?

PA Interview Questionnaire - Environmental Manager

Facility:_____
Interviewer:_____
Date/Time:_____

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

COLCHESTER FD

COL. NYE?

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

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 _____

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

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

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?

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

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: Gus Raggambi

Recorded by: Gus Raggambi

ARNG Contact: Bonnie Packer

Date and Time: May 15, 2018

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

Source/Release Information

Site Name / Area Name / Unique ID: Building 2908 - Former Hangar

Site / Area Acreage: 10,000 square feet / approx. 0.23 acres

Historic Site Use (Brief Description): helicopter hangar and a vehicle maintenance shop

Current Site Use (Brief Description): vehicle, equipment, and non-hazardous material storage

Physical barriers or access restrictions: Camp Johnson installation boundary fence / interior fence around hangar

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):

Unknown

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

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

No

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

3a. Indicate what businesses are located near the site

CJCA buildings, Baker Distributing Corporation (beer, wine, and non-alc. beverage distribution company), New Penn (trucking company), Wendell's Furniture, Saint Michael's College

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

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

No, but a runway exists approximately 1.55 miles south

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:

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:

No drinking water wells; dry wells and monitoring wells in the vinity have been used for previous environmental investigations

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

4a. If so, please note the location:

Yes, a small pond exists immediately north of the site. Additionally, a forested wetland and freshwater pond exist approximately 900 ft and 1,000 feet northwest and southwest of the site, respectively

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

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

No

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

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

Yes, Champlain Cable Company is a confirmed PFAS release source; approximately 0.8 miles northwest of Building 2908.

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

No

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):

No

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

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

The building is locate don paved ground, but bounded to the north by a grassy field.

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

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

No

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:

Yes, a pond exists north of the building.

Receptor Information

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

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

Yes

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:

Only the VTARNG

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

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

Yes, residential areas to the east exist within 0.3 miles

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

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

Saint Mary's College is approximately 0.3 miles southeast of Building 2908.

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

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

Yes, a small pond exists immediately north of the site. Additionally, a forested wetland and freshwater pond exist approximately 900 ft and 1,000 feet northwest and southwest of the site, respectively

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: Gus Raggambi

Recorded by: Gus Raggambi

ARNG Contact: Bonnie Packer

Date and Time: May 15, 2018

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

Source/Release Information

Site Name / Area Name / Unique ID: Pond near Champlain Cable Corporation

Site / Area Acreage: less than 0.8 acres

Historic Site Use (Brief Description): NA (natural pond)

Current Site Use (Brief Description): NA (natural pond)

Physical barriers or access restrictions: Camp Johnson installation boundary fence (partially). The pond straddles the property boundary, and partially occupies public space next to a public trail

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):

PFAS release confirmed at the Champlain Cable Corporation facility. PFAS detected in the CJ pond.

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

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

NA

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

3a. Indicate what businesses are located near the site

Champlain Cable Corporation

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

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

No

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:

NA

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

NA

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

NA

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

NA

Transport / Pathway Information

Migration Potential:

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

1a. If so, note observation and location:

The pond appears to be freestanding, disconnected from surrounding tributaries.

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

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

No

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

3a. If so, please note the location:

No drinking water wells; 12 monitoring wells on the CCC property have been used for PFAS environmental investigations at CCC

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

4a. If so, please note the location:

Yes, forested wetlands and freshwater ponds exist within 0.1 miles of the pond

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

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

No

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

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

Yes, Champlain Cable Company is a confirmed PFAS release source believed to have contributed to PFAS detection int the pond

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

No

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):

No

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

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

Yes, the pond is located in a wooded area

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

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

No

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:

Yes, the site is a pond

Receptor Information

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

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

Yes

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:

Only the VTARNG (on the fenced in portion); public on the trail portion

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

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

Yes, residential areas to the northwest (0.5 miles), south (0.8 miles), and southwest (0.9 miles)

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

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

Winooski High School is approximately 0.7 miles south of the CCC property/pond

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

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

Yes, forested wetlands and freshwater ponds exist within 0.1 miles of the pond

Visual Survey Inspection Log

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Camp Johnson, Colchester, Vermont

Why has this location been identified as a site? No documentation of the use or release of PFAS, though potential historical use and the potential PFAS usage at adjacent sites which may have led to migration of contaminants onto the site is the basis of identifying CJ as a site

Are there any other activities nearby that could also impact this location? Champlain Cable Corporation; Burlington Air National Guard Base, Fort Ethan Allen Historic District (historic operations at fort)

Training Events

Have any training events with AFFF occurred at this site? No

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? Unknown

Average rainfall? 34.47 inches

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? Unknown

Any impoundment areas or retention ponds? Yes

Any NPDES location points near the site? Unknown

How does surface water drain on and around the flight line? Unknown

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? "Cannot be predicted with reasonable confidence"

Depth to groundwater? Shallow GW Table may be as little as 3 feet bgs

Uses (agricultural, drinking water, irrigation)? No potable or irrigation use at CJ

Any groundwater treatment systems? Unknown

Any groundwater monitoring well locations near the site? Yes

Is groundwater used for drinking water? Not used as drinking water on site

Are there drinking water supply wells on installation? No

Do they serve off-post populations? N/A

Are there off-post drinking water wells downgradient N/A

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? Unknown

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? Unknown

Equipment Rinse Water

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

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? N/A

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)?

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	Camp Johnson	Colchester, Vermont

Photograph No. 1

Description:

View of Building 2908. View to the northwest.

Photograph No. 2

Description:

Building 2908. View to the north.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Johnson	Colchester, Vermont

Photograph No. 3

Description:

Sunny Hollow Trail between Champlain Cable Company (left side of photograph) and Camp Johnson (right side of photograph). View to the north.

Photograph No. 4

Description:

View of Camp Johnson's western property boundary adjacent to Sunny Hollow Trail.

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Johnson	Colchester, Vermont

Photograph No. 5

Description:

View of low lying areas with ponded water adjacent to Sunny Hollow Trail and Camp Johnson's western property boundary.