FINAL
Preliminary Assessment Report
Barnes Army Aviation Support Facility #2
Westfield, Massachusetts

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

November 2020

Prepared for:

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

UNCLASSIFIED

Table of Contents

Executive Summary 1
1. Introduction 4
   1.1 Authority and Purpose 4
   1.2 Preliminary Assessment Methods 4
   1.3 Report Organization 4
   1.4 Facility Location and Description 5
   1.5 Facility Environmental Setting 5
      1.5.1 Geology 6
      1.5.2 Hydrogeology 6
      1.5.3 Hydrology 6
      1.5.4 Climate 7
      1.5.5 Current and Future Land Use 7
2. Fire Training Areas 11
   2.1 Former FTA-01, Environmental Restoration Program Site 1 (ERP 1) 11
3. Non-Fire Training Areas 14
4. Emergency Response Areas 15
5. Adjacent Sources 16
   5.1 Fire Department Equipment Test Area 16
   5.2 Stormwater Drainage Basin (ERP Site 4) 16
   5.3 Hangars 27A and 27B 16
   5.4 Former Fire Station (Building 004) 17
   5.5 Current Fire Station (Building 040) 17
   5.6 Hush House 17
   5.7 Former FTA-06 (ERP Site 2) 17
   5.8 Landfills 18
   5.9 Emergency Response Areas 18
      5.9.1 Civilian Aircraft Fire 18
      5.9.2 Civilian Airplane Crash into HFP Sprinkler Corporation 18
      5.9.3 Northern Soccer Fields 18
6. Conceptual Site Model 21
   6.1 AOI 1 Former FTA-01 21
7. Conclusions 24
   7.1 Findings 24
   7.2 Uncertainties 24
   7.3 Potential Future Actions 25
8. References 27

Figures

Figure ES-1 Summary of Findings
Figure ES-2 Preliminary Conceptual Site Model, Barnes AASF #2 FTA-01
Figure 1-1 Facility Location
Figure 1-2 Groundwater Features
Figure 1-3 Surface Water Features
Figure 2-1 Fire Training Areas
Figure 5-1 Adjacent Off-Site Sources
Figure 5-2 Emergency Response Areas
Figure 6-1 Areas of Interest
Figure 6-2 Preliminary Conceptual Site Model, Barnes AASF #2 FTA-01
Figure 7-1 Summary of Findings

Tables

Table 7-1 AOIs at Branes AASF#2
Table 7-2 Uncertainties within the PA
Table 7-3 Potential Future Actions

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.
AASF	Army Aviation Support Facility
AFFF	aqueous film forming foam
AOI	area of interest
ANG	Air National Guard
ANGB	Air National Guard Base
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	conceptual site model
ERP	Environmental Restoration Program (formally Installation and Environment Program)
°F	degrees Fahrenheit
FTA	fire training area
HEF	High Expansion Foam
IED	Installations & Environment Division
MA	Massachusetts
MAARNG	Massachusetts Army National Guard
MassDEP	Massachusetts Department of Environmental Protection
NOAA	National Oceanic and Atmospheric Administration
OWS	oil/water separator
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
UMDI	University of Massachusetts Donahue Institute
US	United States
USACE	United States Army Corps of Engineers
VSI	Visual Site Inspection

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 (AFFF) released as part of firefighting activities, although other PFAS sources are possible.

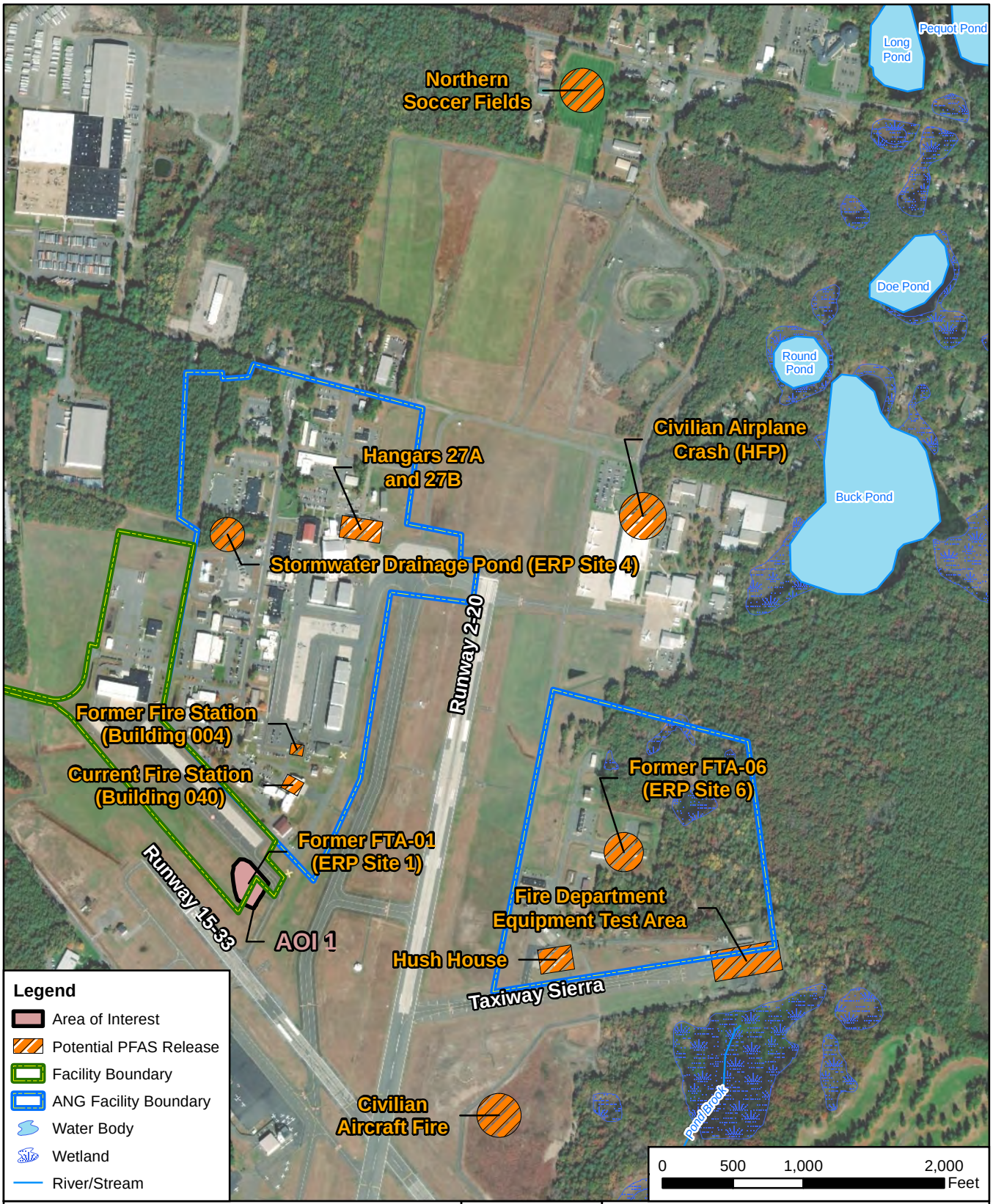
AECOM completed a PA for PFAS at Barnes Army Aviation Support Facility (AASF) #2 (AASF #2; also referred to as the "facility") located at Westfield Barnes Air National Guard Base (ANGB) in Westfield, Massachusetts (MA) identify areas of known or suspected PFAS releases known as Areas of Interest (AOIs). The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a 1-day site visit on 18 April 2018
- Interviewed personnel during the site visit including the Westfield Barnes ANGB Environmental Coordinator, the Westfield Barnes ANGB Fire Department Chief, and the Westfield Barnes ANGB facility manager
- Completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs
- Developed a conceptual site model (CSM)

One AOI related to PFAS release was identified at Barnes AASF #2 based on PA data (**Figure ES-1)**:

- Former fire training area (FTA)-01 AOI

Based on documented AFFF releases at this AOI, there is potential for exposure to PFAS contamination in groundwater and surface water for installation personnel, construction workers, residents, and nearby recreational users. A soil removal action at the former FTA has mitigated continued soil exposure on site. Residents using groundwater for drinking water surrounding the facility to the south and residents using a downstream intake for drinking water may potentially be exposed to migrating PFAS contamination via the groundwater pathway. The CSM for AOI is shown on **Figure ES-2**



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SCALE	1:12,000	CHK BY	TK	12/20/2018
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	12/20/2018

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Summary of Findings

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Figure ES-1

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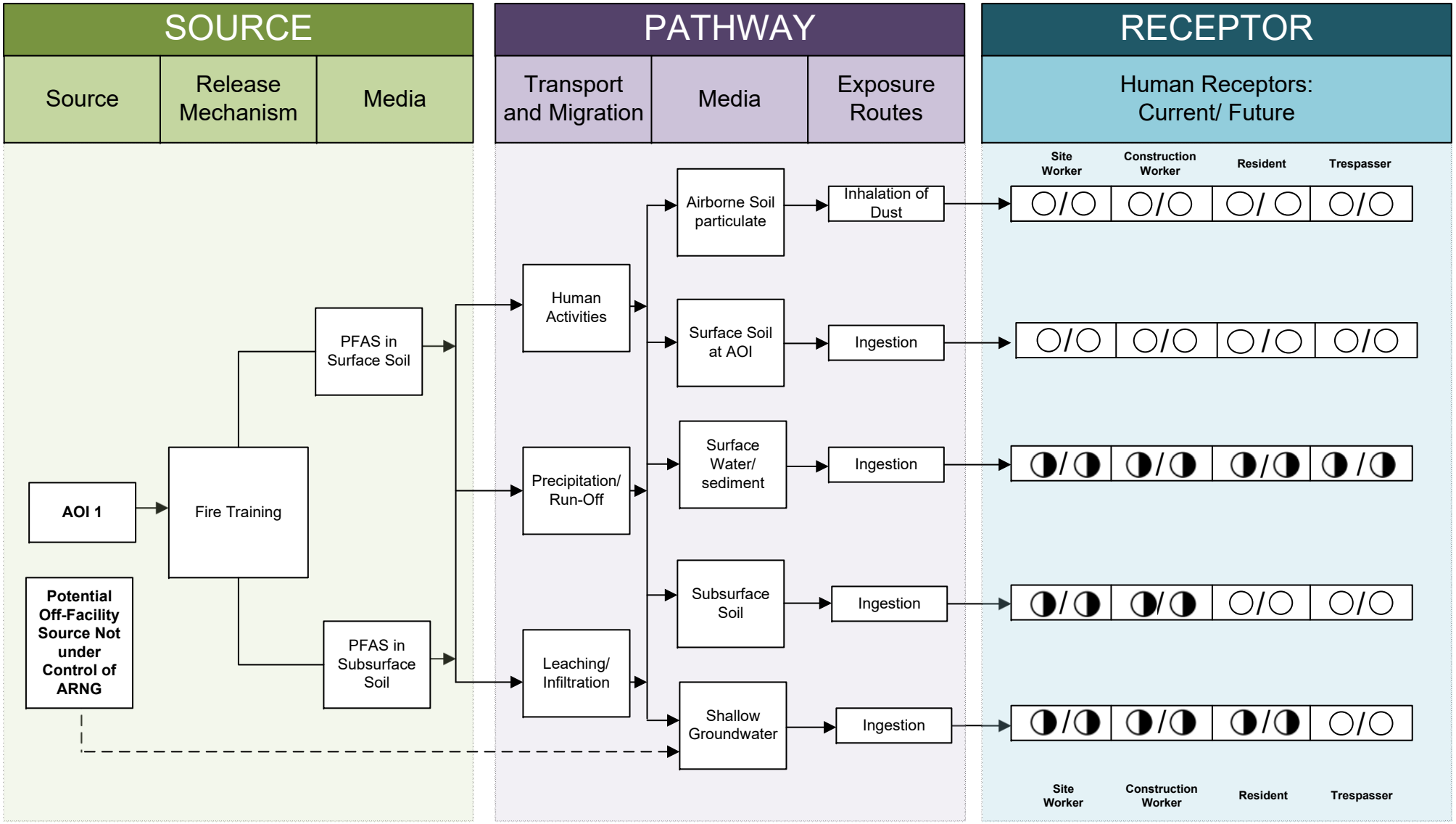


LEGEND

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

Note: The residential receptor refers to an off-facility receptor.

Figure ES-2
Preliminary Conceptual Site Model
Barnes AASF #2 FTA-01

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 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, and Modification 01 issued 30 September 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.

This report presents findings of a PA for PFAS at Barnes Army Aviation Support Facility (AASF) #2 (AASF#2) in Westfield, Massachusetts (MA) 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 Report documents a former fire training area (FTA) as well as nearby off-facility locations where PFAS may have been released into 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 site visit on 18 April 2018
- Interviewed Barnes personnel during the site visit including the Westfield Barnes Air National Guard Base (ANGB) Environmental Coordinator, the Air National Guard (ANG) Fire Department Chief, and ANG facility manager Completed visual site inspections (VSIs) at known or suspected PFAS release locations and document with photographs
- Developed a conceptual site model (CSM)

1.3 Report Organization

This report has been prepared in accordance with the U.S. Environmental Protection Agency's *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA.
- **Section 2** – **Fire Training Areas:** describes the FTA at the facility identified during the site visit.

- **Section 3** – **Non-Fire Training Areas:** describes non-FTAs at the facility identified during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of AFFF release specifically in response to emergency situations.
- **Section 5** – **Adjacent Sources**: describes nearby areas of interest just outside the ARNG property boundary that have previously reported AFFF release**.**
- **Section 6** – **Conceptual Site Model:** describes the pathways of PFAS transport and receptors at the facility.
- **Section 7** –**Conclusions:** summarizes the data findings and presents the conclusions of the PA.
- **Section 8** – **References:** provides the references used to develop this document.
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

Barnes AASF #2 is an element of the Massachusetts ARNG (MAARNG), 3rd Battalion, and 126th Aviation Regiment, headquartered at Joint Base Cape Cod. Within Westfield-Barnes Regional Airport is the joint operation of both the ANG and the ARNG, with each entity having its own property parcels. The regional airport is located in Hampden County in western MA, approximately 10 miles northwest of Springfield (**Figure 1-1**). Barnes AASF #2 is an active MAARNG facility providing aero-medical evacuation, intelligence, surveillance, reconnaissance, and air-movement operations (University of Massachusetts Donahue Institute [UMDI], 2015). This facility has a variety of aviation capabilities and supports local and state firefighting, search and rescue and disaster response operations (UMDI, 2015). The location allows the ARNG to maintain readiness in western MA.

Originally known as Camp Bartlett, Barnes AASF#2 was a training facility used by the MAARNG from 1905 to approximately 1918. Following World War I, the land was donated by Vincent E. Barnes to private businessmen for the development of Westfield Aviation Field, later to become Barnes Municipal Airport, and now currently Westfield-Barnes Regional Airport (Amec Foster Wheeler, 2017). Westfield-Barnes Regional Airport encompasses 1,103 acres. In December 2006, the MAARNG entered into a lease with the city of Westfield for the use and occupancy of three contiguous parcels of land totaling 36.04 acres within the Westfield-Barnes Airport. This lease is in effect until June 2105.

The current ANG base mission is the 104th Fighter Wing. Fueling and maintenance activities are the most common activities at this installation (Amec Foster Wheeler, 2017). The concurrent ANG and ARNG activities that occurred on the now-divided property have the potential to impact one another, making information regarding ANG activities relevant to this PA.

1.5 Facility Environmental Setting

The facility is located at the southwest foothills of Mount Tom, a ridge that curves south between the towns of Holyoke and Westfield (Jahns, 1947). Located approximately 8 miles east of Tekoa Mountain and 11 miles southwest of Mount Tom, Westfield-Barnes Regional Airport is located mostly on a flat plain, with elevations averaging around 270 feet above mean sea level. The previous FTA lies in the northwest portion of the facility in a low-lying grassy region with some

areas of pavement. The fire department equipment test area lies to the east of the facility and is surrounded by a wooded area containing several small bodies of water which flow into Pond Brook.

1.5.1 Geology

Westfield-Barnes Regional Airport is located within the Mount Tom quadrangle as part of the Mesozoic-era Hartford Basin, which has been established by the USGS and the MA Department of Public Works. Surficial formations are characterized by Quaternary-aged glacial materials. These formations, throughout the entire quadrangle, are underlain by sedimentary and igneous bedrock of the Newark Series of the Jurassic and upper Triassic (Larsen, 1972). The sedimentary rocks are of continental origin and are dominated by red, pink, and gray coarse-grained beds ranging from arkosic conglomerate through arkosic sandstone to siltstone and silty shale.

The lowland area of Barnes is characterized by smooth outwash and lacustrine pains, broken up by north- to south-trending ridges. The lithology of this region is mostly characterized by dark-gray, fine-grained basalt consisting mostly of plagioclase and augite (Larsen, 1972). The dominant basaltic lava sheets surrounding Barnes are representative of Triassic igneous activity.

The Barnes delta-outwash plain is the single largest depositional landform within the quadrangle, covering more than 10 square miles. The delta-outwash plain was built eastward of the Westfield River from its emergence with the Connecticut Valley. Typically, surficial glacial outwash sand and gravel deposits range from 100 to 150 feet in thickness. Other sediments formed post-glacially include peat, talus, and alluvium (Larsen, 1972).

1.5.2 Hydrogeology

Westfield-Barnes Regional Airport occupies a large portion of the groundwater recharge for the Barnes Aquifer, one of the most important groundwater supplies in the state (Pioneer Valley Planning Commission, 2010). Barnes AASF #2 and several surrounding municipalities including Holyoke, Easthampton, and Southampton obtain drinking water from the city of Westfield, which relies on groundwater from the Barnes Aquifer for drinking water. The groundwater beneath Barnes AASF #2 is designated as a Zone II aquifer, indicating the area around and including the facility is a contributing zone to a drinking water aquifer. Drinking water from the Barnes Aquifer comes from a series of nine municipal wells, with two of these wells located approximately 1,000 feet north of the southeast end of Runway 15-33 (BB&E, 2016) (**Figure 1-2**). An additional two public supply drinking water wells are located approximately 1.75 and 2.5 miles south of the facility, respectively.

The Barnes Aquifer is a portion of the sand and gravel outwash aquifer, which extends from the Connecticut River to Westfield River. Although the aquifer extends in a north to south direction, it is bound in an east to west direction due to the geologic contact between the outwash and the bedrock. Groundwater flow is generally in a south or southeasterly direction. Depth to groundwater within Westfield-Barnes generally ranges from 20 to 45 feet below ground surface (bgs). Environmental investigations of the ANG property included the installation of several monitoring wells, which provide local hydrogeological information relevant to this PA.

1.5.3 Hydrology

A series of streams and ponds in the surrounding area collect surface water runoff at Westfield-Barnes Municipal Airport (**Figure 1-3**). A watershed divide running north to south along Runway 2-20, the airport's major runway, splits the airport. On the western side of the divide, surface water flow is predominately westward toward Arm Brook. On the eastern side of the divide, in the location of the fire department equipment test area, surface water flow is predominately eastward

toward Pond Brook. Both Arm Brook and Pond Brook flow south and discharge into the Westfield River, approximately 1.5 miles south of the airport boundary. Stormwater drains at various basins throughout the airport. The drainage basins discharge runoff from the installation and surrounding areas into seven various on-site retention ponds (BB&E, 2016).

All surface drainage ultimately flows to the Connecticut River, eventually flowing into Long Island Sound, approximately 62 miles south of the facility (Larsen, 1972). As a result of continental glaciation, drainage within this quadrangle is poorly integrated as indicated by the various swamps, ponds, and irregular stream paths throughout the region. The scattered streams within the vicinity of Barnes AASF #2 flow southward into Westfield River, a major tributary of the Connecticut River.

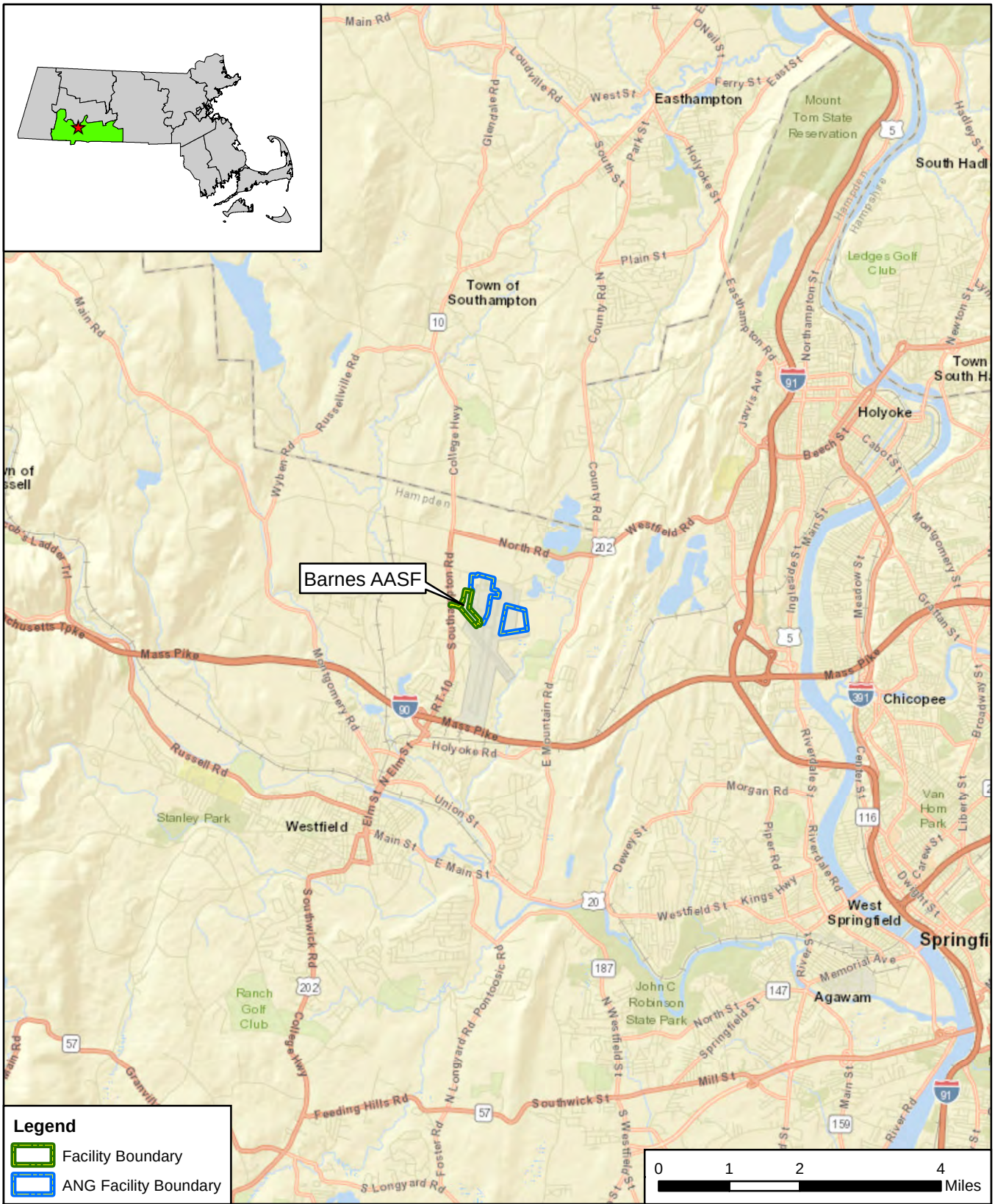
Slightly northeast of Barnes AASF #2 is a group of kettle ponds, whose lower portions are below the groundwater table (Larsen, 1972). Kettles are defined as depressions created through the melting of stagnant ice beneath glaciofluvial sediments and are common in outwash plains. The outwash deposits within this region are the topset beds of large deltas built into glacial lakes.

1.5.4 Climate

The climate in the area is moderate, with an average temperature of 50.1 degrees Fahrenheit (°F). Seasonally, temperatures vary from humid summer highs of 103°F to winter lows of -13°F (National Oceanic and Atmospheric Administration [NOAA], 2018). Precipitation is relatively evenly distributed throughout the year, with averages of 43 inches of rain and 51 inches of snow annually. The prevailing wind is typically west by northwest at seven miles per hour (NOAA, 1998).

1.5.5 Current and Future Land Use

Current ARNG facility property is used solely for military operations, including the AASF, runway, and support buildings. Fueling and maintenance activities for military aircraft are the most common activities at this facility. These current land use activities within the facility will continue until the termination of the ARNG lease with the city of Westfield, in 2105.



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Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	7/19/2018

Facility Location

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Figure 1-1

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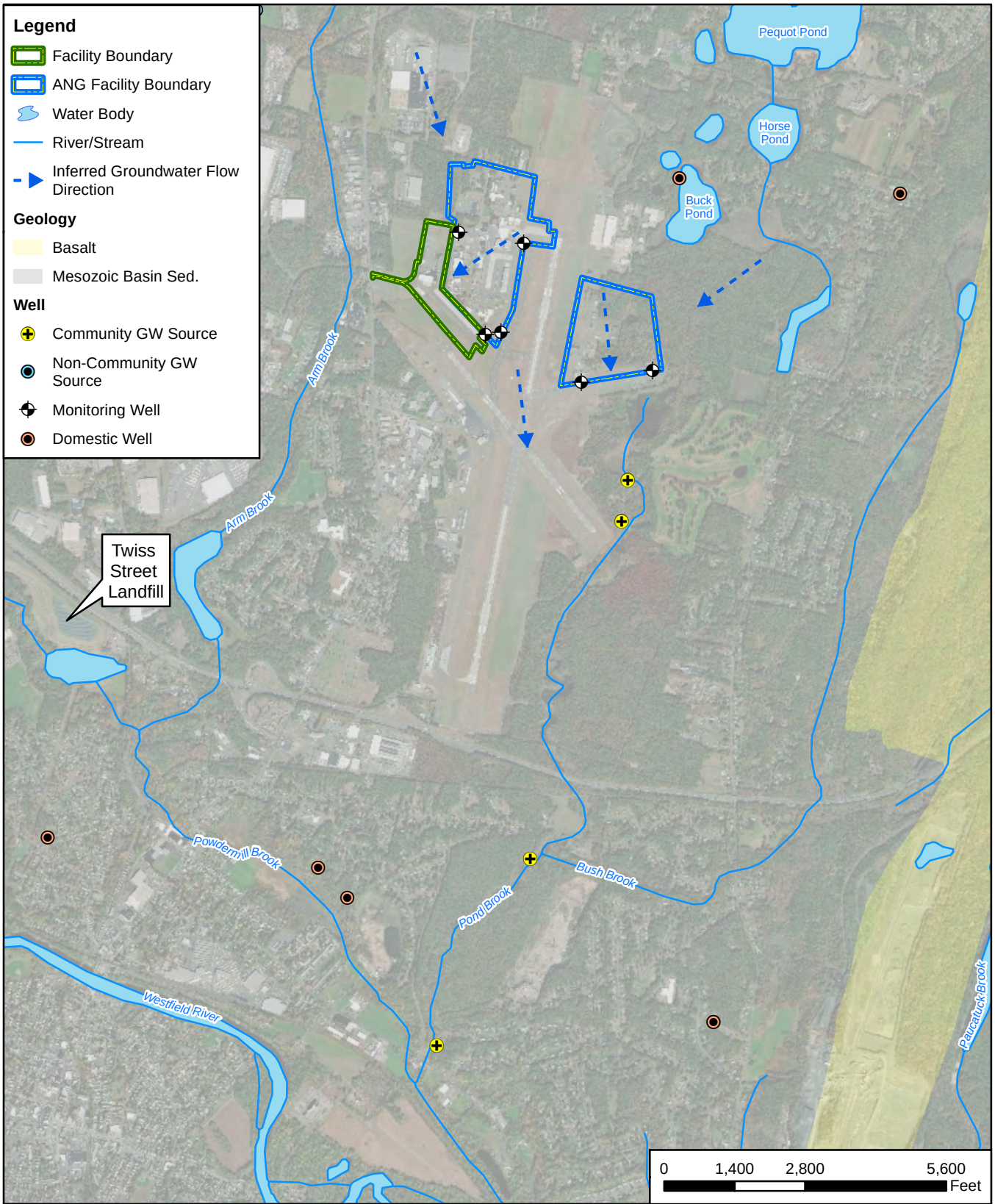

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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	7/19/2018

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Groundwater Features

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Figure 1-2

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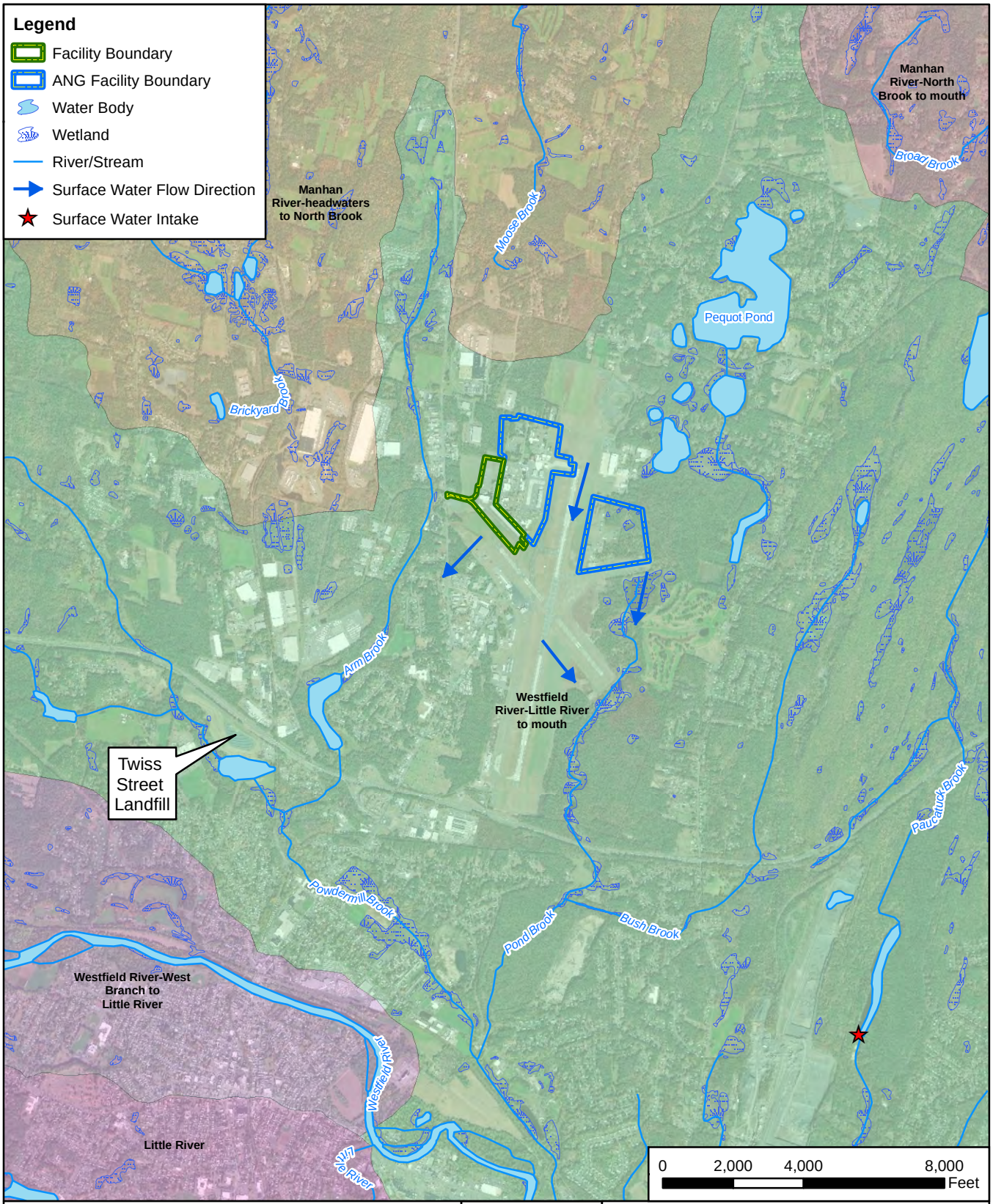

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

One former FTA was identified within the Barnes AASF #2 facility during the PA as an Area of Interest (AOI). A description of the FTA is presented below, and the FTA location is shown on **Figure 2-1**. Detailed photographs of the FTA appear in **Appendix C**.

2.1 Former FTA-01, Environmental Restoration Program Site 1 (ERP 1)

Environmental investigations performed on behalf of the ANG in the Environmental Restoration Program (ERP) included Former FTA-01, also known as the ERP Site 1. The location of FTA-01, as seen on **Figure 2-1**, was determined in detail using historical aerial photographs from 1942-1997 (**Appendix A**) and observations made during the site visit at AASF #2. FTA-01 is located approximately 150 yards southwest of the current fire station (Building 040), northwest of the Sierra Taxiway. FTA-01 is currently located on flat lying land mostly consisting of grass with small patches of airfield pavement in the vicinity. This FTA was active from approximately 1950 until 1987 and consisted of a burn pit, a fire extinguisher training pit, a drum storage area, and an up-gradient bermed area (BB&E, 2016).

In 1988, FTA-01 was identified as a potential area of concern in a PA conducted by HMTC (HMTC, 1988). According to the PA conducted by HMTC, the location of this former FTA was on property owned by the airport, not on property leased to the ANG; however, the 2016 PA conducted by BB&E confirmed that this former FTA extended outside the airport property boundary and onto property leased to the ANG. The FTA was used primarily by the ANG during their occupancy, and therefore held ultimate responsibility for waste-related and cleanup activities at this location (HMTC, 1988).

In the spring of 2000, under the direction and ownership of the ANG, over 3,300 tons of impacted soil were excavated from FTA-01 and transported off-base to Ondrick Asphalt Company in Chicopee, MA for asphalt repurposing. During this time, a large bermed area consisting of a retention pond and several areas of dense trees were removed for the installation of the AASF #2 building and a new aircraft parking ramp.

FTA-01 lies between Arm Brook and Pond Brook, with groundwater flowing south to Pond Brook, and surface water flowing mostly southwest to Arm Brook. FTA-01 is downgradient from other potential off-site AFFF releases.

During fire training activities, mixed liquid waste, including aviation gasoline, waste oils, solvents, and jet fuel #4 (JP-4), were utilized as accelerants. Approximately 300 to 500 gallons of this mixed waste were used for each fire training event, which occurred generally every six weeks during the summer months from the 1950s until 1987 (HMTC, 1988).

Groundwater sampling during an environmental investigation revealed that this specific FTA was not impacted by chlorinated solvents or waste fuels likely used during fire training events, and site closure was initiated in 2002 (Amec Foster Wheeler, 2017). Following closure, portions of the facility were redeveloped to include a new approach ramp and parking apron for ARNG aircraft. While there is no documented use of AFFF specifically used at this FTA, given the timeframe of fire training activities, it is highly likely that AFFF was utilized at FTA-01 during its operation from the 1950s until 1987.

Three nested groundwater monitoring wells are located within FTA-01 (MW-7A, MW-7B, and MW-7C). Previous investigative studies performed by Geosphere Environmental Management in 2016 revealed concentrations for various perfluorinated compounds well above the Environmental

Protection Agency established lifetime health advisory limit of 70 nanograms per liter (ng/L), with MW-7B having a PFOS concentration of 1,200 ng/L (BB&E, 2016). The city of Westfield has four municipal water wells downgradient of Barnes, three of which are no longer used due to elevated levels of PFAS detected in drinking water samples collected in 2016 (TestAmerica, 2016). The city of Westfield then identified Barnes ANG as a potentially responsible party in connection with the release of PFOA and PFOS compounds from previous known AFFF usage. In July 2017, the city of Westfield sent a notification of claim to Barnes ANG in pursuant to the City's public water supply wells and the associated elevated PFAS detections that were found in these wells. The claim states:

> "Barnes ANG is liable for releases of hazardous materials that have impacted and continue to threaten to impact the City's public water supply wells. As such, Barnes ANG is responsible for performing necessary and appropriate response actions…" (Bowditch & Dewey Attorneys, 2017).

The areas identified in the claim by the City of Westfield as potential areas of significant PFAS release include the former FTA-01, previously used by the ANG, and identified above (Bowditch & Dewey Attorneys, 2017). As of December 2018, three of the four municipal wells within the City of Barnes are still inactive due to elevated levels of PFAS.

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Barnes AASF, MA			
REVISED	10/9/2018	GIS BY	MS	10/9/2018
SCALE	1:10,800	CHK BY	TK	10/9/2018
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/9/2018

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Fire Training Areas

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Figure 2-1

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3. Non-Fire Training Areas

No non-FTAs were identified at Barnes AASF#2 during this PA. One former landfill was identified in the vicinity of Barnes and is discussed in **Section 5**.

4. Emergency Response Areas

During the site visit at AASF #2, no emergency response areas were identified within ARNG property boundaries; however, three off-site emergency response areas were identified as potential AFFF release areas and are discussed in **Section 5**.

5. Adjacent Sources

Several potential off-facility PFAS sources were identified during this PA. Seven of these areas are on ANG property and were identified in a PA performed by the ANG (BB&E, 2016). These areas have the potential to impact groundwater and drinking water supplies in the area, and their relationship is relevant to the ARNG due to close proximity and groundwater flow. The locations of the potential off-facility source areas are shown on **Figure 5-1**.

5.1 Fire Department Equipment Test Area

The Fire Department Equipment Test Area is located on the far east end of the Sierra Taxiway. According to a PA conducted by the ANG, testing was predominately done on the end of the paved taxiway, with resulting releases draining to the edge of the taxiway or infiltrating through the porous pavement (BB&E, 2016).

There are three documented releases of AFFF at this location, all occurring in the mid-1990s, with the latest one occurring between 1996 and 1997. Testing involving AFFF prior to 1993 was not documented. Exact quantities of AFFF used during these testing periods are unknown. More recent testing of equipment has used mostly water, and when AFFF is involved, it is used in “very small amounts” and is captured in a portable drum for disposal or reuse (BB&E, 2016).

There are no records of any AFFF use prior to 1993. Based on the time period of fire training activities at FTA-01, fire equipment testing likely occurred at FTA-01 until at least 1987, with the possibility of foam tests occurring until the mid-1990s. The Massachusetts Department of Environmental Protection (MassDEP) issued a letter in April 1987 ordering ANG personnel to cease all fire training activities involving AFFF.

Due to changes in property line boundaries, the Fire Department Equipment Test Area is not located within ANG property.

5.2 Stormwater Drainage Basin (ERP Site 4)

The stormwater drainage basin was investigated by the ANG as “ERP Site 4”. It located on the northwest boundary of the ANG parcel to the west of Runway 2-20. This retention basin is approximately 100 feet wide, 200 feet long and 10 feet deep and lined with crushed rock and dirt. Stormwater enters the basin by percolating to the subsurface through the permeable, sandy surface soils.

Prior to conversion to the city of Westfield sanitary sewer system in the early 1990s, floor drains in the hangars and buildings near the flight line drained to the retention basin (BB&E, 2016). Although there are no direct releases of AFFF recorded here, any releases of AFFF in the buildings may have entered the floor drains and to the drainage basin. Under the ERP, this site was investigated and approved for closure in 1998 with no further action (BB&E, 2016).

5.3 Hangars 27A and 27B

The ANG PA identified Hangars 27A and 27B as potential AFFF sources. These two hangars serve as the active Base Fuels and Corrosion Control Facilities. Automatic high expansion foam (HEF) fire suppression systems were installed in the early 2000s in both of these hangars. A total of four manually operated AFFF guns, two in each hangar, were located inside the hangars during the site visit. These AFFF guns, each containing 50 gallons of AFFF concentrate, were removed from the facility in August 2018. The exact date of when these AFFF guns were brought into these hangars is unknown.

While there are no documented releases of AFFF at these hangars, any releases that might have occurred, including releases in flight line area buildings before the early 1990s, would have drained to the building floor and trench drains, which lead to the stormwater drainage basin (ERP Site 4, described above). Like the drainage basin, floor drains at these hangars are now directed to the City's sanitary sewer system by an oil/water separator (OWS) (BB&E, 2016).

5.4 Former Fire Station (Building 004)

The former fire station on ANG property was used from the 1940s until 1992, when the new fire station was constructed. Most of the AFFF in the facility was stored and handled at Building 004, during its active use as a fire station. As reported in the ANG PA, facility personnel indicated that the floor drains at the fire station were connected to an OWS that discharged to a sanitary sewer system outside the facility. There are no documented releases of AFFF at the former fire station; however, small releases may have occurred here when it served as the main storage facility for AFFF on the installation. Any spills at Building 004 would have likely drained to the floor drains and entered the sanitary sewer system.

5.5 Current Fire Station (Building 040)

Building 040 currently serves as the fire station at Westfield-Barnes ANG Base. Any AFFF on ANG property is stored by the fire department at the current fire station. Built in 1992, with renovations in 2010, the fire station houses three crash trucks, with a total capacity of approximately 320 gallons among them. At the time of the ANG PA (BB&E, 2016), there were several 5-gallon totes containing 3% AFFF at the fire station, totaling approximately 250 gallons, to refill the crash trucks if needed.

During original construction of the fire station, floor drains were connected to the city of Westfield's sanitary sewer via an OWS. Since renovations in 2010, all of the trucks and storage areas of AFFF were located inside of the fire station, where no floor drains are present. Any transfer of AFFF occurred by either manually pouring the 5-gallon totes with AFFF directly into the crash trucks or by a hand transfer pump within the fire station. AFFF is no longer used in Building 040 as of late 2016. No spills or releases of AFFF have been recorded at the current fire station.

5.6 Hush House

Built in approximately 1995, the Hush House is where ANG jet engine testing occurs. The Hush House was originally constructed with a fire suppression system containing AFFF. In the early 2000s, the fire suppression system was converted to HEF. One documented release of AFFF occurred at the Hush House in 1995 during acceptance testing of the fire suppression system. Two additional fire suppression system tests reportedly occurred (BB&E, 2016); however, exact quantities and dates were not documented, and it is unclear whether these releases were AFFF or HEF. Due to the layout of the building floor drains, any AFFF that was released during these events would flow to an OWS and to the city of Westfield's sanitary sewer system.

5.7 Former FTA-06 (ERP Site 2)

FTA-06 is a former FTA on ANG property that consisted of two distinct areas. These two areas were used for training purposes in the late 1950s and early 1960s, before AFFF was used by the military. To address potential contamination from residual fuel constituents, soil excavation and removal activities were conducted at this location in 2003, and site closure was initiated in 2005. Based on the timeframe of use, it is unlikely that AFFF was used at this location.

5.8 Landfills

Twiss Street Landfill, a former municipal solid waste landfill, is located approximately 3 miles southwest of FTA-01. The geographic coordinates for this landfill are 42°08’49.83"N; 72°44'41.20"W (**Figure 1-3** and **Figure 6-1**). The city of Westfield closed the 40-acre Twiss Street Landfill in April of 1997. Final capping was completed in early 1998 in accordance with engineering plans approved by MassDEP. The former landfill was capped with 6 inches of sand gas vent layer, a 40 millimeter high-density polyethylene impermeable geomembrane liner, 12 inches of sand drainage layer, and 12 inches of topsoil (MassDEP, 2014). The former landfill was used as a transfer station from 1997 until 2015, when Westfield commissioned the “Twiss Street Solar” project. Approximately eight acres of the capped landfill are currently covered in solar panels, which generate renewable energy for the city of Westfield.

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 waste water treatment plant that processes PFAS-laden water, used AFFF storage containers, or products associated with waterproofing uniforms or boots. At Barnes, no information obtained indicates PFAS-related materials were disposed of in the landfill.

5.9 Emergency Response Areas

During the site visit at AASF #2, three off-site emergency response areas were identified as potential AFFF release areas (**Figure 5-2**). While none of these emergency response areas fall within ARNG property boundaries, the proximity of these locations means they have the potential to impact areas surrounding the ARNG property.

5.9.1 Civilian Aircraft Fire

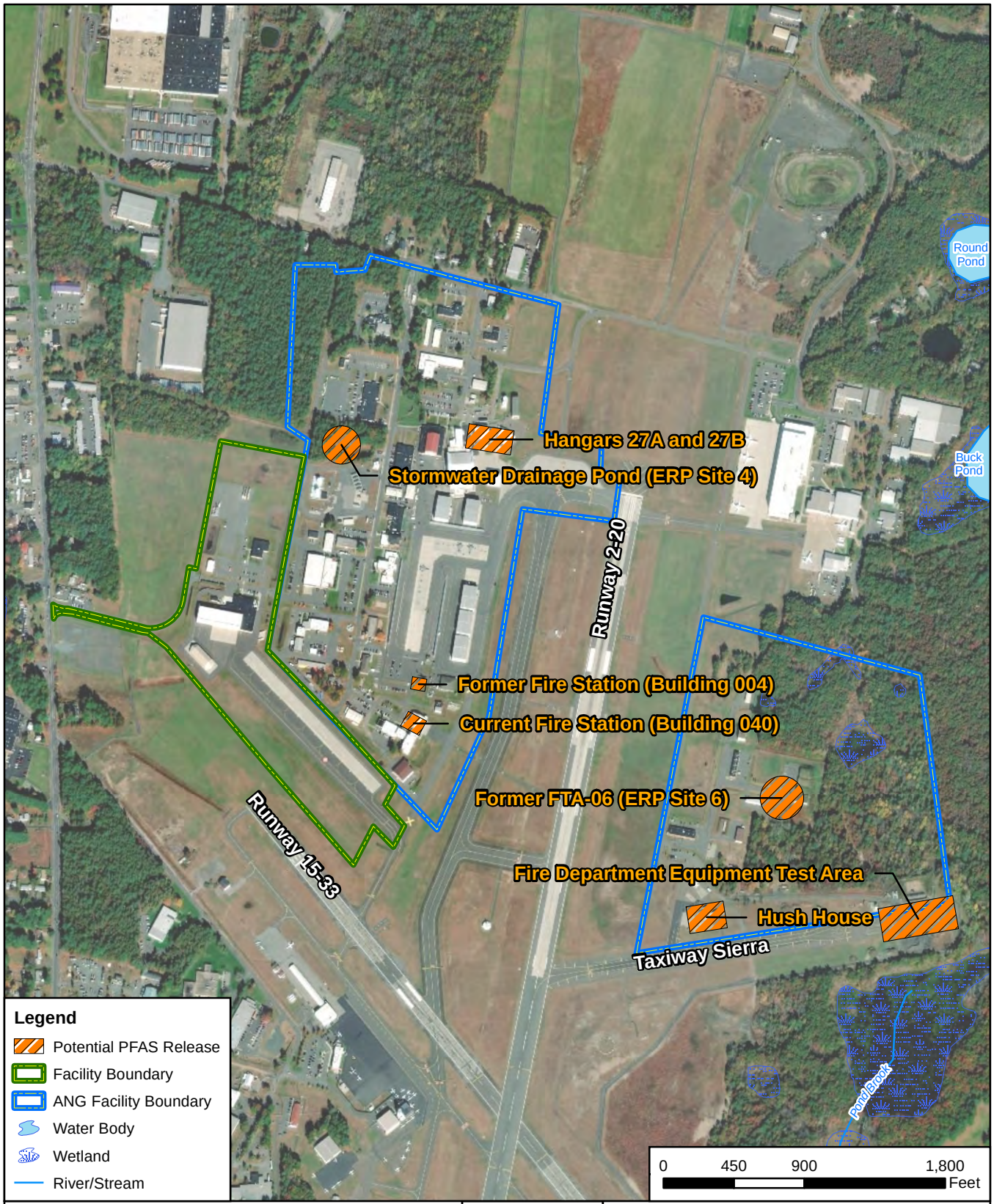
In 2013, a civilian aircraft caught fire approximately 1,500 feet southeast of the current fire station, south of the Hush House, near the intersection of Runways 02 and 15. During the site visit at AASF #2, interviews with the ANG Fire Chief confirmed the base fire department used approximately five gallons of concentrated 3% AFFF mixed with water to fight the aircraft fire. According to the PA conducted by BB&E, all liquids expended during this incident were left on the ground to dissipate, infiltrating through the paved runaway and into the surrounding permeable soils (BB&E, 2016).

5.9.2 Civilian Airplane Crash into HFP Sprinkler Corporation

In 2001, a civilian aircraft crashed into HFP Sprinkler Inc., a private business located approximately 0.5 miles northeast of the northeast edge of ANG property. Personnel from the local and ANG fire departments teamed together to extinguish the fire. Interviews with the ANG Fire Chief conducted during the site visit confirmed approximately 50-60 gallons of 3% AFFF were used in combatting the fire. Due to the uncontained nature of the crash, all AFFF was released into the nearby parking lot, surrounding storm drains, and the permeable soil surface.

5.9.3 Northern Soccer Fields

Around 0.5 miles north of Falcon Drive, on ANG property, an accidental release of approximately 5 gallons of 3% AFFF occurred in the late 1990s. During the site visit at AASF #2, interviews with the ANG Fire Chief confirmed the one-time release occurred while providing irrigation support to newly seeded soccer fields. The AFFF that was released was allowed to dissipate and soak into the surrounding permeable ground surface.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Barnes AASF, MA			
REVISED	7/19/2018	GIS BY	MS	7/19/2018
SCALE	1:10,800	CHK BY	TK	7/19/2018
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	7/19/2018

N

Adjacent Off-Site Sources

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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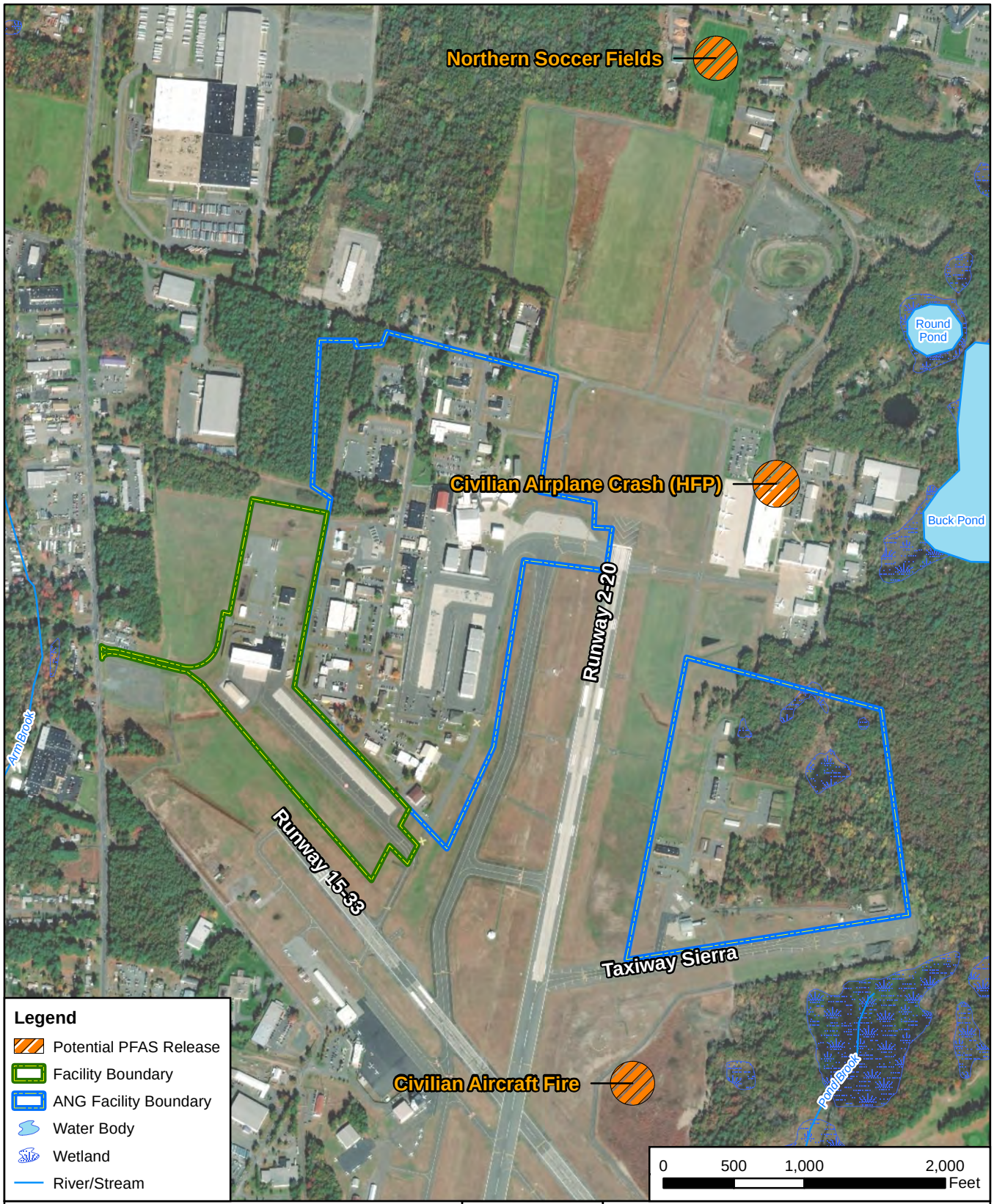

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Barnes AASF, MA			
REVISED	12/20/2018	GIS BY	MS	12/20/2018
SCALE	1:12,000	CHK BY	TK	12/20/2018
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	12/20/2018

N

Emergency Response Areas

AECOM
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Germantown, MD 20876

Figure 5-2

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\MA\Fig_5-2_Barnes_AASF_Emergencey_Response_Areas.mxd

6. Conceptual Site Model

Based on the PA findings, one potential release area, Former FTA-01, was identified as an AOI. This AOI is shown on **Figure 6-1**. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways is sparse and continues to be the subject of PFAS toxicological study. Receptors at Barnes AASF #2 include facility personnel, site and construction workers, trespassers, and residents outside the facility boundary. The CSM described below indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1 Former FTA-01

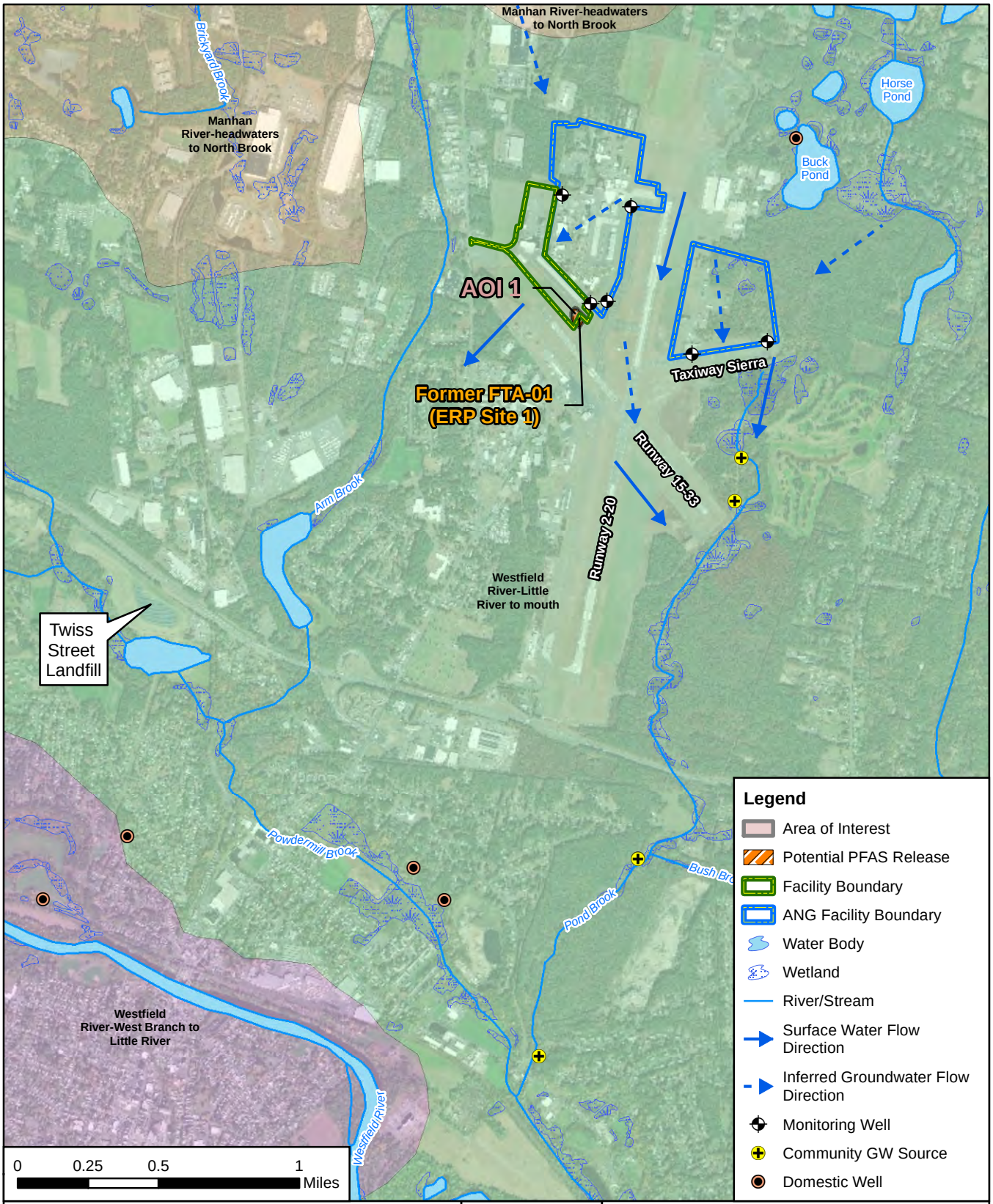
AOI 1 is the Former FTA-01 (see **Figure 6-1**). Based on activities that historically occurred at this location, frequent releases of AFFF likely occurred at AOI 1 until 1987, prior to the MAARNG leasing the property. AOI 1 lies within open, flat-lying land mostly consisting of grass with small patches of airfield pavement in the vicinity, northwest of the intersection of Runway 15-33 and Runway 2-20. As part of ANG ERP activities, soil was removed from AOI 1 because of volatile and semivolatile contamination. The clean fill may be assumed to be PFAS free; however, deeper soil down to the water table may contain residual PFAS. Ground-disturbing activities at the AOI are unlikely to result in exposure to PFAS contamination via inhalation of dust or ingestion of soil.

In their anionic forms, PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. Given the length of time since the AFFF release and the average precipitation at the facility, it is possible that potential PFAS contamination at the AOI 1 has migrated from the soil to nearby surface water bodies via over-land surface water flow and into the groundwater via infiltration.

AOI 1 is on the west side of the runway, which forms a local surface water divide. Therefore, site run-off might have flowed to Arm Brook, which flows south to the Westfield River, which then flows into the Connecticut River, east of the city of Westfield. Potentially complete exposure pathways exist for surface water and sediment via ingestion for facility personnel, site and construction workers, nearby residents, and recreational users of Westfield River, including the associated surface water bodies such as Arm Brook (e.g., swimming and fishing).

Drinking water for Barnes AASF #2 comes from the city of Westfield. The city of Westfield's drinking water is supplied via groundwater wells in the Barnes aquifer, as supplemented by the Granville Reservoir, which is about 14 miles southwest of Westfield Regional Airport, within a separate watershed and outside the influence of groundwater from AASF #2. However, infiltrating precipitation entering the shallow groundwater system may discharge to adjacent deeper groundwater systems. Precipitation that infiltrates and reaches the intermediate and deeper groundwater may bypass streams and be intercepted by the underground aquifer at Barnes as well as downgradient drinking water wells. The groundwater beneath Barnes AASF #2 is designated as a Zone II aquifer, meaning Barnes and surrounding areas are contributing zones to a drinking water aquifer. Therefore, a potentially complete pathway for groundwater via ingestion exists for site and construction workers as well as residents obtaining drinking water from the city of Westfield.

The CSM for Barnes AASF #2 AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Barnes AASF, MA			
REVISED	10/9/2018	GIS BY	MS	10/9/2018
SCALE	1:31,680	CHK BY	TK	10/9/2018
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/9/2018

N

Areas of Interest

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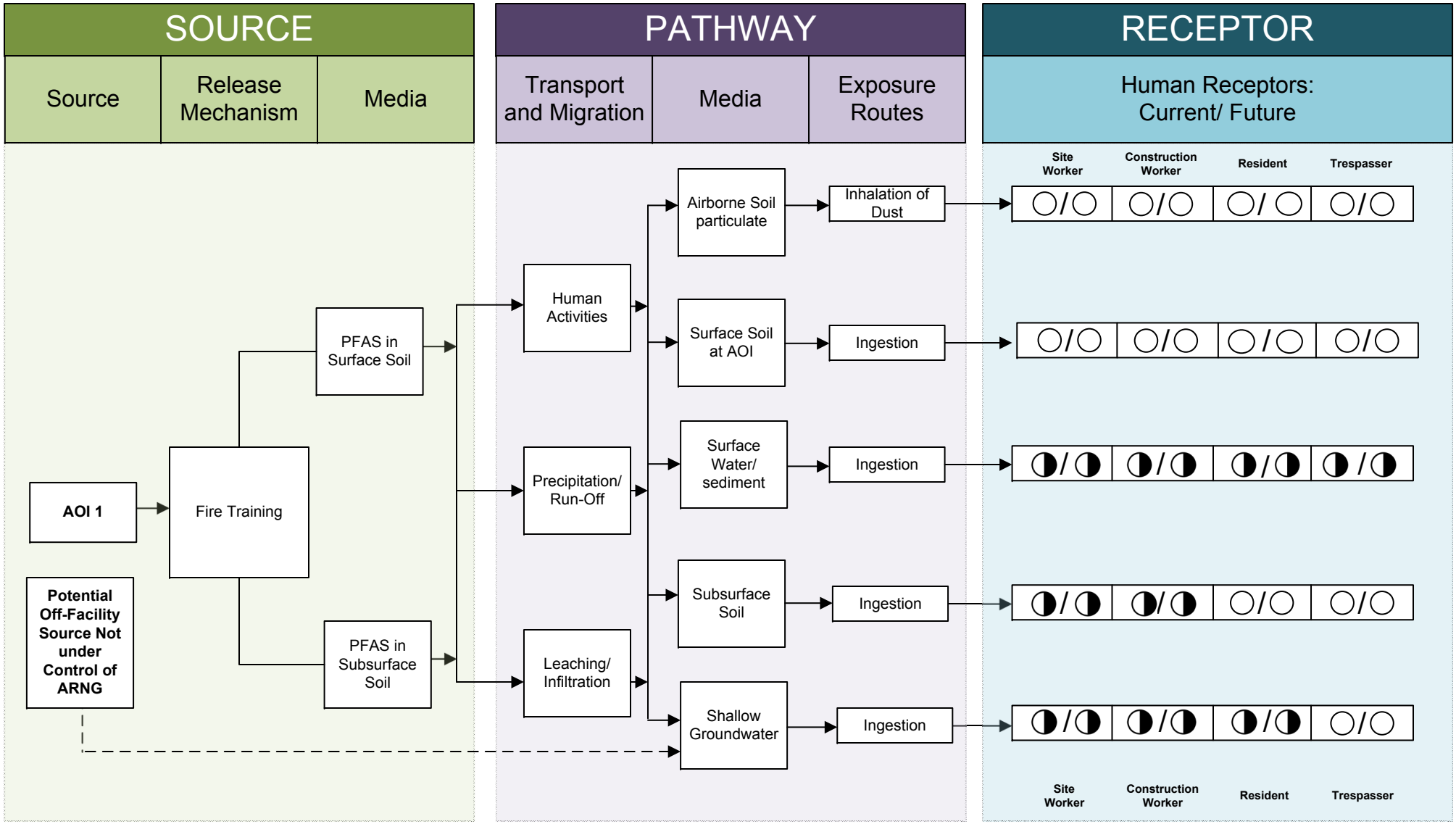
Figure 6-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\MA\Fig_6-1_Barnes_AASF_Area_of_Interest.mxd



LEGEND

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

Note: The residential receptor refers to an off-facility receptor.

Figure 6-2
Preliminary Conceptual Site Model
Barnes AASF #2 FTA-01

7. Conclusions

This report presents a summary of available information gathered during the PA on the use and storage of AFFF and other PFAS-related activities at Barnes AASF #2. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to PFAS release was identified at Barnes AASF #2 based on PA data. **Figure 7-1** present a summary of PA findings, and the AOIs are presented in **Table 7-1**.

Table 7-1: AOIs at Branes AASF#2

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	FTA-01	MAARNG	1969 until 1988

Based on potential historic AFFF releases and previous groundwater sampling at this AOI, there is potential for exposure to PFAS contamination in soil, groundwater, surface water, and sediment for facility personnel, site and construction workers, and recreational users. In conjunction with the AOI, the eight adjacent off-site sources that were identified create potential exposure to PFAS. Residents using groundwater for drinking water surrounding the facility to the south and residents using a downstream intake may potentially be exposed to migrating PFAS contamination via the groundwater pathway.

7.2 Uncertainties

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

The conclusions of this PA are 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.

In order 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. **Table 7-2** summarizes the uncertainties associated with this PA:

Table 7-2: Uncertainties within the PA

Area of Interest	Source of Uncertainty
AOI 1 (FTA-01)	No or limited information was available on the exact dates, type, amount, and frequency of AFFF potentially used at AOI 1.

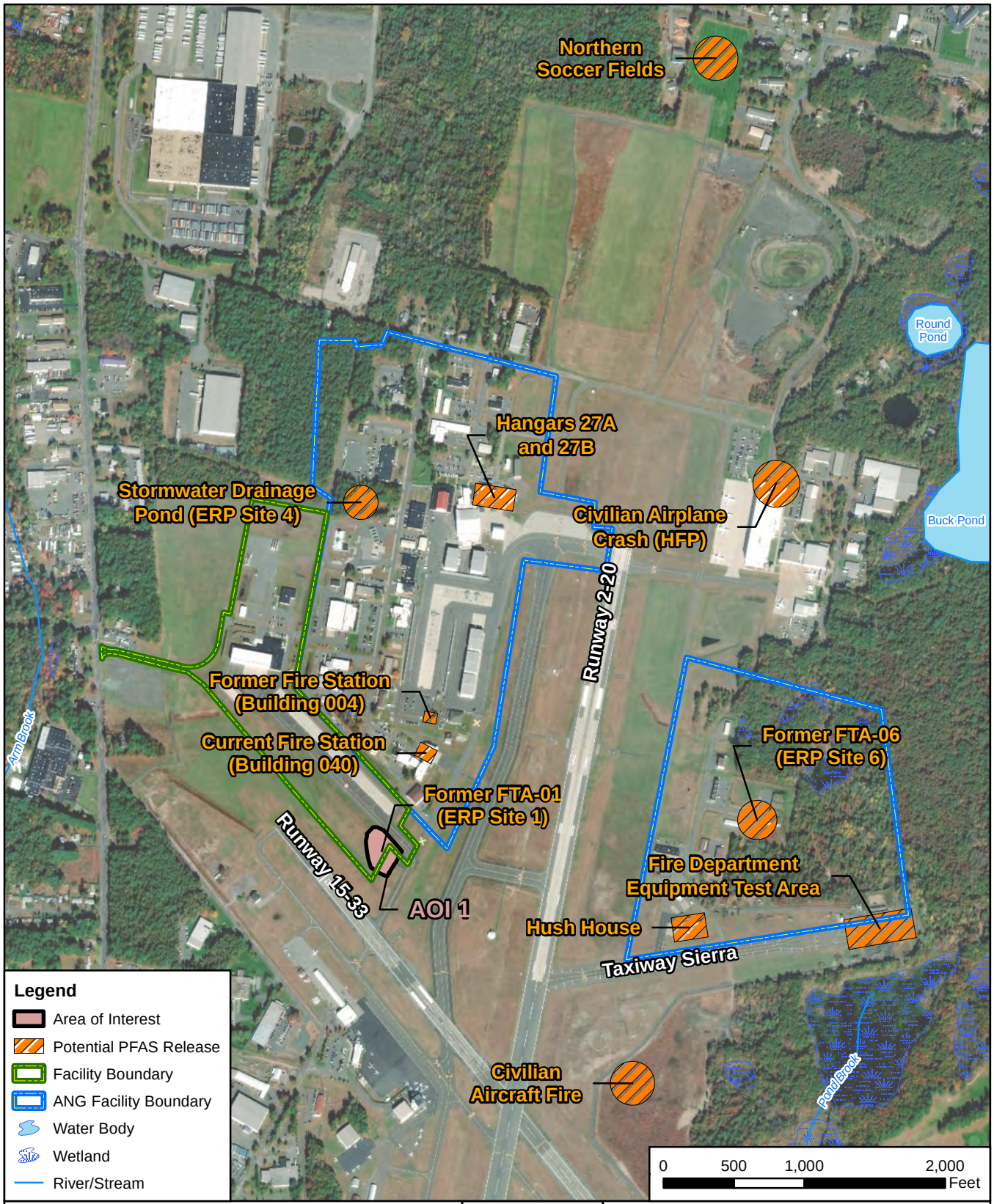
7.3 Potential Future Actions

Interviews and records (covering 1950 to present) indicate that ANG activities may have resulted in potential PFAS releases at the AOI identified during the PA. Based on the CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at the AOI. **Table 7-3** summarizes the rationale used to determine if the AOIs should be considered for further investigation under the CERCLA process and undergo an SI.

Table 7-3: Potential Future Actions

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1 Former FTA-01	42°09’50.77”N 72°43’06.04”W	From approximately 1950 until 1987, AOI 1 consisted of a burn pit, a fire extinguisher training pit, a drum storage area, and an up-gradient bermed area where AFFF was likely used.	Proceed to an SI, focus on soil, groundwater, surface water, sediment

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



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Barnes AASF, MA			
REVISED	12/20/2018	GIS BY	MS	12/20/2018
SCALE	1:12,000	CHK BY	TK	12/20/2018
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	12/20/2018

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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8. References

Amec Foster Wheeler. 2017. *Final Work Plan FY16 Phase 1 Regional Site Inspections for Perfluorinated Compounds, 104th Fighter Wing Massachusetts Air National Guard Barnes Air National Guard Base Westfield, Massachusetts.*

BB&E, Inc. 2016. *Final Perfluorinated Compounds Preliminary Assessment Site Visit Report, Barnes Air National Guard Base Westfield, Massachusetts.*

Bowditch & Dewey Attorneys. 2017. Letter, RE: Notification of Claim Pursuant to M.G.L. c. 21E, §4A City of Westfield Public Water Supply Wells. July 2017.

Hazardous Materials Technical Center (HMTC). 1988. *Installation Restoration Program Preliminary Assessment, 104th Tactical Fighter Group Massachusetts Air National Guard Barnes Municipal Airport Westfield, Massachusetts.*

Jahns, R.H. 1947. *Geological Features of the Connecticut Valley, Massachusetts as Related to Recent Floods*.

Larsen, F.D. 1972. *Surficial Geology of the Mount Tom Quandrangle, Massachusetts.*

Massachusetts Department of Environmental Protection (MassDEP). 2014. *Westfield Twiss Street Landfill Post Closure Use – Solar Power Permit Approval*.

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

National Oceanic and Atmospheric Administration (NOAA), 1998. *Climatic Wind Data for the United States*.

NOAA, National Centers for Environmental Information. 2018. *Climate Data Online Database*.

Pioneer Valley Planning Commission. 2010. *City of Westfield Open Space and Recreation Plan*.

TestAmerica. 2016. Analytical Report Number 320-19817-1, directed to Geosphere Environmental Management, Inc.

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

University of Massachusetts Donahue Institute (UMDI), for the Commonwealth of Massachusetts Military Asset and Security Strategy Task Force. 2015. *An Economic-Contribution Analysis and Overview of Massachusetts Military Installations.*

Appendix A
Data Resources

Data resources will be provided separately on CD. Data resources for Westfield Barnes AASF #2 include:

Leases, Licenses, and Permits

- 2006, Department of the Army. Land Lease between City of Westfield, Massachusetts and United States of America. Lease No. DACA33-5-06-005. Barnes Airfield, Westfield, Massachusetts. December 15, 2006.
- 2010, Department of the Army. License for Army Aviation Support Facility #2. Westfield, Massachusetts. August 16, 2010.

AFFF Release Documentation

- 1991, Department of Defense. DD Form 1348-1A, Issue Release/Receipt. July 1991.
- 2003, ANSUL. Purple-K Material Safety Data Sheet. Form No. F-9752-2.
- 2016, Geosphere Environmental Management, Inc. TestAmerica Laboratory Report for PFAS Sampling. June 2016.
- 2018, Massachusetts Department of Environmental Protection (MassDEP). RE: Sampling Results for PFAS (Per- and Polyfluoroalkyl substances) in Drinking Water. March 1, 2018.

Previous Investigations Completed

- 1947, United States Geological Survey (USGS). Geologic Features of the Connecticut Valley, Massachusetts as Related to Recent Floods. Water-Supply Paper 996.
- 1972, USGS. Surficial Geology of the Mount Tom Quadrangle, Massachusetts.
- 1988, Hazardous Materials Technical Center (HMTC). Installation Restoration Program Preliminary Assessment, 104th Tactical Fighter Group Massachusetts Air National Guard Barnes Municipal Airport Westfield, Massachusetts. March 1988.
- 1998, National Oceanic and Atmospheric Administration. Climatic Wind Data for the United States. November 1998.
- 2003, MassDEP. Source Water Assessment and Protection (SWAP) Report for Westfield Water Department. April 15, 2003.
- 2007, Agency for Toxic Substances and Disease Registry. Public Health Assessment for Evaluation of Environmental Concerns Related to the Barnes Aquifer and Cancer Incidence, 1982-2000. Easthampton & Southampton, Hampshire County, Massachusetts, Holyoke & Westfield, Hampden County Massachusetts. MassDEP RTN 1-13737, 1-11888, 1-13735, 1-13736. October 17, 2007.
- 2015, University of Massachusetts Donahue Institute (UMDI), for the Commonwealth of Massachusetts Military Asset and Security Strategy Task Force. *An Economic-Contribution Analysis and Overview of Massachusetts Military Installations.*
- 2016, BB&E. *Final Perfluorinated Compounds Preliminary Assessment Site Visit Report, Barnes Air National Guard Base Westfield, Massachusetts.* January 2016.
- 2016, TestAmerica. Analytical Report Number 320-19817-1, directed to Geosphere Environmental Management, Inc.
- 2017, Bowditch & Dewey Attorneys. Letter, RE: Notification of Claim Pursuant to M.G.L. c. 21E, §4A City of Westfield Public Water Supply Wells. July 2017.

- 2017a, Amec Foster Wheeler. Final Work Plan FY16 Phase 1 Regional Site Inspections for Perfluorinated Compounds, 104th Fighter Wing Massachusetts Air National Guard Barnes Air National Guard Base Westfield, Massachusetts.
- 2017b, Amec Foster Wheeler. QAPP Rev. 1 and FSP Rev. 1, Phase 1 Site Inspection for Per-fluorinated Compounds (PFCs) Bangor Air National Guard Base, Bangor, Maine.
- 2018, Amec Foster Wheeler. Final Report FY16 Phase 1 Regional Site Inspections for Perfluorinated Compounds, Massachusetts Air National Guard – 104th Fighter Wing Barnes Air National Guard Base Westfield, Massachusetts.

Installation Maps

- 1998, USGS. Mount Tom Quadrangle Massachusetts, 7.5-Minute Series (Topographic).
- 2015, BB&E. Site Features and Potential AOCs. Barnes Air National Guard Base. Westfield, Massachusetts.
- 2018, Massachusetts Army National Guard. Westfield-Barnes AASF 2-2596A. Real Property.
- Pioneer Valley Planning Commission. Surficial Geology of the Barnes & Great Brooks Aquifers.
- Pioneer Valley Planning Commission. Surficial Geology of the Barnes & Great Brooks Aquifers – Westfield.

Miscellaneous Data Resources

- 2018, EDR™. The EDR™ Radius Map Report with GeoCheck. Barnes AASF, Westfield, Massachusetts 01085. Inquiry Number: 5338000.2s. June 19, 2018.

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire – Fire Station

104th Fighter u

Facility: Westfield Barnes ANG
Interviewer: [redacted]
Date/Time: 18 APR 2018 / 11 AM

Interviewee: [redacted] **Title:** Installation Fire Chief **Phone Number:** [redacted] **Email:** [redacted]	Can your name/role be used in the PA Report? (Y) or N Can you recommend anyone we can interview? (Y or N) None additional

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

JUL 1994 - ANG enlisted
DEC 2013 - released
Lineman Firefighter
↓
full time employee
2013 Fire Chief

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

Nozzle testing, see below
(annual foam concentrate)

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?

2 Bldg contains foam; fuel cell maintainence activity
200 gal
2 not armed and scheduled for replacement summer 2018
Also have HEF systems *acceptance test only; none ongoing

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

No -- see only above.
HEF systems

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

Nat'l Guard Bureau ordered an allocation in 1994; never ordered by Barnes ANG
Subsequently ~~reques~~ ordered thru Civil Eng Squadron who purchased directly from vendor

PA Interview Questionnaire – Fire Station

Facility: Westfield Barnes
Interviewer: [redacted]
Date/Time: 18 APR 2018 11 AM

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

No others

7. Is AFFF formulated on base? If so, where ~~is~~ was the solution mixed, contained, transferred, etc.?

Past practice (1990s): ~~use~~ gravity feed 5 gallon pails
later: 55 gal drum transferred via pump.

8. Where ~~is~~ was 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?

Bldg 54 -- Supply Bldg Bldg 40 - Fire Dept
~~stored~~ as 3% in 5 gal buckets always concentrated.

9. How ~~is~~ was the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? ~~Is~~/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where ~~are~~ were vehicles storing AFFF cleaned/decontaminated?

Halon only

Old fire station -- had a o/w separator 1989 est. fire dept and moved into old vehicle maintenance.
Wash vehicles in old bays of former fire house.
1990 - new fire station (no floor drains)
Addition 2010 - addition to new

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

ARFF Airfield Rescue + Fire
X2 - P19s 130 gal foam cap
X1 - P23 360 gal foam cap (gone - expended)
5 gal of new formulation.
~~ATs~~
TI1500 - 300 gal foam

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

Vehicles were known to leak; filmy residue from tanks or filling activity
Vehicles gauges did not illustrate a continual leak.

Annual spray pattern @ Sierra Taxiway into containers 55 gallons drum turned over to ENV

PA Interview Questionnaire – Fire Station

Facility: Westfield Barnes ANG
Interviewer: [redacted]
Date/Time: 18 APR 2018 11AM

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

During AFFF period: FTA01 @ MSF Taxiway and FTA02 @ Sierra Taxiway
All inactive.

Currently train for petroleum fires @ Logan Airport

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

JP-8 JP-4 Diesel Contaminated Motor Oil.
Waste fuel from POL. Vacuumed from fuel spills.

14. What was the frequency of AFFF use at each ~~location~~ FTA? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

No direct knowledge
Speculatively, left in place @ FTA

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

Westfield has a fire department. ANG Fire supports --under a mutual informal agreement. ~~would Hampden~~ Hamden City Mutual Aid Association covers them as a fire fighting entity.

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

No ~~former~~ local firefighting units trained @ Barnes ANG. FTAs.

PA Interview Questionnaire – Fire Station

Facility: Westfield Barnes
Interviewer: [redacted]
Date/Time: 18 APR 2018 11AM

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

Off post training never involved foam.

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

~1995 Tanker trunk just off of I-90 @ 202 near toll area -- no report
Barnes ANG responded + use foam.
1 ~~X~~ crashes on base aircraft @ 15-20 intersection - small private aircraft Propeller
1 crash off base north @ HFP Sprinkler bldg - fatality small private jet aircraft

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

Fuel spills are all logged -- often below reportable limit <10 gallons; no AFFF used
All pre 2000 logs (paper) are disposed.
No preventative AFFF use

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

No

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

~~1998~~ Release at corner of ~~Falcon Rd~~ Rte 10 + 202 when irrigation of new soccer fields
1998 at the latest.
Accidental small foam release from firefighting vehicles
Instead of water

PA Interview Questionnaire – Fire Station

Facility: Westfield Barnes ANG
Interviewer: [redacted]
Date/Time: 18 APR 11 AM

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

No. In role as LT in 1990s -- no releases.

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

Turned over to ENV and DLA. for 10 years expired foam sat in fire department.

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

No other staff with additional relevant knowledge.

PA Interview Questionnaire - Environmental Manager

Facility: Barnes
Interviewer: _____
Date/Time: _____

Interviewee: [redacted] **Title:** Env. Program Manager **Phone Number:** [redacted] **Email** [redacted]	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.

27 years (1991)

2. Where can I find previous facility ownership information?

MADEP E-repository
Leases (copies obtained)

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 - No
Fire Training Areas - yes, see notes
Firefighting (Active Fire) - yes, 2 crashes
Crash - yes, 2 crashes
Fire Suppression Systems (Hangers/Dining Facilities) - see notes (nozzel testing)
Fire Protection at Fueling Stations — 2 5,000 gallons tanks; FSS = dry chem + possibly hand
Non-Technical/Recreational/ Pest Management - No
Metals Plating Facility - No
Waterproofing Uniforms (Laundry Facilities) - No
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?

B27 is only building w/ foam
Fuelcell corrosion hangar (<6 months) will be replaced
HEF Buildings - Building 23, 50, 27, 45-47, 13, 19
Hush (107)

old - B-54 (supply house); 2 disposal events (2026)
Now: B-54
5-gallon only
B-27 (<6 months) 200-250 gallon

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?

AFFF @ fire house (~~B247~~)
other buildings HEF

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

NGB used to procure (see Rosa's notes)
Hazmark - refill
yearly inventory; procured by civil engineering group

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)?

3% Drychem (need SDS for both)
New C6

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?

5-gallon buckets (concentrate)

B54 - supply building
B40 - Fire Dept.

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?

Just ~~one~~ two ~~active~~
IRP Site 1 (~~old~~ FTA-01; no longer used)
North (IRP-4) ~1950's (closed; no longer used)
↳ likely no AFFF release

⊕ FTA-02 (Sierra taxiway) - inactive
(not ARNG property)

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?

Not collected, flowed to retention pond to infiltrate
Hose/nozzel testing foam collected in 55-gallon drums

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

No

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

NO

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?

NO
NO
Emergencies - trucks w/ AFFF

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?

Yes, ask [redacted] (Fire Chief)

Late 1980's

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?

[redacted] (Fire chief)
No fuel spills used AFFF; just absorbent booms + pads

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

No

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

Yes
Respond to all local fires

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)?

yes, see pg. 1 notes

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

NO

No foam in 27 years
Runway 1533+20: Aviation crash
verify year
~~2010 (Springfield)~~
~~#2 fuel (2017)~~

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?

NO

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

we have access

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

No, never
No uniform water proofing

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.?

Not on base

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?

DLA disposer
All AFFF (old, used) goes to DLA

Need copies of manifests

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?

PA Interview Questionnaire - Other

Facility:_____
Interviewer:_____
Date/Time:_____

Interviewee: [redacted] **Title:** Facility Mgr. **Phone Number:** [redacted] **Email:** [redacted]	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:

2003 - Since beginning
Maintain facility - breaking down → repairs

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?

	Known Uses
NO	Use
Safety officer	Procurement
	Disposition
8 spaces total, ~4 (can't number) outside when warm, inside when snow	Storage (Mixed)
—	Storage (Solution)
6-8 portable	Inventory, Off-Spec
	Containment
	SOP on Filling
N/A	Leaking Vehicles
Schedules testing; 3 SS.; inspected bi-annually; needs 1 pulse stations; no nozzel testing	Nozzle and Suppression System Testing
NO	Dining Facilities
No vehicle washing on facility; cold storage for aviation wash	Vehicle Washing
NO	Ramp Washing
(1 fueling station) - Not on Army side, only AF	Fuel Spill Washing and Fueling Stations
No	Chrome Plating or Waterproofing

11 S.S - nychem → 10 wet Foam

PA Interview Questionnaire - Other

Facility:_____
Interviewer:_____
Date/Time:_____

spent bulbs (fluor.)

Appendix B.2
Visual Site Inspection Checklists

Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact:
Date: 4/18/18

Source/Release Information

Site Name / Area Name / Unique ID: FTA-1
Site / Area Acreage:
Historic Site Use (Brief Description): Old fire training area; open field w/ berms + retention pond ~150 yards dup-gradient
Current Site Use (Brief Description):

1. Was AFFF used (or spilled) at the site/area? (Y) N
   Quantities unknown; stopped FT ~1995 (Remediated ~2000)
2. Has usage been documented? (Y) / N
   2a. If yes, keep a record (place electronic files on a disk): Need historical records
3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**
   3a. Indicate what businesses are located near the site: None
4. Is this site located at an airport/flightline? (Y) N
   4a. If yes, provide a description of the airport/flightline tenants: Located @ end of current flightline partially paved

Other Significant Site Features:

1. Does the facility have a fire suppression system? (Y) N ~~(Not at this particular location on FTIG)~~
   1a. If yes, indicate which type of AFFF has been used:
   Previously used 3% AFFF, now uses Drychem
   1b. If yes, describe maintenance schedule/leaks:
   Bi-annual inspections of all systems
   1c. If yes, how often is the AFFF replaced:
   Every 3-7 years, but varies
   1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?
   Most buildings do not; as-builts not available

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? (Y) N
   1a. If so, note observation and location: GW flow is SE; flows offsite
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:
   Monitoring wells (x3); drinking water off base
4. Are surface water intakes located near the site? Y (N)
   4a. If so, please note the location:

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):
   Excavation ~3,000 tons of soil; retention pond taken away, mass pine trees removed, flight line added (2010)

Visual Survey Inspection Log

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

2a. If not vegetated, briefly describe the site/area composition: Not currently, was @ time of & AFFF use; pine trees now removed

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

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

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

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

Receptor Information

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

1a. If so, please note to what extent: Need badge + escort

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: + those w/ escort

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

3a. If so, please note the location/distance: <5 miles; residential wells have high PFC concentrations (+1,000 ppt)

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

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

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

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

Additional Notes

Remediated soil taken to Andrick A for asphalt repurposing; asphalt installed in various locations on + off site
FTA-01 is both on/off ARNG property; shared by ANG

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

upload photos

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Westfield Barnes AASF (Westfield, MA)

Why has this location been identified as a site?

Location has been identified as a site due to previous firefighting training activities and AFFF storage

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

None known

Training Events

Have any training events with AFFF occurred at this site? Yes

If so, how often? Approximately every 6 weeks during summer months (approximately 1950-1987)

How much material was used? Is it documented?
No documented use/release of AFFF directly; however, AFFF likely used in conjunction with aviation gasoline (AVGAS), waste oils, solvents, and jet fuel #4 (JP-4). Approximately 300-500 gallons of mixed liquid wastes were used during each training event

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? No surface water (SW) present on base; however, SW flow on western side of the land divide flows mostly westward toward Arm Brook; SW flow on eastern side of divide flows mostly eastward toward Pond Brook; both Arm Brook and Pond Brook flow south and discharge to Westfield River

Average rainfall? 43 inches/year

Any flooding during rainy season? No

Direct or indirect pathway to ditches? No

Direct or indirect pathway to larger bodies of water? No

Does surface water pond any place on site? No

Any impoundment areas or retention ponds? No (not currently; retention pond used to be located around 150 yards northwest of FTA-01 (IRP Site 1); backfill of retention pond occurred around 2000)

Any NPDES location points near the site? No

How does surface water drain on and around the flight line?
No surface water present on base; water doesn't pool/pond in any place

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Generally south or southeast

Depth to groundwater? Typically ranges from 25-35 bgs

Uses (agricultural, drinking water, irrigation)? Area around and including base is a Zone II aquifer, meaning it is a contributing zone to a drinking water aquifer

Any groundwater treatment systems?

Any groundwater monitoring well locations near the site? Yes; three located within FTA-01

Is groundwater used for drinking water? No

Are there drinking water supply wells on installation? No; but two supply wells located approximately ½ mile southeast of base; two additional supply wells located approximately 1.75 and 2.5 miles, south of base, respectively.

Do they serve off-post populations? N/A

Are there off-post drinking water wells downgradient Yes

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No; closest WWTP is off-base in City of Westfield

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

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

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

Equipment Rinse Water

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

Equipment and vehicles washed in old bays of former fire station which included drains and an oil/water separator

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?

Yes, nozzles are tested yearly in/around the fire station area. All rinse water is collected into 55-gallon drums for proper disposal

3. Other?

N/A

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker Yes

Construction Worker Yes

Recreational User No

Residential Yes

Child No

Ecological No

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?
None noted

Documentation

Ask for Engineering drawings (if applicable). Done

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	Barnes AASF #2	Westfield, Massachusetts

Photograph No. 1

Description:

Northwest end of paved area in Fire Training Area 1, facing southeast.

18 April 2018

Photograph No. 2

Description:

Southeast end of Fire Training Area 1, facing northwest.

18 April 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Barnes AASF #2	Westfield, Massachusetts

Photograph No. 3

Description:

Monitoring wells on the southwest end of Fire Training Area 1, facing northeast.

18 April 2018

Photograph No. 4

Description:

West end of the apron, approximately 500 feet northwest of Fire Training Area 1. The circled area shows one of the various drains throughout the apron.

18 April 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Barnes AASF #2	Westfield, Massachusetts

Photograph No. 5

Description:

Southeast end of Fire Training Area 1, facing northwest towards tree-lined area where previous berm used to exist.

18 April 2018

Photograph No. 6

Description:

Main AASF #2 Building, approximately 2,000 feet northwest of Fire Training Area 1.

18 April 2018