FINAL
Preliminary Assessment Report Muscatatuck Urban Training Center, Indiana

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

October 2020

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
ATV	all-terrain vehicle
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
EDR™	Environmental Data Resource™
°F	degrees Fahrenheit
FSS	Fire Suppression System
ft^3/s	cubic feet per second
FTA	fire training area
HA	Health Advisory
INARNG	Indiana Army National Guard
MSW	Municipal Solid Waste
MUTC	Muscatatuck Urban Training Center
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
UCMR3	Unregulated Contaminant Monitoring Rule 3
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VSI	visual site inspection
WWTP	waste water treatment plant

Executive Summary

The Army National Guard (ARNG) is performing *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. A PA for per- and polyfluoroalkyl substances (PFAS)-containing materials was completed at the Indiana ARNG's (INARNG) Muscatatuck Urban Training Center (MUTC; also referred to as the "facility") in Butlerville, Indiana to assess potential PFAS release areas and exposure pathways to receptors. Established as an urban training center in 2005, the footprint of MUTC currently encompasses over 1,000 acres and more than 200 buildings designed for any type of urban training simulation.

The performance of this PA included the following tasks:

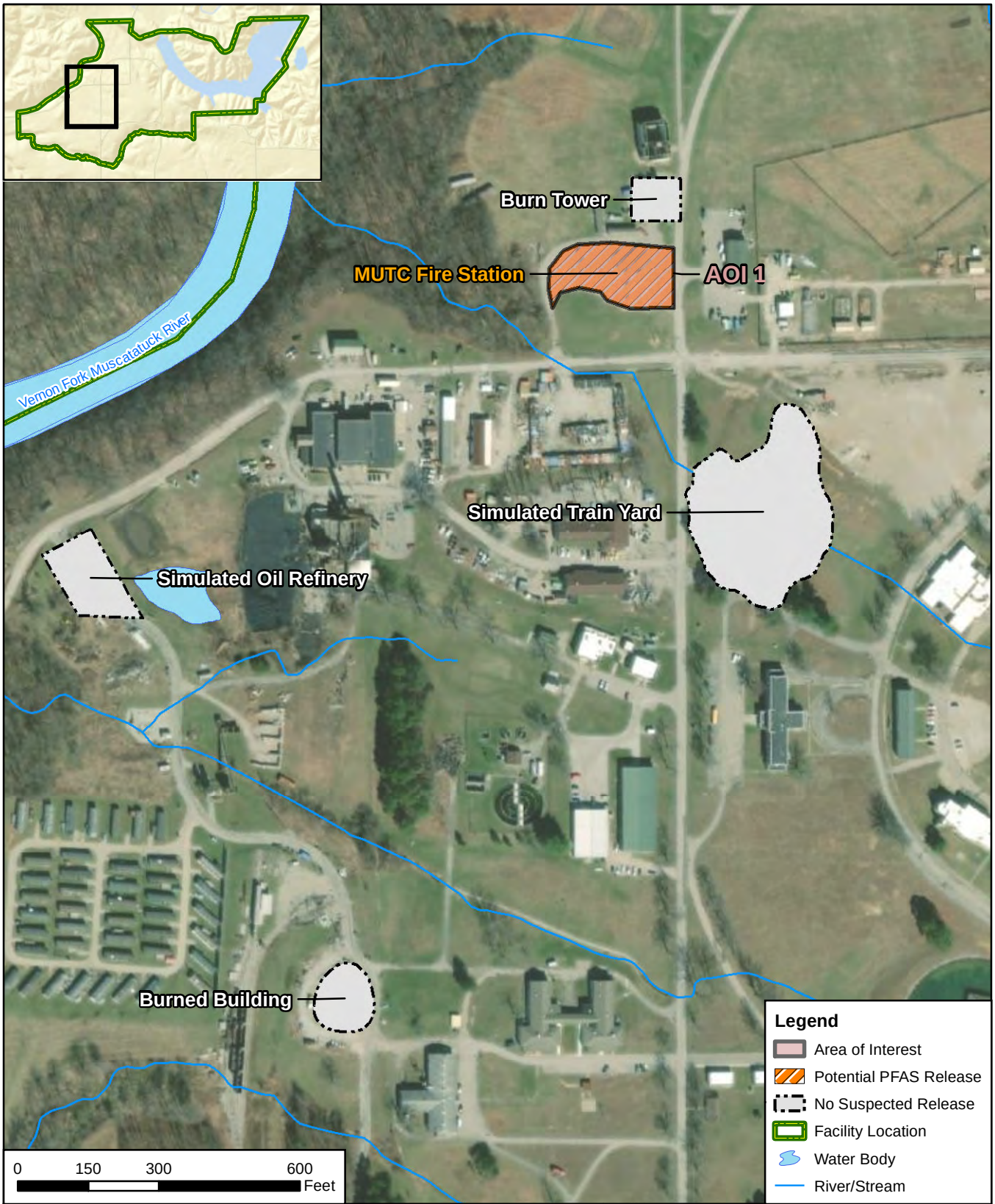
- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a 1-day site visit on 29 August 2018 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current MUTC personnel, including:
  - Current MUTC Fire Chief
  - Current MUTC Assistant Fire Chief
  - Current MUTC Environmental Manager
  - Current MUTC Operations Head
- Identified Area(s) of Interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

One AOI related to potential PFAS release were identified at MUTC during the PA. The AOI is shown on **Figure ES-1** and described in **Table ES-1** below:

Table ES-1: AOI at MUTC

Area of Interest	Name	Used by	Potential Release Date
AOI 1	MUTC Fire Station	INARNG	2008 to present

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



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NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
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SCALE	1:3,600	CHK BY	LC	8/28/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	8/28/2020

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Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

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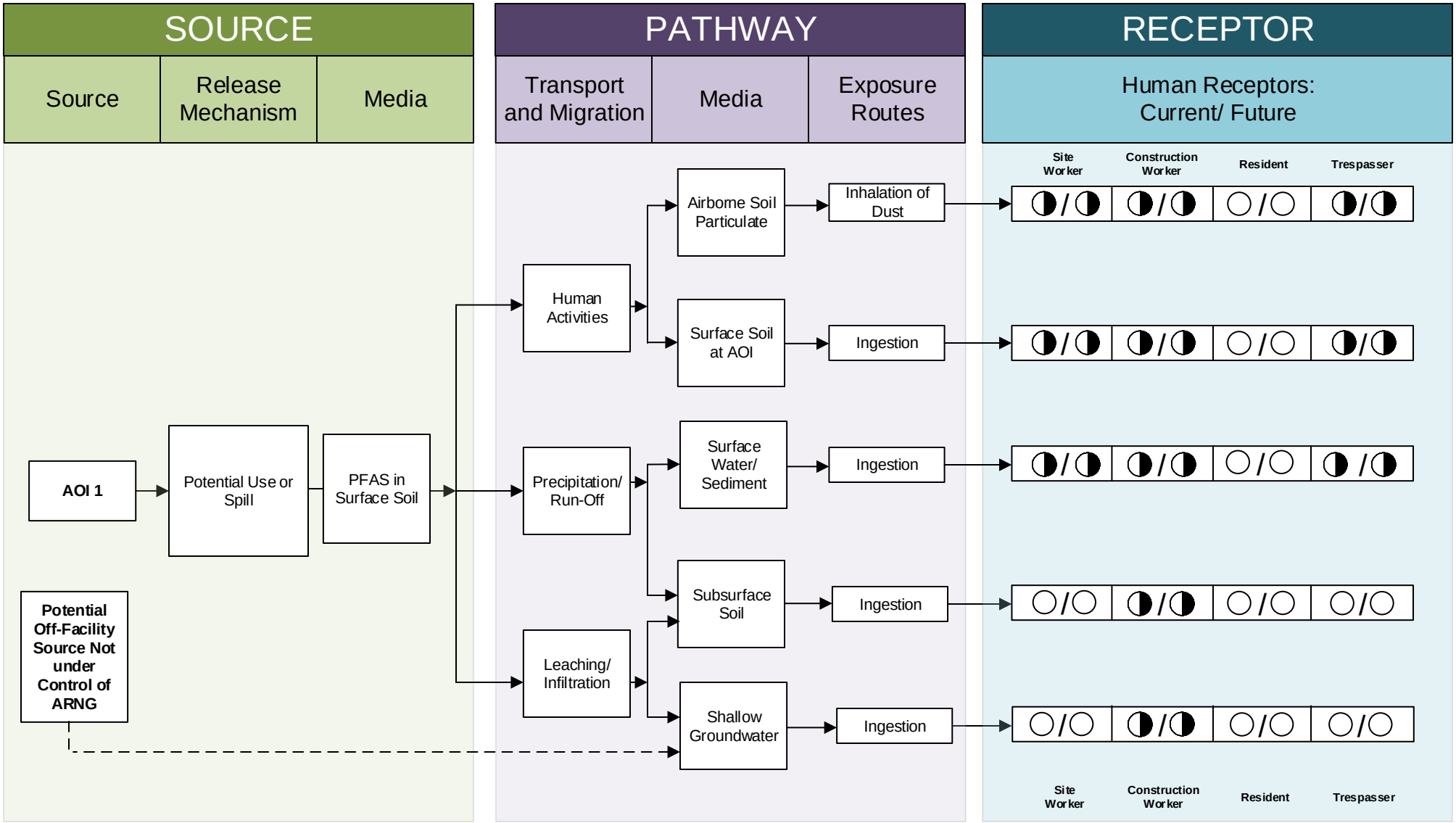


LEGEND

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

Notes:
1. The residential receptor refers to an off-facility receptor.
2. Human consumption of agricultural products potentially affected by PFAS is possible.

Figure ES-2
Preliminary Conceptual Site Model
Muscatatuck Urban Training Center, Indiana

1. Introduction

1.1 Authority and Purpose

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

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

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

This report presents findings of a PA for PFAS-containing materials at the Muscatatuck Urban Training Center (MUTC; also referred to as the “facility”) near Butlerville, Indiana in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and Army requirements and guidance.

This PA Report documents the known fire training areas (FTAs) as well as additional locations where PFAS may have been released into the environment at MUTC. 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 available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a 1-day site visit on 29 August 2018 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current MUTC personnel, including:
  - Current MUTC Fire Chief
  - Current MUTC Assistant Fire Chief
  - Current MUTC Environmental Manager

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

1.3 Report Organization

This report has been prepared in accordance with the USEPA'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 FTAs at the facility identified during the site visit.
- **Section 3** – **Non-Fire Training Areas:** describes other locations of PFAS releases at the facility identified during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of PFAS release at the facility, specifically in response to emergency situations.
- **Section 5** – **Adjacent Sources:** describes sources of PFAS release adjacent to the facility that are not under the control of ARNG.
- **Section 6** – Preliminary **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

MUTC is located approximately 1.4 miles northwest of Butlerville, Indiana, in northeast Jennings County (**Figure 1-1**). MUTC is part of the Atterbury-Muscatatuck Training Complex that encompasses more than 35,000 acres of which MUTC comprises about 1,000 acres. The facility is the Department of Defense's largest urban training facility, consisting of more than 200 physical buildings, an integrated cyber-infrastructure, a combined arms collective training facility, and a "live-fire" cyber warfare range (Atterbury-Muscatatuck, 2018).

In the 1930s, the facility was a mental institution known as the Indiana Farm Colony for Feeble Minded Boys and was operational as such until 2005, when its population had dwindled to about 12. The land was going to be converted to a tree farm when the Indiana ARNG (INARNG) expressed interest in the land "as is" and purchased it in 2005 (Magnuson, 2010). Real property documents were requested but unavailable at the time the PA was conducted.

MUTC was designed by INARNG as a "non-service-centric entity" capable of serving the needs of civilian first responders as well as tactical training for each branch of the US military, whose individual branch facilities tend to be molded to a particular service (Atterbury-Muscatatuck,

2018). The abandoned buildings of the former mental institution now serve as part of the realistic training facility alongside newly constructed buildings. Training scenarios include emergency response and tactical training in a variety of urban environments including, but not limited to, downed planes, derailed trains, flooded neighborhoods, and school lockdowns.

1.5 Facility Environmental Setting

MUTC is located in the Muscatatuck Regional Slope physiographic province of Indiana, a gently westward-dipping structural plain covering much of southeastern Indiana from above the Wisconsinan Glacial Boundary to as far south as the Ohio River (Murray, 1955). This sloping region of southeastern Indiana is covered by a thin layer of glacial sediments that overlie predominately carbonate bedrock. MUTC is surrounded on all sides by agricultural land. The nearest town, Butlerville, is 2 miles to the southeast and is the only development within a 4-mile radius.

1.5.1 Geology

The geology of the Muscatatuck Regional Slope is dominated by Paleozoic carbonate bedrock overlain by Quaternary glacial sediments. While Indiana experienced several glaciations during the Quaternary period, Jennings County was glaciated only by pre-Wisconsinan glaciers, which left behind complex deposits of till. These till deposits make up the Jessup Formation, a deposit of unconsolidated calcareous conglomeratic mudstone averaging 25 feet thick laid down in the Pleistocene (Wayne, 1963).

The subsurface bedrock near MUTC, unconformably overlain by the Jessup Formation, is limestone and dolomite deposited during the Devonian and Silurian periods. A 1955 Indiana Department of Conservation field guide defined the stratigraphy of the area, then called the Muscatatuck State School, from a spillway section in the Brush Creek Reservoir. Approximately 35 feet of pre-Wisconsinan till (Jessup Formation) overlie 2.8 feet of unconsolidated Devonian quartz sands. These sands are derived from the silicified basal section of the Jeffersonville limestone (Murray, 1955). Underlying the sands is 44 feet of exposed Laurel limestone, part of the lower Silurian aquifer sequence.

MUTC lies in a transitional zone on the eastern edge Muscatatuck Regional Slope, where aquifer and overlying till thickness depend heavily on whether there was regional erosion before deposition. The Waldron Shale, the typical marker that separates the lower Silurian aquifer sequence from the upper Silurian-Devonian aquifer sequence, is absent here, as is most of the upper aquifer sequence.

1.5.2 Hydrogeology

MUTC is in the East Fork White River Aquifer Basin. The majority of potable water wells in Jennings County draw from limestone and dolomite bedrock aquifers within this basin (Risch et al., 2005). Locally, these groundwater wells are situated mainly to the east/southeast of the facility (**Figure 1-2)**. The bedrock aquifers of Jennings County are separated into two sequences: an upper Silurian-Devonian sequence and a lower Silurian sequence, often separated by approximately a dozen feet of the Waldron Shale. The Waldron Shale and overlying Silurian-Devonian upper aquifer sequence have been eroded from the eastern section of Jennings County in which MUTC lies (Greeman, 1981).

The Silurian lower sequence aquifer is capped by a siliceous dolomitic unit that prevents intersequential-flow, and it is underlain by thin beds of interbedded Ordovician limestone and shale. Being composed of low-porosity limestone, these aquifers rely primarily on their secondary porosity due to jointing and faulting within the bedrock. To that effect, the upper sequence, absent

at MUTC, is noted for having a higher secondary porosity than the lower sequence (Greeman, 1981).

A 2005 environmental assessment of MUTC surveyed the area with approximately two dozen temporary groundwater wells. These wells found bedrock refusal at an average of 8 to 10 feet below ground surface (bgs), with the deepest at 26 feet bgs. Recovered soil samples ranged from dry to moist, or were wet directly above bedrock surface, indicating that groundwater is contained within the bedrock aquifer below (Risch et al., 2005). Groundwater flow on and around the facility is generally southwest (**Figure 1-2)**.

An EDR™ report conducted a well search for a 1-mile radius surrounding the facility (**Appendix A**). Using additional online resources, such as state and local Geographic Information System databases, wells were researched to a 4-mile radius of the facility.

1.5.3 Hydrology

MUTC sits on a watershed divide between the Long Branch-Vernon Fork Muscatatuck River Watershed and the Brush Creek Reservoir-Brush Creek Watershed (**Figure 1-3**). The majority of the developed section of the facility lies within the Muscatatuck River Watershed. The portion of the facility within the Brush Creek Reservoir-Brush Creek Watershed is almost entirely forested and undeveloped.

The Brush Creek Reservoir was created in 1953 as a water-supply reservoir that has a surface area of approximately 150-acres during normal conditions. Public water, from which MUTC draws its supply, is taken from the Vernon Fork Muscatatuck River near the north boundary of MUTC from an intake constructed in 1956. Per US Geological Survey (USGS) policy and Indiana Code, surface water intakes are not listed by coordinates nor shown on maps (ILSA, 2006). The northern section of MUTC property lies within the water-supply emergency-management zone (i.e., within a quarter mile from a shoreline that drains into the river from within 1,000 feet upriver of a potable water intake) (Risch et al., 2005). The Brush Creek Reservoir services MUTC and the City of North Vernon as a supplemental water source during dry periods.

MUTC is bordered by the Vernon Fork of the Muscatatuck River to the west and northwest. Brush Creek flows into Brush Creek Reservoir at the northeast facility boundary. Pleasant Run is located along the southern border of the facility, ultimately discharging to the Vernon Fork of the Muscatatuck River. Although topography is relatively flat, surface drainage from the western portion of MUTC generally flows northwest into the Vernon Fork of the Muscatatuck River. Surface runoff from the eastern portion of the facility that lies within the Brush Creek Watershed flows into Brush Creek Reservoir. Ultimately, all drainage from the facility flows to the Muscatatuck River.

USGS streamflow gauge #03369000 is stationed on the Vernon Fork Muscatatuck River west of MUTC. Operational from 1942 to 2001, the gauge's historical data show that the mean daily streamflow ranged from a low of 5.37 cubic feet per second (ft^3/s) in the fall to a high of 318 ft^3/s in the winter and spring (USGS, 2006). The USEPA Unregulated Contaminant Monitoring Rule 3 (UCMR3) data indicate that PFOS/PFOA were not detected in a public water system above the USEPA HA within a 20-mile radius of the facility. The HA is 70 parts per trillion for PFOS and PFOA, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.

1.5.4 Climate

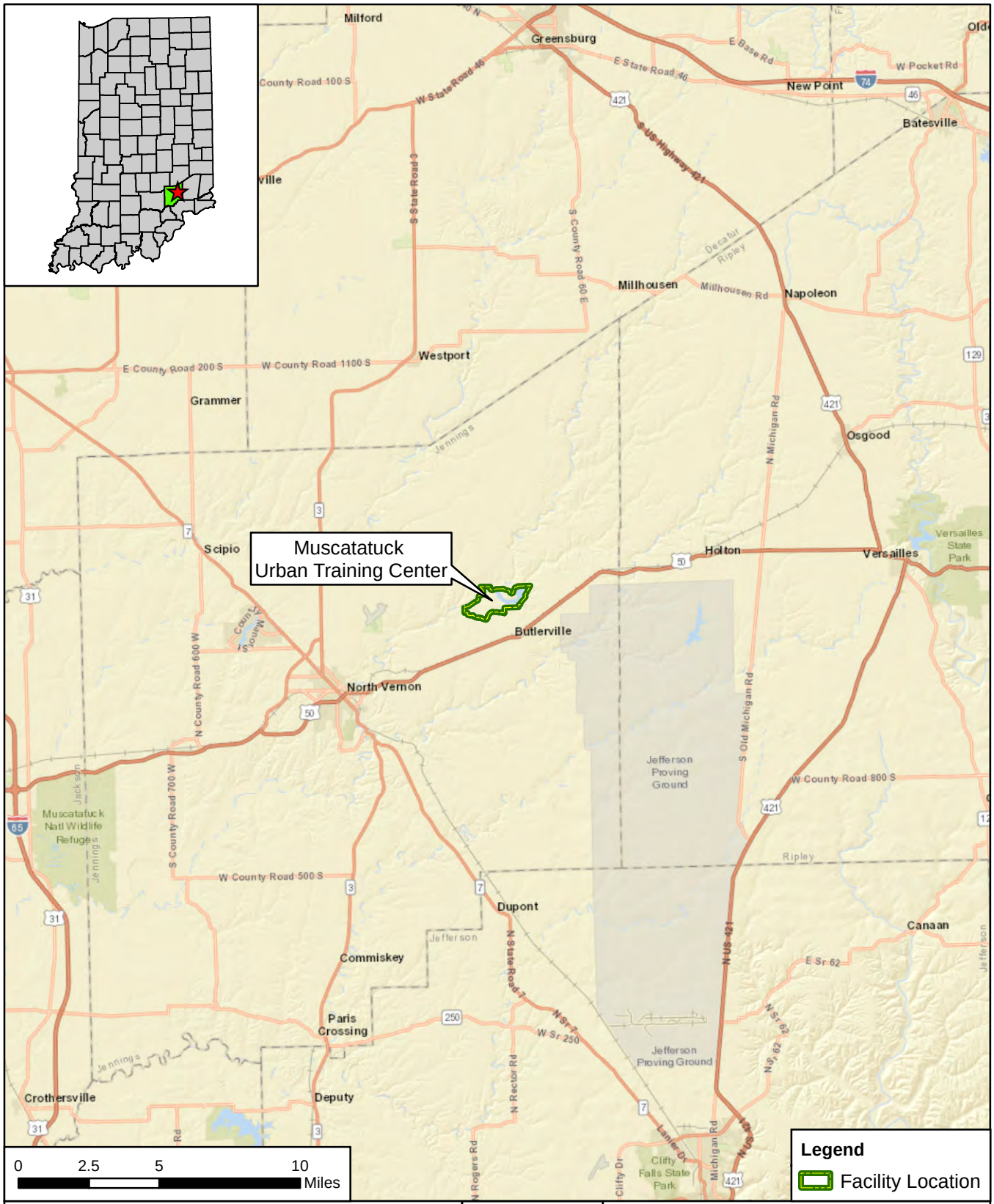
MUTC lies within southeastern Indiana, an area categorized as hot-summer humid continental. Average climate data for the past 5 years were found for North Vernon, approximately 5 miles to the southwest of MUTC. The average annual temperature of North Vernon is 55 degrees

Fahrenheit (°F). Summer has an average maximum temperature is 84.2 °F, with July being the hottest month. Winter has an average minimum temperature of 25.3 °F, with January being the coldest month.

Total annual precipitation is 70.3 inches, of which 21.45 inches is snowfall. Rainfall is fairly evenly distributed throughout the year with the wettest month, June, receiving 5.9 inches of rain, and the driest month, August, receiving 2.8 inches of rain. Snowfall occurs from late November to March, the majority of which falls in January and February. Monthly snowfall varies considerably from year to year, ranging from fractions of an inch to over 14 inches (National Oceanic and Atmospheric Administration, 2018).

1.5.5 Current and Future Land Use

The land for MUTC was acquired by INARNG in 2005 from the State of Indiana. The Urban Training Center is a little over a decade old and serves as a “real city” in which all aspects, from the buildings and surrounding property to the people and animals, are considered “in play” for training scenarios. Training scenarios consist of tactical military maneuvers and response to emergencies in the wide variety of urban environments that agencies encounter in the modern world. Land surrounding the facility is heavily forested and/or agricultural land. There is a public access point to the Brush Creek Reservoir for fishing and water-based recreation. A Purdue University Agricultural Research Center is located approximately 1.5 miles to the southwest. Reasonably anticipated future land use is not expected to change from the current land use.



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Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	1/9/2019

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Facility Location

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Figure 1-1

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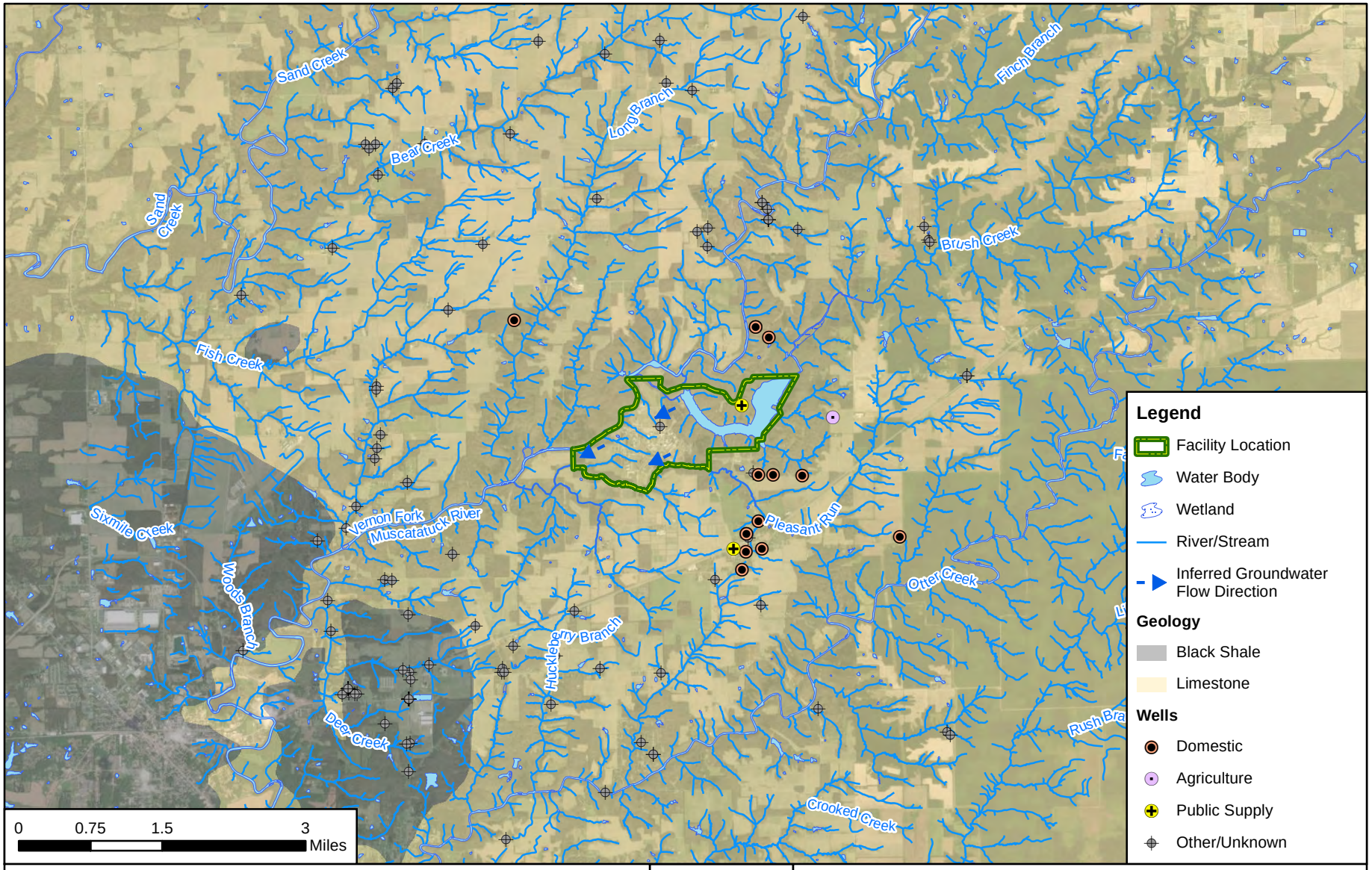

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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	8/28/2020

Groundwater Features

AECOM
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Germantown, MD 20876

Figure 1-2

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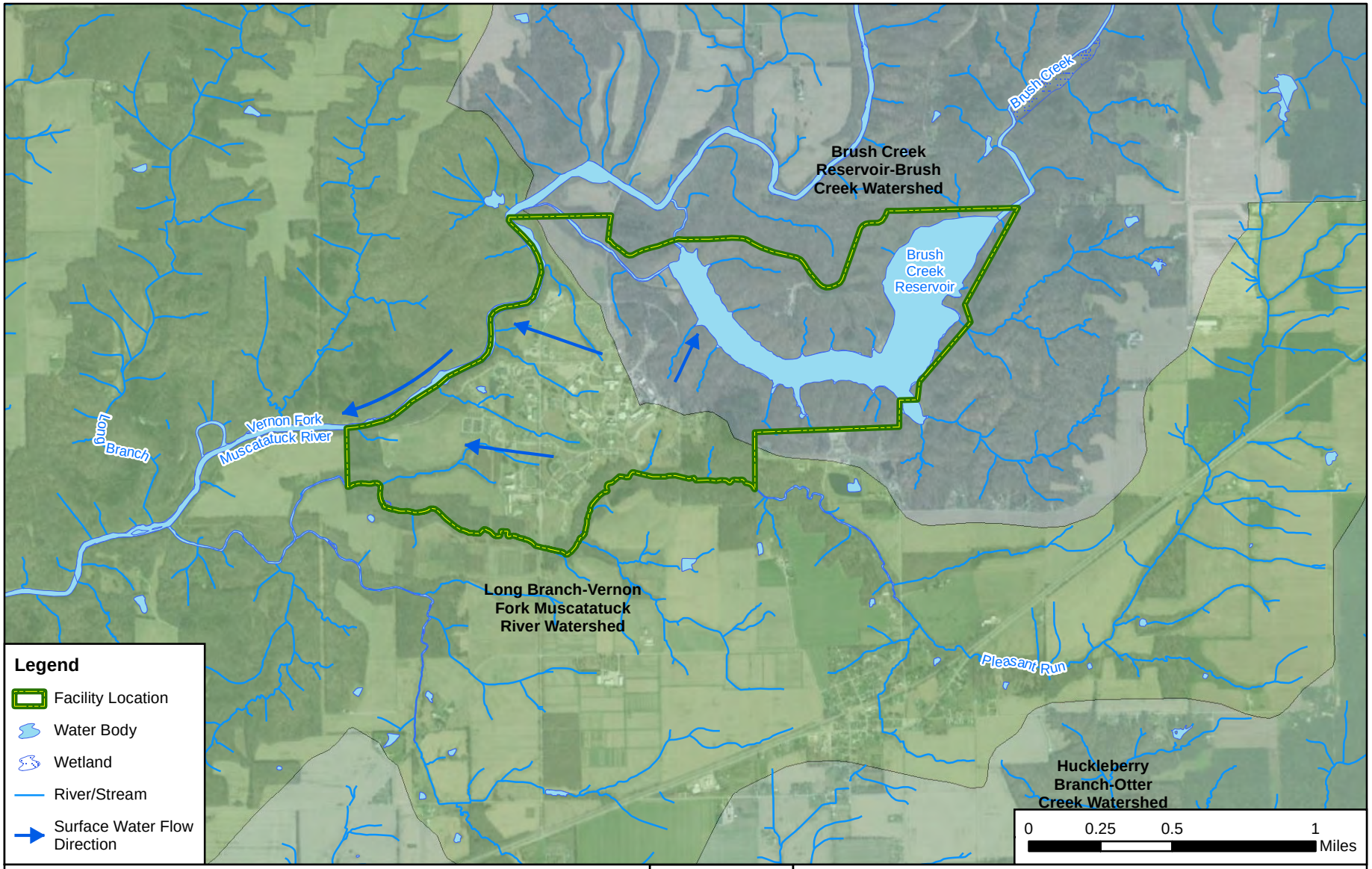

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Surface Water Features

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Figure 1-3

2. Fire Training Areas

Tactical and emergency response training frequently includes pyrotechnics for fire suppression maneuvers and general atmosphere. MUTC comprises infrastructure that is equipped with controlled propane burners, and several buildings onsite are also equipped. These propane systems may be used to, for example, set train cars from the “derailed train scenario” alight, thereby providing a realistic atmosphere to an emergency response maneuver. Additionally, controlled burns of gutted cars and other props occur frequently on the facility grounds. All controlled burns are performed with dry fuel (i.e., hay and/or pallets), and all fire suppression training is conducted with water only. Coordination between the MUTC fire department and the Decatur County and Campbell Township fire departments occurs occasionally for training purposes, but outside agencies have only used water at the facility (**Appendix B.1**). All extinguishers are ABC.

Three FTAs were identified at MUTC during the PA. No training or nozzle testing with AFFF has occurred at the facility since the tenure of the current fire chief, circa 2008. Interviewees had no knowledge of FTA activities between the time of purchase (2005) and 2008. A description of the FTAs is presented below, and the FTA locations are shown on **Figure 2-1**. Photographs of the FTAs appear in **Appendix C**.

2.1 Burn Tower

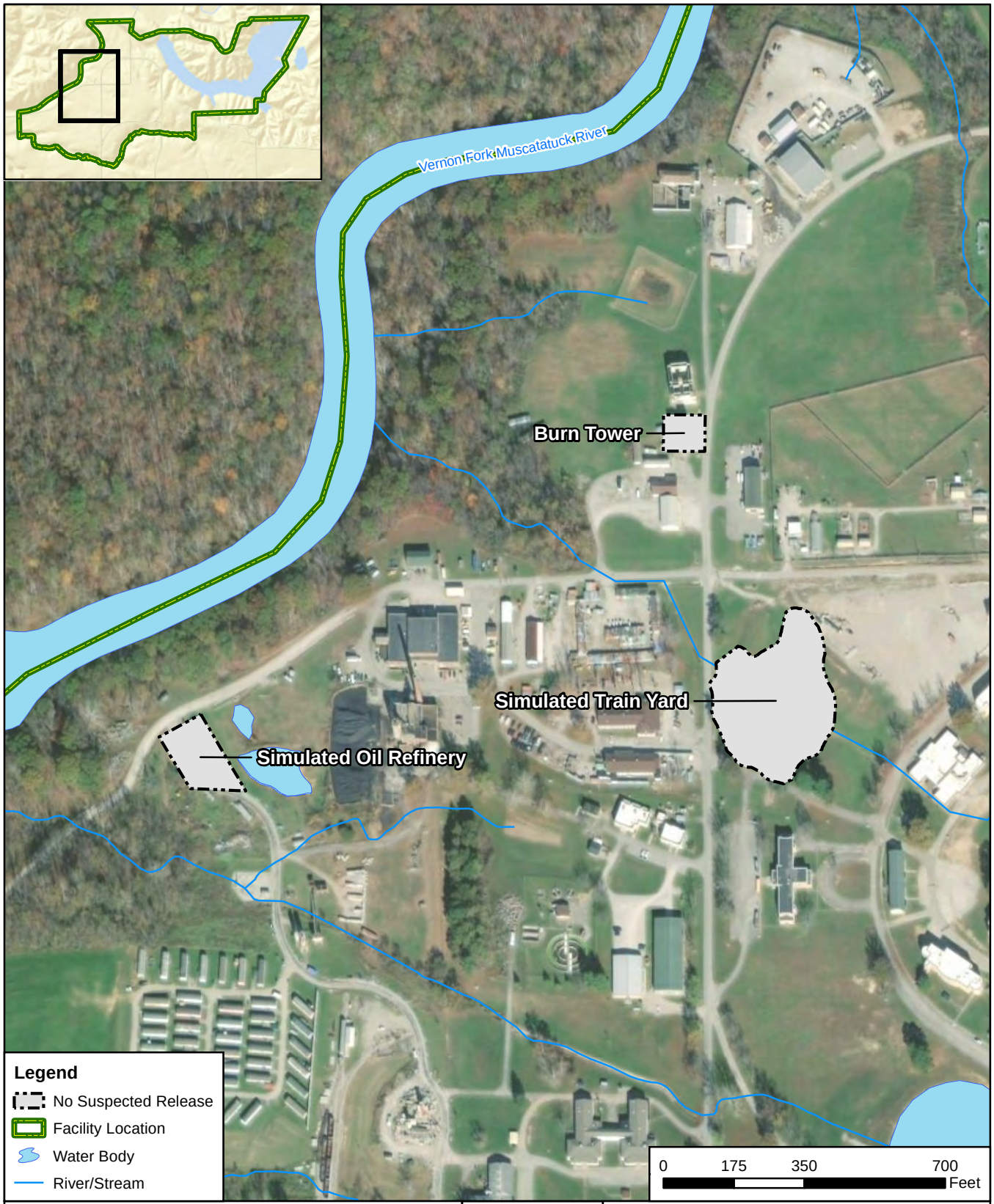
Located just to the north of the fire station (39°03’09.64’’N; 85°32’00.53’’W), the Burn Tower is used for vertical rescue simulations. The Burn Tower building is situated on a gravel pad, stands four stories tall, and houses a “burn room” on the ground floor. The burn room is used in fire simulations, which include filling the burn room with dry fuel, typically hay and/or wooden pallets, and setting the fuel on fire to create an atmosphere of a burning building, as smoke and fire pours up and out of the windows and through the structure. Interviewees confirmed that AFFF has not been used to extinguish these fires; all fires are put out with water, and only dry fuel is used.

2.2 Simulated Oil Refinery

Located on the western edge of the facility, near the southern bank of the Muscatatuck River, (39°03’01.83’’N; 85°32’15.63’’W), the Simulated Oil Refinery is used to simulate oil refinery explosions. The structure is equipped with a propane gas system that allows flames to be turned on and off, similar to an automatic fireplace. Fire training at the Simulated Oil Refinery is conducted with water only.

2.3 Simulated Train Yard

The Simulated Train Yard, located at coordinates 39°03’02.99’’N; 85°31’57.47’’W, is a collection of six train cars stacked haphazardly on and around each other and simulates a derailment. The cars are equipped with a propane gas system to allow for controlled burns for fire training and tactical atmosphere. Fire training, as well as emergency rescue maneuvers, is performed here.



CLIENT	ARNG			
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SCALE	1:4,200	CHK BY	LC	4/3/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	4/3/2019

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Fire Training Areas

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Figure 2-1

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3. Non-Fire Training Areas

In addition to FTAs, the PA evaluated areas where PFAS-containing materials may have been broadly used, stored, or disposed. This may include buildings with fire suppression systems (FSS), paint booths, AFFF storage areas, and areas of compliance demonstrations. Information on these features obtained during the PA are included in **Appendices A** and **B**. Two non-FTAs where AFFF may have been released were identified during the PA. A total of 365 gallons of AFFF are stored onsite; 300 gallons in 5-gallon buckets and 65 gallons stored in equipment. In 2016, AFFF was received from Camp Atterbury in 77 5-gallon buckets.

FSS across the facility are water sprayer-based and are not charged with AFFF. In addition to the water sprayer systems, there is an ANSUL wet chemical system equipped in the mess hall kitchen, and an HFC-125 clean agent system equipped in the "high-tech vault" behind buildings 56, 57, and 58.

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 MUTC Fire Station

Located in the northwestern corner of the facility (39°03'08.24"N; 85°32'01.03"W), the MUTC fire station houses three firetrucks that were acquired in 2008 and 2009. It is unknown if or how much AFFF was acquired at this time in addition to 77 5-gallon buckets received from Camp Atterbury in 2016.The main and reserve trucks are stationed in the bay; the third reserve truck was out of commission at the time of the PA. Each truck has foaming capabilities and has capacity to hold 40 gallons of AFFF; however, during the PA, each truck held approximately 20 gallons of AFFF within their tanks. Interviewees reported that AFFF has not been discharged from the trucks since 2008. In addition, 16 5-gallon buckets of 3% to 6% alcohol-resistant AFFF concentrate are located in the loft storage area of the Fire Station building, as well as 17 empty buckets. Interviewees confirmed that contents of the empty buckets were used to fill the three firetrucks onsite. The "brush truck", a small fire-fighting all-terrain vehicle (ATV) stored in the station bay, has an additional 5 gallons of 3% to 6% AFFF solution in its tank.

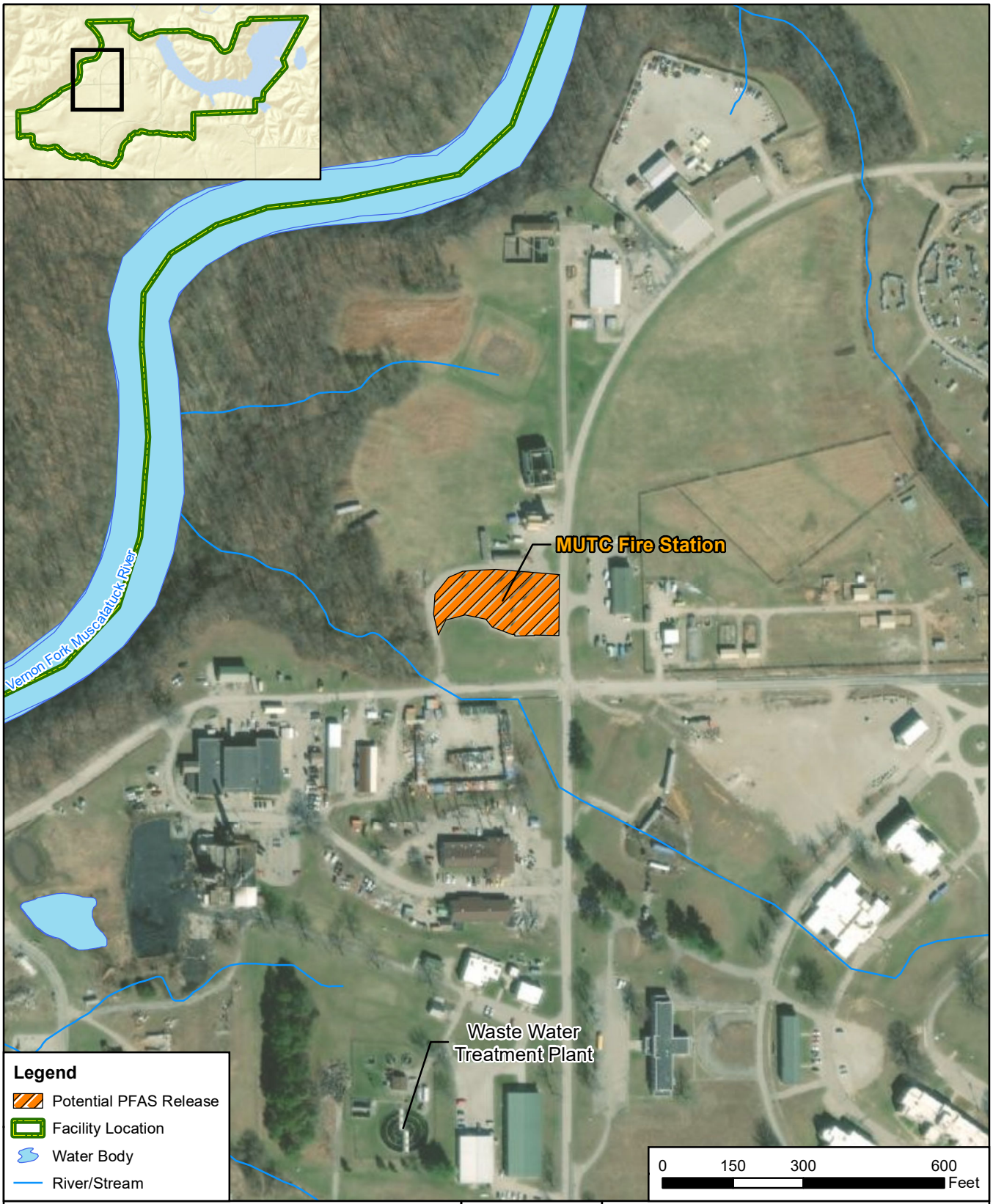
Located behind the fire station is a small (approximately 0.25-acre) gravel pad. A reserve firetruck, out of commission at the time of the PA, is parked there. Similar to the other firetrucks, the reserve firetruck's tank is filled with approximately 20 gallons (half of its 40-gallon capacity) of AFFF. In addition to the truck's tank contents, 44 5-gallon buckets of 3% to 6% AFFF are stored within storage areas on the truck. According to INARNG Environmental, the out of commission firetruck was removed from this location following the 2018 site visit. The current location of the firetruck, the AFFF within its tank, and the 44 5-gallon buckets of AFFF are unknown.

Interviewees confirmed that AFFF has not been discharged from the trucks since 2008. In general, firetrucks containing/equipped with AFFF have historically had the potential to leak due to corrosion of fittings and gaskets; interviewees stated that no leaks had been reported or noted during their tenure at the facility. Based on visual inspections of the trucks and storage areas, all 77 5-gallon buckets and their contents were accounted for at MUTC and have not been discharged. However, because AFFF is stored at the facility, there is potential for it to have been incidentally released to the environment during handling or via leaks.

3.2 Waste Water Treatment Plant

A waste water treatment plant (WWTP) was identified along the northwestern edge of the facility boundary, at coordinates 39°02'56.86"N; 85°32'04.41"W. Although no use of AFFF has been identified here, WWTPs can often be sources of PFAS. Exact dates of use are unknown, but the

WWTP has since been decommissioned, and the facilities' sewer lines have been connected to the City of North Vernon's sewer system.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
REVISED	9/16/2020	GIS BY	MS	9/16/2020
SCALE	1:3,600	CHK BY	LC	9/16/2020
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	9/16/2020

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
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Figure 3-1

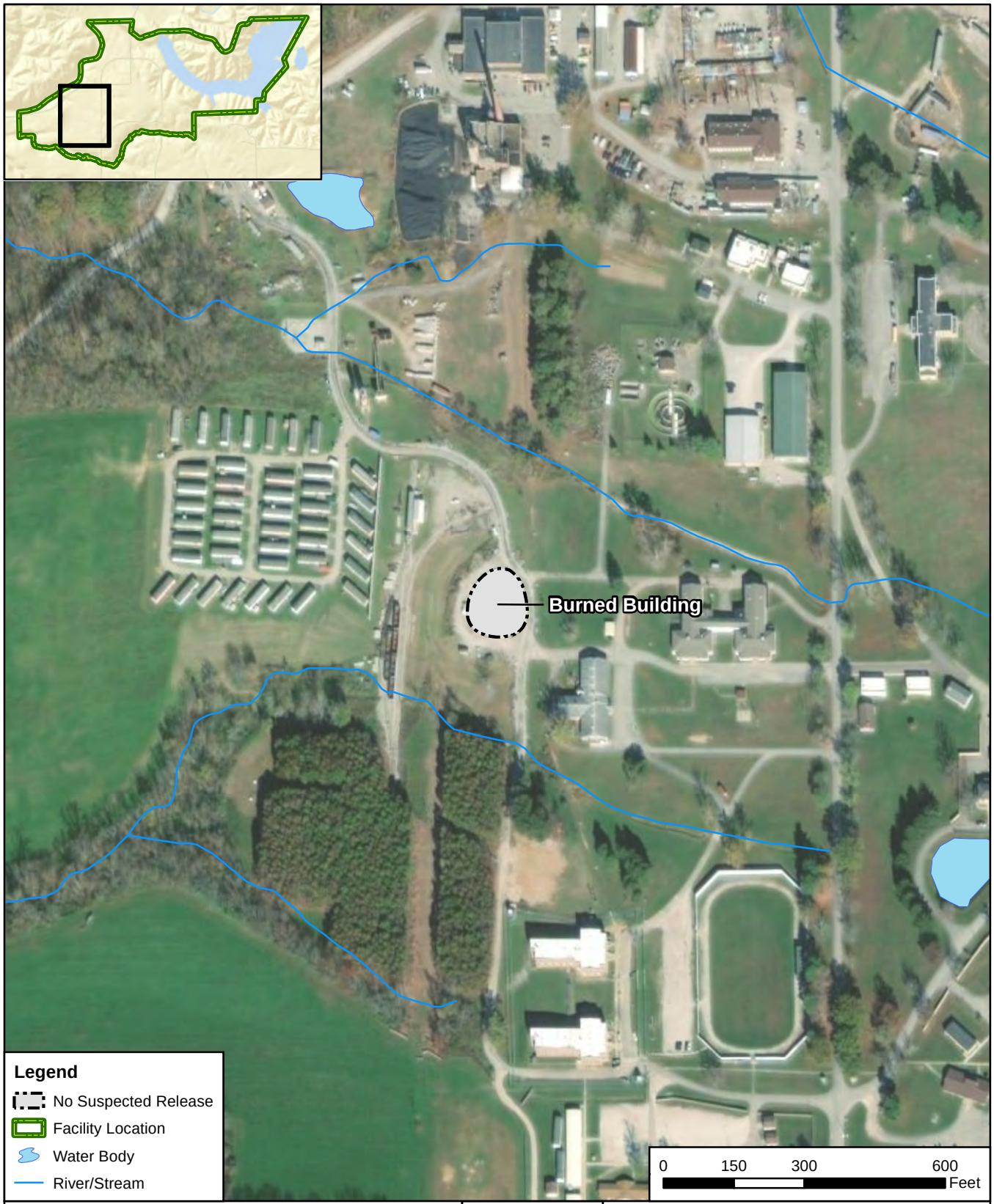
C:\Users\grace.canham\AECOM Directory\Stankevich, Michael - ARNG_PFAS_GIS_60552172\MXDs\IN\Muscatatuck_UTC_figures\PA_Figures\Fig_3-1_MUTC_Non-Fire_Training_Areas.mxd

4. Emergency Response Areas

One emergency response incident at MUTC was identified during the PA. No history of wildfire-fighting was reported during the PA. The single Emergency Response Area identified is shown on **Figure 4-1**.

4.1 Burned Building

In 2012, a fire at an old building located on the western edge of the facility (39°02’52.78’’N; 85°32’09.23’’W) was responded to by MUTC fire personnel. The incident involved a fire training activity that became uncontrolled, and the building caught fire. According to an interview with the Assistant Fire Chief, the fire was put out using only FireAde®, a class A foam product. The remains of the building now serve as part of the MUTC training infrastructure.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
REVISED	1/9/2019	GIS BY	MS	1/9/2019
SCALE	1:3,600	CHK BY	LC	1/9/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	1/9/2019

Emergency Response Area

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Figure 4-1

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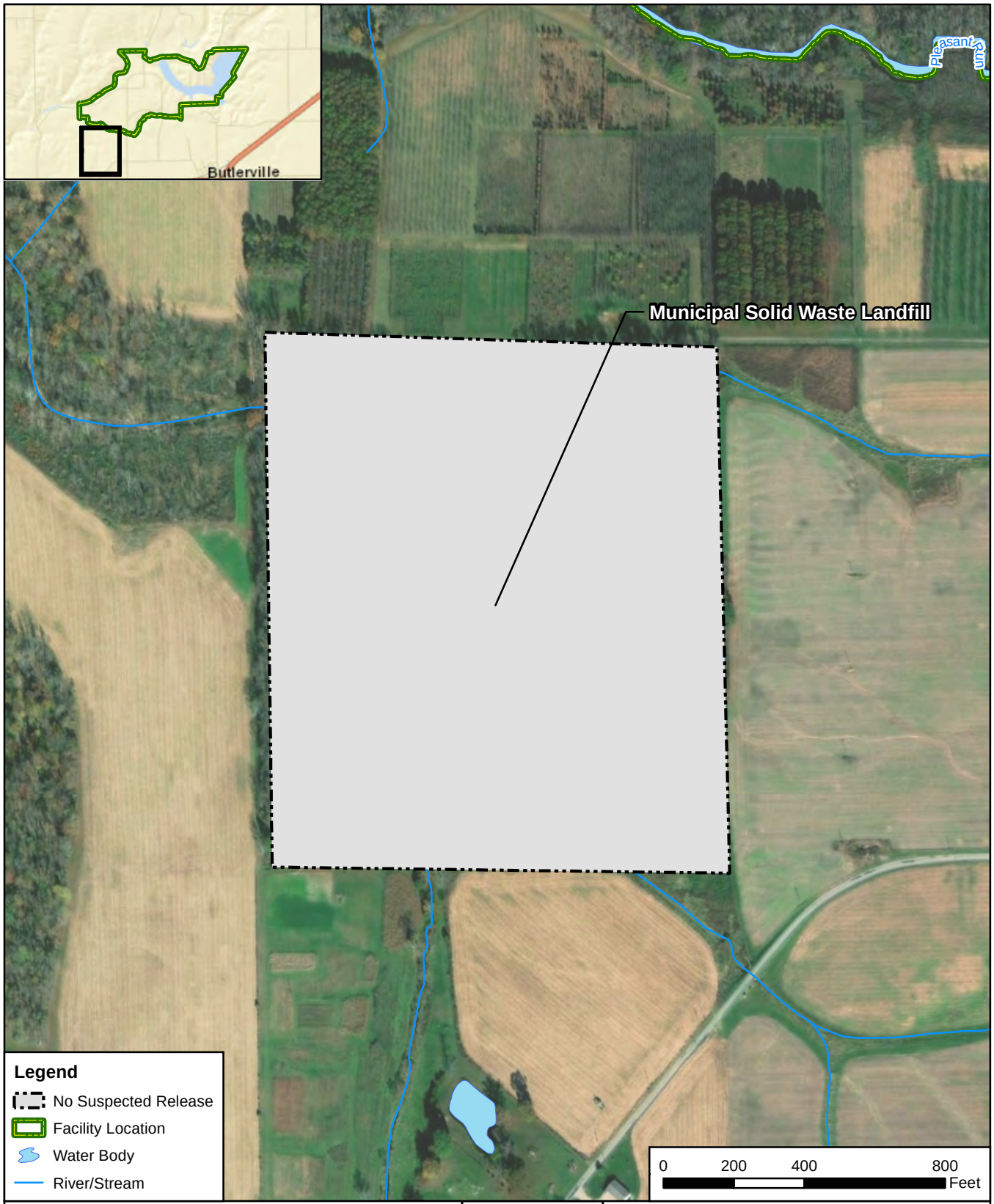
5. Adjacent Sources

Interviewees noted that there are no known adjacent sites that may be a source of PFAS; however, one potential adjacent off-facility source was identified during the PA based on the EDR™ report (EDR™, 2018; **Appendix A**). A description of this adjacent source is presented below and shown on **Figure 5-1**.

5.1 Landfill

Landfills are not usually a primary source of PFAS; however, materials disposed of in landfills that contain PFAS may leach the compounds into the environment over time. Such materials may include residual sludge wastes from WWTF operations, used AFFF storage containers, or products associated with waterproofing such as uniforms or boots.

The EDR™ report identified a Municipal Solid Waste (MSW) landfill located 0.211 miles to the southwest. The landfill was closed in 1985 (EDR™, 2018). Approximate location coordinates of the MSW are 39°02’20.40”N; 85°32’18.73”W.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
REVISED	1/9/2019	GIS BY	MS	1/9/2019
SCALE	1:4,800	CHK BY	LC	1/9/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	1/9/2019

N

Adjacent Source

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Figure 5-1

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6. Preliminary Conceptual Site Model

Based on the PA findings, one AOI was identified at MUTC. The AOI location is shown on **Figure 6-1**. The following sections describe the CSM components and the specific preliminary CSM developed for the AOI. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of PFAS toxicological study (National Ground Water Association, 2018). Receptors at MUTC include site workers, construction workers, and trespassers. The preliminary CSM for MUTC indicates which specific receptors could potentially be exposed to PFAS. The preliminary CSM for AOI 1 is shown in **Figure 6-2.**

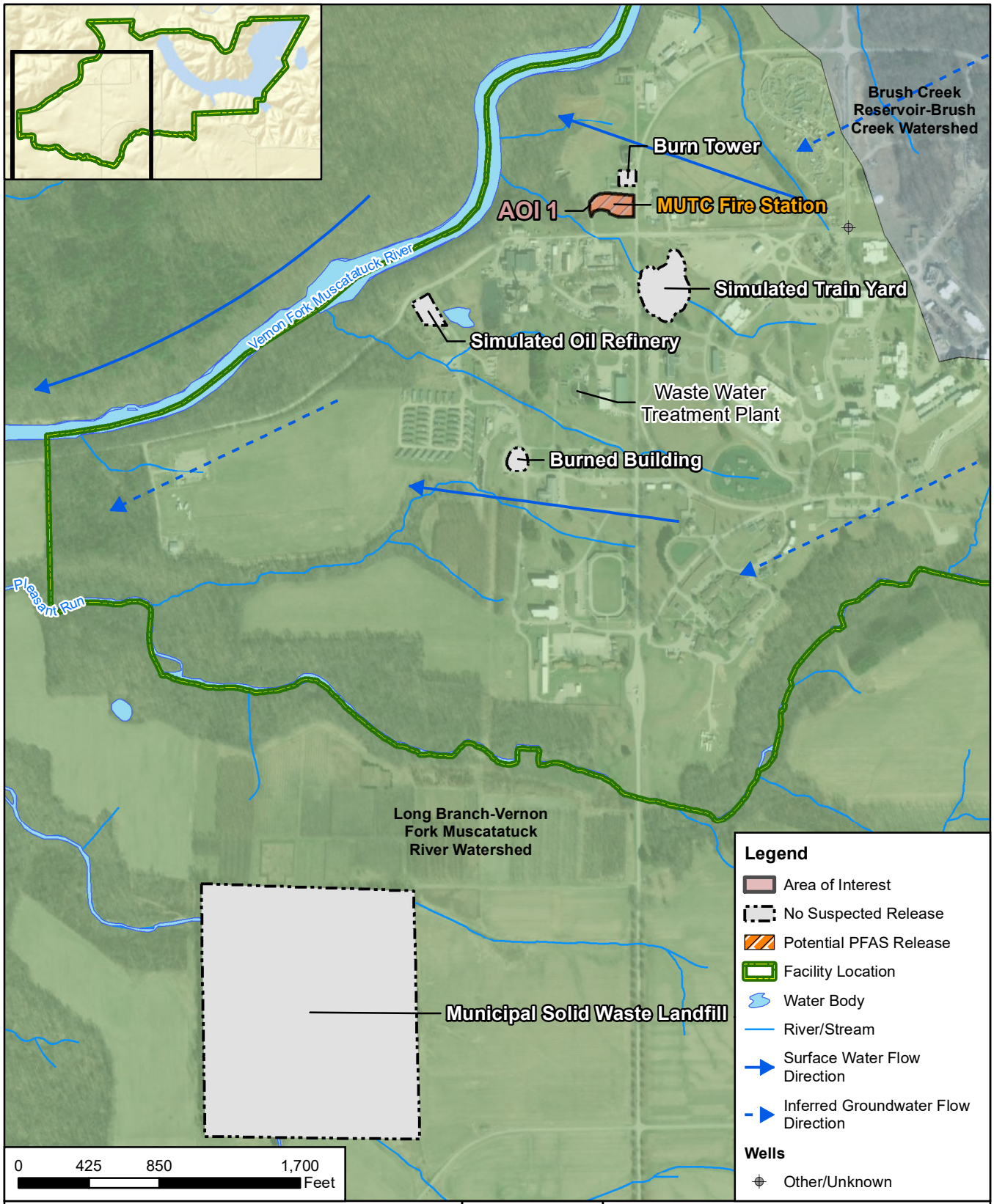
6.1 AOI 1: MUTC Fire Station

AOI 1 is the MUTC Fire Station located in the northwestern corner of the facility (**Figure 6-1**). The fire station historically housed three firetrucks and a “brush truck”, which is a small fire-fighting ATV. These firetrucks were acquired in 2008 and 2009. Two of the firetrucks and the brush truck are stored inside of the fire station. A third out of commission firetruck was formerly stored on a gravel pad behind the fire station but has since been moved to an unknown location. Each truck has the capacity to hold 40 gallons of AFFF, but at the time the PA was written, each only held approximately 20 gallons within their tanks. The firetruck located on the gravel pad behind the fire station additionally carried 44 5-gallon buckets of 3% to 6%. The ATV brush truck contains 5 gallons of a 3% to 6% AFFF solution in its tank. Additionally, 16 5-gallon buckets of 3 to 6% alcohol-resistant AFFF concentrate are located in the loft storage area of the fire station building along with 17 empty buckets whose contents were confirmed by interviewees to be used to fill the firetrucks on site. According to interviewees, AFFF has not been discharged since 2008, when the firetrucks were purchased, and there are no records of any leaks or spills at this location. However, historically, firetrucks containing/equipped with AFFF have had the potential to leak due to corrosion of fitting and gaskets.

The AOI encompasses the fire station and the 0.25-acre gravel pad behind the fire station. Although there are no documented AFFF releases, there is potential for incidental spills or minor leaks to have occurred during AFFF handling. Because AFFF is stored within both the station and firetrucks within and around the buildings, it is possible that AFFF may have historically been spilled or released during routine training activities or product handling. Details of fire training or fighting activities at the facility between the years 2005 and 2008 are not known.

Any released AFFF within or around the MUTC Fire Station building may have been captured by floor drains located within the buildings; however, it is unknown where the floor drains lead to. Any AFFF expelled outside of the buildings would have occurred on unpaved, grassy, or gravel surfaces. Ground disturbing activities may result in potential exposure to surface soils via ingestion and inhalation dust by trespassers, site workers, and construction workers; and to subsurface soils by construction workers. PFAS are water soluble and can migrate readily from soil to groundwater via leaching. Groundwater depth in the area is roughly 10 feet and flows southwest, traveling away from the facility potable wells. Potential leaching of PFAS into the groundwater may result in potential exposure to construction workers. Public water, from which MUTC draws its supply, is taken from the Vernon Fork Muscatatuck River near the north boundary of MUTC from an unlisted surface water intake constructed in 1956. Surface drainage from the western portion of MUTC generally flows northwest into the Vernon Fork of the Muscatatuck River. Potential exposure to PFAS in surface water and sediment via ingestion is possible for trespassers, site workers, and construction workers. Because the drinking water intake is

upgradient from AOI 1 drainage pathways, drinking water pathways are considered incomplete. The preliminary CSM for AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
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SCALE	1:10,200	CHK BY	LC	9/16/2020
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	9/16/2020

N

Areas of Interest

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Figure 6-1

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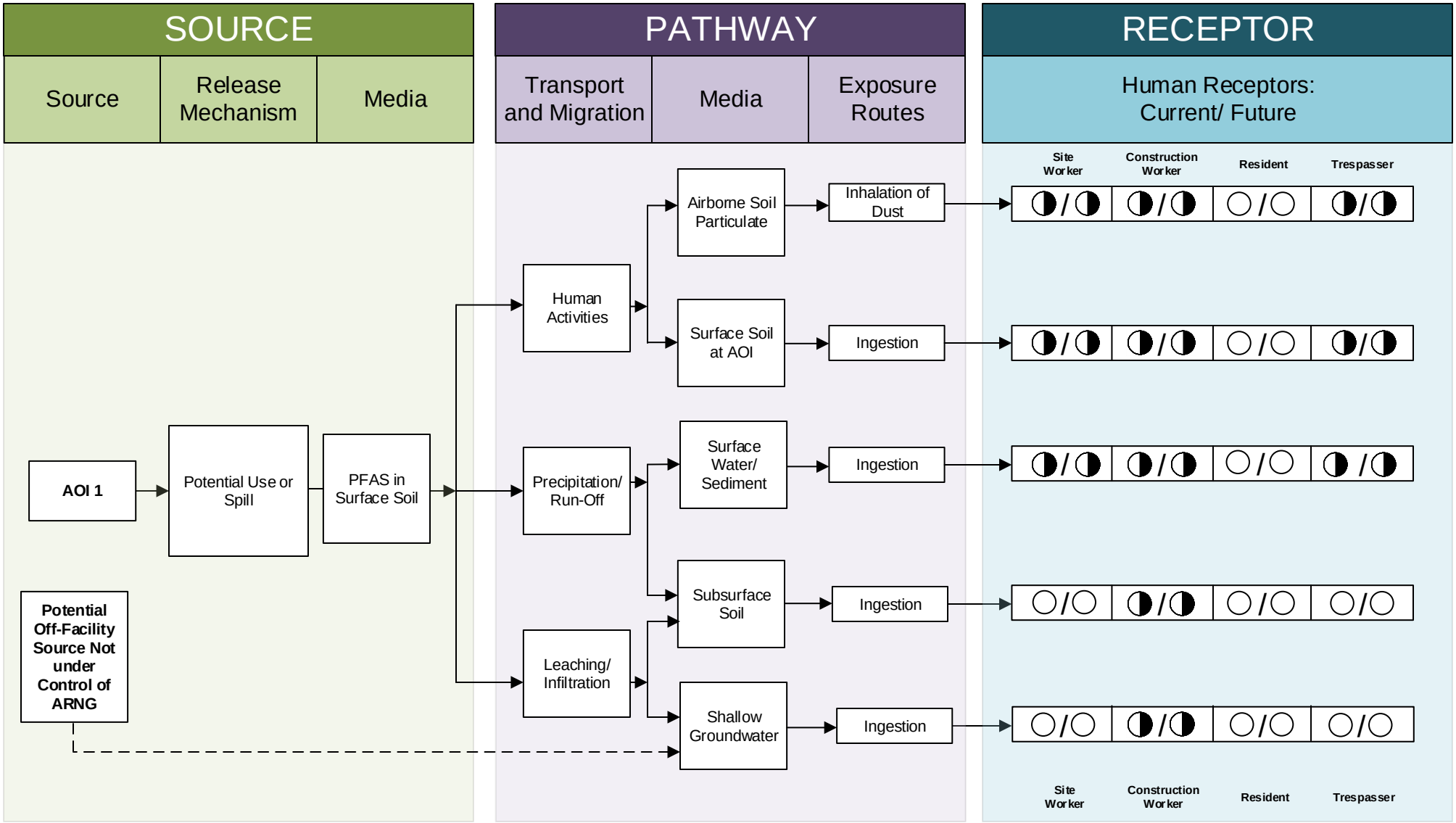


LEGEND

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

Notes:
1. The residential receptor refers to an off-facility receptor.
2. Human consumption of agricultural products potentially affected by PFAS is possible.

Figure 6-2
Preliminary Conceptual Site Model
Muscatatuck Urban Training Center, Indiana

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 MUTC. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

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

Table 7-1: AOI at MUTC

Area of Interest	Name	Used by	Potential Release Date
AOI 1	MUTC Fire Station	INARNG	2008 to present

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

One potential off-facility sources of PFAS (an MSW landfill located 0.211 miles to the southwest which was closed in 1985) was considered as having potential for PFAS releases in the local area based on the 2019 EDR™ report.

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 disposition and use of AFFF in training, firefighting, other non-traditional activities.

The conclusions of this PA are based on all available information, including: previous environmental reports, EDRs™, observations made during the VSI, and interviews. Interviews of personnel with direct knowledge of a facility generally provided the most useful insights regarding a facility's historical and current PFAS-containing materials. Sometimes the provided information is vague or conflicts 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 (early 1970s), 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 potential 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 potential storage of PFAS were reviewed, retired and current personnel were interviewed, multiple persons were interviewed for the same potential source area, and the facility was visually inspected.

The following **Table 7-2** summarizes the uncertainties associated with the PA:

Table 7-2: Summary of Uncertainties

Area	Source of Uncertainty
MUTC Fire Station	It is unknown whether the floor drains in the station are connected to the municipal sewer lines or not. While AFFF leaks are not known to have occurred, potential AFFF leaks could infiltrate into the ground, or may reach the City of North Vernon's sewer system. It is also unknown if and how much AFFF was present at the facility prior to 2016. The current location of the out of commission firetruck, the AFFF within its tank, and the 44 5-gallon buckets of AFFF stored within are unknown.
FSS	An FSS in the "high-tech vault" contains HFC-125 (pentafluoroethane), a clean agent suppressant (colorless gas) that is a short chain PFAS. The compound is not regulated, and it is uncertain if USEPA will regulate it in the future.
General	Interviewees tenure started in 2008. A small data gap exists between 2005 when INARNG purchased the land and 2008 when the fire chief arrived.

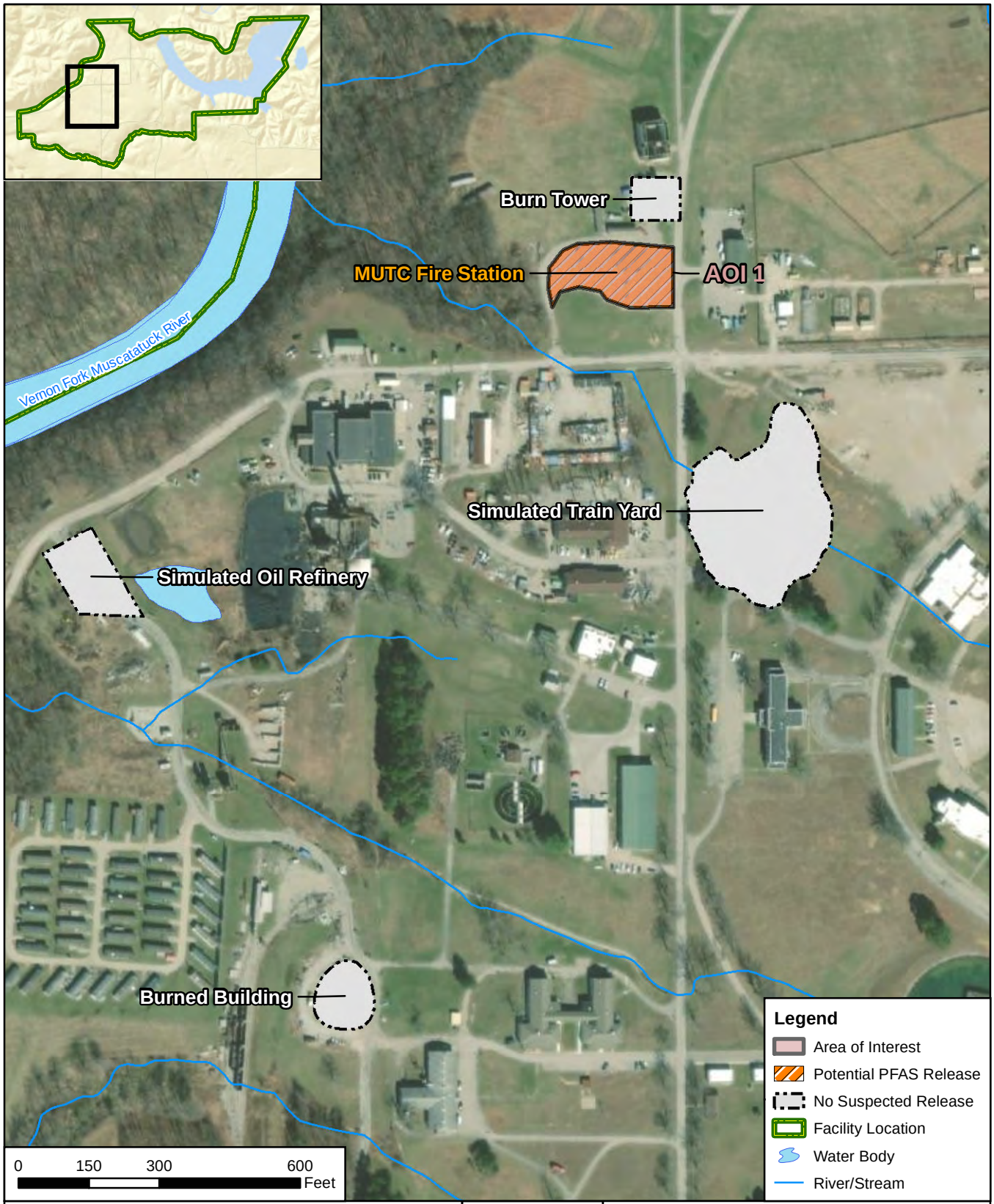
7.3 Potential Future Actions

Interviews with current INARNG facility staff whose first-hand knowledge at MUTC span 2008 - present indicate that ARNG activities may have resulted in a potential PFAS release at one AOI identified during the PA. Based on the preliminary CSMs developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1: MUTC Fire Station	39°03'08.24"N, 85°32'01.03"W	Location of three firetrucks, a brush fire ATV, and storage for numerous containers of AFFF.	Proceed to an SI, focus on soil, groundwater, surface water, sediment

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



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Muscatatuck UTC, IN			
REVISED	8/28/2020	GIS BY	MS	8/28/2020
SCALE	1:3,600	CHK BY	LC	8/28/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	8/28/2020

N

Summary of Findings

AECOM
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Germantown, MD 20876

Figure 7-1

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8. References

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Appendix A
Data Resources

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

Previous Investigations Completed

- 2018 The EDR Radius Map™ Report with GeoCheck®; Aerial Photo Decade Package; & Certified Sanborn Map Report; Target Property Muscatatuck Urban Training Center, 4230 East Administration Drive, North Vernon, Indiana 47265.
- 2005 Environmental Assessment of the Muscatatuck Urban Training Center near Butlerville, Indiana

Miscellaneous Data Resources

- 2010 National Defense Magazine Article *Indiana Psychiatric Institution Transformed Into Urban Training Ground*.

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Environmental Manager

Facility: MUTC
Interviewer: _____
Date/Time: _____

Interviewee: [redacted] **Title:** MUTC Environmental Specialist **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.

New hire, only been @ MUTC for a couple months.

He is the environmental specialist/manager

2. Where can I find previous facility ownership information?

State of Indiana

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

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

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?

No.

PA Interview Questionnaire - Environmental Manager

Facility: MWTC
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?

No.

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

Acquired from Camp Atterbury

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)?

U.S. First Strike 3-6% Alcohol resistant

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?

On/in Firetrucks, in 5-Gal buckets
↓ ↓
mixed concentrated

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?

3 - Burn Tower
"Oil Refinery"
"Train Yard"

PA Interview Questionnaire - Environmental Manager

Facility: MWTC
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?

No releases documented.

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?

Outside entities train @ MWTC frequently

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?

Sometimes, but no 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?

No physical report, but in 2012 the assistant fire chief reported to a fire training exercise that got out of hand and the building was burnt down.

PA Interview Questionnaire - Environmental Manager

Facility: MCTC
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?

No.

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

No.

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

No.

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)?

In the fire station loft storage (5-Gal buckets)

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

No.

PA Interview Questionnaire - Environmental Manager

Facility: MOTC
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?

ICRMP - only contains information on cemeteries onsite.

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

N/A

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

No.

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

No.

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

All AFFF onsite currently is on-spec.

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?

SFC. [redacted]

PA Interview Questionnaire – Fire Station

Facility: MWTC
Interviewer:
Date/Time:

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

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

10 years @ MWTC (2008) as 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) — No use, only storage
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?

No.

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

No.

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

Acquired one-time from Camp Atterbury

PA Interview Questionnaire – Fire Station

Facility: MWTC
Interviewer: _____
Date/Time: _____

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

U.S. First Strike 3-6% alcohol resistant concentrate

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

Fire stations, one time to fill (K) tanks at current trucks.

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

in foam tanks on trucks, and in 5-Gal buckets on trucks & in bulk storage in fire station.

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

In tanks on trucks. No.

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

3 Firetrucks & 1 brush truck

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?

No.

PA Interview Questionnaire – Fire Station

Facility:_____
Interviewer:_____
Date/Time:_____

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

3 - Burn Tower
"Oil Refinery" } No AFFF use
"Train Yard"

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

dry Fuel - hay / pallets

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

None.

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?

Outside entities train frequently @ MUTC.

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.

PA Interview Questionnaire – Fire Station

Facility: MWTC
Interviewer: _____
Date/Time: _____

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

No.

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?

In 2012 a building burned down → responded to by ARFF.
Fire chief [redacted]

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?

No.

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)?

stored in lots @ fire stations in 5-Gal buckets

PA Interview Questionnaire – Fire Station

Facility: MWTC
Interviewer: _____
Date/Time: _____

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved? No.
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? No off-spec AFFF has been onsite.
24. Do you recommend anyone else we can interview? If so, do you have contact information for them? No.

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

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

Recorded by:

ARNG Contact: [redacted]

Date and Time:

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

Source/Release Information

Site Name / Area Name / Unique ID: MUTC

Site / Area Acreage:

Historic Site Use (Brief Description): Mental Hospital

Current Site Use (Brief Description): Urban training Center

Physical barriers or access restrictions: Guard house

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

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

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

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

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

3a. Indicate what businesses are located near the site

None

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

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

Visual Survey Inspection Log

Other Significant Site Features:

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

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

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

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

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

Transport / Pathway Information

Migration Potential:

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

1a. If so, note observation and location:

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:

location withheld by S.O. Indiana

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

4a. If so, please note the location:

Western border, near river

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

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

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

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

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

Visual Survey Inspection Log

Significant Topographical Features:

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

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

Structures have been built & demolished.

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

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

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

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

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

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

Receptor Information

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

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

Guard House & private/military property

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

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

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

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

West, SE ~ 1 - 1.5 miles

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:

The Brush Creek reservoir is part of the site.

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Muscatatuck UTC

Why has this location been identified as a site?

AFFF received from Camp Atterbury, stored onsite for several years

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

No.

Training Events

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

If so, how often?

How much material was used? Is it documented?

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

Surface Water:

Surface water flow direction? Generally N&W

Average rainfall? ~50 in. annually

Any flooding during rainy season?

Direct or indirect pathway to ditches?

Direct or indirect pathway to larger bodies of water? Eastern section of MUTC drains to Brush Creek reservoir

Does surface water pond any place on site? there are artificial surface ponds for training

Any impoundment areas or retention ponds?

Any NPDES location points near the site? No.

How does surface water drain on and around the flight line? N/A

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Generally W/SW

Depth to groundwater? ~10 ft.

Uses (agricultural, drinking water, irrigation)? dW

Any groundwater treatment systems? No.

Any groundwater monitoring well locations near the site? None Remnant

Is groundwater used for drinking water? yes

Are there drinking water supply wells on installation? yes

Do they serve off-post populations? No.

Are there off-post drinking water wells downgradient

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? A WWTP exists onsite for training purposes only.

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

Do we understand the fate of sludge waste?

Is surface water from potential contaminated sites treated?

Equipment Rinse Water

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

Floor drains of Fire Station.

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?

No.

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker ✓

Construction Worker ✓

Recreational User ✓

~~Residential~~ Trespasser ✓

~~Child~~ Resident ✓

Ecological

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

Agriculture

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	Muscatatuck Urban Training Center (UTC)	Butlerville, Indiana

Photograph No. 1

Description:

Primary Firetruck located in the fire station bay. Currently loaded with ~20 gallons of AFFF.

Date Taken:

29 August 2018

Photograph No. 2

Description:

Secondary Firetruck located in the fire station bay. Currently loaded with ~20 gallons of AFFF.

Date Taken:

29 August 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Muscatatuck Urban Training Center (UTC)	Butlerville, Indiana

Photograph No. 3

Description:

Tertiary reserve truck located in the rear of the fire station (building directly in back of photo). The truck is loaded with ~20 gallons of AFFF, but is currently out of commission. The single FTA at MUTC, the burn tower, can be seen in the back left of the photo.

Date Taken:

29 August 2018

Photograph No. 4

Description:

Storage flap on tertiary truck containing 5-gallon, 3-6% alcohol-resistant AFFF buckets. There are 44 buckets total on this truck; each flap you see here is full in addition to the flaps on the other side of the truck and the top rail.

Date Taken:

29 August 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Muscatatuck Urban Training Center (UTC)	Butlerville, Indiana

Photograph No. 5

Description:

Burn Tower Fire Training Area. No historical or reported use of AFFF has occurred. Dry fuel (burnt pallets) can be seen in the lower left corner of the building, in front of the blue connex.

Date Taken:

29 August 2018

Photograph No. 6

Description:

Site of building fire from 2012. The building was razed under control of the Assistant Fire Chief using only class A foam and water. The rubble now serves as part of the MUTC training infrastructure.

Date Taken:

29 August 2018

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Muscatatuck Urban Training Center (UTC)	Butlerville, Indiana

Photograph No. 7

Description:

17 empty 5-gallon buckets of 3-6% alcohol-resistant AFFF located in the storage loft of the fire station. Another 16 full buckets are stored at either end of the loft.

Date Taken:

29 August 2018

Photograph No. 8

Description:

"Brush Truck," mobile fire-fighting platform located next to the secondary firetruck in the station bay. Currently loaded with ~5 gallons of AFFF.

Date Taken:

29 August 2018