FINAL
Preliminary Assessment Report
River Road Training Site,
New Castle, Delaware

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

July 2020

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

°F	Degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AFW	Amec Foster Wheeler
AOI	Area of Interest
amsl	above mean sea level
ANG	Air National Guard
ARNG	Army National Guard
bgs	below ground surface
bmsl	below mean sea level
C&D	Chesapeake and Delaware
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
DEARNG	Delaware Army National Guard
DGS	Delaware Geological Survey
DO	Delaware Online
DoD	Department of Defense
DNREC	Delaware Department of Natural Resources and Environmental Control
DRBC	Delaware River Basin Commission
EDR™	Environmental Data Resources, Inc.™
FTA	fire training area
HA	USEPA's lifetime Health Advisory
HAZMAT	hazardous materials
IED	Installations & Environment Division
NCCDE	New Castle County Delaware Government
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
RRTS	River Road Training Site
SI	Site Inspection
SWAT	Special Weapons and Tactics
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

Executive Summary

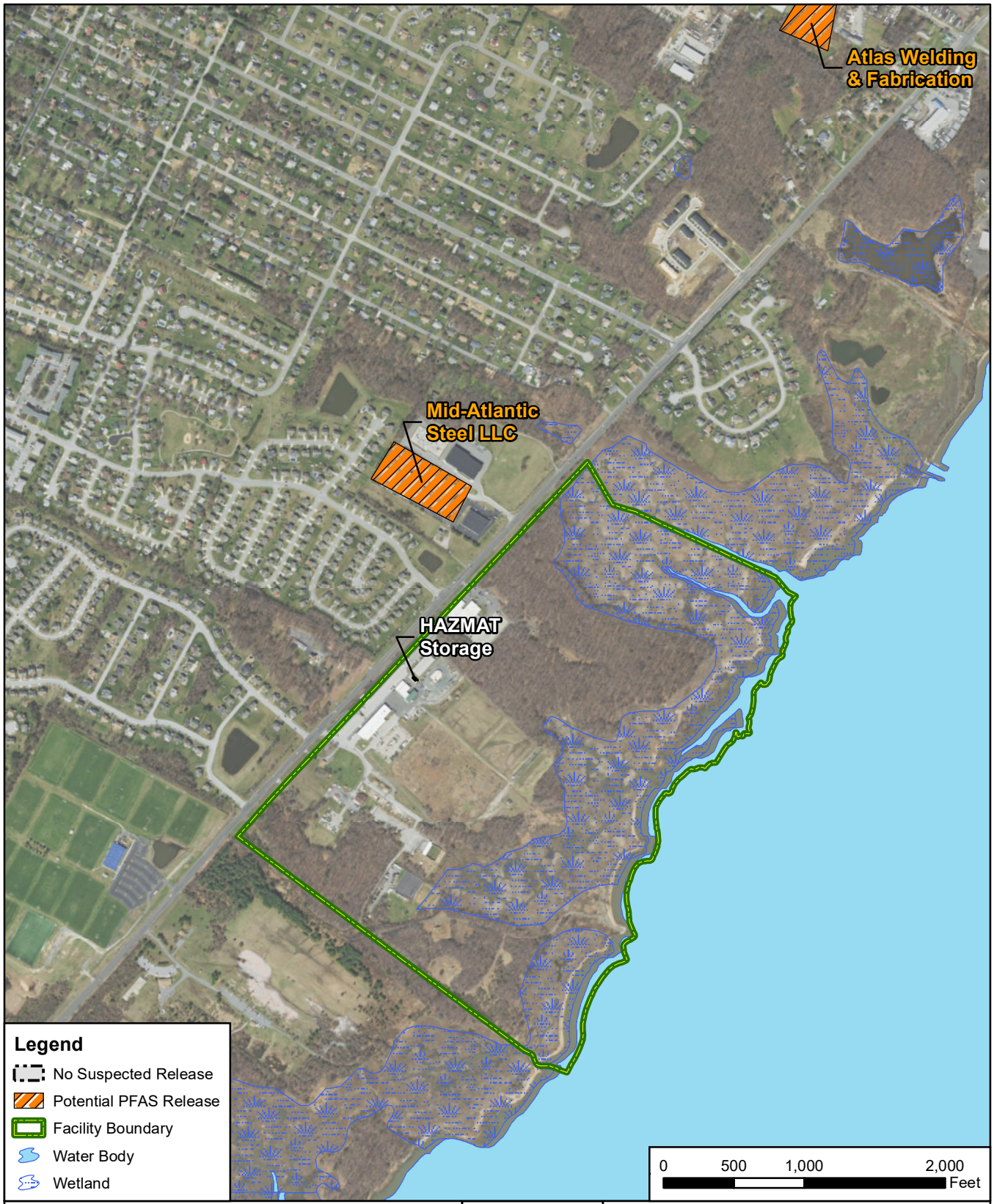
The Army National Guard (ARNG) is performing Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide. A PA for per and polyfluoroalkyl substances (PFAS)-containing materials was completed for River Road Training Site (RRTS; also referred to as the "facility") in New Castle, Delaware, to assess potential PFAS release areas and exposure pathways to receptors. RRTS is constructed on a parcel of land purchased by the US from private landowners in 1908.The performance of this PA included the following tasks:

- Reviewed available administrative and record documents and Environmental Data Resources, Inc. (EDR)^{TM} report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility.
- Conducted a site visit on 5 August 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current RRTS personnel, including environmental managers during the site visit.

No potential PFAS releases were identified at RRTS during the PA investigation. As a result, the exposure pathways to potential receptors are incomplete, and there are no Areas of Interest at the facility (**Figure ES-1**).

Delaware City Refinery, Tybouts Corner Landfill Trust, Mid-Atlantic Steel LLC, Summit Steel, Inc, and Atlas Welding & Fabrication, Inc are potential sources of PFAS adjacent to the facility. The fires at Delaware City Refinery in 2019 both required emergency response either from local fire departments or on-site fire response. Tybouts Corner Landfill Trust may have PFAS-containing materials which could have leeched to the surrounding environment in the area of RRTS. The remaining three potential adjacent sources are metals industries that could use PFAS-containing materials.

Based on the US Environmental Protection Agency (USEPA) Unregulated Contaminant Monitoring Rule 3 data, it was indicated that PFAS were detected in a public water system above the USEPA's lifetime Health Advisory level within 20 miles of the facility. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at River Road Training Site, DE			
REVISED	2/3/2020	GIS BY	GC	2/3/2020
SCALE	1:12,000	CHK BY	LS	2/3/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	2/3/2020

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Summary of Findings

AECOM
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Figure ES-1

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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 Perflorooctanoic acid (PFOA) at Impacted Sites at ARNG Facilities Nationwide.* This work is supported by the United States (US) Army Corps of Engineers (USACE) Baltimore District and their contractor AECOM Technical Services, Inc. (AECOM) under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued 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. In the absence of federal maximum contaminant levels, some states have adopted their own drinking water standards for PFAS; the state of Delaware does not currently have promulgated standards for PFAS in any environmental media.

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

This PA documents potential locations where PFAS may have been released into the environment at RRTS. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed available administrative record documents and Environmental Data Resources, Inc (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a site visit on 5 August 2019 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current RRTS personnel including environmental managers during the site visit.

1.3 Report Organization

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

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA
- **Section 2** – **Fire Training Areas:** describes the fire training areas (FTAs) at the facility identified during the site visit
- **Section 3** – **Non-Fire Training Areas:** describes other locations of potential PFAS releases at the facility identified during the site visit
- **Section 4** – **Emergency Response Areas:** describes areas of potential PFAS release at the facility, specifically in response to emergency situations
- **Section 5** – **Adjacent Sources:** describes sources of potential PFAS release adjacent to the facility that are not under the control of ARNG
- **Section 6** – **Preliminary Conceptual Site Model:** describes the pathways of PFAS transport and receptors for the Areas of Interest (AOIs) and the facility
- **Section 7** – **Conclusions:** summarizes the data findings and presents the conclusions and uncertainties 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

RRTS occupies 190.7 acres in New Castle, Delaware (**Figure 1-1**). The facility's eastern side is bounded by the Delaware River and the facility is located 3 miles southeast of the New Castle Airport. The nearest metropolitan area to RRTS is Wilmington, Delaware, 8.1 miles northeast of the facility. Properties surrounding RRTS are primarily zoned for single-family homes and suburban neighborhoods (New Castle County Delaware Government [NCCDE], 2018).

RRTS is located on a portion of land that, according to the deed provided by RRTS personnel, the Federal Government purchased from private landowners on 16 November 1908. Early activities for the site are unknown due to lack of documentation and the loss of Delaware ARNG (DEARNG) records (URS, 2015). RRTS has historically been used for training encampments, field exercises, and most prominently, live-fire exercises. The facility provides administrative, training and logistical support to the DEARNG, the New Castle City and County police, Special Weapons and Tactics (SWAT) teams, and military and paramilitary organizations (URS, 2015). Directly outside of the facility boundary are a park, a hunter safety training center, and residential neighborhoods. Access to the facility is via a guarded gate.

1.5 Facility Environmental Setting

The facility is located in northern New Castle County, Delaware, along the Delaware River, which flows south to the Delaware Bay. The facility is primarily green space consisting of wetlands and wooded areas. RRTS sits below sea level, and the eastern edge of the property is mostly wetlands that are subject to flooding from the river, while buildings and paved areas sit on the western side

of the property. RRTS is in a transition zone between the Delaware Bay, which has saline waters, and the freshwater Delaware River (URS, 2015). The facility is part of the Army Creek-Frontal Delaware River Watershed, where Army Creek, located to the facility's north, is the main drainage pathway to the Delaware river. On-site drainage pathways are to the wetlands and smaller creeks on-site that discharge into the Delaware River.

In the area of RRTS, the soil is classified as primarily loam. Shallower soils are mostly silt loam from 0-34 inches below ground surface (bgs), while the deeper soil is described as sandy loam from 34-60 inches bgs (EDR™, 2019).

1.5.1 Geology

A geologic map of New Castle County, Delaware provides specific surficial geology of the RRTS area. The portion of land on which RRTS is located includes marsh deposits, the Scotts Corners Formation, and the Lynch Heights Formation (Delaware Geological Survey [DGS], 2005). As shown in **Figure 1-2**, data from the US Geological Survey (USGS) shows the primary rock types of the area are silt and sand. Marsh deposits, located on the eastern edge of the property bordering the Delaware River, mainly consist of organic-rich silty clay to clayey silt. The Scotts Corners Formation in the center of the property consists of coarse to fine sand that is often capped by 1-2 feet of sandy silt. Lastly, the Lynch Heights Formation is located on the western side of the property and consists of fine sand with discontinuous beds of coarse sand, gravel, silt, fine to very fine sand, and organic rich clayey silt to silty sand (DGS, 2005).

1.5.2 Hydrogeology

New Castle County, Delaware has two aquifers: the Columbia and Potomac. The Columbia aquifer is the primary surficial aquifer in New Castle County, Delaware but is in partial contact with the Potomac aquifer, allowing them to act as a hydrogeologic unit (Amec Foster Wheeler [AFW], 2019). An environmental investigation was conducted by the Air National Guard (ANG) approximately 3.5 miles from RRTS. Due to the proximity of this study, it is inferred that the hydrogeologic information provided would be similar to that at RRTS. The study indicated that the Columbia formation in this area is predominantly dry, with perched water tables present (AFW, 2019). The Potomac aquifer consists of two independent water bearing zones (Upper and Middle) in the laterally continuous sand bodies of the Potomac formation.

The Upper Potomac Aquifer lies in both the shallow and intermediate groundwater-bearing zones. The shallow zone extends from 0 to 30 feet above mean sea level (amsl), and there is no clear distinction between the surficial Columbia aquifer and the Upper Potomac aquifer. Separated from the shallow zone by a semi-confining layer of clay, the intermediate groundwater-bearing zone ranges from 1 to 20 feet thick, extends approximately 50 feet below mean sea level (bmsl), and is considered to be part of the Upper Potomac aquifer. Results of groundwater elevation data from a nearby investigation suggest that the shallow and intermediate zones are interconnected, as they show similar trends. Groundwater flow in both zones of the Upper Potomac Aquifer as well as the Columbia Aquifer is generally to the southeast (AFW, 2019) **(Figure 1-2)**.

In New Castle County, south of the Chesapeake and Delaware (C&D) Canal and approximately 7 miles south of the facility, nearly all drinking water is from groundwater provided by public and private wells. However, north of the canal in northern New Castle County, where RRTS is located, groundwater supplies only 30 percent of drinking water (DGS, 2019).

The Delaware Department of Natural Resources and Environmental Control (DNREC) reported that Artesian Water Company, a primary drinking water provider in the area, and the City of New Castle Municipal Services Commission detected PFAS in public water supply wells in the area of RRTS. The area of contamination is approximately 7 square miles and is bounded to the north by Interstate 295, the Delaware River to the east, Route 273 to the south, and Route 13 and New

Castle Airport to the west. This area of PFAS contamination is approximately 2.5 miles north of RRTS.

Four of Artesian Water Company's public water supply wells are between 0.2 and 0.7 miles north of the facility and south of the Army Creek Landfill and the Delaware Sand and Gravel Landfill (**Figure 1-2** and **5-1**). (USEPA, September 2019). Monitoring wells south of the adjacent Landfills tested positive for PFAS (USEPA, September 2019). The public water supply is treated for PFAS contamination by Artesian before distribution (DNREC, 2019); however, there are also 5 private domestic groundwater supply wells within 1 mile of the facility. Well locations shown on **Figure 1-2** are based on the EDR™ report's Physical Setting Source Map and are approximate (**Appendix A**). According to interviewees, drinking water at RRTS is public and provided by Artesian Water Company.

Based on the USEPA Unregulated Contaminant Monitoring Rule 3 data, it was indicated that PFAS were detected in a public water system above the HA level within 20 miles of the facility (**Appendix A**). 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.

1.5.3 Hydrology

Approximately 2 miles west of RRTS is the Christina River Basin, which extends from Pennsylvania through New Castle County, Delaware. The facility is located within the Army Creek-Frontal Delaware River Watershed, between Army Creek to the north and Red Lion Creek to the south **(Figure 1-3)**. Both the Christina River Basin and the Army Creek Watershed are portions of the Delaware River Basin, which is characterized by dendritic interconnected rivers, streams, and wetlands, with outflow to the Delaware River **(Figure 1-3)**. Surface water in the area of the basin where RRTS is located flows generally to the southeast. Due to the facility's eastern bound on the Delaware River, tidal wetlands occur in and adjacent to the facility grounds. Interviewee recollection also includes instances of flooding on-site, close to the river. On facility grounds, runoff flows southeast towards the wetlands and river **(Figure 1-3)**.

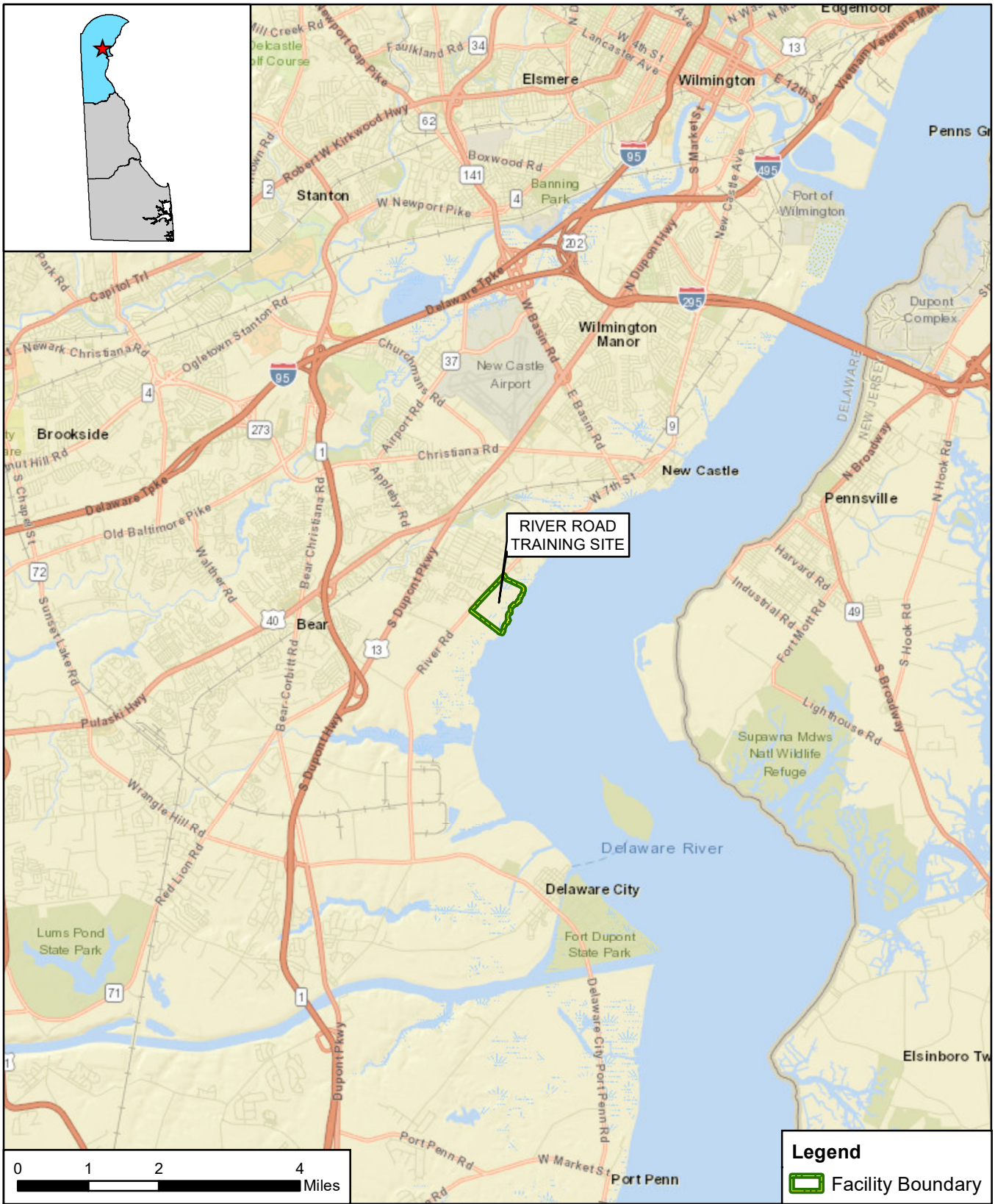
A presentation from the Delaware River Basin Commission provides 2009 PFAS concentration data for media tested along the Delaware river. Results from samples closest to the facility, at river miles 50 and 68, found that PFAS have been detected in source water as well as ambient water (Delaware River Basin Commission [DRBC], 2013).

1.5.4 Climate

The climate at RRTS is humid continental. The Delaware Bay and Atlantic Ocean to the east and south and Chesapeake Bay to the west moderate temperature extremes in the winter and summer months. Although the extremes are lessened, the climate at RRTS is still continental, with hot summers, cold winters, and precipitation throughout the year (AFW, 2019). Mean annual temperature in nearby Wilmington is 54.95 degrees Fahrenheit (°F). The average annual high temperature for nearby Wilmington, Delaware is 64.1°F, and the average annual low temperature is 45.8°F. Annual precipitation for Wilmington is approximately 43 inches of rain and 19 inches of snowfall (US Climate Data, 2019).

1.5.5 Current and Future Land Use

RRTS resides on a portion of land purchased by the US Government in 1908 from private owners and used as a military training facility. The facility is currently used for administrative, training, and logistical support activities. Future land use is not anticipated to change.



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	12/3/2019

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Facility Location

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Figure 1-1

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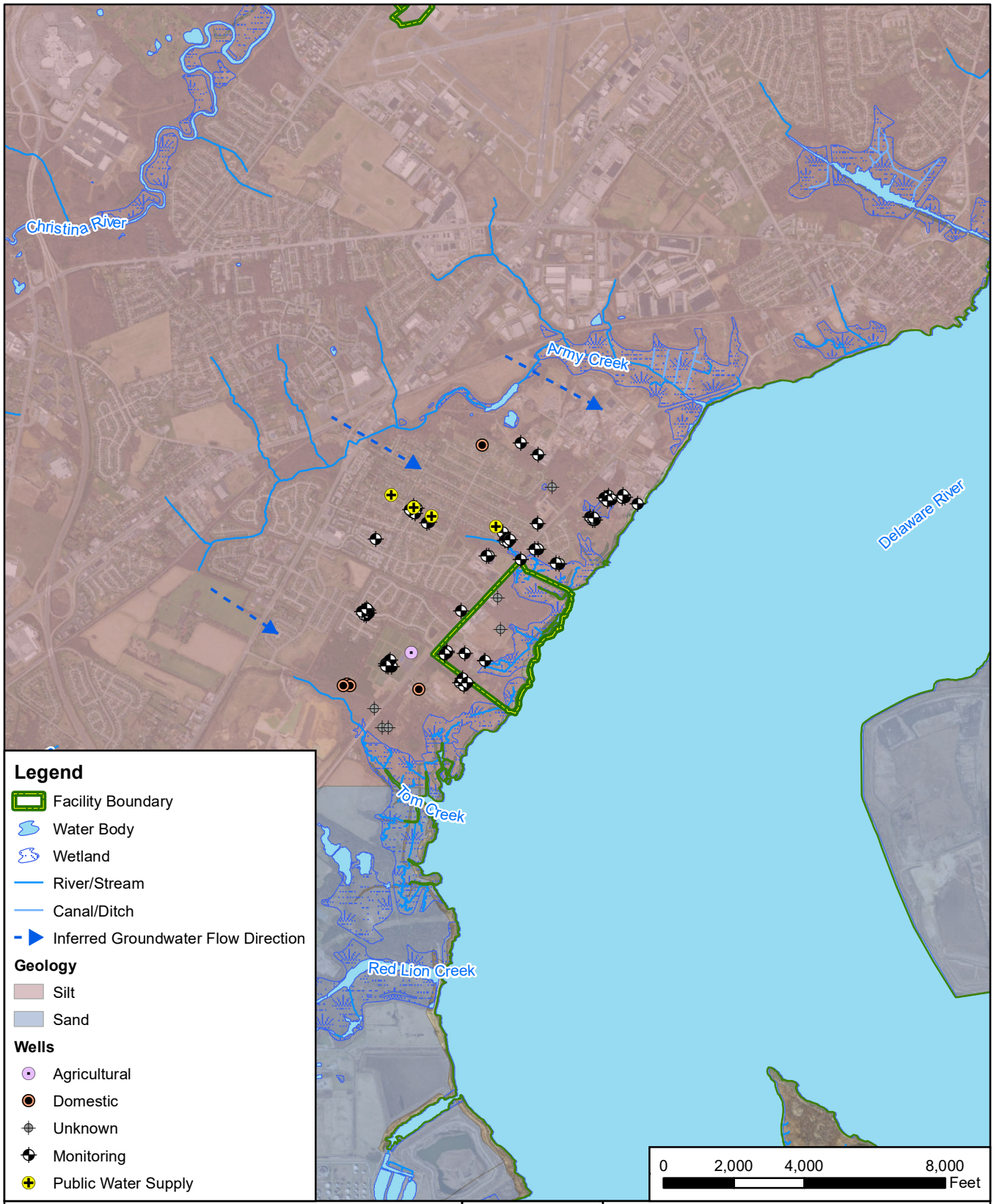

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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	2/4/2020

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Groundwater Features

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Figure 1-2

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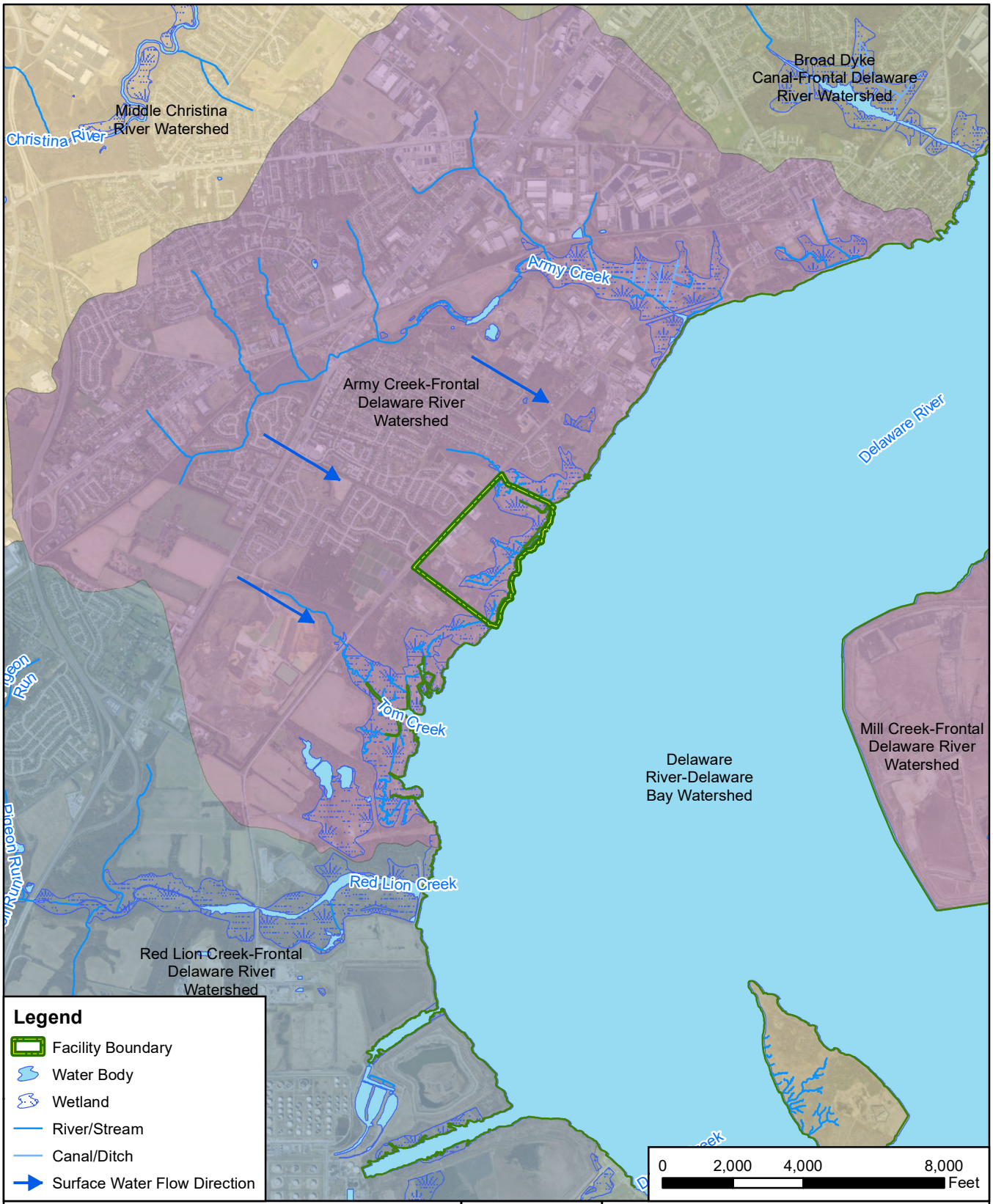

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

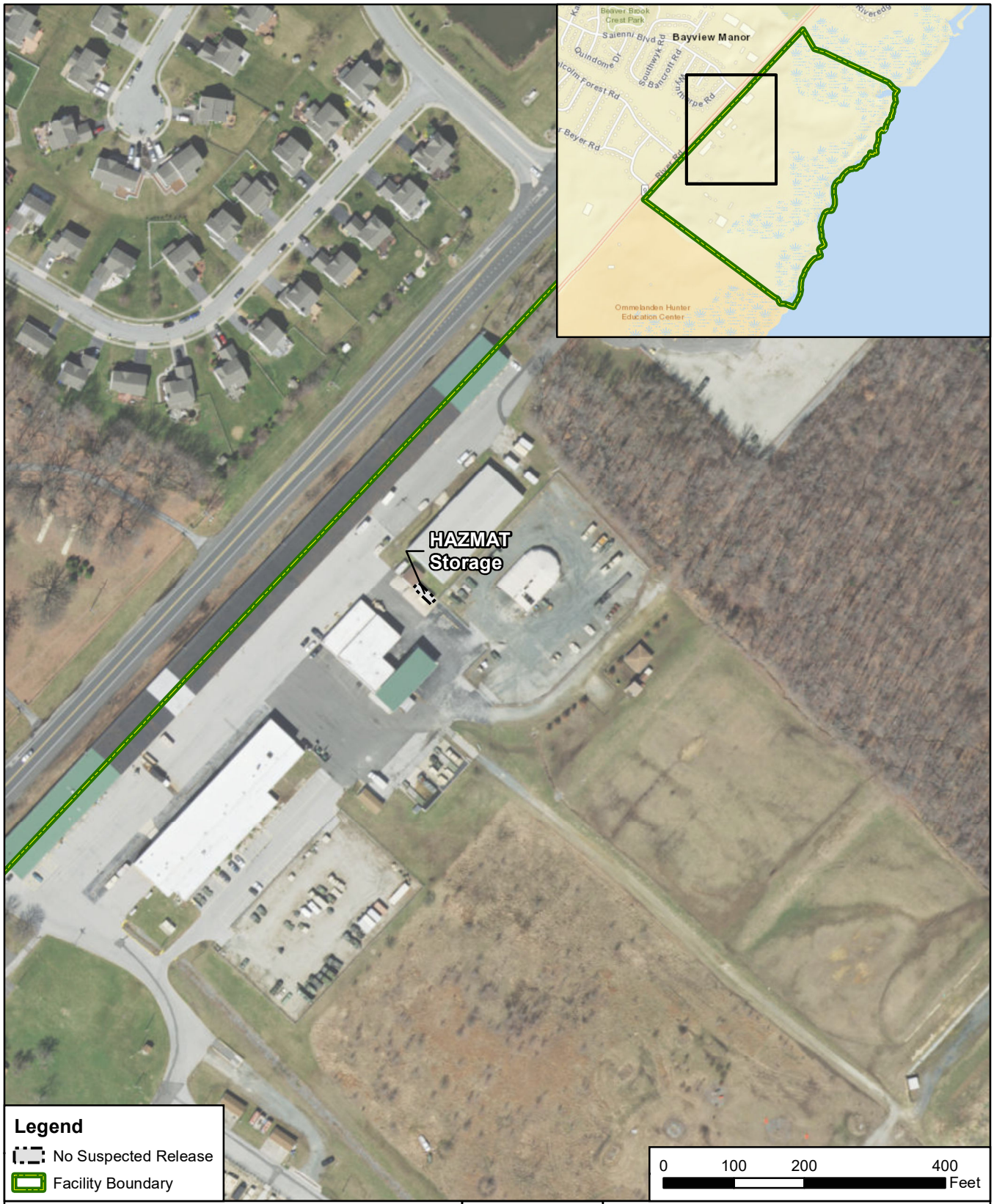
No FTAs were identified within RRTS during the PA through interviews. All fire training for individuals at RRTS is held at the Delaware State Fire School in New Castle, Delaware. It is unknown if training at the Fire School includes AFFF training. Firsthand knowledge of interviewees reaches back to approximately 1991, and there is no primary source information between 1969, the year the Department of Defense (DoD) started using AFFF, and 1991 (**Appendix A**).

3. Non-Fire Training Areas

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

3.1 HAZMAT Storage

The hazardous materials (HAZMAT) storage unit for RRTS is located on the western side of the property. Geographic coordinates for the unit are 39°38'5.946"N; 75°36'35.989"W (**Figure 3-1**). According to interviewee knowledge, there is no AFFF fire suppression system for the HAZMAT storage unit. Photographic logs show a large dry chemical fire extinguisher attached to the side of the storage unit (**Appendix C**). This tank is installed with pipes supplying a deluge system for the unit. Additionally, interviewees do not recall AFFF extinguishers having been used or stored on RRTS property during their time at the facility. Upon visual inspection, extinguishers at the HAZMAT storage unit and around the property are all dry chemical units (**Appendix C**). These extinguishers are visually inspected annually by Hoopes Fire Prevention Inc. Due to the current and historic absence of AFFF extinguishers at this location, there is no suspected AFFF release at the storage unit.



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	2/3/2020

Non-Fire Training Areas

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Figure 3-1

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4. Emergency Response Areas

No emergency response areas were identified at RRTS during the PA through interviews. Interviewees do not recall emergency response at the facility, and there is no documentation of an emergency response event (**Appendix A**).

5. Adjacent Sources

Five potential off-facility sources of PFAS located adjacent to RRTS, not under the control of ARNG, were identified during the PA through interviews and news reports. A description of each adjacent source is presented below, and the adjacent sources are shown on **Figure 5-1**.

5.1 Delaware City Refinery

Delaware City Refinery is located approximately 3.5 miles southwest of the facility (**Figure 5-1**). In both February and April of 2019, there were fires at the refinery. During the fire in February, flames were contained to the refinery with the help of local emergency response units (Delaware Online [DO], 2019). News reports did not mention the use of AFFF, and interviewees are unsure of what was used to control the fire. The fire in April was smaller and did not require outside emergency response from local fire departments. Though there is no definite information provided as to the use of AFFF in either of these emergency responses, AFFF is commonly used at refineries in the event of fuel related fires. As such, there is a possibility that AFFF was released during one or both of these occurrences, making the Delaware City Refinery a possible adjacent source of PFAS. Emergency Response personnel were not interviewed during the PA because the focus of the assessment was to evaluate potential PFAS related activities and sources at DEARNG properties.

5.2 Tybouts Corner Landfill Trust

Tybouts Corner Landfill Trust is located 2.6 miles west-southwest of the facility (**Figure 5-1**). Initially, this location housed a sand and gravel quarry until 1968 and was subsequently converted to a landfill (USEPA, 2019). The landfill was operational until 1971 and accepted municipal and household waste. In 1983, after it was determined that the landfill was the source of contamination in drinking water wells, it was added to CERCLA's national Priorities List. The landfill has since been capped and is monitored semi-annually, with reports ensuring the remedial efforts are, "protective of human health and the environment" (USEPA, 2019). Though there are remedial efforts in place at this site, PFAS-containing materials may have been disposed of in the landfill and may not have been properly contained during the process of remediation. PFAS were not known to be harmful at the time of the remedial action plan and were not taken into account during planning. It is possible that the landfill could be a potential adjacent source of PFAS.

5.3 Mid-Atlantic Steel LLC

Mid-Atlantic Steel LLC sits 0.3 miles northeast of RRTS. While there is no confirmation of the use of PFAS-containing materials at this steel fabrication plant, PFAS are commonly used in the metals and metals plating industries. As such, Mid-Atlantic Steel LLC is a possible adjacent source of PFAS. **Figure 5-1** shows the location of Mid-Atlantic Steel LLC.

5.4 Summit Steel, Inc

Summit Steel, Inc is located 1.4 miles northeast of RRTS (**Figure 5-1**). There is no confirmation of the use of PFAS-containing materials at this steel erecting company in New Castle, Delaware; however, materials containing PFAS are commonly used in metals industries. As a result, Summit Steel, Inc is a possible adjacent source of PFAS.

5.5 Atlas Welding & Fabrication, Inc

Atlas Welding & Fabrication, Inc is located 1.2 miles from RRTS (**Figure 5-1**). There is no confirmation of the use of PFAS-containing materials at this location; however, PFAS are often

used in metalworking industries. Therefore, Atlas Welding & Fabrication, Inc is considered a possible adjacent source of PFAS.

5.6 Delaware Sand and Gravel Landfill

The Delaware Sand and Gravel landfill is a 27-acre superfund site located 0.8 miles north of RRTS and is shown in **Figure 5-1** (USEPA, 2017). Formerly a sand and gravel quarry, the site was converted to a landfill and was operational from 1968 to 1976. The landfill consisted of four disposal areas, three of which held waste materials including hazardous substances in unlined gravel pits. The fourth area was used for temporary chemical waste storage where spillage of hazardous substances occurred (USEPA, 2017). The landfill housed 550,000 cubic yards of both municipal and industrial wastes, including 15,000 drums of chemical production, petroleum, and manufacturing liquids (USEPA, 2017). Contaminants leaking from this site were found in public groundwater supplies in 1971. Since that time, a slurry wall system was installed to prevent contaminants leaking to groundwater, the landfill was capped, and extraction wells were installed to capture and remove contaminants for transfer to the nearby wastewater treatment plant. PFOA and PFOS were detected in groundwater samples from the landfill's monitoring wells in 2013. Monitoring for PFAS began at the landfill in fall 2016 (**USEPA, 2017**). Because groundwater testing has shown PFAS contamination from the landfill, this location is considered an adjacent source of PFAS.

5.7 Army Creek Landfill

The Army Creek Landfill is a also a superfund site and former sand and gravel quarry and is located adjacent to the Delaware Sand and Gravel Landfill, which is immediately across Army Creek to the south of this site (**Figure 5-1**). It operated as an unlined landfill from 1960 to 1968. The Army Creek Landfill accumulated 1.9 million cubic yards of municipal and industrial waste during its time of operation (USEPA, September 2019). In 1971, contaminants were discovered in residential groundwater supply. In response, groundwater monitoring started at the Army Creek Landfill, a groundwater recovery system was installed to remove contaminated groundwater and prevent contamination in an Artesian Water company well field. In 1992, the landfill was capped, and a groundwater treatment plan was put in place between 1992 and 1993 (USEPA, September 2019). The plan consisted of the installation of a water treatment plant to remove contaminants from groundwater before discharging the water to Army Creek. Groundwater monitoring samples between 2013 and 2017 showed the presence of PFAS in groundwater downgradient from Army Creek Landfill (USEPA, September 2019). Artesian water company implemented a treatment system at their adjacent public water supply well field for PFOA and PFOS. The EPA requested that potentially responsible parties conduct groundwater investigations to determine if the Army Creek Landfill is a source of PFAS in the area's groundwater. The investigation is ongoing and is expected to be completed and summarized in a report in March, 2020 (USEPA, September 2019). The exact contents of the landfill are unknown and there is a potential for PFAS-containing substances to be in the landfill, therefore the Army Creek Landfill is a potential adjacent source of PFAS.

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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	2/4/2020

Adjacent Sources

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Figure 5-1

Q:\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\DE\River_Road_Training_Site\Fig_5-1_RRTS_AdjacentSources.mxd

6. Preliminary Conceptual Site Model

Based on the PA findings, no PFAS release areas were identified at RRTS. A conceptual site model (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 are sparse and continue to be the subject of PFAS toxicological study. No known releases of PFAS have been identified at RRTS, therefore the exposure pathways to potential receptors are incomplete, and there are no AOIs at the facility.

7. Conclusions

This report presents a summary of available information gathered during the PA on the use of AFFF at RRTTS. The PA findings are based on the information presented in **Appendix A**, **Appendix B**, and **Appendix C**.

7.1 Findings

No AOIs related to potential PFAS release were identified at RRTS based on information gathered as part of this PA (**Figure 7-1**). Based on the absence of PFAS releases, evidence does not support current or former ARNG activities at the facility contributing to PFAS contamination in soil, groundwater, surface water, or sediment at RRTS or adjacent areas.

The following area, which is shown in **Table 7-1** and was discussed in **Section 3,** is determined to have no suspected release.

Table 7-1 No Suspected Release Areas

No Suspected Release Area	Used by	Rationale for No Suspected Release Determination
HAZMAT Storage Unit	RRTS	The storage unit has never contained AFFF or had an AFFF fire suppression system. The facility has only had dry-chemical extinguishers around the facility.

Several potential adjacent sources of PFAS exist near RRTS. These sources include Delaware City Refinery, Tybouts Corner Landfill Trust, Mid-Atlantic Steel LLC, Summit Steel, Inc, and Atlas Welding & Fabrication, Inc. The fires at Delaware City Refinery in 2019 both required emergency response either from local fire departments or on-site fire response. Though it is unknown if AFFF were used to extinguish these fires, it is commonly used at refineries for fire-fighting purposes. Tybouts Corner Landfill Trust may have PFAS-containing materials that could have leeched to the surrounding environment near RRTS. The remaining three potential adjacent sources are in the metals industry and could use PFAS-containing materials

The summary of findings is presented in **Figure 7-1**.

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, other non-traditional activities, or on its disposition. There is no historically documented use of PFAS-containing materials at RRTS.

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. Direct personnel knowledge of the facility spans from 1991 to present. Sometimes, the provided information was vague. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS were first used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise

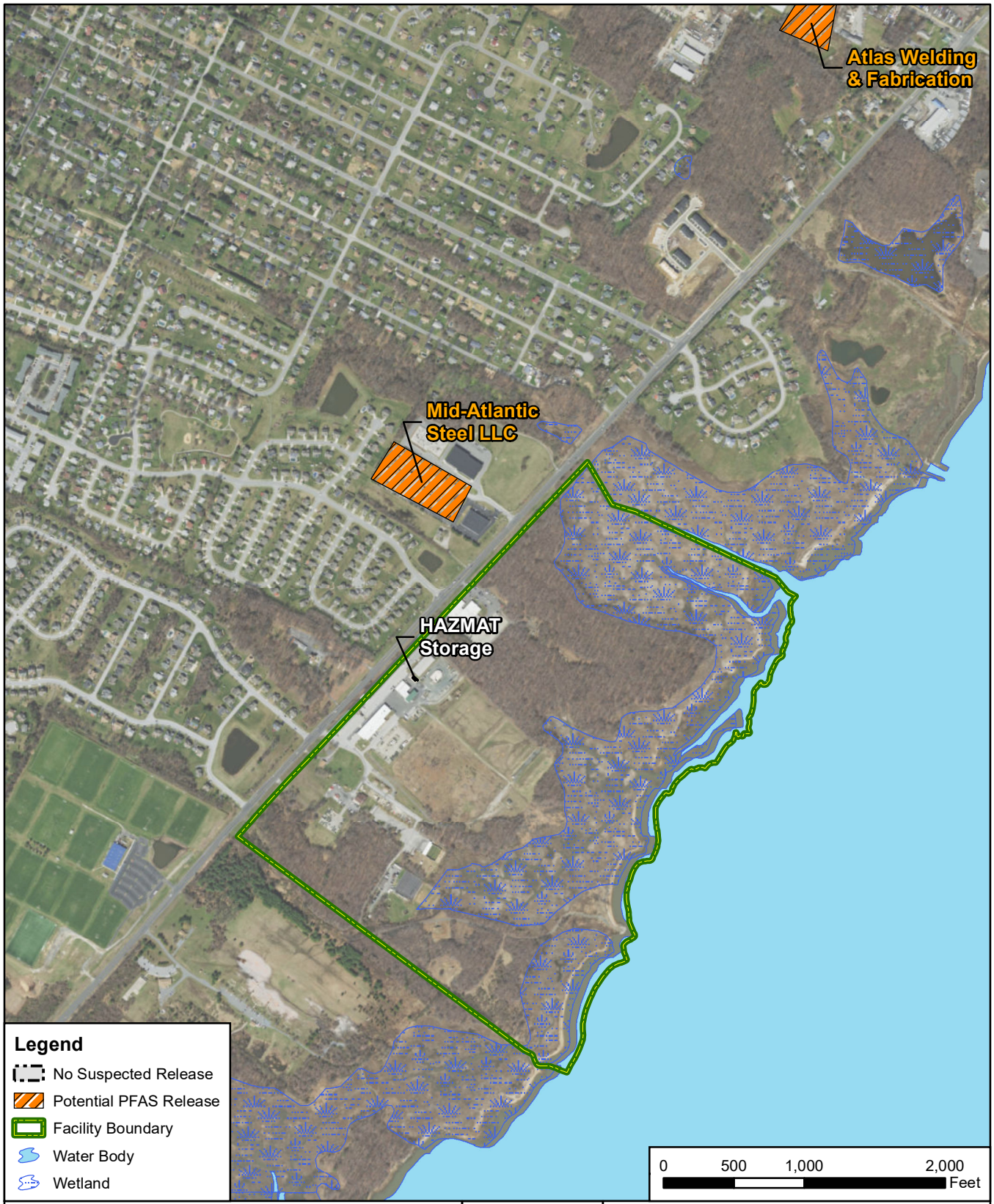
in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

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

7.3 Potential Future Actions

Interviews with RRTS personnel indicate that current and historic DEARNG activities have not resulted in PFAS releases at RRTS. Based on the absence of AFFF and PFAS-containing materials at RRTS, there were no AOIs identified at the facility during the PA.

The DEARNG RRTS will not move forward in the CERCLA process.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at River Road Training Site, DE			
REVISED	2/3/2020	GIS BY	GC	2/3/2020
SCALE	1:12,000	CHK BY	LS	2/3/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	2/3/2020

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for River Road Training Site includes:

RRTS Previous Site Investigations

- 2012, Contaminants of Emerging Concern in the Tidal Delaware River: Pilot Monitoring Survey 2007-2009
- 2014, RRTS Military Munitions Response Program: Remedial Investigation Work Plan/Uniform Federal Policy-Quality Assurance Project Plan, March 2014
- 2015, RRTS Military Munitions Response Program: Remedial Investigation Report, April 2015
- 2019, FY16 Phase 1 Regional Site Inspections For Perfluorinated Compounds: Delaware Air National Guard – 166th Airlift Wing, New Castle Air National Guard Base, New Castle, Delaware, March 2019
- Delaware Department of Natural Resources and Environmental Control's New Castle County Airport Area Fact Sheet, PFOS/PFOA Detected in Ground Water from New Castle Public Wells

RRTS Site Background Documents

- 1998, New Castle County, Delaware Government Zoning Map Index: Zone 59
- 2005, USGS Geologic Map of New Castle County, Delaware, Kelvin W. Ramsey, 2005
- 2017, USEPA Amendment No. 2 to the 1988 Record of Decision for the Delaware Sand & Gravel landfill Superfund Site, New Castle, Delaware, 2017
- 2019, USEPA Fifth Five-Year Review Report for Army Creek Landfill Superfund Site New Castle County, Delaware, September 2019
- UCMR3 Summary Table

RRTS Site Property Documents

- 1908, RRTS Deed, November 16, 1908

Environmental Data Resources, Inc.™ Reports

- 2019, Aerial Photo Decade Package, Environmental Data Resources, Inc., August 27, 2019
- 2019, Historic Aerials Photo Package, Environmental Data Resources, Inc, August 27, 2019
- 2019, Certified Sanborn Map Report, Environmental Data Resources, Inc., August 26, 2019
- 2019, Radius Map Report with Geocheck, Environmental Data Resources, Inc., August 26, 2019

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
Interviewer: [redacted]
Date/Time: 8/5/19

Interviewee: [redacted] **Title:** Environmental Manager **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.

   28 years, 10 years in environmental office

2. Where can I find previous facility ownership information?

   Provided by DEARNG Real Property Manager, [redacted]

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

   > None - No PFAS used at facility

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 - all buildings have water sprinkler system

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
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 AFFF FSS

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

N/A

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

N/A

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

N/A

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

No fire training on the facility

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
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?

N/A

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

None - no fire training at the facility.

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

Yes, units/personnel would fire train at DE fire academy in new castle, DE.

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?

Fire academy provided materials, it is unknown whether AFFF is used during exercises at fire academy.

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?

None

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
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?

None. Machinery is fueled off-site.

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

Not that interviewee is aware of.

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?

Local FD are to respond to emergencies at RRTS

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

N/A

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

No creative uses.

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
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?

Yes, remedial investigation for RRTS.

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

None provided

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 chrome plating shop

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

N/A

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

N/A

PA Interview Questionnaire - Environmental Manager

Facility: RRTS
Interviewer: _____
Date/Time: _____

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

[redacted] - Auto Foreman (interviewing him next)

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

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

Recorded by: [redacted]

ARNG Contact: [redacted]

Date and Time: 8/5/19

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

Source/Release Information

Site Name / Area Name / Unique ID: River Road Training Site

Site / Area Acreage: 190.7

Historic Site Use (Brief Description): Private property until 1908 - Purchased by gov't. After 1905 - Military training site

Current Site Use (Brief Description): Administrative, training, logistical support

Physical barriers or access restrictions: Guarded entrance

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 Metals industries

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) -Water sprinkler system

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:

Flows east to Delaware river (runoff)

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

2a. If so, please note observation and location: Wash rack, drains, waste used to go to leech field, now on public sewer (since ~2004)

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

3a. If so, please note the location:

In figure 1-2

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

4a. If so, please note the location: Eastern side of facility bounded by NE River. Creeks + wetland also on facility

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.

There is a plume by New-castle airport

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

Visual Survey Inspection Log

Significant Topographical Features:

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

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

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

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

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

3a. If yes, describe the location and extent of the erosion: Wetlands on eastern side of property are subject to 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: Eastern edge can get ponded water. Creeks also flow through property

Receptor Information

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

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

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:

0.05 mi NW

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

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

2.3 mi NW

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

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

On-site. Eastern side.

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: River Road Training Site

Why has this location been identified as a site? Potential of AFFF use at this location has been identified.

Are there any other activities nearby that could also impact this location? Yes - landfill, metal industries,

Training Events

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

If so, how often? N/A

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

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

Surface Water:

Surface water flow direction? SE

Average rainfall? ~43in

Any flooding during rainy season? Yes, wetland flooding

Direct or indirect pathway to ditches? No

Direct or indirect pathway to larger bodies of water? Direct - DE River

Does surface water pond any place on site? Yes - east side at wetlands

Any impoundment areas or retention ponds? No

Any NPDES location points near the site? No

How does surface water drain on and around the flight line? No flight line

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? SE

Depth to groundwater? ~0-30ft amsl

Uses (agricultural, drinking water, irrigation)? Public drinking H_2O

Any groundwater treatment systems? Pub. water company treats groundwater

Any groundwater monitoring well locations near the site? Yes

Is groundwater used for drinking water? Yes

Are there drinking water supply wells on installation? No

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient Not downgradient

Waste Water Treatment Plant:

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

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

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

Is surface water from potential contaminated sites treated? Not from this site.

Equipment Rinse Water

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

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

N/A

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors: No history of AFFF/PFAS on site

Site Worker No

Construction Worker No

Recreational User No

Residential No

Child No

Ecological No

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

Documentation

Ask for Engineering drawings (if applicable).

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

Appendix C
Photographic Log

APPENDIX C – Photographic Log

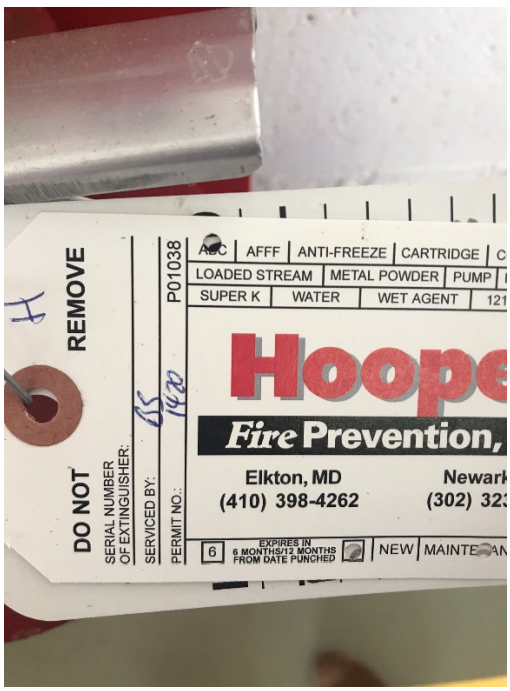
Army National Guard, Preliminary Assessment for PFAS	River Road Training Site	New Castle, Delaware

Photograph No. 1

Description:

Fire Extinguisher and tag inside administrative building. Extinguishers in building are all ABC, non-PFAS fire suppressants.

Photo Date: 8/5/2019



Photograph No. 2

Description:

Wash rack drain that leads to oil/water separator.

Photo Date: 8/5/2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	River Road Training Site	New Castle, Delaware

Photograph No. 3

Description:

Oil/water separator is underground, approximately where the white shed in this photograph is located.

Photo Date: 8/5/2019

Photograph No. 4

Description:

HAZMAT Materials Storage Shed with a dry chem fire extinguisher attached to the side.

Photo Date: 8/5/2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	River Road Training Site	New Castle, Delaware

Photograph No. 5

Description:

Dry chem Fire Extinguisher kept on side of the HAZMAT storage shed.

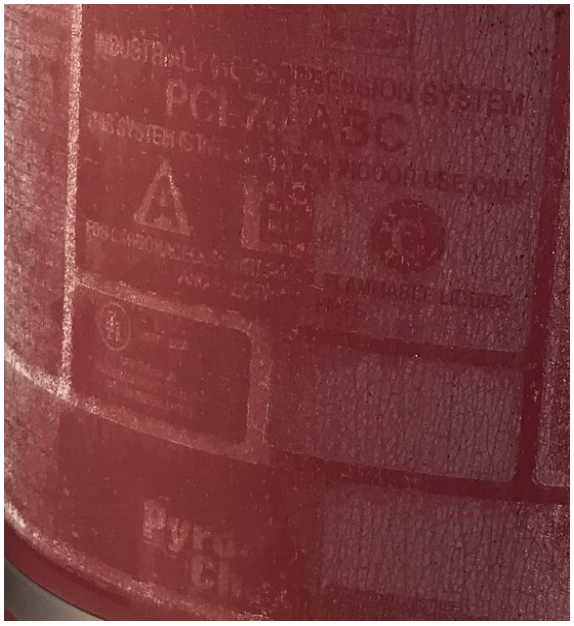
Photo Date: 8/5/2019

Photograph No. 6

Description:

Label from extinguisher in the previous photograph. It is a Pyro Chem PCL 75 ABC dry chem extinguisher.

Photo Date: 8/5/2019



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	River Road Training Site	New Castle, Delaware

Photograph No. 7

Description:

Handheld CO2 fire extinguisher stored outdoors at RRTS.

Photo Date: 8/5/2019