FINAL PRELIMINARY ASSESSMENT AND SITE INSPECTION OF PER- AND POLYFLUOROALKYL SUBSTANCES

United States Army Garrison- West Point, New York

Prepared For:
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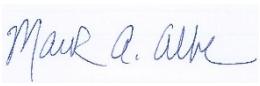

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Preliminary Assessment and Site Inspection of Per- and Polyfluoroalkyl Substances

United States Army Garrison- West Point, New York

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EXECUTIVE SUMMARY

The United States (U.S.) Army (Army) is performing preliminary assessments (PAs) and site inspections (SIs) on per- and polyfluoroalkyl substances (PFAS) with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS), at Army installations nationwide. The PA identifies areas of potential interest (AOPIs) where PFAS-containing materials were used, stored, and/or disposed, or areas where known or suspected releases to the environment occurred. The SI includes multi-media sampling at AOPIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. This United States Army Garrison (USAG) West Point PA/SI was completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), National Oil and Hazardous Substances Pollution Contingency Plan, and Army/Department of Defense policy and guidance.

USAG West Point is located in Orange County, southeastern New York and is approximately 45 miles north of New York City and 100 miles south of Albany, New York. USAG West Point is bounded by the Hudson River, the Town of Highland and the hamlet Fort Montgomery to the east, U.S. Route 6 to the south, Interstate 87 to the west, and Storm King State Park to the north. USAG West Point consists of approximately 16,000 acres and can be considered to consist generally of three areas: (1) Main Post, (2) West Point Military Reservation (WPMR), and (3) Constitution Island. Stewart Army Subpost, which is also part of USAG West Point, is located approximately 14 miles northwest of the Main Post at Stewart Air National Guard Base in the town of New Windsor, New York.

The USAG West Point PA identified 15 AOPIs. SI sampling was completed at 14 of the 15 AOPIs (i.e., all AOPIs except the Target Hill Wastewater Treatment Plant [WWTP] as described in **Table ES-1**). SI sampling results from the 14 sampled AOPIs were compared to risk-based screening levels calculated by the Office of the Secretary of Defense (OSD) for PFOS, PFOA and PFBS. PFOS, PFOA, and/or PFBS were detected in soil, groundwater, surface water, and/or sediment at all 14 sampled AOPIs; however only one of the AOPIs had PFOS, PFOA, and/or PFBS present at concentrations greater than the risk-based screening levels. One AOPI (North Dock 1) had a PFOA sample result (42 ng/L) greater than the OSD risk screening level of 40 ng/L. North Dock 1 is located approximately 40 feet from the Hudson River, a large, tidally-influenced water body. Additionally, PFOS, PFOA, and PFBS concentrations in a proximal groundwater sample collected from North Dock 2, approximately 75 feet from the North Dock 1 groundwater sample, did not exceed the OSD risk screening levels for tap water. Due to the slight groundwater exceedance at North Dock 1, its proximity to the Hudson River, proximity to the other groundwater data point, and limited area of aqueous film-forming foam (AFFF) use, the North Dock 1 is not recommended for any further action at this time. Results from this PA/SI indicate further study in a remedial investigation for PFAS is not warranted at USAG West Point. **Table ES-1** below summarizes the PA/SI sampling results and provides recommendations for further study in a remedial investigation or no action at this time at each AOPI.

Table ES-1. Summary of AOPIs Identified during the PA, PFOS, PFOA, and PFBS Sampling at USAG West Point, and Recommendations

AOPI Name	PFOS, PFOA, and/or PFBS detected greater than OSD Risk Screening Levels? (Yes, No, NA, NS)				Recommendation
	GW	SO	SW	SE	
Fire Station 2 – Building 1203 and Additional AFFF Spray Area	No	No	NA	NA	No action at this time
Ordnance Road East	No	No	NA	NA	No action at this time
Ordnance Road West	No	No	NA	NA	No action at this time
USMA - 32 Burn Pit	No	NS	NS	NS	No action at this time
Crow's Nest Bog	NS	NS	NA	NA	No action at this time
Dumpster Fire – Building 745	No	NS	NS	NA	No action at this time
Fire Station 1 – Building 721	No	No	NS	NS	No action at this time
Army Navy Bonfires	No	No	NS	NS	No action at this time
MVA Delafield Road	No	NS	NS	NA	No action at this time
North Dock 1	Yes	NS	NS	NS	No action at this time*
North Dock 2	No	No	NS	NS	No action at this time
Oil Tank Fire	No	NS	NS	NS	No action at this time
Fire Station 1400	No	No	NS	NS	No action at this time
Old Camp Buckner Fire Station	No	No	NA	NA	No action at this time
Target Hill WWTP	NS	NS	NS	NS	No action at this time**

Notes:
Light gray shading – detection greater than the OSD risk screening level
* North Dock 1 had a groundwater sample result slightly greater than the OSD risk screening level. North Dock 1 is located approximately 40 feet from the Hudson River, a large, tidally-influenced water body. Additionally, a proximal groundwater sample collected from North Dock 2, approximately 75 feet from the North Dock 1 groundwater sample, did not exceed the OSD risk screening level. Due to the slight groundwater exceedance, proximity to the Hudson River, proximity to the other groundwater data point, and limited area of AFFF use, the North Dock 1 is not recommended for any further action at this time
** The Target Hill WWTP was not sampled during the SI due to the following reasons: a lack of media to sample (i.e., WWTP sludges are sent off-post for disposal and effluent water is discharged off-post to a large, tidally-influenced water body [i.e., the Hudson River]), the Target Hill WWTP does not have any history of releases to the environment (i.e., not an Installation Restoration Program site) and is monitored as an active WWTP, and the source AOPI (Fire Station 2 – Building 1203 and Additional AFFF Spray Area) which discharged AFFF to Target Hill WWTP did not have any OSD risk screening level exceedances. Therefore, OSD risk screening level exceedances at the receiving AOPI (Target Hill WWTP) are not anticipated.
GW – groundwater
NA – associated media sampled is not applicable to OSD risk screening levels
NS – not sampled

SE – sediment
SO – soil
SW – surface water

1 INTRODUCTION

The United States (U.S.) Army (Army) is performing preliminary assessments (PAs) and site inspections (SIs) on per- and polyfluoroalkyl substances (PFAS) with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS), at Army installations (installations) nationwide. The Army is the lead agency under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Executive Order 12580 and is conducting the PA/SI consistent with its authority under CERCLA, 42 United States Code §§ 9600, et seq. (as amended), and the Defense Environmental Restoration Program, 10 United States Code §§ 2701, et seq. The PFAS PA/SI included two distinct efforts. The PA identified locations that are areas of potential interest (AOPIs) at United States Army Garrison (USAG) West Point based on the use, storage and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per-and Polyfluoroalkyl Substances (Army 2018). The SI included multi-media sampling at AOPIs to determine whether or not a release has occurred, and the PFOS, PFOA, and PFBS results were compared to the Office of the Secretary of Defense (OSD) PFOS, PFOA, and PFBS risk screening levels to determine whether further investigation is warranted. This report provides the PA/SI for USAG West Point and was completed in accordance with CERCLA and The National Oil and Hazardous Substances Pollution Contingency Plan.

1.1 Project Background

PFAS are a class of compounds that have been used in a wide range of industrial applications and commercial products due to their unique surface tension/leveling properties. Due to industry and regulatory concerns about the potential health effects and adverse environmental impacts, there has been a reduction in the manufacture and use of PFAS worldwide. In the U.S., significant reductions in the production, importation, and use of PFOS and PFOA (two individual compounds in the PFAS class) occurred between 2001 and 2015 (Interstate Technology Regulatory Council 2017). PFBS replaced PFOS in some applications and is currently used and manufactured in the U.S.

In 2016, the United States Environmental Protection Agency (USEPA) established a lifetime health advisory of 70 nanograms per liter (ng/L) in drinking water for PFOS or PFOA and for the sum of PFOS and PFOA when both are present (USEPA 2016a). On 15 October 2019, the OSD provided guidance on the investigation of PFOS, PFOA, and PFBS at Department of Defense (DoD) restoration sites (OSD 2019). The DoD guidance provides risk screening levels for PFOS, PFOA, and PFBS in tap water and soil, calculated using the USEPA's Regional Screening Level (RSL) calculator for residential and industrial/commercial worker receptor scenarios. Following the issuance of the 2019 OSD memo, on 08 April 2021, USEPA published an updated toxicity assessment for PFBS (USEPA 2021). Based on the updated toxicity assessment for PFBS, the OSD issued a memorandum on 15 September 2021 to include updated PFBS risk screening levels (OSD 2021). The September 2021 Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program is provided for reference as **Appendix A**. The OSD risk screening levels for tap water (also used to evaluate groundwater and/or surface water used as a drinking water source) are 40 ng/L for PFOS and PFOA, and 600 ng/L for PFBS. The PFOS and PFOA soil screening levels for the residential and industrial/commercial scenarios are 0.13 milligrams per kilogram (mg/kg) (residential) and 1.6 mg/kg

(industrial/commercial). The soil screening levels for PFBS are 1.9 mg/kg (residential) and 25 mg/kg (industrial/commercial). These screening criteria are discussed further in **Section 6.5**.

1.2 PA/SI Objectives

This PA/SI was conducted consecutively because the results of the PA yielded AOPIs that necessitated continuing onto the SI phase in accordance with CERCLA. Consequently, this report provides the combined objectives of both PA and SI reports.

1.2.1 PA Objectives

During the PA, investigators collect readily available information, conduct site reconnaissance. This PA will evaluate and document areas where PFAS-containing materials were used, stored, and/or disposed, so the Army can distinguish between sites that pose little or no threat to human health and the environment and sites that require further investigation.

1.2.2 SI Objectives

An SI is conducted when the PA determines an AOPI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOPIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required.

Installation-specific data quality objectives (DQOs) and the sampling design and rationale are summarized in **Sections 6.1** and **6.2**.

1.3 PA/SI Process Description

For USAG West Point, PA/SI development followed a similar process as described in **Sections 1.3.1** through **1.3.5** below. **Section 3** provides a summary of the PA activities completed, and **Section 6** provides a summary of the SI activities completed for USAG West Point. The PA and SI processes are documented in the PA/SI Quality Control Checklist included as **Appendix B**.

1.3.1 Pre-Site Visit

First, an installation kickoff teleconference was held between applicable points of contact (POCs) from United States Army Environmental Command (USAEC), United States Army Corps of Engineers (USACE), USAG West Point, and Arcadis U.S., Inc. (Arcadis). The kickoff call occurred on 17 July 2018, approximately two months before the site visit to discuss the goals and scope of the PA, project scheduling, installation access, timeline for the site visit, access to installation-specific databases, and to request available records.

Records review was conducted before the site visit to obtain electronically available documents from the installation and external sources for review. The purpose of the records research was to identify any area on the installation that may have been a location where PFAS-containing materials were used, stored,

and/or disposed, as well as gather information on the physical setting and site history at USAG West Point.

A read-ahead package was prepared and submitted to the appropriate POCs two weeks before the site visit. The read-ahead package contains the following information:

- The Installation Management Command operation order.
- The Army PA Operations Security requirements package, which includes the antiterrorism/operations security review cover sheet (**Appendix C**).
- The PFAS PA kickoff call minutes.
- An information paper on the PA portion of the Army's PFAS PA/SI.
- Contact information for key POCs.
- A list of the data sources requested and reviewed.
- A list of preliminary locations identified during the kickoff call and pre-site visit records review to be evaluated for use, storage, and/or disposal of PFAS-containing materials, where additional information on those areas will be collected through personnel interviews, additional document review, and site reconnaissance.
- A list of roles for the installation POC to consider when recommending potential interviewees.

1.3.2 Preliminary Assessment Site Visit

The site visit was conducted from 18 to 20 September 2018. An in-brief meeting was held to provide installation staff with the objectives of the site visit and team introductions. **Section 3** includes information regarding personnel interviewed.

Personnel interviews were conducted with individuals having significant historical knowledge at USAG West Point. The interviews focused on confirming information discussed in historical documents, collecting information that may have not been in historical documents, and corroborating other interviewees' information.

Site reconnaissance included visual surveys that assessed the points of potential use, storage, and/or disposal of PFAS-containing materials, as well as potential secondary impacts, and the migration potential from each AOPI (e.g., stormwater drains, building drains and sumps, cracks in the floor/pavement). Physical attributes of the preliminary locations were documented, including local slope and ground and floor conditions (i.e., paved, or unpaved, visual staining), surface water bodies and surface flow, potential receptors, and the distance to the installation boundary. Access to existing groundwater monitoring wells, if present, were also noted during the site reconnaissance in case the monitoring wells could be proposed for SI sampling. Photo documentation of the preliminary locations was collected, and access limitations or advantages related to potential future sampling activities were noted.

An exit briefing was offered to installation personnel at the conclusion of the site visit to raise any items identified during the site visit, discuss any follow-up items, and review the schedule for submitting

deliverables. The exit briefing was conducted 20 September 2018 with USAG West Point, USAEC, and USACE to discuss preliminary findings of the PA site visit.

1.3.3 Post-Site Visit

Information collected before, during, and after the site visit was reviewed and corroborated by cross-referencing records and reviewing interview details and observations noted during site visit reconnaissance. A site visit trip report was completed and provided to the installation POC, applicable USAEC POCs, and USACE regional POCs following the site visit. The information collected during the pre-site visit and site visit activities was compiled to develop the installation-specific PA portion of the PA/SI report (**Section 3**). Site data obtained during the PA were used to develop preliminary conceptual site models (CSMs) for each AOPI, which serve as the basis for developing the SI scope of work presented in an installation-specific Quality Assurance Project Plan (QAPP) Addendum.

1.3.4 Site Inspection Planning and Field Work

The SI process was initiated at the installation to evaluate PFOS, PFOA, and PFBS presence or absence at each AOPI and determine whether further investigation is warranted. First, an SI kickoff teleconference was held between the Army PA team and the USAG Wests Point.

The objectives of the SI kickoff teleconference were to:

- discuss the AOPIs selected for sampling and the proposed sampling plan for each AOPI
- gauge regulatory involvement (USEPA, New York State Department of Environmental Conservation [NYSDEC], New York State Department of Health) requirements or preferences
- identify overlapping unexploded ordnance areas (i.e., USMA-32 Burn Pit, Crow's Nest Bog, Fire Station 1400) or cultural resource areas
- confirm the plan for investigation-derived waste (IDW) handling and disposal
- identify specific installation access requirements and potential schedule conflicts
- discuss general SI deliverable and field work schedule information and logistics

Following development of the SI sampling technical approach, an SI scoping teleconference was held to obtain concurrence on the SI sampling plan from USAEC, USACE, and USAG West Point. Additional discussion topics included:

- confirm the sampling plan for each AOPI
- provide an updated SI deliverable and field work schedule

On 15 October 2019, a technical project planning meeting was held between USAG West Point, USAEC, USACE, the NYSDEC, and the New York State Department of Health. Discussion topics included:

- a presentation of the AOPIs selected for sampling and the proposed sampling plan for each AOPI
- discuss general SI deliverable and field work schedule information

A Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP) was developed and finalized in October 2019 for the USAEC PFAS PA/SI (Arcadis 2019). The PQAPP details general planning processes for collecting data and describes the implementation of quality assurance (QA) and quality control (QC) activities for the SI portion for Army installations nationwide. Additionally, an installation-specific QAPP Addendum was developed to define the DQOs, present the sampling design and rationale, and provide qualifications for project personnel. The SI field work was completed in accordance with the PQAPP (Arcadis 2019) and the approved installation-specific QAPP Addendum. A Site Safety and Health Plan (SSHP) was also developed as an attachment to the QAPP Addendum to identify specific health and safety hazards that may be encountered at the installation during sampling. The SSHP was designed to supplement the Accident Prevention Plan (Arcadis 2018), which was developed for Army installations nationwide. The QAPP Addendum and SSHP were submitted to the installation, USACE, USAEC, and NYSDEC and was finalized before commencement of field work.

The DQOs, sampling design and rationale, and field methods employed for the SI are summarized from the QAPP Addendum developed for USAG West Point (Arcadis 2020a) in **Sections 6.1** through **6.3**.

After finalization of the QAPP Addendum and SSHP, field planning and coordination with the installation and subcontractors was completed. Once the schedule was determined, field teams mobilized to the installation to complete the scope of work defined in the QAPP Addendum.

1.3.5 Data Analysis, Validation, and Reporting

Environmental samples collected during the SI were submitted to a laboratory which is DoD Environmental Laboratory Accreditation Program (ELAP)-accredited for PFOS, PFOA, and PFBS analysis by liquid chromatography with tandem mass spectrometry and compliant with the DoD Quality Systems Manual (QSM) 5.1.1 (DoD 2018). Laboratory analytical results were then validated and verified by a project chemist to assess the usability of the data collected. Validated analytical results were summarized in the context of OSD risk screening levels (defined in **Section 6.5**).

2 INSTALLATION OVERVIEW

The following subsections provide general information about USAG West Point, including the location and layout, the installation mission(s) over time, a brief site history, current and projected land use, climate, topography, geology, hydrogeology, surface water hydrology, potable wells within a 5-mile radius of the installation, and applicable ecological receptors.

2.1 Site Location

USAG West Point is located in Orange County, southeastern New York and is approximately 45 miles north of New York City and 100 miles south of Albany, New York. USAG West Point is bounded by the Hudson River, the Town of Highland and the hamlet Fort Montgomery to the east, U.S. Route 6 to the south, Interstate 87 to the west, and Storm King State Park to the north. U.S. Route 9W and New York State Route 293 intersect in the northern portion of USAG West Point (**Figure 2-1**). USAG West Point can be considered to consist generally of three areas: (1) Main Post (i.e., cantonment area), (2) West Point Military Reservation (WPMR), and (3) Constitution Island (**Figure 2-1**). Stewart Army Subpost (STAS), which is also part of USAG West Point, is located approximately 14 miles northwest of the Main Post at Stewart Air National Guard Base in the town of New Windsor, New York.

Both the Main Post and WPMR lie entirely in Orange County, New York and are separated by Route 9W. Directly across the Hudson River from the Main Post is Constitution Island, located in the township of Philipstown, Putnam County, New York. Constitution Island is bounded by the Hudson River on three sides except the eastern border, where it is bounded by Metro-North railroad tracks (**Figure 2-2a**) (Tetra Tech, Inc. 2011).

2.2 Mission and Brief Site History

USAG West Point is the oldest continuously occupied military post in the United States. The primary mission of USAG West Point is educating and training cadets to provide the Nation with “leaders of character who serve the common defense”. The first troops were stationed at USAG West Point in 1778, which at the time was an outpost of 1,770 acres. From its establishment until 1974, USAG West Point acquired and excised lands to reach approximately 16,000 acres. The USAG West Point acreage excluding Constitution Island (i.e., the parcel west of the Hudson River only) is approximately 15,877 acres. Main Post (**Figure 2-2b**), or the cantonment area, is the academic, administrative, and community area along the Hudson River and consists of approximately 2,500 acres. The WPMR (**Figure 2-2c**) lies west of the Main Post and serves as a field training facility for USAG West Point and consists of approximately 14,000 acres. Constitution Island is located across the Hudson River and does not currently host any mission-related activities (Tetra Tech, Inc. 2011).

2.3 Current and Projected Land Use

Land uses on the Main Post include academic (the United States Military Academy [USMA]), administrative, limited military field training, recreation, facility support and residential. The golf course, ski area and USMA Preparatory School are on the Main Post. Military training of cadets is conducted on 48 training areas, 14 live fire ranges, one artillery range, one mortar range, and one mortar firing point on

over 14,000 acres of land. Most of the ranges direct weaponry into the approximately 963 acres of land on the reservation that are designated as a permanent impact/dudded danger area. Camp Buckner, located at Popolopen Lake, has administrative buildings and provides summer housing for cadets. Camp Natural Bridge provides housing for support/training personnel (e.g., 10th Mountain Division). The Camps are located off of Route 293 about 6 miles west of the Main Post. Crow's Nest is a dudded danger zone located in the northern part of the reservation. Though not currently in use, this area has been used in the past as an impact area for artillery fire, and therefore, access is limited. Constitution Island is used primarily by the Constitution Island Association for tours and for cadet outdoor recreation and training (Tetra Tech, Inc. 2011).

Approximately 4,800 cadets, 1,100 active military personnel, and 2,900 civilians live at USAG West Point. Additionally, approximately 4,000 civilians and 750 contract workers are employed at USAG West Point. The area surrounding USAG West Point is dominated by residential, agricultural, and recreational land uses. Although there is some light industry in the surrounding areas, there is no heavy industry (Tetra Tech, Inc. 2011).

2.4 Climate

The climate of the region including USAG West Point is characterized as a humid, continental climate. Summers are warm and have periods of high humidity. July is the hottest month, with a mean temperature of 86 degrees Fahrenheit. Winters are cold with extended periods of snow cover and are influenced by the cold Hudson Bay air masses that are brought into the area. The coldest month of the year is January, which has a mean temperature of 27 degrees Fahrenheit. Most winters include one or more warm periods when soils nearly or completely thaw. A third weather pattern that influences the climate of USAG West Point is an air mass that flows inland from the North Atlantic Ocean bringing cool, cloudy, and damp weather to the region. Prevailing winds are generally westerly. Total annual precipitation is approximately 49.5 inches, with the least amount of precipitation occurring in January and February (3.5 inches each month) and the most occurring in May (4.9 inches) (Tetra Tech, Inc. 2011).

2.5 Topography

The USAG West Point is located in the New England Physiographic Province and occupies the Hudson Highlands section of this Province (**Figure 2-3**). The topography at USAG West Point is characterized by elevations ranging from 20 feet above mean sea level at the Hudson River to about 420 feet above mean sea level. The terrain exhibits moderate to steep hillsides and slopes covered with a thin veneer of glacial till, many of which are forested. The original topography of many areas has been altered due to the construction of roads and buildings at USAG West Point (Woodward-Clyde Federal Services 1995).

2.6 Geology

The USAG West Point occupies the Hudson Highlands section of the New England Physiographic Province. The Hudson Highlands consist of diverse Middle Proterozoic gneisses, which were deformed and metamorphosed to the hornblende-granulite facies and intruded by syntectonic granites about 1,150 million years ago. Within the last 20,000 years the bedrock of the region was eroded, and unconsolidated material was deposited by advances and retreats of continental ice sheets during Pleistocene glaciation.

Surficial geologic formations on USAG West Point predominantly consist of glacial till and areas of exposed or nearly exposed bedrock. Precambrian-age granite, diorite, gneiss, and schist compose the majority of the crystalline bedrock underlying USAG West Point (Tetra Tech, Inc. 2011). Depth to bedrock ranges from approximately 3 to 30 feet. Bedrock in the region is covered in places by a thin veneer of glacial till deposited during the most recent glacial episode. Sediments deposited by the glaciers comprise stratified and unstratified till that varies in thickness over the area up to several tens of feet. Most of the till on USAG West Point is likely to be less than 20 feet thick, and in most places is likely less than 10 feet thick. These widespread till deposits are typically mixtures of sand, silt, clay, and gravel with occasional boulders (Woodward-Clyde Federal Services 1995). Linear deposits of outwash sand and gravel, and more localized kame deposits are more apparent in the western-most areas of USAG West Point (Tetra Tech, Inc. 2011).

Two major normal faults traverse USAG West Point (**Figure 2-2b**). A northeast trending fault, Long Pond Fault, extends from Route 218, passing across the Hudson River and terminating in the town of Cold Spring. A north-northeast fault, Crown Ridge Fault, extends through the long axis of the Lusk Reservoir from Highland Falls and appears to terminate at the Hudson River west of the North Dock (Law Engineering and Environmental Services 1994).

The geology of Constitution Island is similar to that of the WPMR, consisting of bedrock composed of granite, diorite, gneiss, and schist. The surficial geology is characterized by glacial drift and talus deposits and slopes with outcrops (Tetra Tech, Inc. 2011).

2.7 Hydrogeology

The USAG West Point area is dissected by several small streams and is the source for many bedrock groundwater springs (Woodward-Clyde Federal Services 1995). Groundwater at USAG West Point occurs in an unconsolidated aquifer consisting of alluvial deposits and a consolidated bedrock aquifer. Water within the unconsolidated aquifer occurs primarily in the sands and gravels of the stratified drift deposits. These deposits are thin and generally have fairly small well yields. Water in the unconsolidated aquifer usually occurs under water table conditions (Tetra Tech, Inc. 2011). Shallow groundwater is commonly encountered 15 to 30 feet below ground surface (bgs) but may be as deep at 50 feet bgs (Law Engineering and Environmental Services 1994).

Recharge to the unconsolidated aquifer is primarily from local precipitation, but hydrologic communication occurs between the alluvial and the bedrock aquifers and some upward seepage from the bedrock aquifer occurs in low-lying areas. The unconsolidated glacial till deposits on the installation exhibit poor sorting and a high clay percentage, which results in low porosity and permeability. As a result, the glacial tills typically have low well yields (Tetra Tech, Inc. 2011).

Groundwater occurs in the upper weathered, jointed, and fractured sections of the bedrock that underlies the installation. Recharge to the bedrock aquifer occurs in upland areas by precipitation, and discharge occurs in lowland areas through springs and upward seepage. Permeability and water movement in the bedrock aquifer is generally extremely slow due to the limited extent of the joint and fracture systems (Tetra Tech, Inc. 2011).

Throughout Orange County, the water table flows eastward, towards the Hudson River; however, localized flow may be towards nearby streams, lakes and ponds (Woodward-Clyde Federal Services 1995).

2.8 Surface Water Hydrology

USAG West Point lies within the Hudson River drainage basin. Shallow soil, glacial geology, and abundant rainfall produce a regionally high-water table, resulting in numerous wetlands, lakes, and ponds. Most of the lakes and ponds are the result of artificial dams that have raised water levels within former wetland areas (Tetra Tech, Inc. 2011). Surface water drains into numerous interconnected upland ponds and tributaries; the southeast-flowing Popolopen and Highland Brooks are the main bodies of water that drain the area's surface water into the Hudson River (Woodward-Clyde Federal Services 1995). The Popolopen Brook system, which is also a major source of potable water for USAG West Point, discharges into the Hudson River just upstream of the Bear Mountain Bridge. The Highland Brook system, which provides potable water for the Town of Highland, flows just west of and drains about one quarter of Main Post and ultimately discharges into the Hudson River. The rest of Main Post is drained by the Crow's Nest Brook system, the Kinsley Farm Brook drainage, and a system of storm drains and sewers. Other drainages on the east side of USAG West Point include: to the southeast, the Cragston Brook/Cragston Lakes system, and an unnamed brook to the south of Cragston. In the northeast a small portion of the Upper Reservoir watershed flows into Black Rock. The western side of USAG West Point is made up of the Lake Frederick, Trout Brook, and Mineral Springs Brook sub-drainages that eventually meet in the Woodbury/Moodna Creek system (Tetra Tech, Inc. 2011). The tidal range of the Hudson River at USAG West Point is approximately 2 feet; however, the water is normally fresh and upstream of saltwater intrusion from the lower Hudson River (Woodward-Clyde Federal Services 1995).

2.9 Relevant Utility Infrastructure

The following subsections provide general information regarding the installation's stormwater and wastewater management systems, as well as information on how the utility infrastructures may influence the fate and transport of PFAS constituents at USAG West Point.

2.9.1 Stormwater Management System Description

Stormwater from Main Post drains into Crow's Nest Brook, Highland Brook, Kinsley Farm Brook, Dassori Pond, or through open channels or pipes, catch basins and swales, all eventually emptying into the Hudson River. Stormwater drainage on Camp Buckner, the firing ranges, and training areas throughout the WPMR consist of natural swales, man-made ditches, and storm pipes where roads cross drainage ditches. Water from Camp Buckner is discharged into Popolopen Lake (Tetra Tech, Inc. 2011).

2.9.2 Sewer System Description

Three wastewater treatment systems and plants serve USAG West Point. All treatment plants operate under a New York State Pollutant Discharge Elimination System permit. Dewatered sludge from the sewage treatment facilities is transported directly to a permitted landfill off-post (Tetra Tech, Inc. 2011).

The Target Hill Wastewater Treatment Plant (WWTP) serves the majority of the Main Post cantonment area and effluent discharges to the Hudson River. The system is separate from the installation's stormwater collection system (Tetra Tech, Inc. 2011). There is one known AFFF disposal to the Target Hill WWTP. In 2011, the USAG West Point fire chief (current fire chief at the time of the PA site visit in September 2018 but has since retired) recalled replacing foam in a fire truck tank, where they had removed old foam from the tank into a 55-gallon drum. The fire chief rinsed the tank with a garden hose within the Fire Station 2 bay, resulting in AFFF rinsate being washed down the internal drains. The internal drains lead to an oil water separator before the lift station directed to the Target Hill WWTP.

Camp Buckner and Natural Bridge are served by the Camp Buckner WWTP. This treatment plant discharges to the Popolopen Creek (Tetra Tech, Inc. 2011). The PA findings did not identify any use, storage, or disposal of PFAS-containing materials to the Camp Buckner WWTP.

The Department of Logistics Motor Pool WWTP serves the Directorate of Logistics Motor Pool only and discharges to Mine Lake. The PA findings did not identify any use, storage, or disposal of PFAS-containing materials to the Department of Logistics Motor Pool WWTP.

2.10 Potable Water Supply and Drinking Water Receptors

Potable water at USAG West Point is currently managed by American Water. There are four water treatment plants (WTPs) at USAG West Point that are supplied by various lakes and reservoirs within the Popolopen watershed, including the Popolopen Lake, Stilwell Lake, Mine Lake, Long Pond and Lusk Reservoir as well as groundwater wells on-post. The WTPs include the Stony Lonesome WTP, the Lusk WTP, the Transportation Motor Pool (TMP) WTP, and the Camp Buckner WTP (**Figure 2-2a**). The Stony Lonesome WTP is supplied by a 20-inch pipeline pumped from Long Pond. The Lusk WTP is supplied by a 20-inch gravity pipeline that originates at Popolopen Brook and flows to Lusk Reservoir. The TMP WTP is supplied by Stilwell Lake, which is hydrologically connected to and downgradient of Mine Lake. The Camp Buckner WTP is supplied by Popolopen Lake. The Camp Buckner WTP operates seasonally and serves Camp Buckner and Camp Natural Bridge only. USAG West Point also has a license agreement with the Palisades Interstate Park Commissions to provide an unlimited supply of potable water during the high demand period of October 16 through May 31 each year (Tetra Tech, Inc. 2011).

There are 28 active on-post potable groundwater wells that provide potable water to satellite buildings or facilities throughout USAG West Point. The groundwater wells most likely draw water from the stratified alluvial sand and gravel deposits, and the upper weathered bedrock aquifers (Tetra Tech, Inc. 2011).

There are numerous off-post potable wells and potable use surface water bodies in between the southeastern installation boundary and the Hudson River (**Figure 2-4**), in the anticipated downgradient surface water and groundwater flow direction. An Environmental Database Resources Inc. (EDR) report includes search results from a variety of environmental, state, city, and other publicly available databases for a referenced property. An EDR report was generated for USAG West Point, which along and the NYSDEC potable water database, identified several off-post public and private wells and surface water bodies within 5 miles of the installation boundary (**Figure 2-4**). The EDR report providing well search results is provided as **Appendix E.**

2.11 Ecological Receptors

PA team collected information regarding ecological receptors that was available in the installation documents reviewed during the PA process. The following information is provided for future reference should the Army decide to evaluate exposure pathways relevant to the ecological receptors.

There are approximately 1,010 acres of wetlands located throughout USAG West Point in association with streams, ponds, depressions, and seeps. Most of the wetlands on USAG West Point are small with areas of less than 5 acres, and only a few of the wetlands on the installation exceed 15 acres. Aquatic habitats on USAG West Point include 17 ponds and small lakes covering 565.7 acres, as well as 11 stream reaches (many of which are tributaries to the Hudson River) extending approximately 35 miles. A variety of fish species have been found at USAG West Point (e.g., largemouth bass, bluegill, walleye, brook trout, brown bullhead) (Tetra Tech, Inc. 2011).

There is a diverse array of fauna that occur at USAG West Point. Forty-eight species of mammals (e.g., coyote, black bear, white-tailed deer, river otter, red fox, Indiana bat), 249 species of birds (e.g., loons, geese, falcons, typical owls, sparrows, great blue heron), 22 species of reptiles (e.g., various turtles, snakes, and 18 species of amphibians [e.g., frogs, toads, salamanders]) have been observed and/or documented on USAG West Point (Tetra Tech, Inc. 2011).

2.12 Previous PFAS Investigations

Previous (i.e., pre-PA) PFAS investigations relative to USAG West Point, including both those conducted and not conducted by the Army, are summarized to provide full context of available PFAS data for USAG West Point. However, only data collected by the Army will be used to make recommendations for further investigation. The USEPA conducted the third Unregulated Contaminant Monitoring Rule (UCMR3) monitoring between 2013 to 2015. UCMR3 is a national program that collects data for contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (USEPA 2016b). The UCMR3 included the analysis of PFOS, PFOA, and PFBS in public water systems serving more than 10,000 people between 2013 to 2015. The Highland Falls Village Treatment Plant, located to the south of USAG West Point, was sampled during the UCMR3 in 2014 and results indicated that PFOS, PFOA, and PFBS were not detected. The limit of detection (LOD) at the time of UCMR3 sampling was 40 ng/L for PFOS, 20 ng/L for PFOA, and 90 ng/L for PFBS. Of those public water systems sampled during UCMR3 and within a 5-mile radius of USAG West Point, only one, the New Windsor Consolidated Water District, had detections of PFOS or PFOA. The New Windsor Consolidated Water District is located upgradient to the north of USAG West Point.

In response to Installation Management Command Operations Order 16-088, issued in 2016, USAG West Point sampled all post-treatment/finished drinking water from on-post potable wells and WTP surface water intakes for PFOS and PFOA in August 2016. Each of the surface water intake locations and five on-post potable wells at Round Pond are regulated water systems; the remaining on-post potable wells are non-regulated water systems and are used on a seasonal or transient basis. Results were provided for PFOS and PFOA only; PFBS results were not provided, and it is unknown if PFBS was analyzed. Select locations were sampled again in October 2017, January 2018, April 2018, July 2018, and June 2020 (**Table 2-1a**). June 2020 data provided by USAG West Point indicated PFBS, PFOS, and PFOA

were detected at levels below the OSD risk screening levels for tap water (**Section 6.5**). The maximum detections of PFOS, PFOA, and PFBS are summarized below:

- PFOS: 10.7 ng/L (August 2016 at Bull Pond groundwater well)
- PFOA: 14.8 ng/L (April 2018 at Integrated Training Area Management groundwater well)
- PFBS: 6.9 ng/L (June 2020 at Range Control Headquarters groundwater well)

According to USAG West Point and American Water personnel, the wells noted above are all non-regulated wells that are seasonally used for consumption and have not been sampled for PFAS constituents since June 2020.

Additionally, in July 2020, a total of 10 sediment samples from the Delafield Dam at USAG West Point were collected and analyzed for PFOS, PFOA, and PFBS as part of a Delafield Field Engineering project, independent of the PFAS PA/SIs (**Table 2-1b**). The maximum detections of PFOS, PFOA, and PFBS are summarized below:

- PFOS: 0.000372 J [estimated] milligrams per kilogram (mg/kg)
- PFOA: 0.000064 J mg/kg
- PFBS was not detected in any of the 10 sediment samples.

3 SUMMARY OF PA ACTIVITIES

To document areas where any potential current and/or historical PFAS-containing materials were used, stored and/or disposed at USAG West Point, data was collected from three principal sources of information:

1. Records review
2. Personnel interviews
3. Site reconnaissance

These sources of data, along with their relative application to this PA, are discussed below. The specific findings of the records review, personnel interviews, and site reconnaissance relevant to PFAS-containing materials at USAG West Point are described in **Section 4**.

3.1 Records Review

The records reviewed for this PA included, but were not limited to, various Installation Restoration Program (IRP) administrative record documents, compliance documents, USAG West Point Directorate of Public Works (DPW) documents, documents provided by USAEC, and GIS files. Internet searches were also conducted to identify publicly available and other relevant information. Additionally, an EDR report generated for USAG West Point was reviewed to obtain off-post water supply well information (**Appendix E**). A list of the specific documents reviewed for USAG West Point is provided in **Appendix F**.

3.2 Personnel Interviews

All interviews were conducted during the site visit. The list of roles for the installation personnel interviewed during the PA process for USAG West Point is presented below (affiliation is with USAG West Point unless otherwise noted).

- DPW Environmental Restoration Manager
- Fire Department Fire Chief (i.e., current fire chief at the time of the PA site visit in September 2018 but has since retired as of January 2021).
- DPW Natural Resources Manager
- Pest Control Project Manager
- Real Property Accountable Officer

The compiled interview logs are provided in **Appendix G**.

3.3 Site Reconnaissance

Site reconnaissance and visual surveys were conducted at the preliminary locations identified at USAG West Point during the records review process, the installation in-brief meeting, and/or during the installation personnel interviews. A photo log from the site reconnaissance is provided in **Appendix H**;

photos were used to assist in verification of qualitative data collected in the field. The site reconnaissance logs are provided in **Appendix I**.

Access to existing groundwater monitoring wells, if present, was also noted during the site reconnaissance in case the monitoring wells could be proposed for SI sampling.

Preliminary locations of potential use, storage, and/or disposal of PFAS-containing materials were then evaluated in the PA (during records review, personnel interviews, and/or site reconnaissance) and were categorized as AOPIs or as areas not retained for further investigation at this time. A summary of the observations made, and data collected through records reviews (**Appendix F**), installation personnel interviews (**Appendix G**), and site reconnaissance logs (**Appendix I**) during the PA process for USAG West Point is presented in **Section 4**. Further discussion regarding areas not retained for further investigation and AOPIs is presented in **Sections 5.1** and **5.2**, respectively.

4 POTENTIAL PFAS USE, STORAGE, AND/OR DISPOSAL AREAS

USAG West Point was evaluated for all potential current and historical use, storage, and/or disposal of PFAS-containing materials. There are a variety of PFAS-containing materials used in relation to current and historical Army operations. However, the use, storage, and/or disposal of AFFF is the most prevalent potential source of PFAS chemicals at DoD facilities. As such, this section is organized to summarize the AFFF-related uses first, and all remaining potential PFAS-containing materials in the subsequent section.

4.1 AFFF Use, Storage, and Disposal Areas

AFFF was developed in the mid-1960s in response to a need for firefighting foams better suited to extinguish Class B, fuel-based fires. AFFF formulations consist of water, an organic solvent, up to 5 percent (%) hydrocarbon surfactants, and 1 to 3% PFAS (Interstate Technology Regulatory Council 2020). AFFF concentrate is designed to be diluted with water to become a 1, 3, or 6% foam. AFFF releases at DoD facilities may have occurred during firefighter training, emergency response actions, equipment testing, or accidental releases. The military still primarily uses AFFF for Class B fires; however, the current formulations of AFFF contain significantly lower amounts of PFOS, PFOA, and their precursors, and significant operational changes have been implemented to restrict uncontrolled releases and non-essential use of PFAS-containing foams. Army installations may still house AFFF, commonly stored in closed containers (e.g., 55-gallon drums, 5-gallon buckets), within designated storage buildings or at firehouses.

Following document review prior to the site visit (**Appendix F**), AFFF storage was identified at USAG West Point related to USAG West Point Fire Department operations. Army-provided documents indicated AFFF is stored within seven 55-gallon drums as well as within three fire truck tanks (a 1995, 2001, and 2003 Pumper), holding 55-gallons of AFFF in each. Additionally, the PA team reviewed a list of AFFF fire responses provided by a retired USAG West Point fire department chief. The fire chief at the time of the PA site visit in September 2018, who had worked at USAG West Point since 1991, confirmed AFFF has historically been and is currently stored at USAG West Point for fire department operations and AFFF has been used for fire responses on-post.

Historically and currently, AFFF has been stored at Fire Station 1- Building 721, Fire Station 2- Building 1203, and Fire Station 1400 in 55-gallon drums, fire truck tanks, and/or 5-gallon pails. The PA team collected a copy of the safety data sheet for the AFFF stored at USAG West Point at the time of the site visit (**Appendix J**).

AFFF use at USAG West Point is restricted to use by the USAG West Point Fire Department for fire response, equipment testing, and/or personnel training, as further discussed in **Section 4.3**. There are no AFFF suppression systems at USAG West Point, nor have there been AFFF suppression systems historically according to the retired USAG West Point fire chiefs. The following areas were specifically evaluated for AFFF suppression systems/use, but do not have one: Building 604F Foam Generator House, Flammable material storehouses, Central power plant. Additionally, AFFF storage has been restricted to USAG West Point Fire Department use areas (i.e., fire stations, fire truck tanks).

There are four known fire stations at USAG West Point. A brief history and data gaps for each fire station are provided below. Each fire station at USAG West Point was identified as an AOPI; therefore, detailed site histories for each fire station AOPI are further described in **Section 5.2**.

- Fire Station 1- Building 721 was built in 1941 and is the oldest fire station located in the cantonment area. This is an active fire station that currently and historically stored AFFF within foam-capable fire trucks and in 5-gallon pails within the fire station bay. The fire chief at the time of the PA site visit reported accidental discharges of AFFF occurred at this fire station when the foam lever was pulled during other fire truck maintenance activities. Foam-capable trucks were also washed out on the front ramp of this fire station.
- Fire Station 2- Building 1203 was built in 2001 and is the second fire station located in the cantonment area. This is an active fire station that currently stores AFFF within foam-capable fire trucks only. Historically, AFFF had also been stored in 55-gallon drums at Fire Station 2- Building 1203 as well as within foam-capable fire trucks. The fire chief at the time of the PA site visit reported AFFF-switch outs from fire truck tanks into 55-gallon drums occurred at Fire Station 2- Building 1203. The fire chief also recalled an instance in 2011 when about 5 gallons of AFFF concentrate were spilled and drained to the sanitary drains during the switch out process. Lastly, the fire chief confirmed that AFFF-carrying foam-capable trucks have historically and are currently washed in the bay and outside on the front and rear ramps.
- Fire Station 1400 was constructed prior to the USAG West Point Fire Department use of the building in 2002. Fire Station 1400 is still an active station that is located in the ranges area of USAG West Point. The fire chief at the time of the PA site visit confirmed AFFF was stored at this fire station in 5-gallon buckets until 2017; the fire chief did not recall a specific use. Foam-capable trucks were stored inside of the fire station bays.
- The Old Camp Buckner Fire Station was constructed in the 1940s and was used seasonally by the USAG West Point Fire Department when Camp Buckner was active in the spring/summer months. It is located directly at Camp Buckner in the ranges area of USAG West Point. The Old Camp Buckner Fire Station is no longer active, and use of the fire station ceased in the mid/late-1990s. The fire chief at the time of the PA site visit noted this fire station likely had AFFF-containing trucks parked and washed outside on the asphalt driveway. However, he was unaware of any use, storage, or disposal of AFFF within the fire station. The fire chief noted the foam-capable trucks would have been stored outside of the fire station, and there are no drains within the fire station bays that lead to the proximal Camp Buckner WWTP.

There are no current firefighting training areas at USAG West Point, although the retired fire chief noted that firefighting training using AFFF historically occurred at the USMA-32 Burn Pit. The fire chief at the time of the PA site visit did not recollect any AFFF use at USMA-32 Burn Pit and the area has been regraded since its use. Specific information regarding AFFF use at USMA-32 Burn Pit is unknown; however, available site history is described in **Section 5.2**.

Several areas were identified as AOPIs due to AFFF use during fire responses. The retired USAG West Point fire chiefs noted the following areas at which AFFF was used as a fire-fighting measure or a preventative measure during emergency responses: Crow's Nest Bog, Army-Navy Bonfires, Dumpster Fire- Building 745, Oil Tank Fire, and MVA Delafield Road. Detailed site histories for each AFFF fire

response AOPI are described in **Section 5.2**. Several areas were also identified as areas where AFFF was potentially used during a fire response, however, following additional records review and personnel interviews (i.e., who were present during the fire responses), the PA team confirmed AFFF was not used during these fire responses: Cement truck rollover and S-211 Class Wildland Portable Pump Class.

For emergency preparedness, USAG West Point Fire Department personnel were trained to perform nozzle testing with AFFF to ensure optimal flow and use of the AFFF mixture. Nozzle testing involved spraying AFFF through fire department equipment such as a hose, which could spread to the environment if the mixture was not fully contained. AFFF use related to fire department personnel training at USAG West Point included arc training, which demonstrates how to maximize the arc, reach, and distance covered by AFFF in an emergency response. Equipment testing and/or personnel training operations occurred at the following areas that were also identified as AOPIs: North Dock 1, North Dock 2, Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, and Ordnance Road West. The detailed site histories for each AFFF equipment testing/personnel training AOPI and approximate volumes of AFFF used are further described in **Section 5.2**.

USAG West Point Fire Department activities off-post are noted in **Section 4.3**.

4.2 Other PFAS Use, Storage, and/or Disposal Areas

Following document research, personnel interviews, and site reconnaissance at USAG West Point, pesticide use areas, laundry facilities, vehicle maintenance areas, and WWTPs were also identified as preliminary locations for use, storage, and/or disposal of PFAS-containing materials. A summary of information gathered in the PA for each of these preliminary locations is described below. Specific discussion regarding areas not retained for further investigation and AOPIs are presented in **Section 5.1** and **Section 5.2**, respectively.

Pesticide Use Areas

PFOS containing insecticides (i.e., Sulfluramid in an ant bait) were identified during review of the USAG West Point pesticide use proposals (PUPs), starting in the 2005 PUP. The USAG West Point Natural Resources Manager and the Pest Control representative were interviewed during the PA site visit. Both personnel confirmed these specific insecticides are used on an as needed and sporadic basis (i.e., no widespread or repeated uses). Pesticide and insecticide uses and storage are performed by a vendor, who brings chemicals on-post only when needed. Pesticides and insecticides have not been stored at USAG West Point since 1995.

Laundry Facilities

A laundry and dry-cleaning facility at USAG West Point was identified during records review. Facility operations include sporadic waterproofing on a seldom basis on Honor Guard and some of the USMA Band uniforms. The PA technical team reviewed a chemical inventory from the facility, and noted the waterproofing product used (Par-RePel) contains PFOS. Correspondence with a representative from this facility indicated this product is minimally and infrequently used. Wastewater associated with this facility is directed to the Target Hill WWTP.

Vehicle Maintenance Areas

Both permanent and seasonal vehicle maintenance areas were identified at USAG West Point. The USAG TMP is a permanent vehicle maintenance area that services and maintains government owned or leased vehicles and equipment. Activities at the USAG TMP include indoor vehicle/equipment maintenance, vehicle painting, vehicle and equipment washing, outdoor vehicle fueling and vehicle storage.

Camp Natural Bridge is a seasonable vehicle maintenance facility which includes a large fueling area consisting of a 10,000-gallon diesel aboveground storage tank, and a 3,000-gallon gasoline aboveground storage tank. Maintenance and repair activities are performed on military tactical vehicles at this location.

WWTPs

Several WWTPs were identified at USAG West Point as locations where PFAS-containing materials were potentially disposed. As described in **Section 2.9.2**, there are three active WWTPs at USAG West Point: Target Hill WWTP, Camp Buckner WWTP, and Department of Logistics Motor Pool WWTP.

4.3 Readily Identifiable Off-Post PFAS Sources

An exhaustive search to identify all potential off-post PFAS sources (i.e., not related to operations at USAG West Point) is not part of the PA/SI. However, potential off-post PFAS sources within a 5-mile radius of the installation that were identified during the records search and site visit are described below.

The USAG West Point Fire Department has a mutual aid agreement with the City of Newburgh but has also responded to fires for the nearby communities in Rockland County and Highland Falls. During site visit interviews, the USAG West Point Fire Department did not note any fire responses where AFFF was used within a 5-mile radius of USAG West Point. The USAG West Point Fire Department stated that old AFFF was sent to the Orange County Fire Training Center in New Hampton, New York and AFFF training was conducted there. However, this training center is located more than 5 miles (i.e., approximately 29 miles) from USAG West Point and is unlikely to be an off-post PFAS source. Lastly, the USAG West Point Fire Department confirmed that AFFF was not used in a mutual aid fire response or group training activity on-post by any off-post fire department.

5 SUMMARY AND DISCUSSION OF PA RESULTS

The areas evaluated for potential use, storage and/or disposal of PFAS-containing materials at USAG West Point were further refined during the PA process and identified either as an area not retained for further investigation or as an AOPI. In accordance with the established process for the PA/SI, 15 have been identified as AOPIs. The process used for refining these areas is presented on **Figure 5-1**, below.

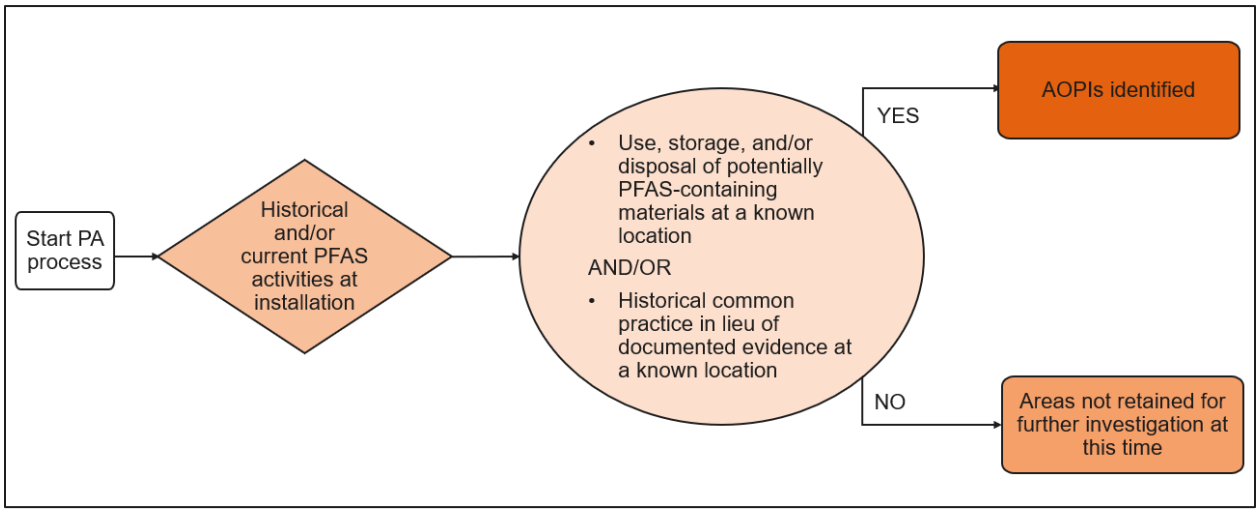

Figure 5-1: AOPI Decision Flowchart

The areas not retained for further investigation are presented in **Section 5.1**. The areas retained as AOPIs are presented in **Section 5.2**.

Data limitations for this PA/SI at USAG West Point are presented in **Section 8**.

5.1 Areas Not Retained for Further Investigation

Through the evaluation of information obtained during records review, personnel interviews, and/or site reconnaissance, the areas described below were categorized as areas not retained for further investigation at this time.

A brief site history and rationale for areas not retained for further investigation is presented in **Table 5-1**, below.

Table 5-1. Installation Areas Not Retained for Further Investigation

Area Description	Dates of Operation	Relevant Site History	Rationale
Building 604F Foam Generator House	1946 to 1970s	Building 604F Foam Generator House was built in 1946 and was decommissioned in the 1970s. The technical team concluded that AFFF was not generated here following review of building drawings provided by USAG West Point because the majority of the operations pre-date AFFF United States Military Standard (i.e., MILSPEC) and the process yielded what appeared to be a powder, not a foam. The building is currently used for general storage.	Building activity pre-dates the time period of interest for AFFF use. There is no suspected use, storage, or disposal of PFAS-containing materials.
Aircraft Maintenance Hangars (108, 109) at STAS	Facility built in 1942	USAG West Point currently owns two aircraft maintenance hangars at STAS, located approximately 15 miles north of USAG West Point. Identified for potential use of AFFF-based fire suppression systems.	It was confirmed during site visit interviews with current and retired USAG West Point Fire Department personnel that the STAS hangars do not currently and have not historically used any AFFF-based fire suppression systems. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
Fire Station 664	Unknown	Identified in the USAG West Point current assets as a Fire Station Facility.	It was confirmed during site visit interviews that Building 664 is an administration building. There is no record of this building or area ever being utilized as a fire station at USAG West Point. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
Cement Truck Rollover	After 1991	Initially identified by the retired USAG West Point fire chief as a potential location of historical AFFF usage.	The USAG West Point fire chief (current chief at the time of the PA site visit), who was present for the Cement Truck Rollover fire response, confirmed during PA site visit interviews that AFFF was not used to extinguish this fire. Following additional records review, interviews, and site reconnaissance, the PA team concluded, there is no suspected use, storage, or disposal of

Area Description	Dates of Operation	Relevant Site History	Rationale
			PFAS-containing materials at this location.
S-211 Class Wildland Portable Pump Class	Unknown	Initially identified by the retired USAG West Point fire chief as a potential location of historical AFFF usage.	The USAG West Point fire chief (current chief at the time of the PA site visit), confirmed during PA site visit interviews that a Class A foam (i.e., not AFFF) would have been used during this event based on common practice by the USAG West Point Fire Department. Following additional records review, interviews, and site reconnaissance, the PA team concluded there is no suspected use, storage, or disposal of PFAS-containing materials at this location.
Pesticide use areas	After 2005 (PUPs for USAG West Point could not be obtained prior to the 2005 PUP)	PFOS-containing insecticides were identified during review of the USAG West Point PUPs prior to the site visit, starting in the 2005 PUP.	Following interviews with both the USAG West Point Natural Resources Manager and the Pest Control representative, it was confirmed that these specific insecticides are used on an as needed basis. The Pest Control representative has not treated for these target pests since he has worked at USAG West Point (4 years). The use of these insecticides in the past has also been sporadic. In addition, since 1995, the pesticide program switched to contractor based, and no storage or mixing of pesticides occurs on-post. Could not confirm widespread and consistent use of the PFOS containing insecticide. Therefore, there is no suspected widespread use, storage, or disposal of PFAS-containing materials.
Building 851 – Flammable Material Storehouse	Unknown	Identified in the USAG West Point current assets as a flammable material storehouse. A fire suppression system could exist for this facility.	It was confirmed during site visit interviews that USAG West Point does not have any AFFF-based fire suppression systems. Therefore, there is no suspected

Area Description	Dates of Operation	Relevant Site History	Rationale
			use, storage, or disposal of PFAS-containing materials.
Building 106 – Flammable Material Storehouse	Unknown	Identified in the USAG West Point current assets as a flammable material storehouse. A fire suppression system could exist for this facility.	It was confirmed during site visit interviews that USAG West Point does not have any AFFF-based fire suppression systems. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
Central Power Plant	Plant began operations in the early 1900s	Power plant that includes two 30,000-gallon fuel oil aboveground storage tanks and a 5,000-gallon diesel aboveground storage tank. Identified for potential use of AFFF-based fire suppression systems.	It was confirmed during site visit interviews that USAG West Point does not have any AFFF-based fire suppression systems. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
USAG West Point Laundry and Dry-Cleaning Facility	Unknown	Laundry and dry-cleaning facility located within USAG West Point. Performs waterproofing seldomly on Honor Guard and some of the USMA Band uniforms. The waterproofing product used at this facility (Par-RePel) was found to contain PFOS following technical review.	Correspondence with a representative from this facility indicated that this product is minimally and infrequently used. Wastewater associated with this facility goes to the Target Hill WWTP. Therefore, there is no suspected widespread use, storage, or disposal of PFAS-containing materials.
USAG TMP	Active since 2010	Vehicle maintenance facility that services and maintains government owned or leased vehicles and equipment. Activities include indoor vehicle/equipment maintenance, vehicle painting, vehicle and equipment washing, outdoor vehicle fueling and vehicle storage.	Upon technical review of the TMP chemical inventory provided by USAG West Point, the only PFAS-containing product identified was a Teflon tape, which is not likely to be a PFOS, PFOA, or PFBS source of release. In addition, USAG West Point Fire Department firetrucks are not serviced or washed here. Therefore, there is no suspected widespread use, storage, or disposal of PFAS-containing materials.
Department of Logistics Motor Pool WWTP	Unknown	Associated with the USAG TMP is the TMP WWTP which discharges into Mine Lake, a surface water body used to supply potable water for West Point. Mine Lake discharges into Stilwell	The USAG TMP is not suspected to be a source of PFAS-containing material use; therefore, the TMP WWTP is not

Area Description	Dates of Operation	Relevant Site History	Rationale
		Lake, where the intake for the TMP WTP is located.	suspected to be a PFOS, PFOA, or PFBS source.
Camp Natural Bridge	Unknown	Vehicle maintenance facility that is seasonally operated. Includes a large fueling area consisting of a 10,000-gallon diesel aboveground storage tank, and a 3,000-gallon gasoline aboveground storage tank. Maintenance and repair activities to military tactical vehicles.	It was confirmed during site visit interviews that USAG West Point does not have any AFFF-based fire suppression systems. Vehicle maintenance operations are seasonal and minor, mostly consisting of oil changes and small engine repairs. A chemical inventory was not available for review. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
Camp Buckner WWTP	After 1942 to present, seasonally operated	Seasonal plant that serves only Camp Natural Bridge and Camp Buckner during cadet training in the summer months. Identified as a potential secondary source, however, did not note any PFAS-containing materials going to the Camp Buckner WWTP. Additionally, during PA site reconnaissance at the Former Camp Buckner Fire Station, the fire chief noted that the sanitary drains at the fire station do not go to the Camp Buckner WWTP and was able to confirm this by looking at the sanitary system maps at Camp Buckner.	Following records review, personnel interviews, and site reconnaissance visits, was unable to confirm PFAS-containing materials use, storage, or disposal related to either Camp Natural Bridge or Camp Buckner facilities. Additionally, the Former Camp Buckner Fire Station does not have any internal drains that lead to the Camp Buckner WWTP. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.
Crow's Nest Trail	1999	Initially identified during the USAG West Point site visit as an area of AFFF use related to fire response. The fire chief at the PA site visit was unsure whether AFFF was used on the trail, but later confirmed with the retired fire chief that AFFF was used at Crow's Nest Bog, not Crow's Nest Trail for the fire response.	The retired fire chief confirmed that AFFF was not used at Crow's Nest Trail as part of the fire response in 1999. Therefore, there is no suspected use, storage, or disposal of PFAS-containing materials.

5.2 AOPIs

Overviews for each AOPI identified during the PA process are presented in this section. One of the AOPIs, Crow's Nest Bog, overlaps with a USAG West Point IRP site identified in Headquarters Army Environmental System (HQAES). The AOPI, overlapping IRP site identifier, HQAES number, and current

site status are discussed within the Crow's Nest Bog AOPI subsection below. At the time of the PA, none of the USAG West Point IRP sites had historically been investigated for the possible presence of PFAS.

The AOPI locations are shown on **Figure 5-2**. Aerial photographs of each AOPI that also show the approximate extent of AFFF use (if applicable) are presented on **Figures 5-3** through **5-15**.

5.2.1 Fire Station 2- Building 1203 and Additional AFFF Spray Area

Fire Station 2- Building 1203 is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to documented uses of AFFF related to fire department operations. Fire Station 2- Building 1203 was built in 2001, is the largest fire house, and is still an active fire station at USAG West Point. During PA site visit interviews and site reconnaissance visits, the fire chief stated AFFF switch out and accidental AFFF disposal during batch mixing from fire truck tanks have occurred at this fire station. Specifically, the fire chief recalled replacing foam in a fire truck tank in the 2000s, from which old AFFF had been removed and placed into a 55-gallon drum. The 55-gallon drum was sent off-post and the fire chief rinsed the fire truck tank with a garden hose within the Fire Station 2 bay, resulting in about 5 gallons of AFFF rinsate washed down the internal drains. Washing and storage of AFFF-containing fire trucks also occurred here in the front and rear driveways. There is also a sanitary drain in the rear driveway where washing of AFFF-carrying fire trucks occurred. Both the outside drain in the rear pavement lot and internal drains lead to an oil water separator prior to being pumped via lift station to the Target Hill WWTP. Additionally, following the PA site visit, the fire chief noted AFFF was used during equipment testing (nozzle testing) in the 1990s and early 2000s. AFFF concentrate was mixed with water to create a specific mixture fraction and was then discharged through a hose to surrounding paved areas in the rear parking lots at Fire Station 2- Building 1203. The volume of AFFF used during these operations is unknown. Surface water runoff from AFFF uses to the pavement would flow towards the Stony Lonesome Brook, which merges with Highland Brook prior to flowing off-post and discharging into the Hudson River. Groundwater flow from the AOPI likely discharges to the Stony Lonesome Brook and other surface water bodies and/or flows off post to the southeast prior to discharging into the Hudson River.

The Fire Station 2- Building 1203 and Additional AFFF Spray Area AOPI is located on Main Post and is an active fire station (industrial use). Fire Station 2 – Building 1203 consists of a stone building used for office/living space for USAG West Point Fire Department personnel as well as two bays for firetruck and firefighting materials storage. There are both front and rear paved surfaces for fire truck and vehicle parking. The Additional AFFF Spray Area consists of a paved roadway and parking lot areas directly north of Fire Station 2- Building 1203. The AOPI is also surrounded by Stony Lonesome Brook to the West, wooded areas to the north, and other industrial buildings to the northeast/east (**Figure 5-3**).

5.2.2 Ordnance Road East

Ordnance Road East is identified as an AOPI following personnel interviews due to documented uses of AFFF related to fire department operations. Following the PA site visit, the fire chief noted that AFFF was used in this area during equipment testing (i.e., nozzle testing) a few times in the 1990s and early 2000s. AFFF concentrate was mixed with water to create a specific mixture fraction and was then discharged through a hose to the wooded area. The fire chief estimated that at least 100 gallons of AFFF were used in this area during equipment testing operations over time. Surface water runoff from AFFF uses at Ordnance Road East would flow towards a swampy area to the west of the AOPI prior to flowing into

small streams/swamps and eventually the beginning of the Stony Lonesome Brook. The Stony Lonesome Brook merges with Highland Brook prior to flowing off-post and discharging into the Hudson River. Groundwater flow from the AOPI likely discharges to the Stony Lonesome Brook and other surface water bodies and/or flows off post to the southeast prior to discharging into the Hudson River.

Ordnance Road East is located on Main Post and consists of a wooded area to the north of Ordnance Road. A marshy area lies to the west of the area, more wooded area to the south and east, and light industrial buildings to the north. (**Figure 5-4**).

5.2.3 Ordnance Road West

Ordnance Road West is identified as an AOPI following personnel interviews due to documented uses of AFFF related to fire department operations. Following the PA site visit, the fire chief noted AFFF was used in this area during equipment testing (i.e., nozzle testing) a few times in the 1990s and early 2000s. AFFF concentrate was mixed with water to create a specific mixture fraction and was then discharged through a hose to the wooded area. The fire chief estimated that at least 100 gallons of AFFF were used in this area during equipment testing operations over time. Surface water runoff from AFFF uses at Ordnance Road West would flow towards a swampy area to the east and/or south of the AOPI prior to flowing into small streams/swamps and eventually the beginning of the Stony Lonesome Brook. The Stony Lonesome Brook merges with Highland Brook prior to flowing off-post and discharging into the Hudson River. Groundwater flow from the AOPI likely discharges to the Stony Lonesome Brook and other surface water bodies and/or flows off post to the southeast prior to discharging into the Hudson River.

Ordnance Road West is located on Main Post and consists of a wooded area to the north of Ordnance Road. A marshy area lies to the east of the area, and more wooded area to the north, south, and west. (**Figure 5-4**).

5.2.4 USMA-32 Burn Pit

The USMA-32 Burn Pit is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to documented uses of AFFF related to fire department operations. The AOPI was initially identified in document research that indicated firefighting training was historically conducted here (prior to 1991) within a burn pit. The fire chief interviewed during the PA site visit started with the USAG West Point Fire Department in 1991 and noted AFFF has not been used for firefighting training within this area during his time at USAG West Point. However, following review of historical photos provided by the retired fire chief and document research, AFFF was likely used within the burn pit during firefighting training activities, similar to typical AFFF use practices in training burn pits prior to the 1990s at other installations. In addition, AFFF impacted soils from the Army-Navy bonfire activities noted below were stockpiled here, as the AOPI historically was used as a clean fill storage site. It was noted that the historical burn pit is currently under about 45 feet of fill and has been regraded since the fire chief had been to the AOPI last; therefore, the exact location is unknown. The volume of AFFF historically used at this AOPI is unknown. Groundwater flow from the AOPI likely discharges to Long Pond and other surface water bodies and/or flows off post to the southeast prior to discharging into the Hudson River. Long Pond is a surface water body that supplies potable water to USAG West Point via a 20-inch line to the Stony Lonesome WTP. Long Pond flows into Long Pond Brook before joining Popolopen Brook before eventually discharging into the Hudson River.

The USMA-32 Burn Pit is located within the ranges area of the WPMR. The AOPI consists of a cleared area surrounded by industrial operations. Route 293 is located to the north of the AOPI, additional industrial operations and storage to the east, wooded areas and ranges to the south, and wooded areas and Long Pond to the west (**Figure 5-5**).

5.2.5 Crow's Nest Bog (WSTPT-023-R-01, 36993.1025)

The Crow's Nest Bog (WSTPT-023-R-01, HQAES site 36993.1025) is identified as an AOPI following personnel interviews due to one documented use of AFFF related to fire department operations. Following the PA site visit, the fire chief noted AFFF was used directly in the bog as a preventative measure during the 1999 fires on Crow's Nest Mountain. The volume of AFFF used as part of this fire response is unknown. The AOPI lies within a topographical divide and it is likely that groundwater and surface water flow in multiple directions. Groundwater flow from the AOPI likely discharges to an unnamed tributary to the Hudson River, flows off post to the east prior to discharging into the Hudson River, or flows to the north/northwest off-post.

The Crow's Nest Bog is a marshy/bog area that is located in the northern boundary of the installation. Crow's Nest Bog lies to the east of U.S. Highway 9W and is surrounded by wooded/mountainous areas to the north, east, and south (**Figure 5-6**).

The Crow's Nest Bog AOPI lies entirely within the Crow's Nest Impact Area IRP site (WSTPT-023-R-01) and HQAES site (36993.1025). The Crow's Nest Impact Area was used as the installation's main impact area for munitions training until the 1930s and the site constituents of concern include munitions and explosives of concern and munitions constituents. A remedial investigation (RI) (i.e., non-PFAS) for the Crow's Nest Impact Area was completed in 2016 and a feasibility study (i.e., non-PFAS) is underway (Army 2017).

5.2.6 Dumpster Fire- Building 745

The Dumpster Fire- Building 745 is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to a documented use of AFFF related to fire department operations. The retired fire chiefs stated AFFF was used in 2012 to extinguish a fire that occurred within a dumpster in the vicinity of Building 745. The fire was caused by hot charcoal being placed in the dumpster and subsequently cardboard within the dumpster catching on fire. The fire chief at the time of the PA site visit noted a maximum of 55-gallons of AFFF was used to extinguish the fire. Currently and at the time of the AFFF use in this area, the surrounding area was paved (**Figure 5-7**). However, the paved asphalt surrounding the AOPI may have been redone or altered since the AFFF use in 2012 due to nearby construction work. Surface water runoff from AFFF uses to the pavement would flow towards the stormwater collection drains, which eventually discharge to the Hudson River.

The Dumpster Fire- Building 745 AOPI is located within Main Post and is a paved area and roadway. The AOPI is surrounded by buildings to the north and south, and other paved areas and roadways to the east and west (**Figure 5-7**).

5.2.7 Fire Station 1- Building 721

The Fire Station 1- Building 721 is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to documented uses of AFFF related to fire department operations. Fire Station 1- Building 721 was built in 1941 and still is an active fire station utilized by USAG West Point Fire Department. The fire chief at the time of the PA site visit stated accidental disposal during batch mixing of AFFF from the fire truck tanks were probably common at this fire station. The fire chief estimated that 55-gallons of AFFF have been disposed throughout the lifetime at Fire Station 1- Building 721 from the fire truck tanks. Additionally, AFFF- carrying trucks were washed and stored on the front pavement and within the bays of Fire Station 1- Building 721. Surface water runoff from AFFF uses to the pavement would flow towards the stormwater collection drains, which eventually discharge to the Hudson River.

The Fire Station 1- Building 721 AOPI is located within Main Post and is an active fire station (industrial use). The AOPI consists of a brick building used for office/living space for USAG West Point Fire Department personnel as well as four bays for firetruck and firefighting materials storage. There is a front paved surface for firetruck and vehicle parking. Fire Station 1- Building 721 is surrounded by a wooded area/vegetation and buildings to the west, a roadway to the north and east, and a wooded area/vegetation and parking lots to the south (**Figure 5-8**).

5.2.8 Army-Navy Bonfires

The Army-Navy Bonfires is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to documented uses of AFFF related to fire department operations. The AOPI was identified by the retired fire chiefs as an area of repeated AFFF uses. From 2001 to 2011 following the annual Army-Navy Bonfire, the USAG West Point Fire Department used AFFF to extinguish the bonfire. The fire chief at the time of the PA site visit estimated 30 gallons of AFFF were used per event, for a total of 300 gallons over the course of 10 years. The USAG West Point DPW reportedly gathered soils following the bonfire and placed the affected soil/debris into the USMA-32 after each event. Groundwater flow from the AOPI likely discharges to the Hudson River to the north and/or east.

The Army-Navy Bonfires AOPI is located within Main Post and is located on athletic fields (recreational use). The AOPI consists of a grassy field area and is surrounded by other grassy/recreational fields to the south, roadways to the west and north, and a paved parking lot to the east (**Figure 5-9**).

5.2.9 MVA Delafield Road

The MVA Delafield Road is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to a documented use of AFFF related to fire department activities. The USAG West Point Fire Department responded to a MVA at the intersection of Delafield Road and Merritt Road in the 1990s with AFFF as a preventative measure to prevent fires from the crash. The fire chief at the time of the PA site visit noted AFFF was sprayed along the rock outcrop at the end of Delafield Road, where the vehicle went off the road. The volume of AFFF used as part of this fire response is unknown. Surface water runoff from AFFF uses to the pavement would flow towards the stormwater collection drains, which eventually discharge to the Hudson River.

The MVA Delafield Road AOPI is located within Main Post at the intersection of Delafield Road and Merritt Road (industrial/commercial use). The AOPI consists of a rocky area where AFFF was sprayed

and the surrounding pavement. The AOPI is bounded by wooded and hilly areas to the south and east, and paved roads to the north and west (**Figure 5-10**).

5.2.10 North Dock 1

The North Dock 1 is identified as an AOPI following personnel interviews and site reconnaissance due to documented used of AFFF related to fire department activities. The fire chief at the time of the PA site visit stated in the 1990s, there were a few accidental discharges of AFFF in this area during batch mixing. New pavement was placed surrounding the area since the last use, but the area was also paved at the time of use. Therefore, surface water runoff from AFFF uses to the pavement would flow towards the Hudson River. There is currently a strip of soil separating the walkway and sea wall rocks, with a downgradient slope towards Hudson River.

The North Dock 1 AOPI is located within Main Post and is located immediately adjacent to the Hudson River proximal to the helipad (industrial/commercial use). The AOPI consists of a paved and gravel area and is surrounded by the Hudson River to the north and west, and a paved parking lot to the east and south (**Figure 5-11**).

5.2.11 North Dock 2

The North Dock 2 is identified as an AOPI following personnel interviews and site reconnaissance due to documented uses of AFFF related to fire department activities. The fire chief at the time of the PA stated in the 1990s, the USAG West Point Fire Department used AFFF for personnel training purposes when a new fire department member was learning how to mix and spray AFFF from the truck tanks. The fire chief noted AFFF was used in this area on a less frequent basis than the proximal North Dock 1 area and estimated that 100 gallons of AFFF were used between this area and North Dock 1 over time. Groundwater flow from the AOPI likely discharges to the Hudson River to the north and/or west.

The North Dock 2 AOPI is located within Main Post and is located adjacent to North Dock 1 (industrial/commercial use). The AOPI consists of a grassy hill area and is surrounded by paved roadways and/or parking lots to the north, east, and west, as well as additional grassy areas to the south (**Figure 5-11**).

5.2.12 Oil Tank Fire

The Oil Tank Fire is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to documented uses of AFFF related to fire department operations. The retired fire chiefs noted this area as a historical AFFF use related to a fire response. The fire occurred during oil tank replacement due to heat/sparks generated. The USAG West Point Fire Department deployed a maximum of 55 gallons of AFFF within the AOPI in response to the fire. The area is paved; however, the PA team could not enter the bermed area during site reconnaissance due to access issues. It is possible that AFFF could have leaked through cracks in the concrete if present. Groundwater flow from the AOPI likely discharges to the Hudson River to the east.

The Oil Tank Fire AOPI is located within Main Post along the eastern USAG West Point boundary. The AOPI consists of a former oil tank storage area (industrial/commercial) that is located within a bermed area/platform. Access to the AOPI is restricted to two sets of staircases on the northern and southern

ends of the area. The AOPI is surrounded by buildings to the west and north, a roadway and the Hudson River to the east, and a parking area to the south (**Figure 5-12**).

5.2.13 Fire Station 1400

Fire Station 1400 is identified as an AOPI following records research, personnel interviews, and site reconnaissance due to potential uses of AFFF related to fire department operations. Fire Station 1400 is an active fire station at USAG West Point, located on the WPMR near range control. The fire chief at the time of the PA stated the USAG West Point Fire Department began occupying this building and added a bay extension in 2002. AFFF has historically been stored here in 5-gallon pails as well as within foam containing fire trucks within the bay, with the most recent AFFF storage dating back to 2017. AFFF-containing trucks were kept within the building bays. The fire chief was uncertain what collection system the center drain connects to and did not recall any sediment cleanouts in the underlying infrastructure. The fire chief at the time of the PA had been present since the start of use of this fire station and did not recall any equipment testing, personnel training, or known AFFF spills at this location; however, due to the storage of AFFF and AFFF-carrying trucks, AFFF disposal is possible during tank filling or truck washing activities. Groundwater from this AOPI likely follows topography and flows southeast prior to discharging to surface water bodies (i.e., Long Pond) in the vicinity.

The Fire Station 1400 AOPI is located within the WPMR. The AOPI consists of an active fire station (industrial use). There is a paved driveway in front of Fire Station 1400 where fire trucks are stored and where vehicles are parked. The AOPI is surrounded by grassy and wooded areas to the north and east, as well as grassy areas, roadways and/or parking lots to the south and west (**Figure 5-13**).

5.2.14 Old Camp Buckner Fire Station

The Old Camp Buckner Fire Station is identified as an AOPI following personnel interviews and site reconnaissance due to potential uses of AFFF related to fire department operations. The fire chief at the time of the PA site visit stated the Old Camp Buckner Fire Station was seasonally used in the summer months as part of Camp Buckner operations up until approximately 1998. Camp Buckner is used as cadet training grounds for approximately six weeks in the summer months. The fire chief did not recall any AFFF storage here, as the building was used seasonally, but noted that AFFF-containing trucks were likely parked and washed here outside on the asphalt driveway. The fire chief noted in the PA site visit interview there is no connection between the Camp Buckner WWTP and the Old Camp Bucker Fire Station since there are no sanitary floor drains. The fire chief added that any runoff from truck parking and washing activities was observed to flow directly into a nearby stream that eventually empties into Mine Lake. The fire chief at the time of the PA started at USAG West Point in 1991, therefore there is uncertainty regarding AFFF-related operations at this fire station from the 1970s to 1991. Both surface water runoff from AFFF uses and shallow groundwater likely discharge to a tributary to Mine Lake, which flows to Stillwell Lake.

The Old Camp Buckner Fire Station AOPI is located within the WPMR. The AOPI consists of historical fire station (industrial use) and the surrounding pavement where trucks may have been parked. The AOPI is surrounded by a roadway to the north, a grassy and parking area to the west, a grassy area and building to the south, and wooded area to the east (**Figure 5-14**). The Camp Buckner WWTP is located further south of the AOPI.

5.2.15 Target Hill WWTP

The Target Hill WWTP receives and treats sanitary sewage generated at the USAG West Point (at least 1990 to present) and operates under a New York State Pollutant Discharge Elimination System Permit. The Target Hill WWTP is identified as an AOPI following personnel interviews and site reconnaissance due to known disposal of AFFF related to fire department operations. As described in **Section 5.2.1**., the fire chief at the time of the PA recalled replacing foam in a fire truck tank in the 2000s at Fire Station 2 – Building 1203. Fire department staff removed old AFFF from the fire truck tank into a 55-gallon drum, which was then sent off-post for turn in/disposal, and the fire chief rinsed the fire truck tank with a garden hose within the Fire Station 2 – Building 1203 bay. This practice resulted in about 5 gallons of AFFF rinsate being washed down the internal bay drains. Washing and storage of AFFF-containing fire trucks also occurred at Fire Station 2 – Building 1203 in the front and rear driveways. There is a sanitary drain in the rear driveway where washing of AFFF-carrying fire trucks occurred. Both the outside drains in the rear pavement lot and internal drains lead to an oil water separator prior to being pumped via lift station to the Target Hill WWTP. The Target Hill WWTP is the primary receiver of all sanitary waste at USAG West Point, and therefore also likely received AFFF rinsate from Fire Station 2 – Building 1203. The Target Hill WWTP also receives sludge from the other two WWTPs on-post and landfill leachate. Effluent waters are discharged to the Hudson River and sludge from the Target Hill WWTP is sent off-post to We Care Organics Rockland County Composting Facility for disposal.

The Target Hill WWTP is located within Main Post and consists of an active WWTP (industrial use). The AOPI is surrounded by athletic fields to the north and south, the Hudson River to the east, and wooded vegetation to the west (**Figure 5-15**). Both surface water and groundwater flows at the AOPI are to the east, discharging to the Hudson River.

6 SUMMARY OF SI ACTIVITIES

Based on the results of the PA at USAG West Point, an SI for PFOS, PFOA, and PFBS was conducted in accordance with CERCLA. SI sampling was completed at USAG West Point at 14 out of the 15 AOPIs (i.e., all AOPIs except the Target Hill WWTP) to evaluate presence or absence of PFOS, PFOA and PFBS in comparison with the OSD risk screening levels. Rationale for not performing SI sampling at the Target Hill WWTP is provided in **Section 6.2**. As such, an installation-specific QAPP Addendum (Arcadis 2020a) was developed to supplement the general information provided in the PQAPP (Arcadis 2019) and to detail the site-specific proposed scopes of work for the SI. A preliminary CSM was prepared for each of the installation's AOPIs in accordance with the USACE Engineer Manual on Conceptual Site Models, EM 200-1-12 (USACE 2012). The preliminary CSMs identified potential human receptors and chemical exposure pathways based on current and/or reasonably anticipated future land uses. The preliminary CSMs identified soil, groundwater, surface water, and sediment pathways as potentially complete, which guided the SI sampling. The QAPP Addendum details the sampling design and rationale based on each AOPI's preliminary CSM. The SI scope of work was completed in July through August 2020 through the collection of field data and analytical samples.

The SI field work was completed in accordance with the standard operating procedures (SOPs), technical guidance instructions (TGIs), sampling design, and QA/QC requirements as detailed in the QAPP Addendum (Arcadis 2020a) and PQAPP (Arcadis 2019). The subsections below summarize the DQOs, sampling design and rationale, sampling activities and methods, and data analyses procedures for the SI phase at USAG West Point. Non-conformances to the prescribed procedures in the PQAPP and QAPP Addendum are described in **Section 6.3.3**. Analytical results obtained through SI field activities are summarized in **Section 7**.

6.1 Data Quality Objectives

As identified during the DQO process and outlined in the site-specific QAPP Addendum (Arcadis 2020a), the objective of the SI is to identify whether there has been a release to the environment at the AOPIs identified in the PA and to determine if further investigation is warranted. This SI evaluated groundwater, soil, surface water, and sediment for PFOS, PFOA, and PFBS presence or absence at each of the sampled AOPIs.

6.2 Sampling Design and Rationale

The rationale for sampling at each AOPI is illustrated on **Figure 6-1** below.

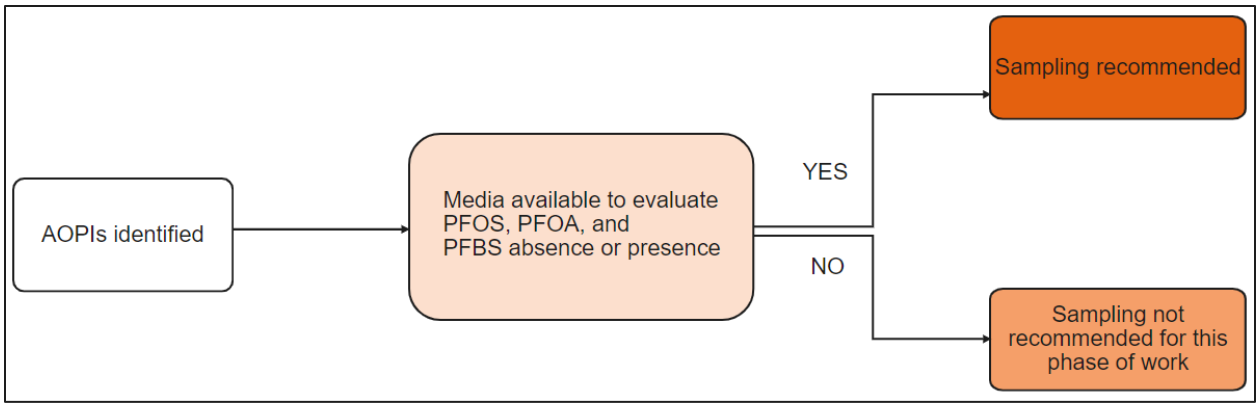

Figure 6-1: AOPI Sampling Decision Tree

The sampling design for SI sampling activities at USAG West Point is detailed in Worksheet #17 of the QAPP Addendum (Arcadis 2020a). A brief summary of the sampling design is provided below.
The areas of focus for this SI include 14 out of the 15 AOPIs identified during the PA (i.e., all AOPIs besides the Target Hill WWTP) and included a combination of surface soil sampling, groundwater sampling following monitoring well installation/air rotary drilling, surface water sampling, and sediment sampling. The Target Hill WWTP was not sampled during the SI due to the following reasons: a lack of media to sample (i.e., WWTP sludges are sent off-post for disposal and effluent water is discharged off-post to a large, tidally-influenced water body [i.e., the Hudson River]), the Target Hill WWTP does not have any history of releases to the environment (i.e., not an Installation Restoration Program site) and is monitored as an active WWTP, and the source AOPI (Fire Station 2 – Building 1203 and Additional AFFF Spray Area) which discharged AFFF to Target Hill WWTP did not have any OSD risk screening level exceedances. Therefore, OSD risk screening level exceedances at the receiving AOPI (Target Hill WWTP) are not anticipated. PFOS, PFOA, and PFBS sampling at Target Hill WWTP may be pursued in the future if warranted or required.

For each of the 14 sampled AOPIs, samples were collected at locations of known or suspected use, storage, and/or disposal of PFAS-containing materials, locations of surface water runoff collection, and downgradient locations if exact use, storage, or disposal location is unknown. Sample locations were chosen based on site-specific historical evidence, suspected groundwater flow conditions, as well as surface runoff/surface conditions observed in the field at each sampled AOPI. Sample media types (e.g., surface soil, groundwater, surface water, sediment) collected for each sampled AOPI were based on media most likely to confirm the presence or absence of PFOS, PFOA, and PFBS directly related to the AOPI.

Approximate sampling depths, and constituents analyzed for each sampling location and medium are included in **Table 6-1**.

6.3 Sampling Methods and Procedures

Environmental data were collected and analyzed in accordance with the PQAPP (Arcadis 2019), the SOPs and TGIs included as Appendix A to the PQAPP, the QA/QC requirements identified in Worksheet #20 of the PQAPP, the approved scope and sampling methods outlined in the site-specific QAPP

Addendum (Arcadis 2020a), and the safety procedures specified in the Accident Prevention Plan (Arcadis 2018) and SSHP (Arcadis 2020b). The sampling methods described in the SOPs and TGIs establish equipment requirements, procedures for preparing equipment and containers before sampling, sampling procedures under various conditions, and procedures for storing samples to ensure that sample contamination does not occur during collection, and transport. In general, sampling techniques used in the SI were consistent with conventional sampling techniques used in the environmental industry, but special considerations were made regarding PFAS-containing materials and equipment and cross-contamination potential.

The sampling methods employed during the SI are detailed in the PQAPP (Arcadis 2019) and QAPP Addendum (Arcadis 2020a). The subsections below provide a summary of the field methods and procedures utilized to complete the SI scope of work. Field notes and field forms (i.e., soil boring logs, groundwater purging logs, equipment calibration forms, tailgate health and safety forms, and sample collection logs) documenting the SI sampling activities are included in **Appendices K** and **L**, respectively. Photographs of the sampling activities are included in **Appendix M**.

6.3.1 Field Methods

Groundwater samples were collected at 13 of the 14 AOPIs sampled during the SI following the installation of 14 monitoring wells via air rotary drilling. Monitoring well screens were installed once first groundwater was encountered, and new monitoring wells were screened in the overburden (seven wells), overburden/bedrock (one well) and bedrock (six wells) lithologic units. Well construction details and design (e.g., screen length and slot size, depth, filter pack material) are included in **Appendix L**. The shallowest new monitoring well has a total depth of 10 feet bgs and is located at the USMA-32 Burn Pit AOPI. The deepest new monitoring well has a total depth of 74 feet bgs and is also located at the USMA-32 Burn Pit. At each new monitoring well, groundwater samples were collected from approximately the center of the saturated screened interval. New monitoring wells were developed using a monsoon pump. Following well development, new monitoring wells were purged using low-flow purging methods with a peristaltic pump/high-density polyethylene (HDPE) tubing or an HDPE bailer. Field parameters (e.g., temperature, pH, specific conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential) were measured during purging and allowed to stabilize prior to sampling to ensure a representative sample was collected. Coordinates for the top of casing at each new groundwater monitoring well were surveyed by a New York State licensed surveyor. Most monitoring wells were completed above grade with a 2-foot by 2-foot concrete pad, metal protective covering, and four concrete bollards. Additional details describing deviations from the planned field methods for monitoring well installation and groundwater sampling are described in **Section 6.3.3**.

Surface soil samples were collected at a total of nine discrete points using a stainless-steel hand auger. At each surface soil sampling point, a composite soil sample was collected within the 0.5 to 2 feet bgs interval. Coordinates for each soil sampling location were recorded using a handheld global positioning system.

A total of seven surface water samples were collected using direct-fill methods just below the water surface. Surface water samples were co-located with select sediment sampling locations. Surface water samples were collected prior to sediment sample collection to reduce siltation. Field parameters (e.g.,

temperature, pH, specific conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential) were measured at the time during surface water sampling.

A total of 11 sediment samples were collected during the USAG West Point SI. Sediment samples were collected from the upper 10 centimeters using a decontaminated Lexan tube and stainless-steel trowel; sediment samples were decanted before bottling for laboratory analysis.

Decontamination procedures for non-dedicated equipment used during sampling are described in **Section 6.3.4**.

6.3.2 Quality Assurance/Quality Control

Worksheets #20 of the PQAPP and QAPP Addendum provide QA/QC and blank sample requirements for field duplicates, matrix spike/matrix spike duplicates, equipment blanks (EBs), source blanks (SBs) for water used in the initial decontamination step, and field blanks (FBs) for laboratory-supplied water used in the final decontamination step.

QA/QC samples were collected at the frequencies specified in the QAPP Addendum (Arcadis 2020a), typically at a rate of 1 per 20 parent samples. Field duplicates and matrix spike/matrix spike duplicate samples were collected for media sampled for PFOS, PFOA, and PFBS only.

EBs were collected for media sampled for PFOS, PFOA, and PFBS at a frequency of one per piece of relevant equipment for each sampling event, as specified in the QAPP Addendum (Arcadis 2020a). The decontaminated reusable equipment from which EBs were collected include the water-level meter, tubing weight, drill bit, stainless steel scoop, stainless steel hand auger, and an HDPE bailer, as applicable to the sampled media. SBs were collected from the water used to pressure-wash drill tooling and from the water supplied by Eurofins Lancaster Laboratories Environmental to perform the initial rinses of reusable equipment. FBs were collected directly from laboratory-provided water. Analytical results for blank samples are discussed in **Section 7.16**.

6.3.3 Field Change Reports

No instances of major scope modifications (i.e., those that may have had a significant impact on the project scope and/or data usability/quality, or required stop-work, and warranted discussion with USACE) were encountered during the USAG West Point SI work.

Minor modifications from the procedures and scope of work detailed in the QAPP Addendum and PQAPP and that did not affect DQOs are documented in Field Change Reports (FCRs) included as **Appendix N** and are summarized below:

- FCR-USAGWP-01: The following drain sediment samples were not collected during the USAG West Point SI field work as listed in the QAPP Addendum: WP-FS1-1-SE-MMDDYY, WP-FS1400-1-SE-MMDDYY, and WP-OCBFS-2-SE-MMDDYY. During the SI, field staff noted the drains from which proposed sediment samples WP-FS1-1-SE-MMDDYY and WP-FS1400-1-SE-MMDDYY were to be collected from did not have sediment in them (i.e., only leaves and water were visible, or the drain was dry). Therefore, sediment samples were not collected from these drain locations. Field staff were unable to access the building (and drain) where WP-OCBFS-2-SE-MMDDYY was proposed to be collected; therefore, the sediment sample was also not

collected. For each of the drain sediment samples listed above, the QAPP Addendum stated the sediment samples would be collected only if available.

- FCR-USAGWP-02: Proposed surface water sample WP-OR-2-SW-MMMDDYY was not collected during the USAG West Point SI field work. Field sampling staff visited the sampling location twice (once after a rainstorm) to collect WP-OR-2-SW-MMDDYY from the culvert south of the AOPIs. However, the culvert was dry both times and therefore a surface water sample was not collected. Surface water sample WP-OR-1-SW-071520 was collected to indicate absence or presence of PFOS, PFOA, and PFBS in surface water at the AOPIs.
- FCR-USAGWP-03: Sediment sample WP-DF745-1-SE-080620 was moved from the proposed stormwater drain presented in the QAPP Addendum to the next downgradient stormwater drain. The stormwater drain lid at the originally proposed location could not open for field staff to observe the contents inside. A stormwater drain immediately downgradient, which would have also received potential AFFF runoff from the AOPI was accessible and had sediment present. Therefore, the sediment sample was collected from the downgradient stormwater drain.
- FCR-USAGWP-04: A groundwater monitoring well was not installed at boring WP-MVADR-1-GW-081020. The boring was advanced on Friday 07 August 2020 to 70 feet bgs and was dry during drilling. As described in the QAPP Addendum, field staff advanced the boring to 70 feet bgs in an attempt to encounter first groundwater. Field staff left the well over the weekend and observed 10 to 14 feet of water on Monday 10 August 2020. A grab groundwater sample was collected via a HDPE bailer and an EB was collected on the HDPE bailers to account for the new sampling equipment used to sample. The borehole was subsequently abandoned in accordance with NYSDEC CP-43 by grouting in place, as described in the QAPP Addendum.
- FCR-USAGWP-05: An HDPE bailer was used to collect a groundwater sample from the newly installed groundwater monitoring well WP-ANB-1-GW instead of low-flow procedures as described in the Final USAG West Point QAPP Addendum. Field staff observed low groundwater recharge in newly installed groundwater monitoring well WP-ANB-1-GW. The recharged groundwater was too deep (i.e., only 4 feet above the bottom of the monitoring well) to sample via a peristaltic pump; therefore, a grab sample via an HDPE bailer was collected from the monitoring well. An EB, WP-EB-6-081920, was collected from HDPE bailers to account for the change in field equipment used.
- FCR-USAGWP-06: A well vault was not installed in association with the installation of monitoring well WP-ANB-1-GW at the Army-Navy Bonfires AOPI. During the utility clearance prior to monitoring well installation, the USAG West Point agronomist noted the existing aeration system would likely interfere with the well vault construction at the AOPI since the well vault side walls would come close to the ground surface, not 6 to 8 inches below grade. Therefore, a well vault was not installed over the monitoring well. Instead, the monitoring well was completed with a flush mount cover 8 inches bgs and approved fescue/sod cover.
- FCR-USAGWP-07: The WP-ORE-1-GW boring and associated groundwater monitoring well were moved approximately 300 feet to the southwest of their originally scoped location. During the utility clearance prior to monitoring well installation, field personnel noted access to the originally scoped location was limited due to overhead utility lines and a drill rig would not be able to access

the boring location. Field staff moved the boring location approximately 300 feet to the southwest, to be immediately downgradient of groundwater and surface water originating at the AOPI.

6.3.4 Decontamination

Non-dedicated reusable sampling equipment (e.g., water-level meter, tubing weight, drill bit, stainless-steel scoop, hand augers) that came into direct contact with sampling media was decontaminated before first use, between sampling locations/intervals, and before demobilization in accordance with P-09, TGI - Groundwater and Soil Sampling Equipment Decontamination (Arcadis 2019; Appendix A).

6.3.5 Investigation-Derived Waste

IDW, including soil cuttings and decontamination water, were placed into Department of Transportation approved 55-gallon drums, labeled as non-hazardous and segregated by medium, and transported to a staging area. The IDW drums were covered and stored on pallets at the drum storage area on Ordnance Road until 11 January 2021, when the drums were picked up and disposed of off-post. Excess sediment, surface water, and purged groundwater were disposed on the ground at the point of collection. Disposable equipment IDW was collected in bags and disposed in municipal waste receptacles on-post. Equipment IDW includes personal protective equipment and other disposable materials (e.g., gloves, plastic sheeting, and HDPE and silicon tubing) that may come in contact with sampling media.

6.4 Data Analysis

The subsections below summarize the laboratory analytical methods and the methodology used to evaluate data collected during the SI through data verification and usability assessments (as completed by a project chemist, independent of the project team).

6.4.1 Laboratory Analytical Methods

Analytical samples collected during the SI were submitted to Eurofins Lancaster Laboratories Environmental, an ELAP-accredited laboratory for PFAS analysis, including PFOS, PFOA, and PFBS, by liquid chromatography with tandem mass spectrometry. Laboratory analyses associated with the SI were completed in accordance with Worksheets #12.1 through #12.5 in the PQAPP (Arcadis 2019). Eighteen PFAS-related compounds, including PFOS, PFOA, and PFBS, were analyzed for in groundwater, soil, surface water, and sediment samples using an analytical method that is ELAP-accredited and compliant with QSM 5.1.1, Table B-15 (DoD 2018).

Additionally, the following general chemistry and physical characteristic analyses were completed for select soil and sediment samples in accordance with Worksheet #18 of the QAPP Addendum (Arcadis 2020a) by the analytical method noted:

- Total organic carbon (TOC) by Solid Waste Test Method 846 9060A
- Grain size analysis by American Society for Testing and Materials D422-63
- pH by Solid Waste Test Method 846 9045D.

These data are collected as they may be useful in future fate and transport studies.

The laboratory LOD is defined as “the lowest concentration for reliable reporting of a non-detect of a specific analyte in a specific matrix with a specific method at 99 percent confidence” (DoD 2017). The lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias is known as the limit of quantitation (LOQ; DoD 2017). Concentrations detected between the LOD and LOQ, therefore, are considered estimates and are qualified as such on laboratory analytical reports. Instrument-specific detection limits (e.g., the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99 percent confidence; DoD 2017), as provided for each analyte by the laboratory, are reported along with the LODs and LOQs in the laboratory analytical reports included in the Data Usability Summary Report (DUSR) (**Appendix O**).

6.4.2 Data Validation

All analytical data generated during the SI, except grain size, were verified and validated in accordance with the data verification procedures described in Worksheets #34 through #36 of the PQAPP (Arcadis 2019). Each laboratory data package/sample delivery group underwent Stage 3 data validation in accordance with DoD QSM 5.1.1 (DoD 2018). Additionally, 10% of the data underwent Stage 4 data validation. Copies of the data validation reports for each sample delivery group are included as attachments to the DUSR in **Appendix O**. The Level IV analytical reports are included within **Appendix O** in the final electronic deliverable only.

6.4.3 Data Usability Assessment and Summary

A data usability assessment was completed for all analytical data associated with SI sampling at USAG West Point. Documentation generated during the data usability assessments, which were compiled into a DUSR (**Appendix O**), was prepared in accordance with the USACE Engineer Manual 200-1-10 (USACE 2005), the Final DoD General Data Validation Guidelines (DoD 2019) and the Final DoD Data Validation Guidelines Module 3: Data Validation Procedure for Per-and Polyfluoroalkyl Substances Analysis by QSM Table B-15 (DoD 2020), that reviewed precision, accuracy, completeness, representativeness, comparability, and sensitivity. A statement of overall data usability is included in the DUSR.

Based on the final data usability assessment, the environmental data collected at USAG West Point during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUSR and its associated data validation reports (**Appendix O**), and as indicated in the full analytical tables (**Appendix P**) provided for the SI results. These data are of sufficient quality to meet the objectives and requirements of the PQAPP (Arcadis 2019) and USAG West Point QAPP Addendum (Arcadis 2020a). Data qualifiers applied to laboratory analytical results for samples collected during the SI at USAG West Point are provided in the data tables, data validation reports, and the Data Usability Summary Table located at the end of DUSR. Qualifiers for data shown on figures are defined in the notes of figures.

6.5 Office of the Secretary of Defense Risk Screening Levels

The OSD risk screening levels for PFOS, PFOA, and PFBS in groundwater (tap water) and soil were calculated using the USEPA’s RSL calculator for residential and industrial/commercial worker receptor scenarios and current toxicity values. These risk screening levels are shown in **Table 6-2**.

Table 6-2 OSD Risk Screening Levels Calculated for PFOS, PFOA, and PFBS in Tap Water and Soil Using USEPA's Regional Screening Level Calculator

Chemical	Residential Scenario Risk Screening Levels Calculated Using USEPA RSL Calculator		Industrial/Commercial Scenario Risk Screening Levels Calculated Using USEPA RSL Calculator
	Tap Water (ng/L or ppt) [1]	Soil (mg/kg or ppm) [1,2]	Soil (mg/kg or ppm) [1,2]
PFOS	40	0.13	1.6
PFOA	40	0.13	1.6
PFBS	600	1.9	25

Notes:

1. Risk screening levels for tap water and soil provided by the OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September 15 (**Appendix A**).
2. All soil data will be screened against both the residential scenario and industrial/commercial risk screening levels, regardless of the current and projected land use of the AOPI.

mg/kg = milligram per kilogram
ng/L = nanograms per liter
ppm = parts per million
ppt = parts per trillion
RSL = regional screening level
USEPA = United States Environmental Protection Agency

The OSD residential tap water risk screening levels will be used to compare all groundwater and potable use surface water data for this Army PFAS PA/SI. While the current and most likely future land uses of the AOPIs at USAG West Point are industrial/commercial, both residential and industrial/commercial soil risk screening levels for PFOS, PFOA, and PFBS will be used to evaluate detected soil concentrations. The data from the SI sampling event are compared to the OSD risk screening levels in **Section 7**. If concentrations of PFOS, PFOA, or PFBS are detected greater than the applicable OSD risk screening levels, further study in an RI is recommended in **Section 8**.

7 SUMMARY AND DISCUSSION OF SI RESULTS

This section summarizes the analytical results obtained from samples collected during the SI at USAG West Point (field duplicate results are provided in the associated tables). Sampled media and QA/QC samples were analyzed for the constituents prescribed per Worksheet #18 of the QAPP Addendum (Arcadis 2020a) and as noted in **Table 6-1**. The sample results discussion below focuses on the PFOS, PFOA, and PFBS analytical results because they have OSD risk screening levels. The Army will make subsequent investigation decisions based on these constituents' concentrations relative to the OSD risk screening levels.

Tables 7-1 through **7-4** provide a summary of the groundwater, soil, surface water, and sediment analytical results for PFOS, PFOA, and PFBS only. **Table 7-5** summarizes AOPIs and whether their SI results exceed the OSD risk screening levels. **Appendix P** includes the full suite of analytical results for these media, as well as for the QA/QC samples. An overview of AOPIs at USAG West Point with OSD risk screening level exceedances is depicted on **Figure 7-1**. **Figures 7-2** through **7-13** show the PFOS, PFOA, and PFBS analytical results in groundwater, soil, and surface water and sediment for each AOPI. Non-detected results are reported as less than the LOQ. Detections of PFOS, PFOA, and/or PFBS greater than the applicable OSD risk screening levels are highlighted in summary tables and on figures. Final qualifiers applied to the data by the laboratory and the project chemist (as defined in **Section 6.4.3**) are presented and defined on the analytical tables. Groundwater and surface water data collected during the SI are reported in ng/L, or parts per trillion, and soil and sediment data are reported in mg/kg, or parts per million.

Field parameters measured for groundwater during low-flow purging and sample collection and for surface water during sample collection are provided on the field forms in **Appendix L**. Soil and sediment lithological descriptions are provided on the field forms in **Appendix L**. The results of the SI are grouped by AOPI and discussed for each medium as applicable. Groundwater was generally first encountered at depths of approximately 3.05 feet bgs (Oil Tank Fire) to approximately 56 feet bgs (MVA Delafield Road) in Main Post and groundwater was generally first encountered at depths of approximately 3.5 feet bgs (Fire Station 1400) to 26.7 (USMA-32 Burn Pit) feet bgs in the WPMR.

Table 7-5 AOPIs and OSD Risk Screening Level Exceedances

AOPI Name	OSD Exceedances (Yes/No)
Fire Station 2 – Building 1203 and Additional AFFF Spray Area	No
Ordnance Road East	No
Ordnance Road West	No
USMA-32 Burn Pit	No
Crow's Nest Bog	No
Dumpster Fire – Building 745	No
Fire Station 1 – Building 721	No

AOPI Name	OSD Exceedances (Yes/No)
Army Navy Bonfires	No
MVA Delafield Road	No
North Dock 1	Yes
North Dock 2	No
Oil Tank Fire	No
Fire Station 1400	No
Old Camp Buckner Fire Station	No
Target Hill WWTP	Not Sampled

7.1 Fire Station 2 - Building 1203 and Additional AFFF Spray Area

The subsections below summarize the groundwater, soil, surface water, and sediment PFOS, PFOA, and PFBS analytical results associated with Fire Station 2 – Building 1203 and Additional AFFF Spray Area.

7.1.1 Groundwater

One monitoring well was installed via air rotary located in the low-lying drainage area where AFFF likely drained during AFFF equipment testing activities. During the PA site reconnaissance, field staff noted AFFF likely drained towards the north due to the slope of the pavement where it was discharged (**Figure 7-2**). One groundwater sample was collected from the newly installed monitoring well, WP-ASFS2-1-GW.

PFOS (2.8 M [manually integrated compound] ng/L), PFOA (10 M ng/L), and PFBS (1.9 ng/L) were all detected in groundwater sample WP-ASFS2-1-GW at concentrations below the OSD risk screening levels for tap water (**Table 7-1**).

7.1.2 Soil

One surface soil sample was collected in the low-lying drainage area where AFFF would have drained from AFFF equipment testing activities. Surface soil sample WP-ASFS2-1-SO-(0.5-2) was co-located with monitoring well/groundwater sample WP-ASFS2-1-GW (**Figure 7-2**).

PFOS, PFOA, and PFBS were not detected in surface soil sample WP-ASFS2-1-SO- (0.5-2) (**Table 7-2**).

7.1.3 Surface Water

One surface water sample, WP-FS2-1-SW, was collected from the stormwater collection basin located southwest of Fire Station 2 – Building 1203, which likely collected surface runoff from AFFF discharges to the pavement during fire truck washing, storage, and foam tank filling (**Figure 7-2**).

PFOS (21 M ng/L), PFOA (20 M ng/L), and PFBS (1.1 J [estimated concentration] ng/L) were all detected in surface water sample WP-FS2-1-SW (**Table 7-3**).

Additionally, one surface water sample, WP-ASFS2-1-SW, was collected from the Stony Lonesome Brook, which collects surface water runoff and stormwater drainage that may have contained AFFF from Fire Station 2- Building 1203 paved areas (**Figure 7-2**). PFOS (3.8 M ng/L), PFOA (8.7 M ng/L), and PFBS (1.9 M ng/L) were all detected in WP-ASFS2-1-SW (**Table 7-3**).

Lastly, one surface water sample, WP-THF-1-SW, was collected from the Highland Brook, slightly upstream (approximately 1,650 feet) of the Village of Highland Falls WTP (**Figure 7-2**). The surface water intake for the Village of Highland Falls WTP is located in between the Village of Highland Falls WTP and the surface water sample WP-THF-1-SW; however, the exact location of the intake is unknown. Sample data from this location are not intended to evaluate absence or presence of PFOS, PFOA, and PFBS at the Fire Station 2 - Building 1203 and Additional AFFF Spray Area AOPI but will be used to indicate the potential risk to a known drinking water receptor (Town of Highland). Also, WP-THF-1-SW is an upstream sample location of the Stony Lonesome Brook prior to flowing off post. PFOA (1.2 J ng/L) was detected in surface water sample WP-THF-1-SW. PFOS and PFBS were not detected in sample WP-THF-1-SW (**Table 7-3**).

7.1.4 Sediment

One sediment sample, WP-FS2-1-SE, was collected from the stormwater collection basin located southwest of Fire Station 2 – Building 1203, which likely collected surface runoff from AFFF discharges to the pavement during fire truck washing, storage, and foam tank filling (**Figure 7-2**). Sediment sample WP-FS2-1-SE and surface water sample WP-FS2-1-SW were co-located.

PFOS (0.0027 mg/kg) was detected in sediment sample WP-FS2-1-SE. PFOA and PFBS were not detected in sediment sample WP-FS2-1-SE (**Table 7-4**).

Additionally, one sediment sample, WP-ASFS2-1-SE, was collected from the Stony Lonesome Brook, which collects surface water runoff and stormwater drainage that may have contained AFFF from Fire Station 2- Building 1203 paved areas (**Figure 7-2**). PFOS, PFOA, and PFBS were not detected in WP-ASFS2-1-SE (**Table 7-4**).

Lastly, one sediment sample, WP-THF-1-SE, was collected from the Highland Brook, slightly upstream (approximately 1,650 feet) of the Village of Highland Falls WTP (**Figure 7-2**). PFOS, PFOA, and PFBS were not detected in WP-THF-1-SE (**Table 7-4**).

7.2 Ordnance Road East

The subsections below summarize the groundwater, soil, surface water, and sediment PFOS, PFOA, and PFBS analytical results associated with Ordnance Road East. As described in **Section 6.3.3**, the second proposed surface water sample WP-OR-2-SW was not collected during the USAG West Point SI field work. Field sampling staff visited the sampling location twice (once after a rainstorm) to collect WP-OR-2-SW from the culvert south of the AOPIs. However, the culvert was dry both times and a second surface water sample was not collected. Additionally, the WP-ORE-1-GW boring and associated groundwater monitoring well were moved approximately 300 feet to the southwest of their originally scoped location. During the utility clearance prior to monitoring well installation, field personnel noted access to the originally scoped location was limited due to overhead utility lines and a drill rig would not be able to

access the boring location. Field staff moved the boring location approximately 300 feet to the southwest, to be immediately downgradient of groundwater and surface water originating at the AOPI.

7.2.1 Groundwater

One groundwater sample, WP-ORE-1-GW, was collected following monitoring well installation slightly downgradient of the AFFF use area (**Figure 7-3**).

PFOS (2.0 M ng/L), PFOA (8.9 M ng/L), and PFBS (3.2 ng/L) were each detected in groundwater sample WP-ORE-1-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.2.2 Soil

One surface soil sample, WP-ORE-1-SO-(0.5-2), was collected in association with the AOPI and was co-located with the WP-ORE-1-GW groundwater sample (**Figure 7-3**).

PFOS, PFOA, and PFBS were not detected in surface soil sample WP-ORE-1-SO-(0.5-2) (**Table 7-2**).

7.2.3 Surface Water

One surface water sample, WP-OR-1-SW, was collected in the marshy area downstream of both the Ordnance Road East and Ordnance Road West AOPIs.

PFOA (8.7 M ng/L) and PFBS (3.4 ng/L) were each detected in surface water sample WP-OR-1-SW. PFOS was not detected in surface water sample WP-OR-1-SW (**Table 7-3**).

7.2.4 Sediment

Two sediment samples, WP-OR-1-SE and WP-OR-2-SE, were collected within the marshy areas downstream of both the Ordnance Road East and Ordnance Road West AOPIs (**Figure 7-3**). One of the sediment samples, WP-OR-1-SE, was co-located with surface water sample WP-OR-1-SW on the north side of Ordnance Road to capture potential downstream (i.e., pre-culvert) surface water and sediment impacts from AFFF uses at both Ordnance Road East and Ordnance Road West AOPIs. PFOS, PFOA, and PFBS were not detected in sediment sample WP-OR-1-SE. The second sediment sample, WP-OR-2-SE, was collected on the southside of Ordnance Road to capture potential downstream (i.e., post-culvert) surface water and sediment impacts from AFFF uses at both the Ordnance Road East and Ordnance Road West AOPIs. PFOS, PFOA, and PFBS were not detected in sediment sample WP-OR-2-SE.

7.3 Ordnance Road West

The subsections below summarize the groundwater, soil, surface water, and sediment PFOS, PFOA, and PFBS analytical results associated with Ordnance Road West.

7.3.1 Groundwater

One groundwater sample, WP-ORW-1-GW, was collected following monitoring well installation in the southeast corner of the AFFF use area (**Figure 7-3**).

PFOS (3.3 M ng/L) and PFOA (7.6 M ng/L) were each detected in groundwater sample WP-ORW-1-GW below the OSD risk screening levels for tap water. PFBS was not detected in groundwater sample WP-ORW-1-GW (**Table 7-1**).

7.3.2 Soil

One surface soil sample, WP-ORW-1-SO-(0.5-2), was collected in association with the AOPI and was co-located with the WP-ORW-1-GW groundwater sample (**Figure 7-3**).

PFOS, PFOA, and PFBS were not detected in surface soil sample WP-ORW-1-SO-(0.5-2) (**Table 7-2**).

7.3.3 Surface Water

Please see **Section 7.2.3** and **Figure 7-3**.

7.3.4 Sediment

Please see **Section 7.2.4** and **Figure 7-3**.

7.4 USMA-32 Burn Pit

The subsections below summarize the groundwater PFOS, PFOA, and PFBS analytical results associated with USMA-32 Burn Pit.

7.4.1 Groundwater

Two groundwater samples were collected in relation to the USMA-32 Burn Pit AOPI following monitoring well installation. One groundwater sample, WP-USMA32BP-1-GW was collected downgradient of USMA-32 Burn Pit before groundwater likely discharges to Long Pond (**Figure 7-4**). PFOA (1.2 J ng/L) was detected at a concentration below the OSD risk screening levels for tap water in WP-USMA32BP-1-GW. PFOS and PFBS were not detected in WP-USMA32BP-1-GW (**Table 7-1**).

Additionally, one groundwater sample, WP-USMA32BP-2-GW was collected within the estimated location of the USMA-32 Burn Pit (**Figure 7-4**). PFOS (4.7 ng/L), PFOA (6.2 M ng/L), and PFBS (5.4 ng/L) were detected in WP-USMA32BP-2-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.5 Crow's Nest Bog (WSTPT-023-R-01, 36993.1025)

The subsections below summarize the surface water and sediment PFOS, PFOA, and PFBS analytical results associated with Crow's Nest Bog.

7.5.1 Surface Water

Three surface water samples were collected in relation to the Crow's Nest Bog AOPI. Two surface water samples, WP-CNB-1-SW and WP-CNB-2-SW were collected within the Crow's Nest Bog where AFFF was sprayed (**Figure 7-5**). PFOS (1.6 J ng/L) and PFOA (4.7 M ng/L) were detected in surface water sample WP-CNB-1-SW. PFBS was not detected in surface water sample WP-CNB-1-SW (**Table 7-3**).

PFOS (1.2 J ng/L) and PFOA (4.6 M ng/L) were detected in surface water sample CP-CNB-2-SW. PFBS was not detected in surface water sample WP-CNB-2-SW (**Table 7-3**).

Additionally, a surface water sample, WP-CNB-3-SW, was collected from a roadside drainage ditch proximal to the USAG West Point northern boundary to evaluate the potential for migration to off post drinking water receptors (i.e., Upper Reservoir). PFOS (13 M ng/L), PFOA (0.8 J ng/L), and PFBS (2.1 ng/L) were detected in surface water sample WP-CNB-3-SW (**Table 7-3**).

7.5.2 Sediment

Three sediment samples were collected in relation to the Crow's Nest Bog AOPI. Two sediment samples, WP-CNB-1-SE and WP-CNB-2-SE were collected within the Crow's Nest Bog where AFFF was sprayed (**Figure 7-5**). PFOS (0.0022 J mg/kg) was detected in sediment sample WP-CNB-1-SE. PFOA and PFBS were not detected in sediment sample WP-CNB-1-SE (**Table 7-4**). PFOS (0.0033 mg/kg) and PFOA (0.0023 J mg/kg) were detected in sediment sample WP-CNB-2-SE. PFBS was not detected in sediment sample WP-CNB-2-SE (**Table 7-4**).

Additionally, a sediment sample, WP-CNB-3-SE, was collected proximal to the USAG West Point northern boundary to evaluate the potential for migration to off post drinking water receptors (i.e., Upper Reservoir). PFOS (0.0027 M mg/kg) was detected in sediment sample WP-CNB-3-SE. PFOA and PFBS were not detected in sediment sample WP-CNB-3-SE (**Table 7-4**).

7.6 Dumpster Fire – Building 745

The subsections below summarize the groundwater and sediment PFOS, PFOA, and PFBS analytical results associated with Dumpster Fire – Building 745. As described in **Section 6.3.3**, sediment sample WP-DF745-1-SE was moved from the proposed stormwater drain presented in the USAG West Point QAPP Addendum to the next downgradient stormwater drain. The stormwater drain lid at the originally proposed location could not open for field staff to observe the contents inside. A stormwater drain immediately downgradient, which would have also received potential AFFF runoff from the AOPI, was accessible and had sediment present. Therefore, the sediment sample was collected from the downgradient stormwater drain.

7.6.1 Groundwater

One groundwater sample, WP-DF745-1-GW, was collected following monitoring well installation adjacent to a stormwater collection drain located downslope of AFFF uses at the Dumpster Fire- Building 745 which likely received AFFF runoff/drainage (**Figure 7-6**).

PFOS (4.5 ng/L), PFOA (6.1 M ng/L), and PFBS (2.2 M ng/L) were each detected in groundwater sample WP-DF745-1-GW, lower than the OSD risk screening levels for tap water (**Table 7-1**).

7.6.2 Sediment

One sediment sample, WP-DF745-1-SE, was collected from a downslope stormwater collection drain, which likely received AFFF runoff/drainage (**Figure 7-6**).

PFOS (0.0007 J mg/kg) was detected in sediment sample WP-DF745-1-SE. PFOA and PFBS were not detected in sediment sample WP-DF745-1-SE (**Table 7-4**).

7.7 Fire Station 1 - Building 721

The subsections below summarize the groundwater and soil PFOS, PFOA, and PFBS analytical results associated with Fire Station 1 – Building 721. Since the known and suspected AFFF use areas are paved, samples were collected downslope/downgradient of AFFF runoff/drainage areas. As described in **Section 6.3.3**, field staff noted the drain from which proposed sediment sample WP-FS1-1-SE was to be collected from did not have sediment in it (i.e., only leaves and water were visible). Therefore, a sediment sample was not collected from this drain location.

7.7.1 Groundwater

One groundwater sample, WP-FS1-1-GW, was collected following monitoring well installation downslope of AFFF runoff/drainage on the pavement at Fire Station 1 – Building 721 (**Figure 7-7**).

PFOS (3.5 ng/L), PFOA (5.3 M ng/L), and PFBS (2.5 ng/L) were each detected in groundwater sample WP-FS1-1-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.7.2 Soil

One surface soil sample, WP-FS1-1-SO-(0-5-2), was collected downslope of AFFF runoff/drainage on the pavement at Fire Station 1 – Building 721 (**Figure 7-7**).

PFOS (0.0073 mg/kg) and PFOA (0.00085 mg/kg) were detected in surface soil sample WP-FS1-1-SO-(0.5-2) below both the residential and industrial/commercial risk screening levels for soil. PFBS was not detected in surface soil sample WP-FS1-1-SO-(0.5-2) (**Table 7-2**).

7.8 Army-Navy Bonfires

The subsections below summarize the groundwater and soil PFOS, PFOA, and PFBS analytical results associated with Army Navy Bonfires. As described in **Section 6.3.3**, an HDPE bailer was used to collect a groundwater sample from the newly installed groundwater monitoring well WP-ANB-1-GW instead of low-flow procedures as described in the USAG West Point QAPP Addendum. Field staff observed low groundwater recharge in newly installed groundwater monitoring well WP-ANB-1-GW. The recharged groundwater was too deep (i.e., only four feet above the bottom of the monitoring well) to sample via a peristaltic pump; therefore, a grab sample via an HDPE bailer was collected from the monitoring well. Additionally, a well vault was not installed in association with the installation of monitoring well WP-ANB-1-GW. During the utility clearance prior to monitoring well installation, the USAG West Point agronomist noted the existing aeration system would likely interfere with the well vault construction at the AOPI since the well vault side walls would come close to the ground surface, not 6 to 8 inches below grade. Therefore, a well vault was not installed over the monitoring well. Instead, the monitoring well was completed with a flush mount cover 8 inches bgs and approved fescue/sod cover.

7.8.1 Groundwater

One groundwater sample, WP-ANB-1-GW, was collected following monitoring well installation within the AFFF use area (**Figure 7-8**).

PFOS (6 M ng/L), PFOA (33 M ng/L), and PFBS (24 ng/L) were each detected in groundwater sample WP-ANB-1-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.8.2 Soil

One surface soil sample, WP-ANB-1-SO-(0.5-2), was collected within the AFFF use area, co-located with the groundwater sample WP-ANB-1-GW (**Figure 7-8**).

PFOS (0.0044 M mg/kg) and PFOA (0.00094 mg/kg) were detected in surface soil sample WP-ANB-1-SO-(0.5-2) below both the residential and industrial/commercial OSD risk screening levels for soil. PFBS was not detected in surface soil sample WP-ANB-1-SO-(0.5-2) (**Table 7-2**).

7.9 MVA Delafield Road

The subsections below summarize the groundwater and sediment PFOS, PFOA, and PFBS analytical results associated with MVA Delafield Road. As described in **Section 6.3.3**, a groundwater monitoring well was not installed at boring WP-MVADR-1-GW as planned. The boring was advanced on Friday 07 August 2020 to 70 feet bgs and was dry during drilling. As described in the USAG West Point QAPP Addendum, field staff advanced the boring to 70 feet bgs in an attempt to encounter first groundwater. Field staff left the well over the weekend and observed 10 to 14 feet of water on Monday 10 August 2020. A grab groundwater sample was collected via a HDPE bailer and an EB was collected on the HDPE bailers to account for the new sampling equipment used to sample. The borehole was subsequently abandoned in accordance with NYSDEC CP-43 by grouting in place, as described in the QAPP Addendum.

7.9.1 Groundwater

One groundwater sample, WP-MVADR-1-GW, was collected following monitoring well installation located adjacent to a stormwater collection drain downgradient of AFFF uses at the AOPI (**Figure 7-9**).

PFOA (2.1 ng/L) was detected in groundwater sample WP-MVADR-1-GW below the OSD risk screening levels for tap water. PFOS and PFBS were not detected in groundwater sample WP-MVADR-1-GW (**Table 7-1**).

7.9.2 Sediment

One sediment sample, WP-MVADR-1-SE, was collected from the stormwater drain downgradient of AFFF uses at the AOPI which likely received AFFF runoff/drainage (**Figure 7-9**).

PFOS, PFOA, and PFBS were not detected in sediment sample WP-MVADR-1-SE (**Table 7-4**).

7.10 North Dock 1

The subsections below summarize the groundwater PFOS, PFOA, and PFBS analytical results associated with North Dock 1.

7.10.1 Groundwater

One groundwater sample, WP-ND1-1-GW, was collected following monitoring well installation adjacent to the AFFF use area (**Figure 7-10**).

PFOA (42 M ng/L) was detected in groundwater sample WP-ND1-1-GW at a concentration greater than the OSD risk screening levels for tap water. PFOS (21 M ng/L) and PFBS (2.9 ng/L) were detected below the OSD risk screening levels for tap water (**Table 7-1**).

7.11 North Dock 2

The subsections below summarize the groundwater and soil PFOS, PFOA, and PFBS analytical results associated with North Dock 2.

7.11.1 Groundwater

One groundwater sample, WP-ND2-1-GW, was collected following monitoring well installation within the AFFF use area (**Figure 7-10**).

PFOS (6.7 M ng/L), PFOA (15 M ng/L), and PFBS (1.8 ng/L) were each detected in groundwater sample WP-ND2-1-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.11.2 Soil

One surface soil sample, WP-ND2-1-SO-(0.5-2) was collected within the AFFF use area, co-located with groundwater sample WP-ND2-1-GW (**Figure 7-10**).

PFOS (0.00067 J mg/kg) and PFOA (0.00072 mg/kg) were detected in surface soil sample WP-ND2-1-SO-(0.5-2) below both the residential and industrial/commercial OSD risk screening levels for soil. PFBS was not detected in surface soil sample WP-ND2-1-SO-(0.5-2) (**Table 7-2**).

7.12 Oil Tank Fire

The subsections below summarize the groundwater PFOS, PFOA, and PFBS analytical results associated with Oil Tank Fire.

7.12.1 Groundwater

One groundwater sample, WP-OTF-1-GW, was collected following monitoring well installation immediately downgradient of the AFFF use area (**Figure 7-11**).

PFOS (6.1 M ng/L), PFOA (10 M ng/L), and PFBS (27 ng/L) were each detected in groundwater sample WP-OTF-1-GW below the OSD risk screening levels for tap water (**Table 7-1**).

7.13 Fire Station 1400

The subsections below summarize the groundwater and soil PFOS, PFOA, and PFBS analytical results associated with Fire Station 1400. As described in **Section 6.3.3**, field staff noted the drain from which proposed sediment sample WP-FS1400-1-SE was to be collected from did not have sediment in it (i.e., the drain was dry). Therefore, a sediment sample was not collected from this drain location.

7.13.1 Groundwater

Two groundwater samples, WP-FS1400-1-GW and WP-FS1400-2-GW, were collected in association with the Fire Station 1400 AOPI following monitoring well installations. Two monitoring wells were installed adjacent to the front pavement/driveway in the downgradient groundwater flow direction since AFFF uses at Fire Station 1400 are unknown (**Figure 7-12**).

PFOS (1.2 J ng/L) was detected in groundwater sample WP-FS1400-1-GW, lower than the OSD risk screening level for tap water. PFOA and PFBS were not detected in groundwater sample WP-FS1400-1-GW.

PFOS (3 J ng/L), PFOA (12 M ng/L), and PFBS (2.7 ng/L) were each detected in groundwater sample WP-FS1400-2-GW at concentrations below the OSD risk screening levels for tap water (**Table 7-1**).

7.13.2 Soil

A total of two surface soil samples, WP-FS1400-1-SO-(0.5-2) and WP-FS1400-2-SO-(0.5-2), were collected, co-located with the monitoring well installation/ groundwater samples to capture AFFF runoff that may have occurred at this fire station (**Figure 7-12**).

PFOS (0.0025 M mg/kg) was detected in surface soil sample WP-FS1400-1-SO-(0.5-2) below both the residential and industrial/commercial risk screening levels for soil. PFOA and PFBS were not detected in surface soil sample WP-FS1400-1-SO-(0.5-2) (**Table 7-2**).

PFOS, PFOA, and PFBS were not detected in surface soil sample WP-FS-1400-2-SO-(0.5-2) (**Table 7-2**).

7.14 Old Camp Buckner Fire Station

The subsections below summarize the groundwater, soil, surface water and sediment PFOS, PFOA, and PFBS analytical results associated with Old Camp Buckner Fire Station. The exact area of AFFF use at the Old Camp Buckner Fire Station is unknown, therefore the majority of sampling occurred in the assumed downgradient direction. The fire chief at the time of the PA noted any runoff from truck parking and washing activities was observed to flow directly into the nearby stream that eventually empties into Mine Lake. As described in **Section 6.3.3**, field staff were unable to access the building (and drain) where sediment sample WP-OCBFS-2-SE was proposed to be collected. Therefore, the sediment sample was not collected.

7.14.1 Groundwater

One groundwater sample, WP-OCBFS-1-GW, was collected following monitoring well installation and was located in the general downgradient/downstream flow path from the Old Camp Buckner Fire Station (**Figure 7-13**).

PFOS, PFOA, and PFBS were not detected in groundwater sample WP-OCBFS-1-GW (**Table 7-1**).

7.14.2 Soil

One surface soil sample, WP-OCBFS-1-SO-(0.5-2), was collected downstream of the suspected AFFF use area (**Figure 7-13**).

PFOS, PFOA, and PFBS were not detected in surface soil sample WP-OCBFS-1-SO-(0.5-2) (**Table 7-2**).

7.14.3 Surface Water

One surface water sample, WP-OCBFS-1-SW, was collected in the marshy area behind the AOPI, downstream of the suspected AFFF use (**Figure 7-13**).

PFOS (6 M ng/L) and PFOA (3.1 M ng/L) were detected in surface water sample WP-OCBFS-1-SW. PFBS was not detected in surface water sample WP-OCBFS-1-SW (**Table 7-3**).

7.14.4 Sediment

One sediment sample, WP-OCBFS-1-SE, was collected in the marshy area behind the AOPI, downstream of the suspected AFFF use (**Figure 7-13**).

PFOS (0.00089 J mg/kg) was detected in sediment sample WP-OCBFS-1-SE. PFOA and PFBS were not detected in sediment sample WP-OCBFS-1-SE (**Table 7-4**).

7.15 TOC, pH, and Grain Size

In addition to analyzing soil for PFOS, PFOA, and PFBS, one soil sample per AOPI was analyzed for TOC, pH, moisture content, and grain size data as they may be useful in future fate and transport studies. TOC in most samples collected ranged from 3,630 mg/kg to 21,100 mg/kg; this organic content is typical of topsoil (5,000 mg/kg- 30,000 mg/kg). However, in two soil samples collected, TOC was greater than typically observed in topsoil (84,300 mg/kg and 99,700 mg/kg). The combined percentage of fines in soils at USAG West Point ranged from 10.2% to 41.6% with an average of 25.6%. In general, PFAS constituents tend to be more mobile in soils with less than 20% fines (silt and clay) and lower TOC. The average percent moisture of the soil, 13.2%, was typical for clay (sandy soil [0 to 10%], loam [0 to 12%], or clay [0 to 20%]). The pH of the soil was slightly alkaline (7 to 9). Based on the geochemical data obtained during the SI at USAG West Point, PFAS constituents may be relatively less mobile based on the average fines above 20% and prevalence of TOC content.

7.16 Blank Samples

PFOS, PFOA, and PFBS were not detected in any of the QA/QC samples collected during the SI work. The following QA/QC samples were collected during the USAG West Point SI:

- Six EBs (WP-EB-1 through WP-EB-6) were collected on a water level meter, HDPE peristaltic tubing, drill bit, stainless-steel scoop, stainless-steel hand auger, and HDPE bailer, respectively.
- Two SBs (WP-SB-1 and WP-SB-2) were collected from water used to decontaminate drilling tooling (from Building 1236 on post) and from water provided by Pine Environmental to perform the initial rinses of reusable equipment during decontamination, respectively.
- Three FBs (WP-FB-1 through WP-FB-3) were collected using laboratory-supplied PFOS, PFOA, and PFBS free water.

The full analytical results for QA/QC samples collected during the SI are included in **Appendix P**.

7.17 Conceptual Site Models

The preliminary CSMs presented in the QAPP Addendum (Arcadis 2020a) were re-evaluated and updated, if necessary, based on the SI sampling results. The CSMs presented on **Figures 7-14** through **7-26** and in this section therefore represent the current understanding of the potential for human exposure. For some AOPIs, the CSM is the same and thus shown on the same figure.

Many of the PFAS constituents found in AFFF are surfactants (which do not volatilize) and are found in a charged or ionic state at environmentally-relevant pH (i.e., pH 5 to 9 standard units). PFOS, PFOA, and PFBS are each negatively charged at environmentally-relevant pH. The media potentially affected by PFOS, PFOA, PFBS releases at Army installations are soil, groundwater, surface water, and sediment. Once released to the environment, a primary factor that inhibits the movement of PFAS constituents is the presence of organic matter and organic co-constituents in soils and sediments. Generally, PFAS constituents are mobile in the potentially affected media, and they are not known to be fully broken down by natural processes.

Based on the historical or potential use, storage, and/or disposal of PFAS-containing materials at the AOPIs, affected media are likely to consist of soil, groundwater, surface water, and sediment. Release and transport mechanisms include dissolution/desorption from soil to groundwater, transport via sediment carried in and dissolution to stormwater and surface water, discharge/recharge between groundwater and surface water, and adsorption/desorption between surface water and sediment. Generic categories of potential human receptors and their associated exposure scenarios that are typically evaluated in a CERCLA human health risk assessment were considered and include on-installation site workers (e.g., industrial/commercial workers, utility workers, or future construction workers who could be exposed to chemicals in soil at an AOPI or to chemicals in tap water in an industrial/commercial building), on-installation residents (e.g., adults and children who could be exposed to chemicals in tap water in a residence), and on-installation recreational users (e.g., hikers or hunters who could be exposed to chemicals in waterways at an installation). Off-installation receptor types could include drinking water receptors (i.e., commercial/industrial workers or residents) and recreational users.

Human exposure pathways are shown as “complete, “potentially complete”, or “incomplete” on the CSM figures. A complete exposure pathway consists of a constituent source and release mechanism, a transport or retention medium, an exposure point where human contact with the contaminated medium could occur, and an exposure route at the exposure point. If any of these elements is missing, the exposure pathway is incomplete. Pathways are “potentially complete” where data are insufficient to conclude the pathway is either “complete” or “incomplete”. Additionally, the CSMs do not include ecological receptors and exposure pathways. The potential for ecological exposures to PFOS, PFOA, and PFBS may be evaluated at a future date if those pathways warrant further consideration.

Following the SI sampling, all 14 sampled AOPIs with confirmed PFOS, PFOA, and/or PFBS presence were considered to have complete or potentially complete exposure pathways. Although the CSMs indicate complete or potentially complete exposure pathways may exist, the recommendation for remedial investigation is based on the comparison of analytical results for PFOS, PFOA, and PFBS to the OSD risk screening levels (**Table 6-2**).

Figure 7-14 shows the CSM for Fire Station 2 – Building 1203 and Additional AFFF Spray AOPI. Potential releases of AFFF to paved surfaces could migrate to groundwater via desorption and/or dissolution. Additionally, potential releases of AFFF to paved surfaces could migrate via surface runoff to an adjacent stormwater collection basin surface water/sediment. Lastly, there is one known occurrence of AFFF disposal to paved surfaces which migrated to the sanitary system drains within the building bays, which are then directed to the Target Hill WWTP.

- Site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust; therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- The AOPI is proximal to drinking water wells used to supply potable water at USAG West Point. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. Recreational users are not likely to contact groundwater; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Groundwater originating at this AOPI flows off-post through the installation’s southeastern boundary, where there are several public and domestic drinking water wells. Due to the absence of land use controls preventing potable use of groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- PFOS, PFOA, and/or PFBS were detected in surface water and sediment collected from the stormwater collection basin adjacent to the AOPI. Site workers have the potential to contact constituents in the stormwater collection basin during site work activities, therefore the surface water and sediment exposure pathways (via incidental ingestion and dermal contact) for site workers are complete. Overburden groundwater from this AOPI likely discharges to Stony Lonesome Brook, which is not used for drinking water and is not otherwise a point of exposure for residential receptors; therefore, the surface water and sediment exposure pathways for on-installation residents are incomplete. Recreational users could contact constituents in Stony Lonesome Brook through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for on-installation recreational users are potentially complete.

- Surface water from Stony Lonesome Brook eventually flows off-post via Highland Brook before discharging into the Hudson River. Highland Brook is used for drinking water, but only upgradient of these AOPIs. The Hudson River is not used for drinking water off-post within a five-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.
- Sanitary wastes from Fire Station 2 – Building 1203 (i.e., AFFF disposal to sanitary bay drains) are conveyed to the Target Hill WWTP. The Target Hill WWTP effluent discharges to the Hudson River, located off post, therefore the surface water and sediment exposure pathways for on-installation receptors (site worker, resident, recreational user) are incomplete. The Hudson River is not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact; therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-15 shows the CSM for AOPIs Ordnance Road East and Ordnance Road West. Potential releases of AFFF to soil could migrate to groundwater via desorption and/or dissolution, to surface water via discharge, and to sediment via adsorption and desorption.

- PFOS, PFOA, and/or PFBS were not detected in soil at these AOPIs. However, PFOS, PFOA, and PFBS were detected in groundwater at the co-located soil/groundwater locations and proximal surface water. Additionally, only one soil sample was collected at each AOPI, and for one of the AOPIs the soil sample was not collected within the suspected AFFF use area (i.e., Ordnance Road East). Given the uncertainties regarding PFOS, PFOA, and PFBS in soil at these AOPIs, the soil exposure pathway for on-installation site workers remains potentially complete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPIs, and the AOPIs are upgradient of/in proximity to drinking water wells used to supply potable water at USAG West Point. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. Recreational users are not likely to contact groundwater; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPIs, and groundwater originating at these AOPIs flows off-post through the installation's southeastern boundary. Due to the absence of land use controls preventing potable use of groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- Overburden groundwater from these AOPIs likely discharges to Stony Lonesome Brook, which is not used for drinking water; therefore, the surface water exposure pathways (via drinking water ingestion

and dermal contact) for on-installation site workers and residents are incomplete. Additionally, on-installation site workers and residents are not likely to contact surface water and sediment at Stony Lonesome Brook; therefore, the surface water and sediment exposure pathways (via incidental ingestion and dermal contact) are also incomplete.

- PFOS, PFOA, and/or PFBS were detected in surface water at the AOPIs. PFOS, PFOA, and/or PFBS were not detected in sediment at these AOPIs, however, there is potential for PFOS, PFOA, and PFBS detected in co-located surface water to partition to sediment. Recreational users could contact constituents in Stony Lonesome Brook surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water exposure pathway for on-installation recreational users is complete and the sediment exposure pathway for on-installation recreational users is potentially complete.
- Surface water from Stony Lonesome Brook eventually flows off-post via Highland Brook before discharging into the Hudson River. Highland Brook is used for drinking water, but only upgradient of these AOPIs. The Hudson River is not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-16 shows the CSM for AOPI USMA-32 Burn Pit. Potential releases of AFFF to soil could migrate to groundwater via desorption and/or dissolution, to surface water via discharge, and to sediment via adsorption and desorption. Based on site reconnaissance, the historical burn pit is under about 45 feet of fill currently and has been regraded multiple times starting in the early 2000s.

- Potentially PFAS-containing soils related to AFFF use at this AOPI are located approximately under 45 feet of fill. It is unlikely that site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is incomplete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI and the AOPI is upgradient of on-post potable wells at USAG West Point. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. Recreational users are not likely to contact groundwater; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- PFOS, PFOA, and PFBS were detected in groundwater at the AOPI and groundwater originating at the AOPI flows off-post through the installation's southeastern boundary. Due to the absence of land use controls preventing potable use of groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- Overburden groundwater from USMA-32 Burn Pit likely discharges to Long Pond to the southwest, which is used for drinking water; therefore, the surface water exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. However, on-installation site workers and residents are not likely to contact sediment at Long Pond;

therefore, the exposure pathways for sediment (via ingestion and dermal contact) are incomplete. Recreational users could contact constituents in Long Pond through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are potentially complete.

- Surface water from Long Pond eventually flows off-post via Popolopen Brook before discharging into the Hudson River. Popolopen Brook and the Hudson River are not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off- installation recreational users are potentially complete.

Figure 7-17 shows the CSM for AOPI Crow's Nest Bog. Potential releases of AFFF to surface water and sediment could migrate to groundwater via desorption and/or dissolution.

- PFOS, PFOA, and PFBS were detected in surface water at the AOPI. The AOPI is outside the vicinity of on-post drinking water wells. However, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete to account for potential future use of the downgradient on-post groundwater. Recreational users are not likely to contact groundwater during outdoor recreational activities. Therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Groundwater originating at this AOPI potentially discharges off-post through the northern installation boundary. Due to the absence of land use controls preventing potable use of groundwater in this area, the groundwater exposure pathway (via drinking water ingestion and dermal contact) for off-installation receptors is potentially complete.
- Crow's Nest Bog is not used as a potable source for USAG West Point, and the possible northern and southern surface water tributaries of Crow's Nest Brook, which both may receive surface water flow and/or discharge of overburden groundwater originating at the AOPI, are not used for drinking water on-post. On-installation site workers and residents are not likely to contact surface water and sediment at the AOPI; therefore, the surface water and sediment exposure pathways for on-installation site workers and residents are incomplete.
- PFOS, PFOA, and/or PFBS were detected in surface water and sediment at the AOPI. Recreational users could contact constituents in the Crow's Nest Bog and associated tributaries through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are complete.
- Surface water originating at this AOPI potentially flows to the north to surface water tributaries prior to flowing off-post across the northern boundary or flows to the south eventually discharging to the Hudson River. Additionally, groundwater originating at this AOPI also potentially discharges to surface water across the northern boundary and south to the Crow's Nest Brook, a tributary to the Hudson River. There are surface water bodies across the northern USAG West Point boundary that are potentially downstream of the AOPI and are used for drinking water. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is potentially complete. The Hudson River is not used as a potable source within a 5-mile radius of the USAG West Point installation boundary, however, recreational users off-post could contact constituents in the Hudson River through incidental ingestion and dermal contact; therefore,

the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-18 shows the CSM for AOPI Dumpster Fire – Building 745. Potential releases of AFFF to paved surfaces and potentially soil could migrate to groundwater via desorption and/or dissolution and could migrate to the USAG West Point stormwater system via runoff.

- Site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is outside the vicinity of on-post drinking water wells. However, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete to account for potential future use of the downgradient on-post groundwater. Recreational users are not likely to contact groundwater during outdoor recreational activities. Therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Overburden groundwater and stormwater originating at the AOPI flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- PFOS, PFOA, and/or PFBS were detected in sediment within a stormwater drain located downstream of the AOPI. Site workers could contact constituents in sediment while performing site work activities on the stormwater system. Therefore, the sediment exposure pathway (via ingestion and/or dermal contact) for on-installation site workers is complete. Additionally, site workers could contact constituents in surface water/standing water within the stormwater drain while performing site work activities on the stormwater system. Therefore, the surface water exposure pathway (via ingestion and/or dermal contact) for on-installation site workers is potentially complete.
- Groundwater originating at this AOPI does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation residents and recreational users are incomplete.
- Overburden groundwater and stormwater originating at this AOPI flow off-post to the Hudson River, which is not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off- installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-19 shows the CSM for AOPI Fire Station 1 – Building 721. Potential releases of AFFF to paved surfaces and potentially soil could migrate to groundwater via desorption and/or dissolution and could migrate to the USAG West Point stormwater system via runoff.

- PFOS, PFOA, and/or PFBS were detected in soil at the AOPI, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPI is not likely to be regularly

accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.

- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is outside the vicinity of on-post drinking water wells. However, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete to account for potential future use of the downgradient on-post groundwater. Recreational users are not likely to contact groundwater during outdoor recreational activities. Therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Overburden groundwater and stormwater originating at the AOPI flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- Groundwater originating at the AOPI does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation site workers, residents, and recreational users are incomplete.
- Overburden groundwater and stormwater originating at this AOPI flow off-post to the Hudson River, which is not used for drinking water off-post within a five-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off- installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-20 shows the CSM for AOPI Army Navy Bonfires. Potential releases of AFFF to soil could migrate to groundwater via desorption and/or dissolution.

- PFOS, PFOA, and/or PFBS were detected in soil at the AOPI. Site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPI is used for tailgating and cadet athletic activities. Therefore, the soil exposure pathway for on-installation recreational users is complete. The AOPI is not likely to be regularly accessed by on-installation residents, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is outside the vicinity of on-post drinking water wells. However, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete to account for potential future use of the downgradient on-post groundwater. Recreational users are not likely to contact groundwater during outdoor recreational activities. Therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Overburden groundwater and stormwater originating at the AOPI flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- Groundwater originating at the AOPI does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation site workers, residents, and recreational users are incomplete.
- Overburden groundwater and stormwater originating at this AOPI flow off-post to the Hudson River, which is not used for drinking water off-post within a 5-mile radius of USAG West Point. Therefore,

the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-21 shows the CSM for AOPI MVA Delafield Road. Potential releases of AFFF to paved surfaces and potentially soil could migrate to groundwater via desorption and/or dissolution and could migrate to the USAG West Point stormwater system via runoff.

- Site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is outside the vicinity of on-post drinking water wells. However, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete to account for potential future use of the downgradient on-post groundwater. Recreational users are not likely to contact groundwater during outdoor recreational activities. Therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Overburden groundwater and stormwater originating at the AOPI flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- PFOS, PFOA, and/or PFBS were not detected in sediment sampled from the stormwater drain at the AOPI. Additionally, groundwater originating at this AOPI does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation site workers, residents, and recreational users are incomplete. However, due to the potential for groundwater originating at the AOPI to discharge to surface water bodies off-post (i.e., Hudson River) the sediment exposure pathway for off-installation recreational users is potentially complete.
- Overburden groundwater and stormwater originating at this AOPI flow off-post to the Hudson River, which is not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off- installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users is potentially complete.

Figure 7-22 shows the CSM for AOPIs North Dock 1 and Oil Tank Fire. Potential releases of AFFF to soil and/or paved surfaces could migrate to groundwater via desorption and/or dissolution.

- Site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPIs, and the AOPIs

are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.

- PFOS, PFOA, and/or PFBS were detected in groundwater at these AOPIs. These AOPIs are not proximal to or upgradient of drinking water wells used to supply potable water at USAG West Point. Additionally, both AOPIs are proximal (i.e., within 150 feet) to the Hudson River (i.e., installation boundary) and therefore it is unlikely a potable well will be installed between the AOPI and the Hudson River in the future. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Overburden groundwater originating at these AOPIs flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- Groundwater originating at these AOPIs does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation site workers, residents, and recreational users are incomplete.
- Overburden groundwater and stormwater originating at this AOPI flow off-post to the Hudson River, which is not used for drinking water off-post within a five-mile radius of USAG West Point. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-23 shows the CSM for AOPI Fire Station 1400. Potential releases of AFFF to soil and/or paved surfaces could migrate to groundwater via desorption and/or dissolution.

- PFOS, PFOA, and/or PFBS were detected in soil at the AOPI, and site workers could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. The AOPIs are not likely to be regularly accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is proximal to drinking water wells used to supply potable water at the installation. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. Recreational users are not likely to contact groundwater; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Groundwater originating at this AOPI flows off-post through the installation's southeastern boundary where there are several public and domestic drinking water wells. Therefore, the groundwater exposure pathway for off-installation drinking water receptors is potentially complete.
- Overburden groundwater from Fire Station 1400 could also potentially discharge to Long Pond, which is used for drinking water; therefore, the surface water exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. However, on-installation site workers and residents are not likely to contact sediment at Long Pond;

therefore, the exposure pathways for sediment (via ingestion and dermal contact) are incomplete. Recreational users could contact constituents in Long Pond through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are potentially complete.

- Surface water from Long Pond eventually flows off-post via Popolopen Brook prior to discharging to the Hudson River. Popolopen Brook and the Hudson River are not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary; therefore, the surface water drinking water exposure pathway for off-installation receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-24 shows the CSM for AOPI Old Camp Buckner Fire Station. Potential releases of AFFF to soil and/or paved surfaces could migrate to groundwater via desorption and/or dissolution and to the tributary leading to Mine Lake and Stilwell Lake via runoff/dissolution in surface water or stormwater and adsorption with associated suspended solids.

- PFOS, PFOA, and/or PFBS were not detected in soil at the AOPI. However, since the exact potential use areas of AFFF at the AOPI are uncertain, it is possible PFOS, PFOA, and PFBS are present in soil at the AOPI (i.e., in an area where the sample was not collected). Site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPI and the AOPI is not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were not detected in groundwater at the AOPI. However, since the exact potential release areas of AFFF at the AOPI are uncertain, it is possible PFOS, PFOA, and PFBS are present in groundwater at the AOPI (i.e., in an area where the sample was not collected). The AOPI is upgradient of several drinking water wells used to supply potable water at USAG West Point. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. Recreational users are not likely to contact groundwater; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.
- Groundwater originating at this AOPI flows off-post through the installation's southeastern boundary where there are several public and domestic drinking water wells. Therefore, the groundwater exposure pathway for off-installation receptors is potentially complete.
- PFOS, PFOA, and/or PFBS were detected in surface water and sediment at the AOPI. Stilwell Lake is used as an on-post source for drinking water. Therefore, the surface water exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are potentially complete. On-installation site workers and residents are not likely to contact sediment at Mine Lake or Stilwell Lake; therefore, the sediment exposure pathways (via incidental ingestion and dermal contact) are incomplete. Recreational users could contact constituents in surface water and sediment at Mine Lake and Stilwell Lake through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for on-installation recreational users are complete.

- Surface water from Stilwell Lake eventually flows off-post via Popolopen Brook prior to discharging to the Hudson River. Popolopen Brook and the Hudson River are not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary; therefore, the surface water drinking water exposure pathway for off-installation receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-25 shows the CSM for AOPI Target Hill WWTP. There is anecdotal evidence of a historical AFFF disposal to the sanitary sewer system at Fire Station 2 – Building 1203 (which is conveyed to the Target Hill WWTP), with potential migration to surface water and sediment in the Hudson River (i.e., outfall discharges to the Hudson River) and to sludges generated from WWTP operations.

- Sludges generated by the Target Hill WWTP are disposed at a landfill off post. Site workers (i.e., installation personnel) could contact constituents in sludges while on-post via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is potentially complete. There are no residences in the vicinity of the AOPI, and the AOPI is not likely to be accessed by on-installation residents and recreational users. Therefore, the soil exposure pathways for on-installation residents and recreational users are incomplete. Since the sludges are disposed off-post, the soil exposure pathway for off-installation receptors is potentially complete.
- Effluent water from the Target Hill WWTP discharges via a permitted outfall to the Hudson River. The outfall is located off-post; therefore, the surface water and sediment exposure pathways are incomplete for the on-installation receptors (site worker, resident, recreational user). The Hudson River is not used for drinking water off-post within a 5-mile radius of the USAG West Point installation boundary; therefore, the surface water drinking water exposure pathway for off-installation receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

Figure 7-26 shows the CSM for AOPI North Dock 2. Potential releases of AFFF to soil and/or paved surfaces could migrate to groundwater via desorption and/or dissolution.

- PFOS, PFOA, and/or PFBS were detected in soil at the AOPI, and site workers (i.e., installation personnel) could contact constituents in soil via incidental ingestion, dermal contact, and inhalation of dust. Therefore, the soil exposure pathway for on-installation site workers is complete. There are no residences in the vicinity of the AOPIs, and the AOPIs are not likely to be accessed by on-installation residents and recreational users, or by off-installation receptors. Therefore, the soil exposure pathways for these receptors are incomplete.
- PFOS, PFOA, and/or PFBS were detected in groundwater at the AOPI. The AOPI is not proximal to or upgradient of drinking water wells used to supply potable water at USAG West Point. Additionally, the AOPI is proximal (i.e., within 120 feet) to the Hudson River (i.e., installation boundary) and therefore it is unlikely a potable well will be installed between the AOPI and the Hudson River in the future. Therefore, the groundwater exposure pathways (via drinking water ingestion and dermal contact) for on-installation site workers and residents are incomplete. Recreational users are not likely

to contact groundwater during outdoor recreational activities; therefore, the groundwater exposure pathway for on-installation recreational users is incomplete.

- Overburden groundwater originating at this AOPI flows off-post through the installation's eastern boundary to the Hudson River. Therefore, the groundwater exposure pathway for off-installation receptors is incomplete.
- Groundwater originating at this AOPI does not discharge to surface water bodies on-post. Therefore, the surface water and sediment exposure pathways (via ingestion and/or dermal contact) for on-installation site workers, residents, and recreational users are incomplete.
- Overburden groundwater and stormwater originating at this AOPI flows off-post to the Hudson River, which is not used for drinking water off-post within a five-mile radius of USAG West Point. Therefore, the surface water exposure pathway (via drinking water ingestion and dermal contact) for off-installation drinking water receptors is incomplete. However, recreational users off-post could contact constituents in surface water and sediment through incidental ingestion and dermal contact. Therefore, the surface water and sediment exposure pathways for off-installation recreational users are potentially complete.

8 CONCLUSIONS AND RECOMMENDATIONS

The PFAS PA/SI included two distinct efforts. The PA identified AOPIs at USAG West Point based on the use, storage, and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per-and Polyfluoroalkyl Substances (Army 2018). The SI included multi-media sampling at AOPIs to determine whether or not a release of PFOS, PFOA, and PFBS to the environment occurred.

OSD provided residential risk screening levels based on the USEPA oral reference dose for PFOS, PFOA, and PFBS in soil and groundwater (tap water) and industrial/commercial risk screening levels for PFOS, PFOA, and PFBS in soil (**Appendix A**). A combination of document review, internet searches, interviews with installation personnel, and an installation site visit were used to identify specific areas of suspected use, storage, and/or disposal of PFAS-containing materials at USAG West Point. Following the evaluation, 15 AOPIs were identified.

There are four WTPs at USAG West Point that are supplied by various surface water bodies and groundwater wells on post: Stony Lonesome WTP, Lusk WTP, TMP WTP, and Camp Buckner WTP (**Figure 2-2a**). The Stony Lonesome WTP is supplied by a 20-inch pipeline pumped from Long Pond. The Lusk WTP is supplied by a 20-inch gravity pipeline that originates at Popolopen Brook and flows to Lusk Reservoir. The TMP WTP is supplied by Stilwell Lake, which is hydrologically connected to and downgradient of Mine Lake. The Camp Buckner WTP is supplied by Popolopen Lake. There 28 on-post potable groundwater wells that provide potable water to satellite buildings or facilities throughout USAG West Point (Tetra Tech, Inc. 2011). The WTPs and potable groundwater wells have been sampled for PFOS, PFOA, and/or PFBS by USAG West Point. All PFOS, PFOA, and PFBS detections were below the 2021 OSD risk screening levels for tap water (**Table 2-1a**).

All AOPIs except the Target Hill WWTP were sampled during the SI at USAG West Point to identify presence or absence of PFOS, PFOA, and PFBS. The SI scope of work was completed in accordance with the Final PQAPP (Arcadis 2019) and the USAG West Point QAPP Addendum (Arcadis 2020a). PFOS, PFOA, and/or PFBS were detected at all 14 sampled AOPIs at USAG West Point; only one groundwater detection at one AOPI exceeded the OSD risk screening levels. PFOS, PFOA, and PFBS detections and maximum concentrations in each sampled medium are summarized below:

- Fourteen out of 15 groundwater samples collected had PFOS, PFOA, and/or PFBS detections. The maximum groundwater detection was observed at the North Dock 1 AOPI (42 ng/L for PFOA), above the OSD risk screening level. The remaining 13 groundwater samples with PFOS, PFOA, and/or PFBS detections did not have detections above the OSD risk screening levels.
- Four out of nine soil samples collected had PFOS, PFOA, and/or PFBS detections. The maximum soil detection was observed at Fire Station 1 – Building 721 (0.0073 mg/kg for PFOS), below the OSD risk screening level.
- All eight surface water samples collected had PFOS, PFOA and/or PFBS detections. The maximum surface water detection was observed at Fire Station 2 – Building 1203 and Additional AFFF Spray Area (21 ng/L for PFOS).
- Six out of 11 sediment samples collected had PFOS, PFOA and/or PFBS detections. The maximum sediment detection was observed at Crow's Nest Bog (0.0033 mg/kg for PFOS).

Following the SI sampling, 15 AOPIs with confirmed PFOS, PFOA, and PFBS presence were considered to have potentially complete or complete exposure pathways. Additionally, although the Target Hill WWTP was not sampled, the AOPI has potentially complete exposure pathways.

- The soil exposure pathways for on-installation site workers are complete for four out of 15 AOPIs: Fire Station 1 – Building 721, Army Navy Bonfires, North Dock 2, and Fire Station 1400. The soil exposure pathways for on-installation site workers are potentially complete for nine out of 15 AOPIs: Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, Ordnance Road West, Dumpster Fire – Building 745, MVA Delafield Road, North Dock 1, Oil Tank Fire, Old Camp Buckner Fire Station, and Target Hill WWTP. The soil exposure pathways for off-installation receptors are potentially complete for one out of 15 AOPIs: Target Hill WWTP.
- The drinking water exposure pathway via groundwater for on-installation site workers and residents is potentially complete for six out of 15 AOPIs where PFOS, PFOA, and PFBS compounds were detected in groundwater samples and the groundwater is proximal to or upgradient of a USAG West Point drinking water source: Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, Ordnance Road West, USMA-32 Burn Pit, Fire Station 1400, and Old Camp Buckner Fire Station.
- The drinking water exposure pathway via groundwater for off-installation receptors is potentially complete for seven out of 15 AOPIs where PFOS, PFOA, and PFBS compounds were detected in groundwater samples and/or the groundwater may migrate off-post: Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, Ordnance Road West, USMA-32 Burn Pit, Crow's Nest Bog, Fire Station 1400, and Old Camp Buckner Fire Station.
- The drinking water exposure pathway via surface water for on-installation site workers and residents is potentially complete at three out of 15 AOPIs where PFOS, PFOA, and PFBS compounds were detected in surface water and/or where constituents from the AOPI can migrate to on-post potable use surface water bodies: USMA-32 Burn Pit, Fire Station 1400, and Old Camp Buckner Fire Station.
- The surface water exposure pathways (via incidental ingestion and dermal contact) for site workers are complete at one out of the 15 AOPIs due to the potential for site workers to contact constituents in the stormwater collection system: Fire Station 2 – Building 1203 and Additional AFFF Spray Area. The surface water exposure pathways (via incidental ingestion and dermal contact) for site workers are potentially complete at one out of the 15 AOPIs due to the potential for site workers to contact constituents in the stormwater drain: Dumpster Fire – Building 745.
- The surface water exposure pathways for on-installation recreational users are complete at five out of 15 AOPIs: Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, Ordnance Road West, Crow's Nest Bog, and Old Camp Buckner Fire Station. The surface water exposure pathways for on-installation recreational users are potentially complete at two out of 15 AOPIs: USMA-32 Burn Pit and Fire Station 1400. The surface water exposure pathways for all off-installation receptors are potentially complete for all 15 AOPIs.
- The sediment exposure pathways for on-installation site workers are complete at two out of the 15 AOPIs due to the potential for site workers to contact constituents in the stormwater collection

system/drain: Fire Station 2 – Building 1203 and Additional AFFF Spray Area and Dumpster Fire – Building 745. The sediment exposure pathways for on-installation recreational users are complete at two out of the 15 AOPIs: Crow's Nest Bog and Old Camp Buckner Fire Station. The sediment exposure pathways for on-installation recreational users are potentially complete at five out of the 15 AOPIs: Fire Station 2 – Building 1203 and Additional AFFF Spray Area, Ordnance Road East, Ordnance Road West, USMA-32 Burn Pit, and Fire Station 1400. The sediment exposure pathways for all off-installation receptors are potentially complete at all 15 AOPIs.

Although the CSMs indicate complete or potentially complete exposure pathways may exist, the recommendation for RI or no action at this time is based on the comparison of the SI analytical results for PFOS, PFOA, and PFBS to the OSD risk screening levels (**Table 6-2**). Following SI sampling, one AOPI (North Dock 1) had a PFOA sample result greater than the OSD risk screening level (**Section 7.10**). North Dock 1 is located approximately 40 feet from the Hudson River, a large, tidally-influenced water body. Additionally, a proximal groundwater sample collected from North Dock 2 is approximately 75 feet from the North Dock 1 groundwater sample and did not exceed the OSD risk screening level for tap water (**Section 7.11**). Due to the slight groundwater exceedance (42 ng/L), proximity to the Hudson River, proximity to the other groundwater data point, and limited area of AFFF use, the North Dock 1 is not recommended for any further action at this time. **Table 8-1** below summarizes the AOPIs identified at USAG West Point, PFOS, PFOA, and PFBS sampling, and recommendations for each AOPI. Further investigation is not warranted at USAG West Point.

Table 8-1 Summary of PFOS, PFOA, and PFBS Sampling at USAG West Point and Recommendations

AOPI Name	PFOS, PFOA, and/or PFBS detected greater than OSD Risk Screening Levels? (Yes, No, NA, NS)				Recommendation
	GW	SO	SW	SE	
Fire Station 2 – Building 1203 and Additional AFFF Spray	No	No	NA	NA	No action at this time
Ordnance Road East	No	No	NA	NA	No action at this time
Ordnance Road West	No	No	NA	NA	No action at this time
USMA-32 Burn Pit	No	NS	NS	NS	No action at this time
Crow's Nest Bog	NS	NS	NA	NA	No action at this time
Dumpster Fire – Building 745	No	NS	NS	NA	No action at this time
Fire Station 1 – Building 721	No	No	NS	NS	No action at this time
Army Navy Bonfires	No	No	NS	NS	No action at this time
MVA Delafield Road	No	NS	NS	NA	No action at this time
North Dock 1	Yes	NS	NS	NS	No action at this time*
North Dock 2	No	No	NS	NS	No action at this time
Oil Tank Fire	No	NS	NS	NS	No action at this time
Fire Station 1400	No	No	NS	NS	No action at this time
Old Camp Buckner Fire Station	No	No	NA	NA	No action at this time

AOPI Name	PFOS, PFOA, and/or PFBS detected greater than OSD Risk Screening Levels? (Yes, No, NA, NS)				Recommendation
	GW	SO	SW	SE	
Target Hill WWTP	NS	NS	NS	NS	No action at this time**

Notes:
Light gray shading – detection greater than the OSD risk screening level
* North Dock 1 had a groundwater sample result slightly greater than the OSD risk screening level. North Dock 1 is located approximately 40 feet from the Hudson River, a large, tidally-influenced water body. Additionally, a proximal groundwater sample collected from North Dock 2, approximately 75 feet from the North Dock 1 groundwater sample, did not exceed the OSD risk screening level. Due to the slight groundwater exceedance, proximity to the Hudson River, proximity to the other groundwater data point, and limited area of AFFF use, the North Dock 1 is not recommended for any further action at this time.
** The Target Hill WWTP was not sampled during the SI due to the following reasons: a lack of media to sample (i.e., WWTP sludges are sent off-post for disposal and effluent water is discharged off-post to a large, tidally-influenced water body [i.e., the Hudson River]), the Target Hill WWTP does not have any history of releases to the environment (i.e., not an Installation Restoration Program site) and is monitored as an active WWTP, and the source AOPI (Fire Station 2 – Building 1203 and Additional AFFF Spray Area) which discharged AFFF to Target Hill WWTP did not have any OSD risk screening level exceedances. Therefore, OSD risk screening level exceedances at the receiving AOPI (Target Hill WWTP) are not anticipated.
GW – groundwater
NA – associated media sampled is not applicable to OSD risk screening levels
NS – not sampled
SE – sediment
SO – soil
SW – surface water

Data collected during the PA (**Section 3**, **Section 4**, and **Section 5**) and SI (**Section 6** and **Section 7**) were sufficient to draw the conclusions summarized in **Section 8**. The data limitations relevant to the development of this PA/SI for PFOS, PFOA, and PFBS at USAG West Point are discussed below.

Records gathered for the use, storage, and/or disposal of PFAS-containing materials were reviewed during the PA process. Documentation specific to AFFF may have been limited (e.g., each AFFF use, procurement records, documentation of AFFF used during crash responses or fire training activities) due to lack of recordkeeping requirements for the full timeline of common AFFF practices. Anecdotal accounts of AFFF use (and therefore likely PFOS, PFOA, and PFBS use) were limited to available installation personnel, whose knowledge of AFFF use may have been restricted by their time spent at the installation or previous roles held that limited their relevant knowledge of potential AFFF (or other PFAS-containing material) use. The volumes of AFFF used during fire responses or equipment testing at Fire Station 2 – Building 1203 and Additional AFFF Spray Area, USMA-32 Burn Pit, Crow's Nest Bog and MVA Delafield Road are unknown. One AOPI (Target Hill WWTP) was not sampled due to the lack of media to sample to evaluate a known historical AFFF disposal and lack of drinking water receptors surrounding the AOPI.

A comprehensive well survey was not completed as part of this PA; therefore, the information reviewed regarding off-post potable wells is limited to what is contained in the EDR well search results. The EDR

well search report (**Appendix E**) was referenced when identifying potential off-post drinking water receptors.

The searches for ecological receptors and off-post PFOS, PFOA, and PFBS sources were not exhaustive and were limited to easily identifiable and readily available information evaluated during the relevant documents research, installation personnel interviews, and site reconnaissance.

Finally, the available PFOS, PFOA, and PFBS analytical data is limited to results from on-post drinking water supply sources, groundwater samples from monitoring wells at 13 of the 15 AOPIs, surface soil samples from eight of the 15 AOPIs, surface water samples from five of the 15 AOPIs, and sediment samples from seven of the 15 AOPIs and Delafield Dam (**Section 2.12**). No residential wells or private wells were sampled as part of the SI. Available data, including PFOS, PFOA, and/or PFBS, is listed in **Appendix P**, which were analyzed per the selected analytical method.

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ACRONYMS

%	percent
AFFF	aqueous film-forming foam
AOPI	area of potential interest
Arcadis	Arcadis U.S., Inc.
Army	United States Army
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CSM	conceptual site model
DoD	Department of Defense
DPW	Directorate of Public Works
DQO	data quality objective
DUSR	Data Usability Summary Report
EB	equipment blank
EDR	Environmental Data Resources, Inc.
ELAP	Environmental Laboratory Accreditation Program
FCR	Field Change Report
GIS	geographic information system
GW	groundwater
HDPE	high-density polyethylene
HQAES	Headquarters Army Environmental System
IDW	investigation-derived waste
installation	United States Army or Reserve installation
IRP	Installation Restoration Program
J	compound concentration is estimated
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram (parts per million)
M	manually integrated compound
MVA	motor vehicle accident

ng/L	nanograms per liter (parts per trillion)
NS	not sampled
NYSDEC	New York State Department of Environmental Conservation
OSD	Office of the Secretary of Defense
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POC	point of contact
ppm	parts per million
ppt	parts per trillion
PQAPP	Programmatic Uniform Federal Policy-Quality Assurance Project Plan
PUP	Pesticide Use Proposal
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	remedial investigation
RSL	Regional Screening Level
SE	sediment
SI	site inspection
SO	soil
SOP	standard operating procedure
SSHP	Site Safety and Health Plan
STAS	Stewart Army Subpost
SW	surface water
TGI	technical guidance instruction
TMP	Transportation Motor Pool
TOC	total organic carbon
UCMR3	Unregulated Contaminant Monitoring Rule

U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USAG	United States Army Garrison
USEPA	United States Environmental Protection Agency
USMA	United States Military Academy
WPMR	West Point Military Reservation
WTP	water treatment plant
WWTP	wastewater treatment plant

TABLES

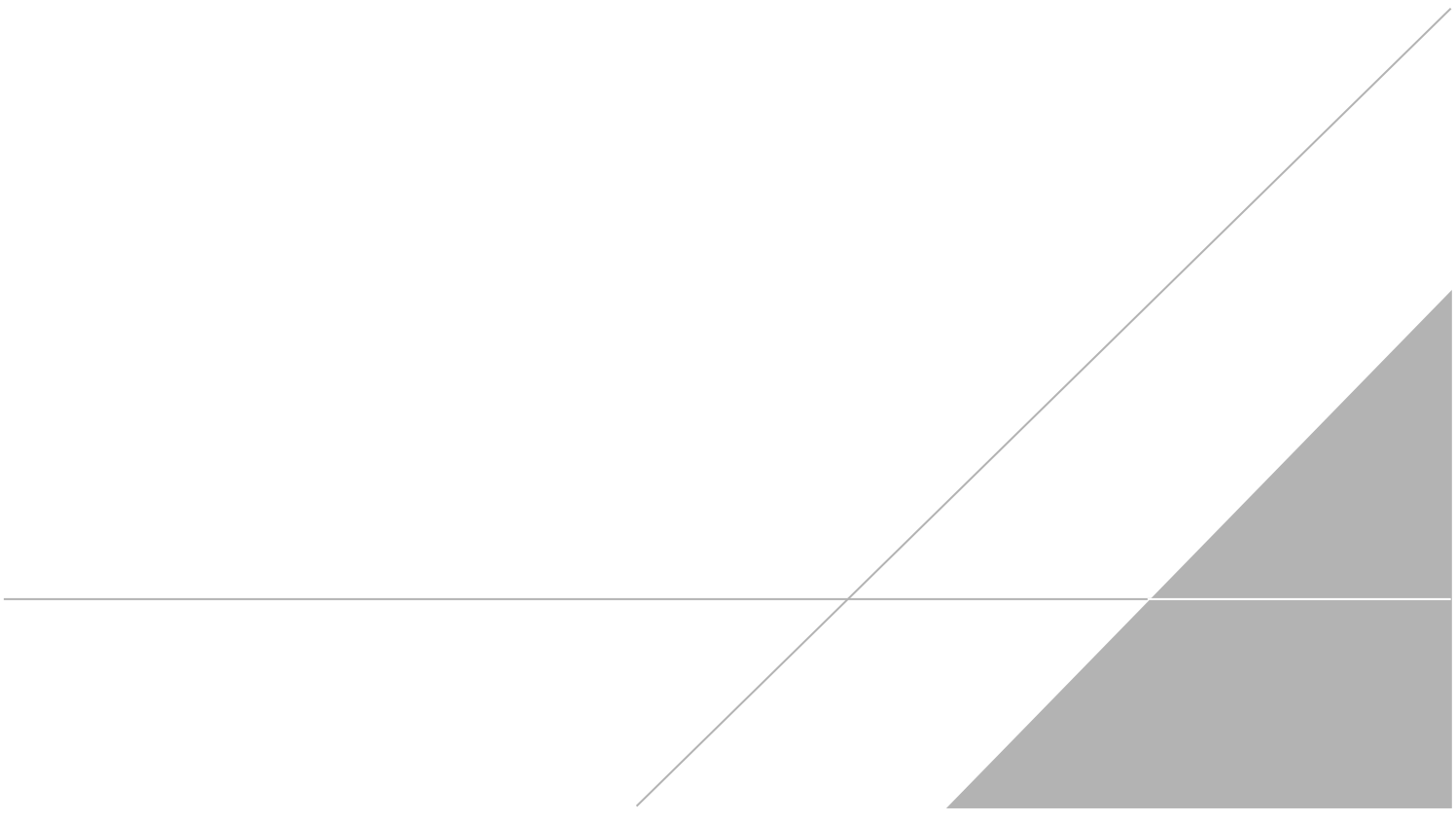

Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1331-W	1331-W	1331-W	1343	1343	1343	1348	1348
		Water System Name	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond
		Sample Date	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017
Chemical Name	OSD Risk Screening Level*	Units								
Perfluorooctanoic acid (PFOA)	40	ng/L	0.691	ND	1.8 U	2.35	ND	1.8 U	1.71	ND
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	ND	1.8 U	1.24	ND	1.8 U	1.63	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	1.8 U	NA	NA	1.8 U	NA	NA

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

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NA - not available
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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

	Source Water		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Surface Water
	Facility Number		1348	1355	1355	1355	1364	1364	1364	1724
	Water System Name		Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Round Pond	Camp Buckner
	Sample Date		6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016
Chemical Name	**OSD Risk Screening Level***	**Units**								
Perfluorooctanoic acid (PFOA)	40	ng/L	1.8 U	0.871	ND	1.8 U	0.80	ND	1.8 U	2.59
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	1.8 U	ND	ND	1.8 U	ND	ND	1.8 U	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	1.8 U	NA	NA	1.8 U	NA	NA	1.8 U	NA

Notes:
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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

	Source Water		Surface Water	Surface Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Facility Number		1724	1724	1670	1670	1670	1400	1400	1400
	Water System Name		Camp Buckner	Camp Buckner	DMI-HQ	DMI-HQ	DMI-HQ	Fire Station #3	Fire Station #3	Fire Station #3
	Sample Date		10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020
Chemical Name	**OSD Risk Screening Level***	**Units**								
Perfluorooctanoic acid (PFOA)	40	ng/L	ND	1.8 U	1.05	ND	1.8 U	ND	ND	1.8 U
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	1.8 U	ND	ND	1.8 U	ND	ND	1.8 U
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	1.8 U	NA	NA	1.8 U	NA	NA	1.8 U

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1225	1225	1225	1223	1223	1223	1236	1236
		Water System Name	GC Maintenance	GC Maintenance	GC Maintenance	GC Practice	GC Practice	GC Practice	HazMat	HazMat
		Sample Date	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017
Chemical Name	OSD Risk Screening Level*	Units								
Perfluorooctanoic acid (PFOA)	40	ng/L	1.12	ND	1.8 U	1.09	ND	1.9 U	0.679	ND
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	ND	1.8 U	ND	ND	1.9 U	ND	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	1.8 U	NA	NA	1.9 U	NA	NA

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Surface Water	Surface Water	Surface Water	Groundwater
		Facility Number	1236	1848	1848	1848	726	726	726	1404
		Water System Name	HazMat	Lake Frederick	Lake Frederick	Lake Frederick	Lusk	Lusk	Lusk	Miller Well
		Sample Date	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/17/2017	6/23/2020	8/30/2016
Chemical Name	**OSD Risk Screening Level***	**Units**								
Perfluorooctanoic acid (PFOA)	40	ng/L	1.8 U	0.65	ND	1.8 U	2.34	ND	1.8 U	0.762
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	1.8 U	ND	ND	1.8 U	ND	ND	1.8 U	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	1.8 U	NA	NA	1.8 U	NA	NA	1.8 U	NA

Notes:
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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1404	2020	2020	2020	2026	2026	2026
		Water System Name	Miller Well	Morgan House	Morgan House	Morgan House	Morgan Stables	Morgan Stables	Morgan Stables
		Sample Date	10/17/2017	8/30/2016	10/17/2017	6/23/2020	8/30/2016	10/17/2017	6/23/2020
Chemical Name	**OSD Risk Screening Level***	**Units**							
Perfluorooctanoic acid (PFOA)	40	ng/L	ND	ND	ND	1.8 U	ND	ND	1.8 U
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	ND	ND	1.8 U	ND	ND	1.8 U
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	NA	1.8 U	NA	NA	1.8 U

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	749	749	749	1403	1403	1403	1428
		Water System Name	Paint Ball Field	Paint Ball Field	Paint Ball Field	Range Control HQ	Range Control HQ	Range Control HQ	Range 11 Maintenance
		Sample Date	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016
Chemical Name	OSD Risk Screening Level*	Units							
Perfluorooctanoic acid (PFOA)	40	ng/L	0.873	ND	1.8 U	0.806	ND	4.6	1.16
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	ND	1.8 U	ND	ND	3.4	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	1.8 U	NA	NA	6.9	NA

Notes:
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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1428	1428	1282	1282	1282	1420-A	1420-A
		Water System Name	Range 11 Maintenance	Range 11 Maintenance	Range 2 Trailer	Range 2 Trailer	Range 2 Trailer	Range 11 Normandy	Range 11 Normandy
		Sample Date	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017
Chemical Name	OSD Risk Screening Level*	Units							
Perfluorooctanoic acid (PFOA)	40	ng/L	ND	4.1	0.909	ND	1.8 U	0.934	ND
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	3.4	ND	ND	1.8 U	ND	ND
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	5.5	NA	NA	1.8 U	NA	NA

Notes:
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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1420-A	1990	1990	1990	1666	1666	1666
		Water System Name	Range 11 Normandy	Range 15	Range 15	Range 15	Snake Pit	Snake Pit	Snake Pit
		Sample Date	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020
Chemical Name	OSD Risk Screening Level*	Units							
Perfluorooctanoic acid (PFOA)	40	ng/L	1.8 U	0.694	ND	1.8 U	2.64	ND	1.8 U
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	1.8 U	ND	ND	1.8 U	1.05	ND	1.8 U
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	1.8 U	NA	NA	1.8 U	NA	NA	1.8 U

Notes:
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Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
		Facility Number	108	108	108	1210	1210	1210	1940	1940	1940
		Water System Name	Stewart	Stewart	Stewart	Stony	Stony	Stony	TMP	TMP	TMP
		Sample Date	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020
Chemical Name	**OSD Risk Screening Level***	**Units**									
Perfluorooctanoic acid (PFOA)	40	ng/L	0.985	ND	1.8 U	3.25	ND	1.8 U	1.93	ND	1.8 U
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	ND	ND	1.8 U	4.36	ND	1.8 U	ND	ND	1.8 U
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	1.8 U	NA	NA	1.8 U	NA	NA	1.8 U

Notes:
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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1378	1378	1378	1378	1378	1378
		Water System Name	Transfer Station Scale	Transfer Station Scale	Transfer Station Scale	Transfer Station Scale	Transfer Station Scale	Transfer Station Scale
		Sample Date	8/30/2016	10/16/2017	1/16/2018	4/10/2018	7/24/2018	6/23/2020
Chemical Name	OSD Risk Screening Level*	Units						
Perfluorooctanoic acid (PFOA)	40	ng/L	3.66	2.51	2.68	8.57	7.73	3.7
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	1.82	ND	2.0 U	2.68	3.34	7.5
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	NA	NA	NA	1.8 U

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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1183	1183	1183	1183	1183	1183
		Water System Name	Constitution Island - Warner House	Constitution Island - Warner House	Constitution Island - Warner House	Constitution Island - Warner House	Constitution Island - Warner House	Constitution Island - Warner House
		Sample Date	8/30/2016	10/16/2017	1/16/2018	4/10/2018	7/24/2018	6/23/2020
Chemical Name	**OSD Risk Screening Level***	**Units**						
Perfluorooctanoic acid (PFOA)	40	ng/L	1.07	2.91	4.18	2.0 U	5.32	3.4
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	1.97	2.06	5.66	2.0 U	7.7	6.5
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	NA	NA	NA	1.8 U

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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

	Source Water		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
	Facility Number		1800	1800	1800	1800	1800	1330	1330	1330
	Water System Name		Bull Pond	Bull Pond	Bull Pond	Bull Pond	Bull Pond	ITAM/ Range Control	ITAM/ Range Control	ITAM/ Range Control
	Sample Date		8/30/2016	10/16/2017	4/10/2018	7/24/2018	6/23/2020	8/30/2016	10/16/2017	1/16/2018
Chemical Name	**OSD Risk Screening Level***	**Units**								
Perfluorooctanoic acid (PFOA)	40	ng/L	6.29	7.19	14.5	2.0 U	3.5	11.3	12	9.26
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	10.7	8.36	2.0 U	2.0 U	7.1	1.78	ND	< 2.0
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	NA	NA	ND	NA	NA	NA

Notes:
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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1330	1330	1330	1338	1338	1338	1338	1338
		Water System Name	ITAM/ Range Control	ITAM/ Range Control	ITAM/ Range Control	Range 5 Gettysburg	Range 5 Gettysburg	Range 5 Gettysburg	Range 5 Gettysburg	Range 5 Gettysburg
		Sample Date	4/10/2018	7/24/2018	6/23/2020	8/30/2016	10/16/2017	1/16/2018	4/10/2018	7/24/2018
Chemical Name	**OSD Risk Screening Level***	**Units**								
Perfluorooctanoic acid (PFOA)	40	ng/L	14.8	2.0 U	3.3	6.93	6.17	5.44	5.11	7.83
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	< 2.0	2.0 U	6.7	4.1	4.01	3.53	3.15	3.14
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	1.8 U	NA	NA	NA	NA	NA

Notes:
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USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
		Facility Number	1338	1389	1389	1389	1389	1389	1389	1379
		Water System Name	Range 5 Gettysburg	Skeet & Trap Range 19	Skeet & Trap Range 19	Skeet & Trap Range 19	Skeet & Trap Range 19	Skeet & Trap Range 19	Skeet & Trap Range 19	Transfer Station
		Sample Date	6/23/2020	8/30/2016	10/16/2017	1/16/2018	4/10/2018	7/24/2018	6/23/2020	8/30/2016
Chemical Name	OSD Risk Screening Level*	Units								
Perfluorooctanoic acid (PFOA)	40	ng/L	3.40	3.49	5.22	4.24	4.76	5.24	3.4	8.52
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	6.20	5.34	5.94	5.94	3.03	8.18	7.1	4.20
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	1.8 U	NA	NA	NA	NA	NA	1.8 U	NA

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

Data prior to 2018 was provided by USAG West Point and laboratory reports were not included. Therefore, the limit of quantitation for not detected samples is unknown

Acronyms/Qualifiers:
NA - not available
ND, U - not detected above the laboratory limit of detection
ng/L - nanograms per liter
OSD - Office of the Secretary of Defense
PA - preliminary assessment
PFAS - per- and polyfluoroalkyl substances
SI - site inspection

Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groudwater
		Facility Number	1379	1379	1379	1379	1379	1186	1186	1186
		Water System Name	Transfer Station	Transfer Station	Transfer Station	Transfer Station	Transfer Station	Warner Groundskeeper	Warner Groundskeeper	Warner Groundskeeper
		Sample Date	10/16/2017	1/16/2018	4/10/2018	7/24/2018	6/23/2020	10/16/2017	1/16/2018	4/10/2018
Chemical Name	OSD Risk Screening Level*	Units								
Perfluorooctanoic acid (PFOA)	40	ng/L	9.18	8.94	8.59	7.29	3.3	ND	<2.0	<2.0
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	4.04	< 2.0	2.67	3.24	6.7	3.49	<2.0	<2.0
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	NA	NA	NA	1.8 U	NA	NA	NA

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

Data prior to 2018 was provided by USAG West Point and laboratory reports were not included. Therefore, the limit of quantitation for not detected samples is unknown

Acronyms/Qualifiers:
NA - not available
ND, U - not detected above the laboratory limit of detection
ng/L - nanograms per liter
OSD - Office of the Secretary of Defense
PA - preliminary assessment
PFAS - per- and polyfluoroalkyl substances
SI - site inspection

Table 2-1a. Historical PFOS, PFOA, and PFBS Analytical Results - Potable Water Supply
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

		Source Water	Groundwater	Groundwater
		Facility Number	1186	1186
		Water System Name	Warner Groundskeeper	Warner Groundskeeper
		Sample Date	7/24/2018	6/23/2020
Chemical Name	OSD Risk Screening Level*	Units		
Perfluorooctanoic acid (PFOA)	40	ng/L	5.23	3.4
Perfluorooctanesulfonic acid (PFOS)	40	ng/L	8.05	7.1
Perfluorobutanesulfonic acid (PFBS)	600	ng/L	NA	1.8 U

Notes:
* Risk screening level for tap water. To be conservative, the OSD tap water risk screening levels will be used to compare all groundwater and potable-use surface water for the Army PFAS PA/SIs.

Data prior to 2018 was provided by USAG West Point and laboratory reports were not included. Therefore, the limit of quantitation for not detected samples is unknown

Acronyms/Qualifiers:
NA - not available
ND, U - not detected above the laboratory limit of detection
ng/L - nanograms per liter
OSD - Office of the Secretary of Defense
PA - preliminary assessment
PFAS - per- and polyfluoroalkyl substances
SI - site inspection

Table 2-1b. Historical PFOS, PFOA, and PFBS Analytical Results - Sediment
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

Media		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Sample ID		SED20-01	SED20-02	SED20-03	SED20-04	SED20-05	SED20-06	SED20-07	SED20-08	SED20-09	SED20-10
Sample Date		8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016	10/16/2017	6/23/2020	8/30/2016
Chemical name	**Units**										
Perfluorooctanoic acid (PFOA)	mg/kg	0.000064 J	0.000638 U	0.000538 U	0.000472 U	0.000935 U	0.000573 U	0.000962 U	0.000466 U	0.000648 U	0.00055 U
Perfluorooctanesulfonic acid (PFOS)	mg/kg	0.000372 J	0.000272 J	0.000538 U	0.000472 U	0.000265 J	0.000573 U	0.00037 J	0.000466 U	0.000328 J	0.00055 U
Perfluorobutanesulfonic acid (PFBS)	mg/kg	0.000606 U	0.000638 U	0.000538 U	0.000472 U	0.000935 U	0.000573 U	0.000962 U	0.000466 U	0.000648 U	0.00055 U

Acronyms:
mg/kg - milligrams per kilogram

Qualifiers:
J - estimated value
U - not detected

Table 6-1 - Site Inspection Sampling Location Details
USAEC PFAS Preliminary Assessment/Site Inspection
United States Army Garrison- West Point, New York

AOPI	Matrix	Sample ID	Depth Interval	Sample Method	Analytes
Fire Station 2- Building 1203 and Additional AFFF Spray	Soil	WP-ASFS2-1-SO-(0.5-2)-071620	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
		WP-FD-1-SO-071620 / WP-ASFS2-1-SO-(0.5-2)-071620	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-ASFS2-1-081920	21-31 ft bgs	Low Flow	PFAS
		WP-FD-1-GW-081920/WP-ASFS2-1-081920	21-31 ft bgs	Low Flow	PFAS
	Surface Water	WP-ASFS2-1-SW-071520	N/A	Grab	PFAS
		WP-THF-1-SW-071720	N/A	Grab	PFAS
		WP-FD-1-SW-071720 / WP-THF-1-SW-071720	N/A	Grab	PFAS
		WP-FS2-1-SW-071520	N/A	Grab	PFAS
	Sediment	WP-ASFS2-1-SE-071520	0- 4 inches	Grab	PFAS
		WP-THF-1-SE-071720	0-4 inches	Grab	PFAS
		WP-FD-1-SE-071720 / WP-THF-1-SE-071720	0-4 inches	Grab	PFAS
		WP-FS2-1-SE-071520	0- 4 inches	Grab	PFAS
Ordnance Road East	Soil	WP-ORE-1-SO-(0.5-2)-071620	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-ORE-1-GW-081020	10 ft bgs	Low Flow	PFAS
	Surface Water	WP-OR-1-SW-071520	N/A	Grab	PFAS
	Sediment	WP-OR-1-SE-071520	0- 4 inches	Grab	PFAS
		WP-OR-2-SE-080520	0- 4 inches	Grab	PFAS
Ordnance Road West	Soil	WP-ORW-1-SO-(0.5-2)-071620	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-ORW-1-GW-081020	10 ft bgs	Low Flow	PFAS
USMA-32 Burn Pit	Groundwater	WP-USMA32BP-1-GW-081320	5-10 ft bgs	Low Flow	PFAS
		WP-USMA32BP-2-GW-081320	54-74 ft bgs	Low Flow	PFAS
Crow's Nest Bog	Surface Water	WP-CNB-1-SW-071520	N/A	Grab	PFAS
		WP-CNB-2-SW-071520	N/A	Grab	PFAS
		WP-CNB-3-SW-072720	N/A	Grab	PFAS
	Sediment	WP-CNB-1-SE-071520	0- 4 inches	Grab	PFAS
		WP-CNB-2-SE-071520	0- 4 inches	Grab	PFAS
		WP-CNB-3-SE-072720	0- 4 inches	Grab	PFAS
Dumpster Fire- Building 745	Groundwater	WP-DF745-1-GW-081220	9-19 ft bgs	Low Flow	PFAS
	Sediment	WP-DF745-1-SE-080620	0-3 inches	Grab	PFAS
Fire Station 1- Building 721	Soil	WP-FS1-1-SO-(0.5-2)-071520	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-FS1-1-GW-081920	28-38 ft bgs	Low Flow	PFAS
Army Navy Bonfires	Soil	WP-ANB-1-SO-(0.5-2)-071520	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-ANB-1-GW-081320	35-45 ft bgs	Low Flow	PFAS
MVA Delafield Road	Groundwater	WP-MVADR-1-GW-081020	56-70 ft bgs	Grab	PFAS
	Sediment	WP-MVADR-1-SE-072320	0-4 inches	Grab	PFAS
North Dock 1	Groundwater	WP-ND1-1-GW-081020	10 ft bgs	Low Flow	PFAS
North Dock 2	Soil	WP-ND2-1-SO-(0.5-2)-071620	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-ND2-1-GW-081020	10 ft bgs	Low Flow	PFAS
Oil Tank Fire	Groundwater	WP-OTF-1-GW-081020	10 ft bgs	Low Flow	PFAS
Fire Station 1400	Soil	WP-FS1400-1-SO-(0.5-2)071320	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
		WP-FS1400-2-SO-(0.5-2)071320	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-FS1400-1-GW-081920	20 ft bgs	Low Flow	PFAS
		WP-FS1400-2-GW-081920	9-19 ft bgs	Low Flow	PFAS
Old Camp Buckner Fire Station	Soil	WP-OCBFS-1-SO-(0.5-2)-071420	0.5-2 ft bgs	Hand Auger	PFAS, TOC, pH, grain size
	Groundwater	WP-OCBFS-1-GW-081920	5-15 ft bgs	Low Flow	PFAS
	Surface Water	WP-OCBFS-1-SW-071420	N/A	Grab	PFAS
	Sediment	WP-OCBFS-1-SE-071420	0-4 inches	Grab	PFAS

Notes:

1. Depth units are reported in feet below ground surface (ft bgs) unless otherwise noted. Sampling depth noted for existing monitoring wells indicates the depth at approximately the center of the saturated screened interval.
2. In addition to laboratory analytes, field parameters were measured for groundwater samples and include temperature, pH, conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential. Lithologic descriptions were logged continuously at soil boring locations, and for sediment sampling locations. Field parameters and lithological descriptions are shown on field sampling forms included in **Appendix L**.
3. The PFAS analyte group includes PFOS, PFOA, PFBS and 15 other PFAS constituents.

Acronyms:

AFFF - aqueous film-forming foam
AOPI - Area of Potential Interest
DPT - Direct Push Technology
ft bgs - feet below ground surface
GW - groundwater
ID - identification
MVA - motor vehicle accident
N/A - not available or not applicable
PFAS - per- and polyfluoroalkyl substances
PFBS - perfluorobutanesulfonic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonate
SE - Sediment
SW - surface water
SO - soil
TOC - total organic carbon
USMA - United States Military Academy

Table 7-1 - Groundwater PFOS, PFOA, and PFBS Analytical Results
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

AOPI	Sample/ Parent ID	Sample Date	Analyte	PFOS (ng/L)		PFOA (ng/L)		PFBS (ng/L)	
			OSD Risk Screening Level - Tap Water	40		40		600	
			Sample Type	Result	Qual	Result	Qual	Result	Qual
Fire Station 2 - Building 1203 and Additional AFFF Spray Area	WP-ASFS2-1-081920	8/19/2020	N	**2.8**	**M**	**10**	**M**	**1.9**	
	WP-FD-1-GW-081920/WP-ASFS2-1-081920	8/19/2020	FD	**2.8**	**M**	**10**	**M**	**1.8**	**J**
Ordnance Road East	WP-ORE-1-GW-081020	8/10/2020	N	**2.0**	**M**	**8.9**	**M**	**3.2**	
Ordnance Road West	WP-ORW-1-GW-081020	8/10/2020	N	**3.3**	**M**	**7.6**	**M**	1.8	U
USMA-32 Burn Pit	WP-USMA32BP-1-GW-081320	8/13/2020	N	1.6	U	**1.2**	**J**	1.6	U
	WP-USMA32BP-2-GW-081320	8/13/2020	N	**4.7**		**6.2**	**M**	**5.4**	
Dumpster Fire- Building 745	WP-DF745-1-GW-081220	8/12/2020	N	**4.5**		**6.1**	**M**	**2.2**	**M**
Fire Station 1- Building 721	WP-FS1-1-GW-081920	8/19/2020	N	**3.5**		**5.3**	**M**	**2.5**	
Army-Navy Bonfires	WP-ANB-1-GW-081320	8/13/2020	N	**6.0**	**M**	**33**	**M**	**24**	
MVA Delafield Road	WP-MVADR-1-GW-081020	8/10/2020	N	1.6	U	**2.1**		1.6	U
North Dock 1	WP-ND1-1-GW-081020	8/10/2020	N	**21**	**M**	**42**	**M**	**2.9**	
North Dock 2	WP-ND2-1-GW-081020	8/10/2020	N	**6.7**	**M**	**15**	**M**	**1.8**	
Oil Tank Fire	WP-OTF-1-GW-081020	8/10/2020	N	**6.1**	**M**	**10**	**M**	**27**	
Fire Station 1400	WP-FS1400-1-GW-081920	8/19/2020	N	**1.2**	**J**	1.8	U	1.8	U
	WP-FS1400-2-GW-081920	8/19/2020	N	**3.0**	**J**	**12**	**M**	**2.7**	
Old Camp Buckner Fire Station	WP-OCBFS-1-GW-081920	8/19/2020	N	1.9	U	1.9	U	1.9	U

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection.
2. Data are compared to the Office of the Secretary of Defense (OSD) risk screening levels for tap water (OSD 2021).
3. Grey shaded values indicate the result was detected greater than the residential risk screening levels for tap water

Acronyms:
AOPI - Area of Potential Interest
FD - field duplicate sample
ID - identification
MVA - motor vehicle accident
N - primary sample
ng/L - nanograms per liter (parts per trillion)
PFAS - per- and polyfluoroalkyl substances
PFBS - perfluorobutane sulfonic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonic acid
Qual - qualifier
USMA - United States Military Academy

Qualifiers:
J - The analyte was positively identified; however the associated numerical value is an estimated concentration only.
M - manually integrated compound
U - The analyte was analyzed for but the result was not detected above the limit of quantitation.

Table 7-2- Soil PFOS, PFOA, and PFBS Analytical Results
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

AOPI	Sample/Parent ID	Sample Date	Analyte	PFOS (mg/kg)		PFOA (mg/kg)		PFBS (mg/kg)	
			OSD Risk Screening Level - Industrial/Commercial Scenario	1.6		1.6		25	
			OSD Risk Screening Level - Residential Scenario	0.13		0.13		1.9	
			Sample Type	Result	Qual	Result	Qual	Result	Qual
Fire Station 2 - Building 1203 and Additional AFFF Spray Area	WP-ASFS2-1-SO-(0.5-2)-071620	7/16/2020	N	0.00059	U	0.00059	U	0.002	U
	WP-FD-1-SO-071620 / WP-ASFS2-1-SO-(0.5-2)-071620	7/16/2020	FD	0.00065	U	0.00065	U	0.0022	U
Ordnance Road East	WP-ORE-1-SO-(0.5-2)-071620	7/16/2020	N	0.0006	U	0.0006	U	0.002	U
Ordnance Road West	WP-ORW-1-SO-(0.5-2)-071620	7/16/2020	N	0.00062	U	0.00062	U	0.0021	U
Fire Station 1- Building 721	WP-FS1-1-SO-(0.5-2)-071520	7/15/2020	N	**0.0073**	**M**	**0.00085**		0.0022	U
Army-Navy Bonfires	WP-ANB-1-SO-(0.5-2)-071520	7/15/2020	N	**0.0044**	**M**	**0.00094**		0.0022	U
North Dock 2	WP-ND2-1-SO-(0.5-2)-071620	7/16/2020	N	**0.00067**	**J**	**0.00072**		0.0023	U
Fire Station 1400	WP-FS1400-1-SO-(0.5-2)071320	7/13/2020	N	**0.0025**	**M**	0.00072	U	0.0024	U
	WP-FS1400-2-SO-(0.5-2)071320	7/13/2020	N	0.00067	U	0.00067	U	0.0022	U
Old Camp Buckner Fire Station	WP-OCBFS-1-SO-(0.5-2)-071420	7/14/2020	N	0.00063	U	0.00063	U	0.0021	U

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection
2. Data are compared to the Office of the Secretary of Defense (OSD) risk screening levels for both the residential as well as the industrial/commercial scenarios (OSD 2021).

Acronyms:
AOPI - Area of Potential Interest
FD - field duplicate sample
ID - identification
mg/kg - milligrams per kilogram (parts per million)
N - primary sample
PFAS - per- and polyfluoroalkyl substances
PFBS - perfluorobutane sulfonic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonic acid
Qual - qualifier

Qualifiers:
J - The analyte was positively identified; however the associated numerical value is an estimated concentration only.
M - manually integrated compound
U - The analyte was analyzed for but the result was not detected above the limit of quantitation.

Table 7-3 - Surface Water PFOS, PFOA, and PFBS Analytical Results
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

AOPI	Sample/Parent ID	Sample Date	Analyte	PFOS (ng/L)		PFOA (ng/L)		PFBS (ng/L)	
			Sample Type	Result	Qual	Result	Qual	Result	Qual
Fire Station 2- Building 1203 and Additional AFFF Spray Area	WP-FS2-1-SW-071520	7/15/2020	N	**21**	**M**	**20**	**M**	**1.1**	**J**
	WP-ASFS2-1-SW-071520	7/15/2020	N	**3.8**	**M**	**8.7**	**M**	**1.9**	**M**
	WP-THF-1-SW-071720	7/17/2020	N	1.6	U	**1.2**	**J**	1.6	U
	WP-FD-1-SW-071720 / WP-THF-1-SW-071720	7/17/2020	FD	1.6	U	**1.2**	**J**	1.6	U
Crow's Nest Bog	WP-CNB-1-SW-071520	7/15/2020	N	**1.6**	**J**	**4.7**	**M**	1.7	U
	WP-CNB-2-SW-071520	7/15/2020	N	**1.2**	**J**	**4.6**	**M**	1.8	U
	WP-CNB-3-SW-072720	7/27/2020	N	**13**	**M**	**0.80**	**J**	**2.1**	
Ordnance Road East/West	WP-OR-1-SW-071520	7/15/2020	N	2.0	U	**8.7**	**M**	**3.4**	
Old Camp Buckner Fire Station	WP-OCBFS-1-SW-071420	7/14/2020	N	**6.0**	**M**	**3.1**	**M**	1.8	U

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection

Acronyms:
AOPI - Area of Potential Interest
FD - field duplicate sample
ID - identification
N - primary sample
ng/L - nanograms per liter (parts per trillion)
PFBS - perfluorobutane sulfonic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonic acid
Qual - qualifier

Qualifiers:
J = The analyte was positively identified; however the associated numerical value is an estimated concentration only.
M = manually integrated compound
U = The analyte was analyzed for but the result was not detected above the limit of quantitation.

Table 7-4 - Sediment PFOS, PFOA, and PFBS Analytical Results
USAEC PFAS Preliminary Assessment/Site Inspection
USAG West Point, New York

AOPI	Sample/Parent ID	Sample Date	Analyte	PFOS (mg/kg)		PFOA (mg/kg)		PFBS (mg/kg)	
			Sample Type	Result	Qual	Result	Qual	Result	Qual
Fire Station 2- Building 1203 and Additional AFFF Spray Area	WP-FS2-1-SE-071520	7/15/2020	N	**0.0027**		0.0009	U	0.003	U
	WP-ASFS2-1-SE-071520	7/15/2020	N	0.0024	U	0.0024	U	0.0078	U
	WP-THF-1-SE-071720	7/17/2020	N	0.0010	U	0.0010	U	0.0035	U
	WP-FD-1-SE-071720 / WP-THF-1-SE-071720	7/17/2020	FD	0.00098	U	0.00098	U	0.0033	U
Ordnance Road East/West	WP-OR-1-SE-071520	7/15/2020	N	0.0018	U	0.0018	U	0.006	U
	WP-OR-2-SE-080520	8/5/2020	N	0.00067	U	0.00067	U	0.0022	U
Crow's Nest Bog	WP-CNB-1-SE-071520	7/15/2020	N	**0.0022**	**J**	0.0023	U	0.0077	U
	WP-CNB-2-SE-071520	7/15/2020	N	**0.0033**		**0.0023**	**J**	0.008	U
	WP-CNB-3-SE-072720	7/27/2020	N	**0.0027**	**M**	0.0008	U	0.0027	U
Dumpster Fire- Building 745	WP-DF745-1-SE-080620	8/6/2020	N	**0.0007**	**J**	0.00087	U	0.0029	U
MVA Delafield Road	WP-MVADR-1-SE-072320	7/23/3030	N	0.00068	U	0.00068	U	0.0023	U
Old Camp Buckner Fire Station	WP-OCBFS-1-SE-071420	7/14/2020	N	**0.00089**	**J**	0.0010	U	0.0033	U

Notes:
1. **Bolded** values indicate the result was detected greater than the limit of detection

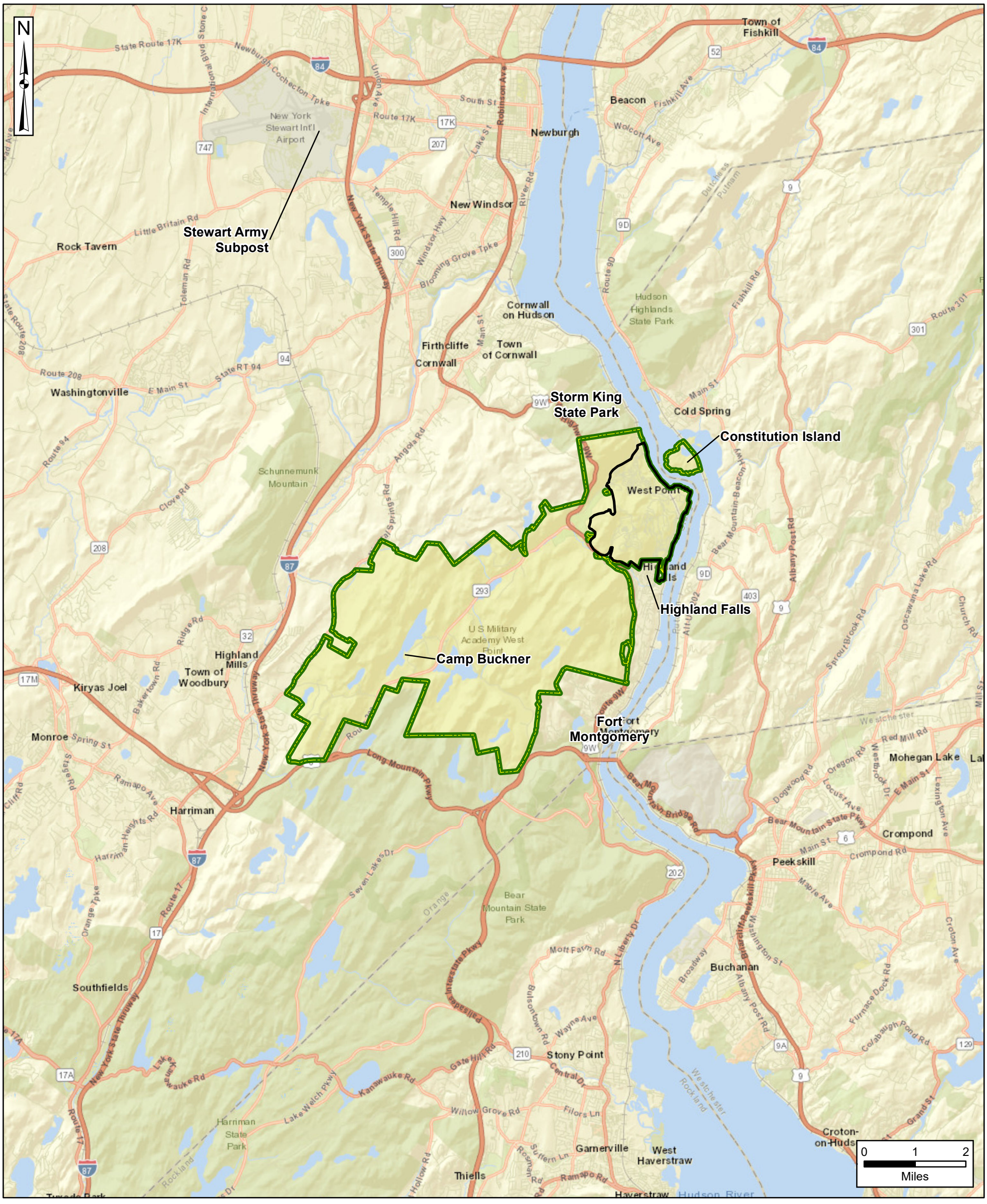
Acronyms:
AOPI - Area of Potential Interest
FD - field duplicate sample
ID - identification
mg/kg - milligrams per kilogram (parts per million)
MVA - motor vehicle accident
N - primary sample
PFBS - perfluorobutane sulfonic acid
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonic acid
Qual - qualifier

Qualifiers:
J - The analyte was positively identified; however the associated numerical value is an estimated
M - manually integrated compound
U - The analyte was analyzed for but the result was not detected above the limit of quantitation.

FIGURES

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point, NY

Figure 2-1
Site Location



Installation Boundary

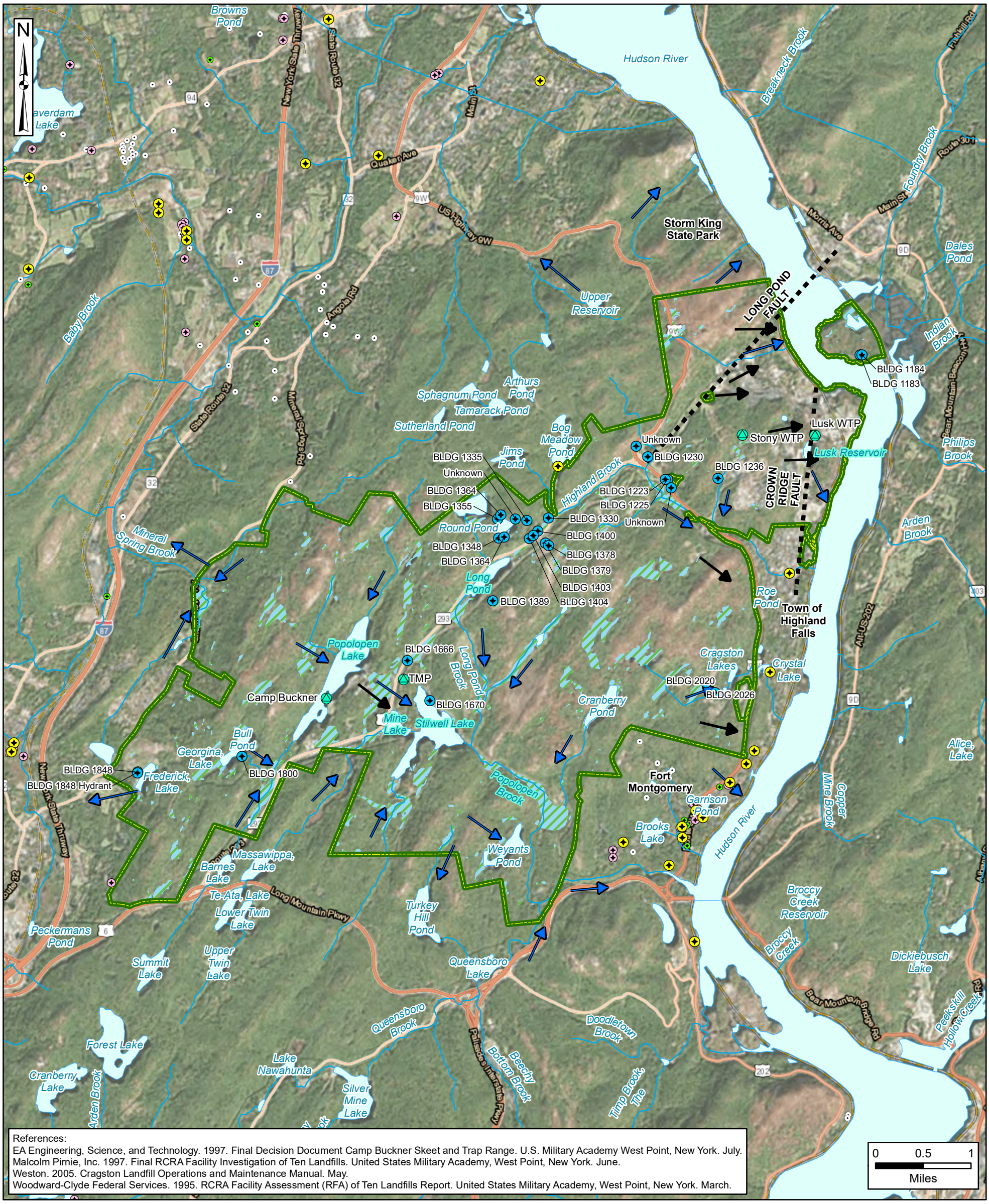
Cantonment Area

Data Sources:
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point, NY

Figure 2-2a
USAG West Point Installation Layout



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- Installation Boundary
- River/Stream
- Water Body
- Wetland
- Surface Water Flow Direction
- General Groundwater Flow Direction
- Approximate Bedrock Fault Location
- Water Treatment Plant
- On-Post Potable Well

EDR Wells

- Public Water Supply System Well
- Other Public Supply Well (Community)
- Domestic Well
- Other Designated Use Water Well

Notes:
1. Water bodies with a teal halo are indicative of surface source water for water treatment plants that supply potable water to West Point.
2. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
3. Other designated use wells include wells with unknown use.
4. Potable well labels indicate the building number associated with the well.

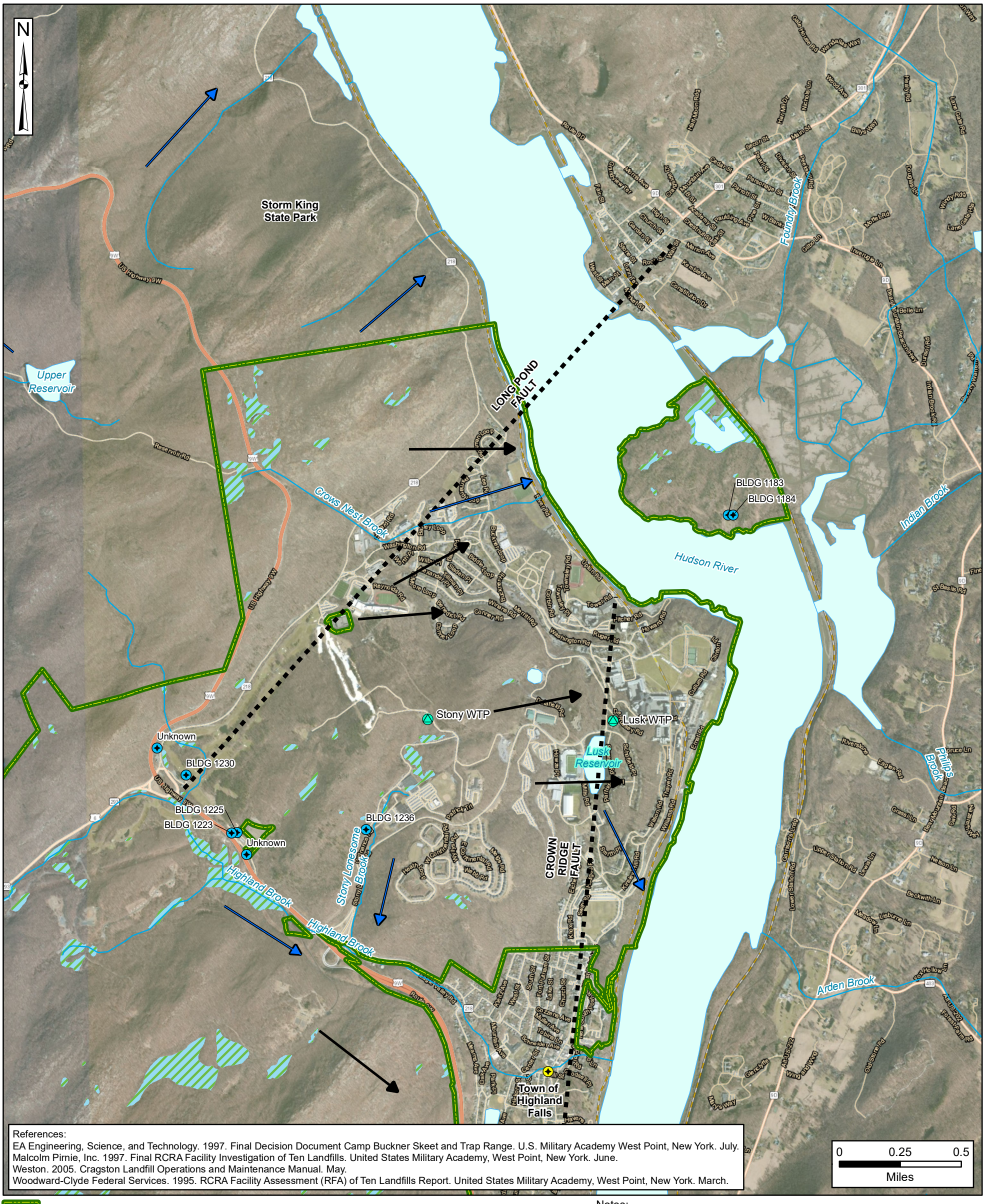
BLDG = building
TMP = transportation motor pool
WTP = water treatment plant

Data Sources:
EDR Well Data, 2018
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point, NY

Figure 2-2b
USAG West Point Installation Layout
Main Cantonment Area



References:
EA Engineering, Science, and Technology. 1997. Final Decision Document Camp Buckner Skeet and Trap Range. U.S. Military Academy West Point, New York. July.
Malcolm Pirnie, Inc. 1997. Final RCRA Facility Investigation of Ten Landfills. United States Military Academy, West Point, New York. June.
Weston. 2005. Cragston Landfill Operations and Maintenance Manual. May.
Woodward-Clyde Federal Services. 1995. RCRA Facility Assessment (RFA) of Ten Landfills Report. United States Military Academy, West Point, New York. March.

- Installation Boundary
- River/Stream
- Water Body
- Wetland
- Surface Water Flow Direction
- General Groundwater Flow Direction
- Approximate Bedrock Fault Location
- Water Treatment Plant
- On-Post Potable Well

EDR Wells

- Public Water Supply System Well
- Other Public Supply Well (Community)
- Domestic Well
- Other Designated Use Water Well

Notes:
1. Water bodies with a teal halo are indicative of surface source water for water treatment plants that supply potable water to West Point.
2. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
3. Other designated use wells include wells with unknown use.
4. Potable well labels indicate the building number associated with the well.

BLDG = building
TMP = transportation motor pool
WTP = water treatment plant

Data Sources:
EDR Well Data, 2018
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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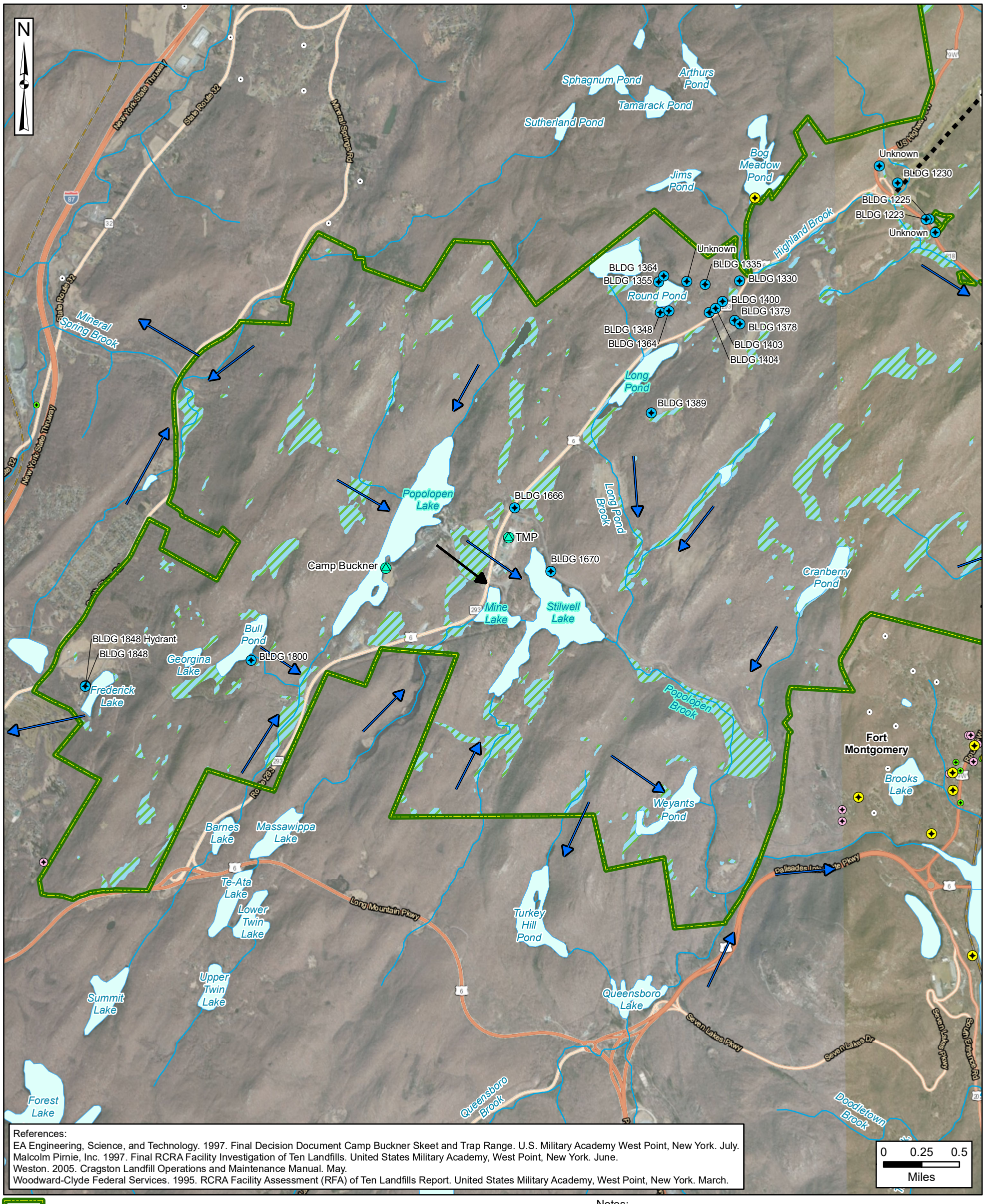
United States Army Garrison - West Point, NY

Figure 2-2c
USAG West Point Installation Layout
Range Area



References:
EA Engineering, Science, and Technology. 1997. Final Decision Document Camp Buckner Skeet and Trap Range. U.S. Military Academy West Point, New York. July.
Malcolm Pirnie, Inc. 1997. Final RCRA Facility Investigation of Ten Landfills. United States Military Academy, West Point, New York. June.
Weston. 2005. Cragston Landfill Operations and Maintenance Manual. May.
Woodward-Clyde Federal Services. 1995. RCRA Facility Assessment (RFA) of Ten Landfills Report. United States Military Academy, West Point, New York. March.

- Installation Boundary
- River/Stream
- Water Body
- Wetland
- Surface Water Flow Direction
- General Groundwater Flow Direction
- Water Treatment Plant
- On-Post Potable Well

EDR Wells

- Public Water Supply System Well
- Other Public Supply Well (Community)
- Domestic Well
- Other Designated Use Water Well

Notes:
1. Water bodies with a teal halo are indicative of surface source water for water treatment plants that supply potable water to West Point.
2. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
3. Other designated use wells include wells with unknown use.
4. Potable well labels indicate the building number associated with the well.

BLDG = building
TMP = transportation motor pool
WTP = water treatment plant

Data Sources:
EDR Well Data, 2018
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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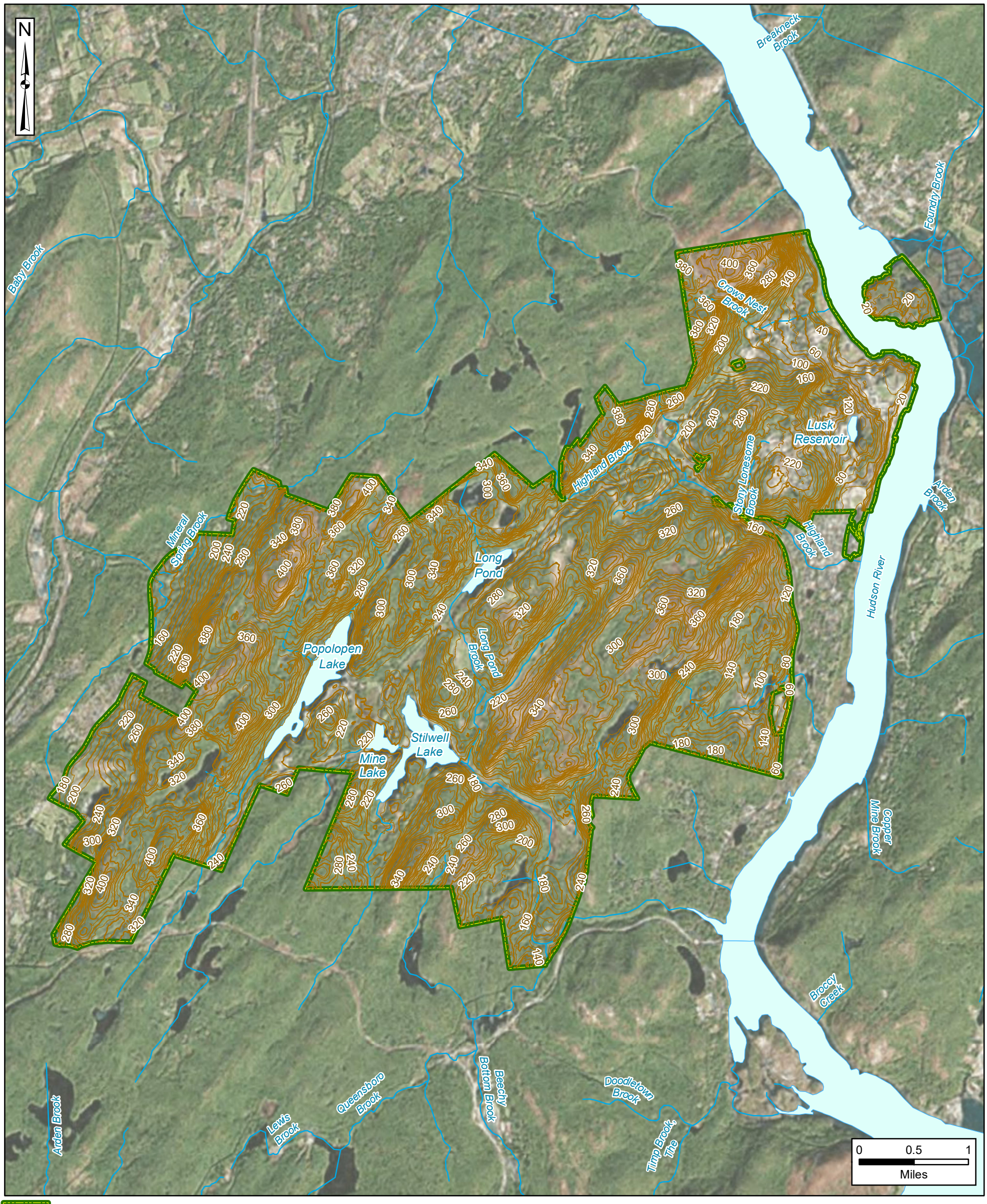
United States Army Garrison - West Point, NY

Figure 2-3
Topographic Map



Installation Boundary
River/Stream
Water Body
Elevation Contour (Feet)

Data Sources:
USAG West Point GIS Data
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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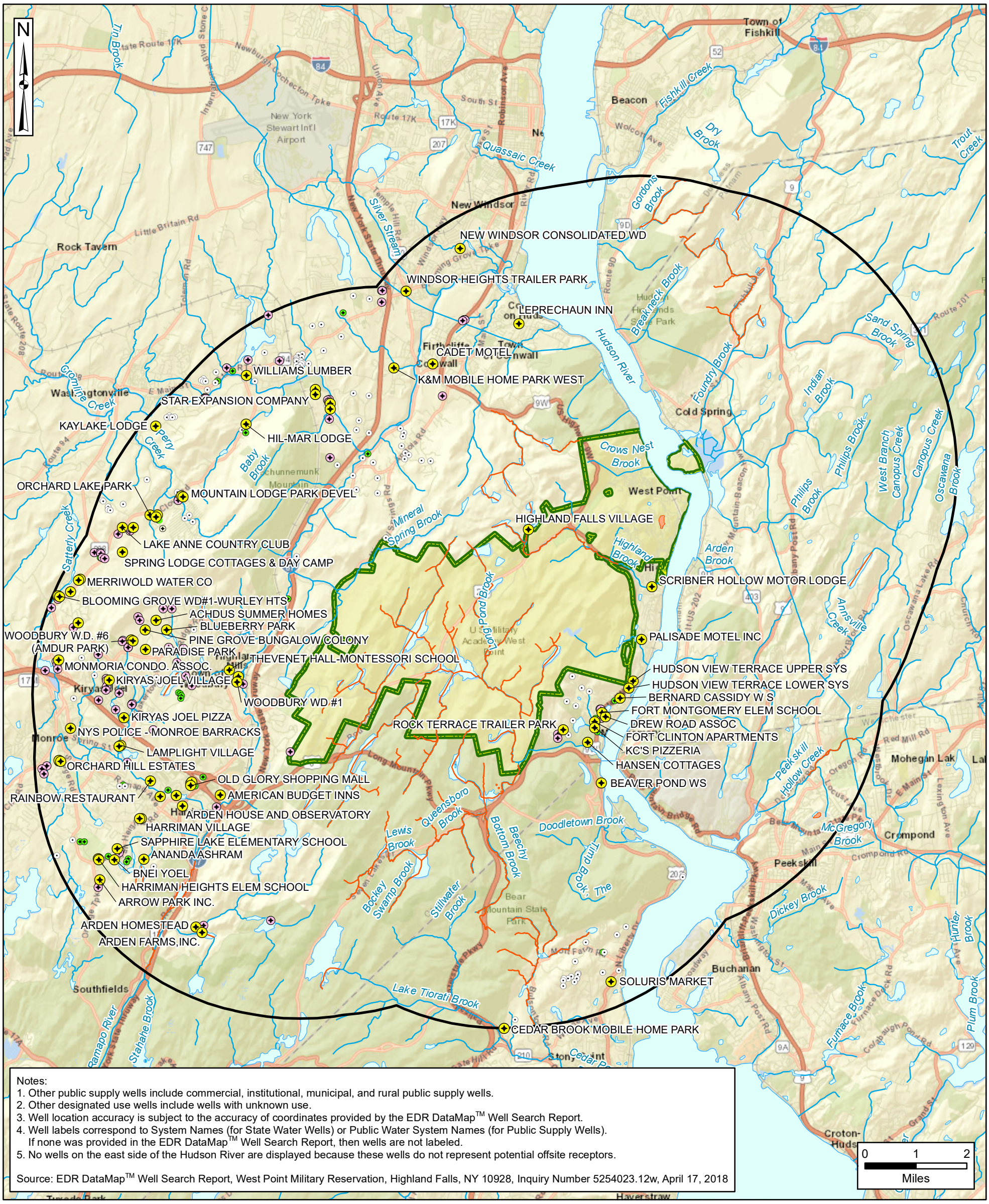
United States Army Garrison - West Point, NY

Figure 2-4
Off-Post Potable Sources



Notes:
1. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
2. Other designated use wells include wells with unknown use.
3. Well location accuracy is subject to the accuracy of coordinates provided by the EDR DataMap™ Well Search Report.
4. Well labels correspond to System Names (for State Water Wells) or Public Water System Names (for Public Supply Wells). If none was provided in the EDR DataMap™ Well Search Report, then wells are not labeled.
5. No wells on the east side of the Hudson River are displayed because these wells do not represent potential offsite receptors.

Source: EDR DataMap™ Well Search Report, West Point Military Reservation, Highland Falls, NY 10928, Inquiry Number 5254023.12w, April 17, 2018

Installation Boundary
5-Mile Radius
River/Stream
Water Body
New York State DEC Class A River/Stream*
New York State DEC Class A Waterbody*

Public Water Supply System Well
Other Public Supply Well (Community)
Domestic Well
Other Designated Use Water Well

DEC = Department of Environmental Conservation

* The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival. This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Data Sources:
EDR Well Data, 2018
NYS DEC WQC Data, 2019
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 18 North

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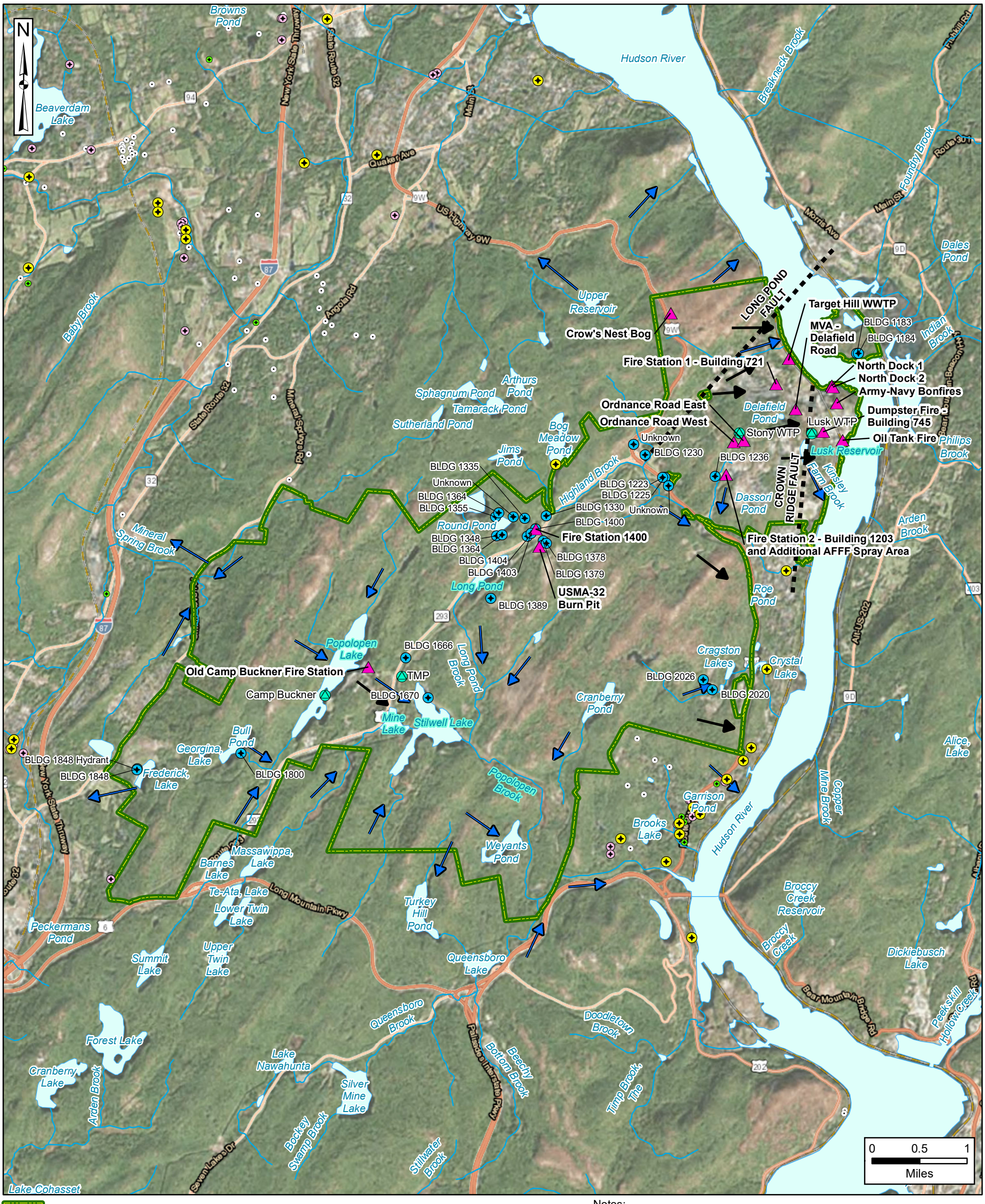
United States Army Garrison - West Point, NY

Figure 5-2
USAG West Point AOPI Locations



- Installation Boundary
- AOPI Location
- River/Stream
- Water Body
- Surface Water Flow Direction
- General Groundwater Flow Direction
- Approximate Bedrock Fault Location
- Water Treatment Plant
- On-Post Potable Well

EDR Wells

- Public Water Supply System Well
- Other Public Supply Well (Community)
- Domestic Well
- Other Designated Use Water Well

Notes:
1. Water bodies with a teal halo are indicative of surface source water for water treatment plants that supply potable water to West Point.
2. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
3. Other designated use wells include wells with unknown use.

AFFF = aqueous film-forming foam
AOPI = area of potential interest
BLDG = building
MVA = motor vehicle accident
TMP= Transportation Motor Pool
USMA = United States Military Academy
WTP = water treatment plant
WWTP = wastewater treatment plant

Data Sources:
EDR Well Data, 2018
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

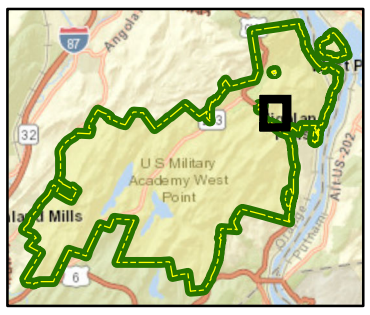


Figure 5-3
Aerial Photo of Fire Station 2 - Building 1203 and Additional AFFF Spray Area AOPI

Additional AFFF Spray at Fire Station 2 - Building 1203
Fire Station 2 - Building 1203
BLDG 1236
Stormwater collection basin
Ordnance Rd
Stony Lonesome Rd
Stony Lonesome Brook
Highland Brook
Town of Highland Falls WTP
US-9W
218
0 100 200 Feet

Notes:
1. Potable well labels indicate the building number associated with the well.
** The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival. This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- River/Stream
- Culvert
- Wetland
- Elevation Contour (feet)
- New York State DEC Class A River/Stream**
- On-Post Potable Source
- Surface Water Flow Direction
- Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AFFF = aqueous film-forming foam
AOPI = area of potential interest
BLDG = building
DEC = Department of Environmental Conservation
WTP = water treatment plant

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

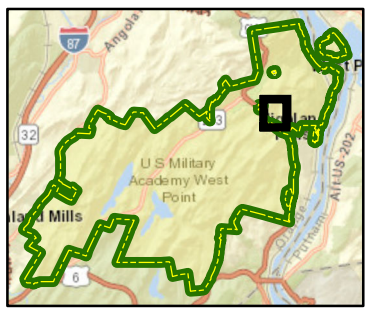
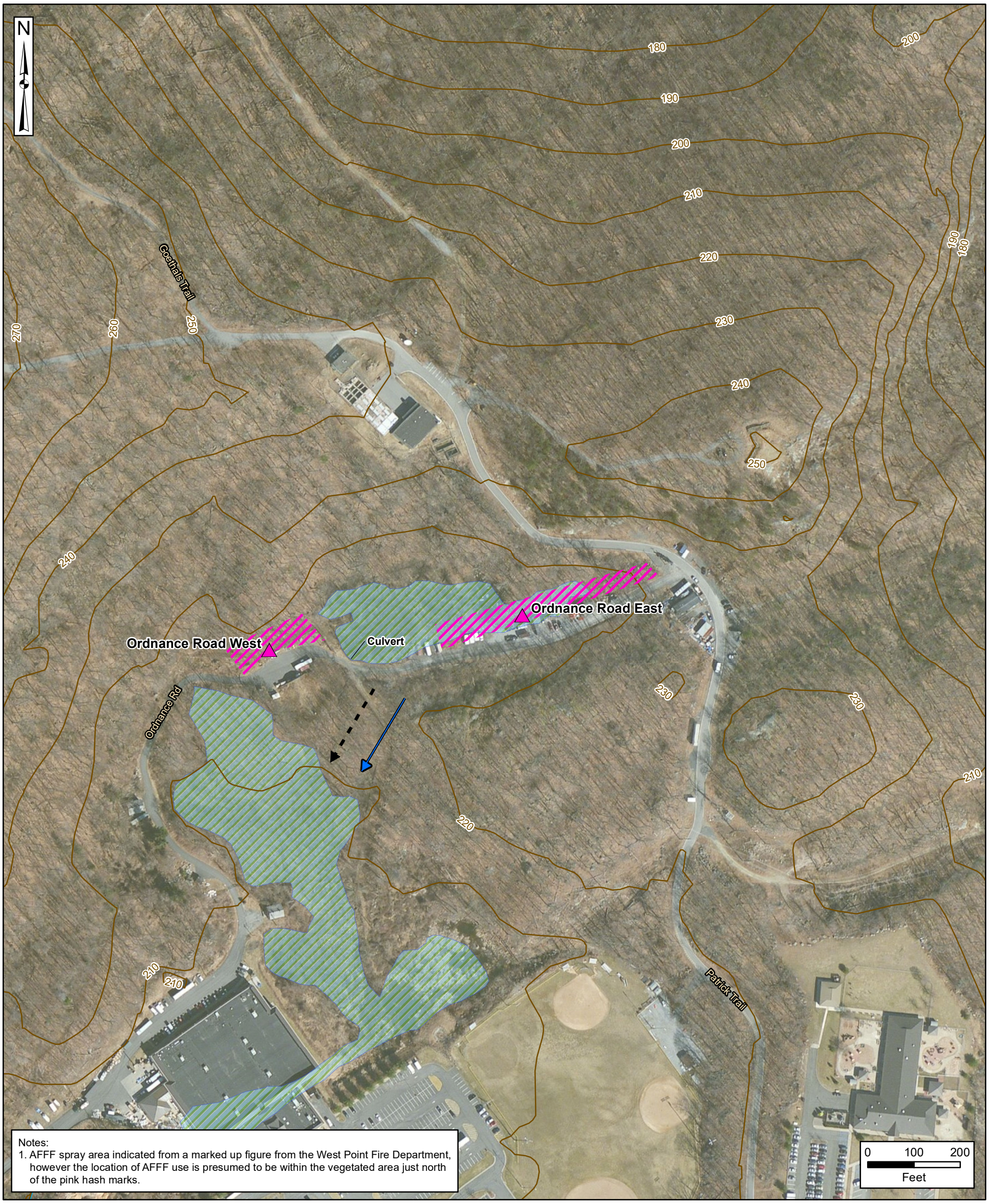


Figure 5-4
Aerial Photo of
Ordnance Road East and Ordnance Road West AOPIs



Notes:
1. AFFF spray area indicated from a marked up figure from the West Point Fire Department, however the location of AFFF use is presumed to be within the vegetated area just north of the pink hash marks.

Installation Boundary
AOPI
Approximate Area of AFFF Release
Wetland
Elevation Contour (feet)

Surface Water Flow Direction
Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

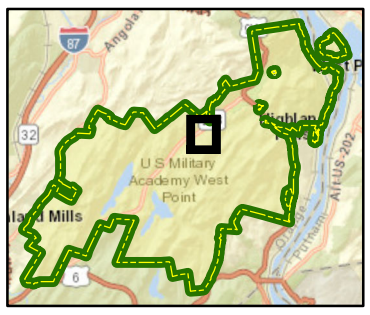
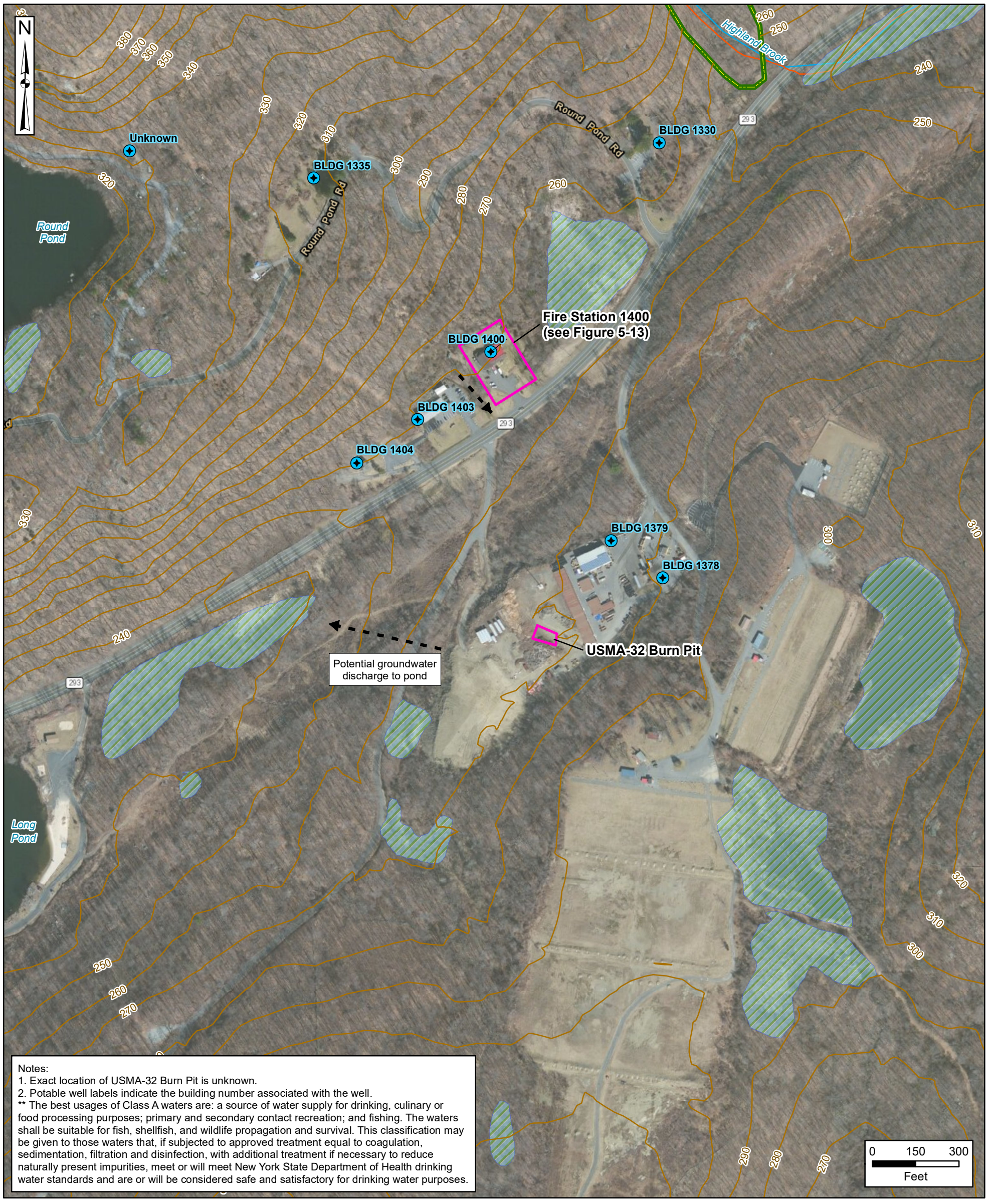


Figure 5-5
Aerial Photo of
USMA-32 Burn Pit AOPI



Notes:
1. Exact location of USMA-32 Burn Pit is unknown.
2. Potable well labels indicate the building number associated with the well.
** The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival. This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

- Installation Boundary
- AOPI
- River/Stream
- Wetland
- Elevation Contour (feet)
- New York State DEC Class A River/Stream**
- On-Post Potable Source
- Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AOPI = area of potential interest
BLDG = building
DEC = Department of Environmental Conservation
USMA = United States Military Academy

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

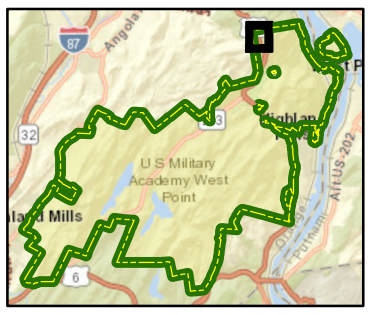
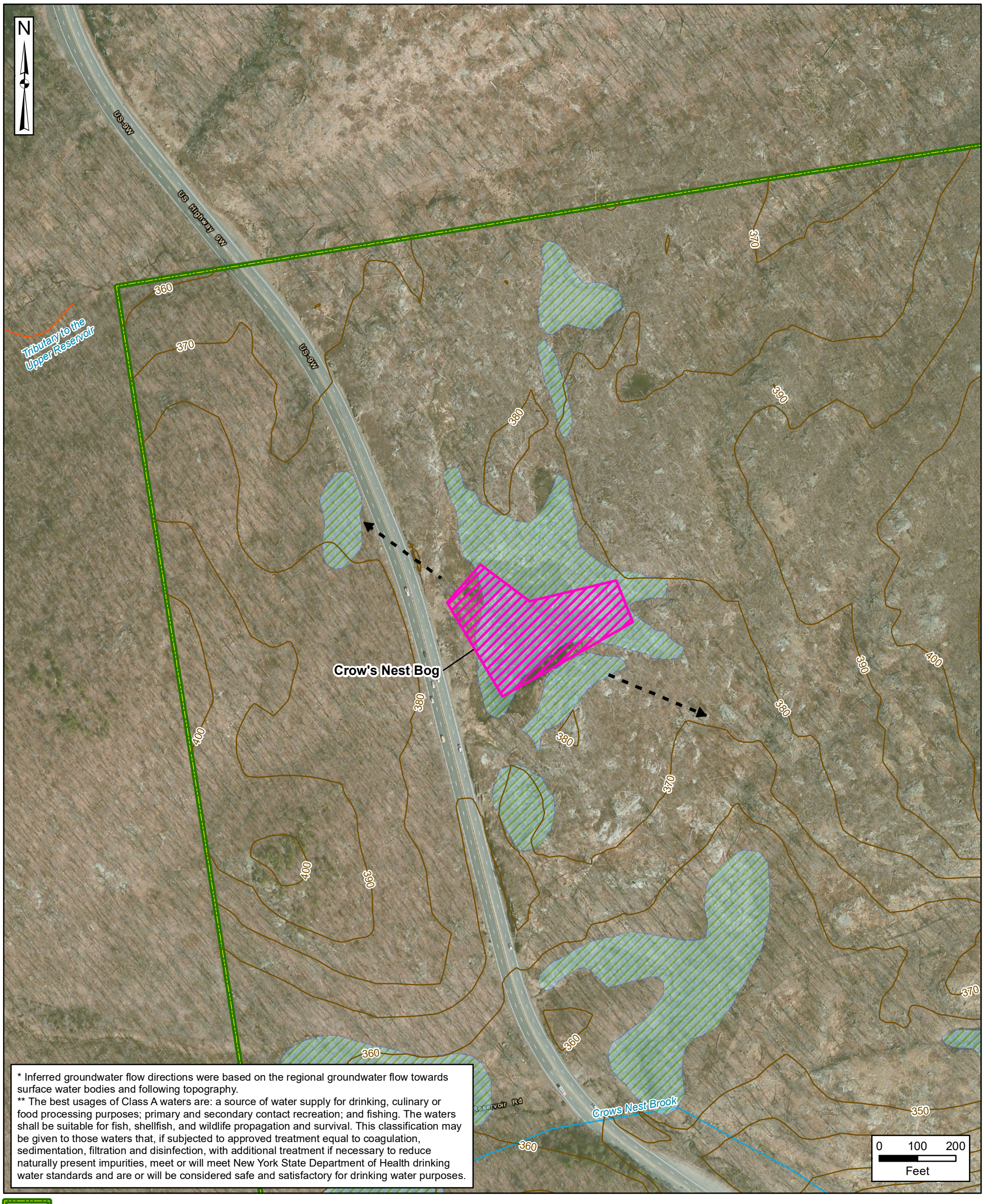


Figure 5-6
Aerial Photo of
Crow's Nest Bog AOPI



* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.
** The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival. This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- River/Stream
- New York State DEC Class A River/Stream**
- Wetland
- Elevation Contour (feet)
- Groundwater Flow Direction (inferred)*

AFFF = aqueous film-forming foam
AOPI = area of potential interest
DEC = Department of Environmental Conservation

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

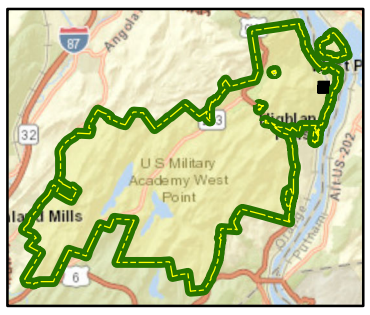
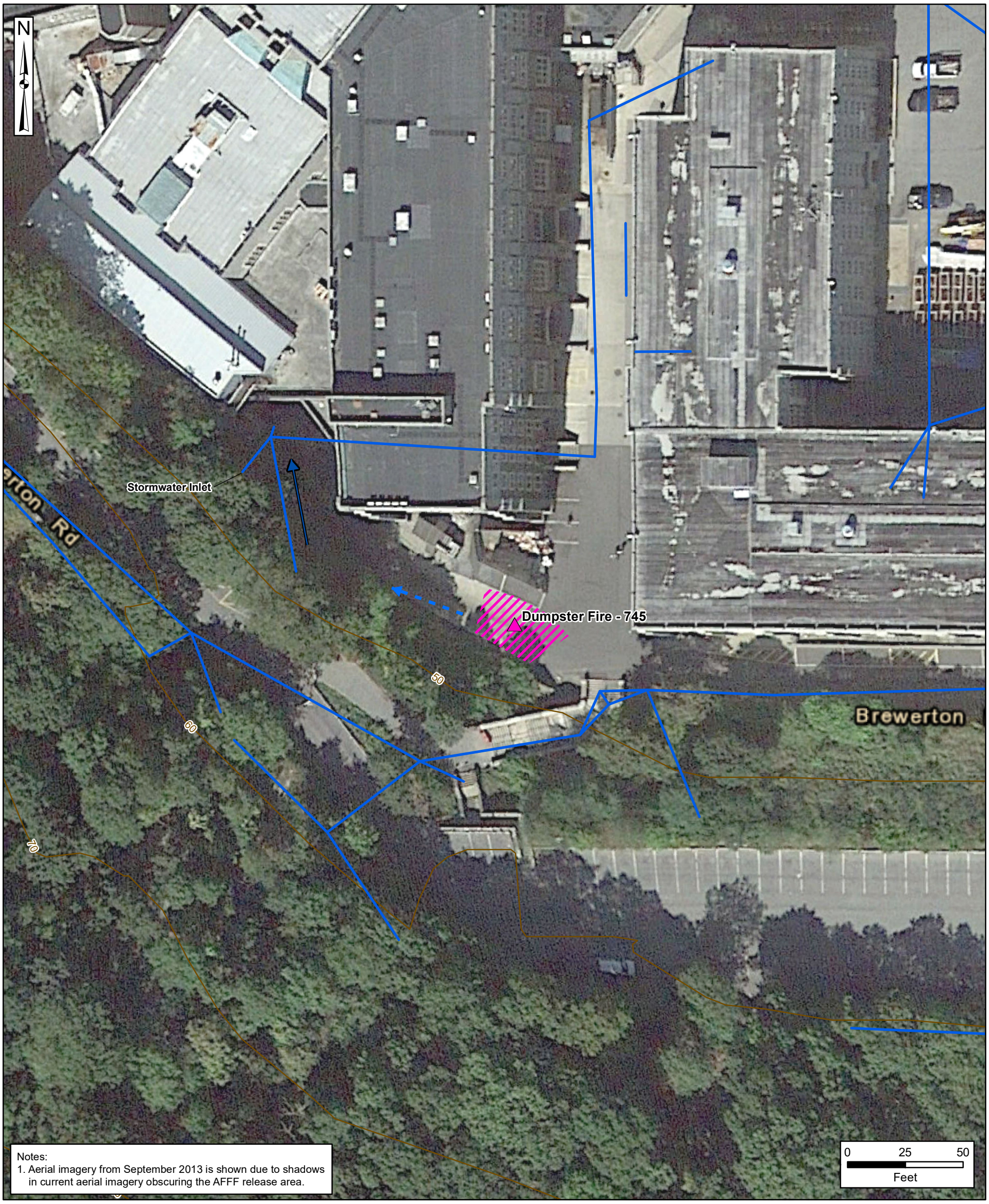


Figure 5-7
Aerial Photo of
Dumpster Fire - Building 745 AOPI



Installation Boundary
AOPI
Approximate Area of AFFF Release
Elevation Contour (feet)
Surface Water Runoff Flow Direction
Storm Sewer Line
Stormwater Flow Direction

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
Google Earth, Aerial Imagery, 2013

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

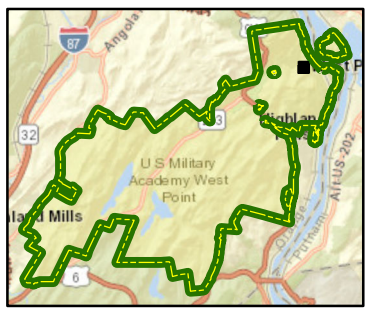


Figure 5-8
Aerial Photo of
Fire Station 1 - Building 721 AOPI

Installation Boundary
AOPI
Approximate Area of AFFF Release
Elevation Contour (feet)
Surface Water Runoff Flow Direction
Groundwater Flow Direction (inferred)*
Storm Sewer Line
Stormwater Flow Direction

AFFF = aqueous film-forming foam
AOPI = area of potential interest

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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United States Army Garrison - West Point

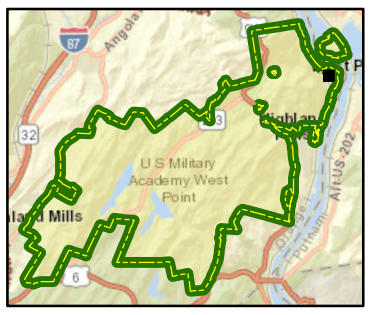
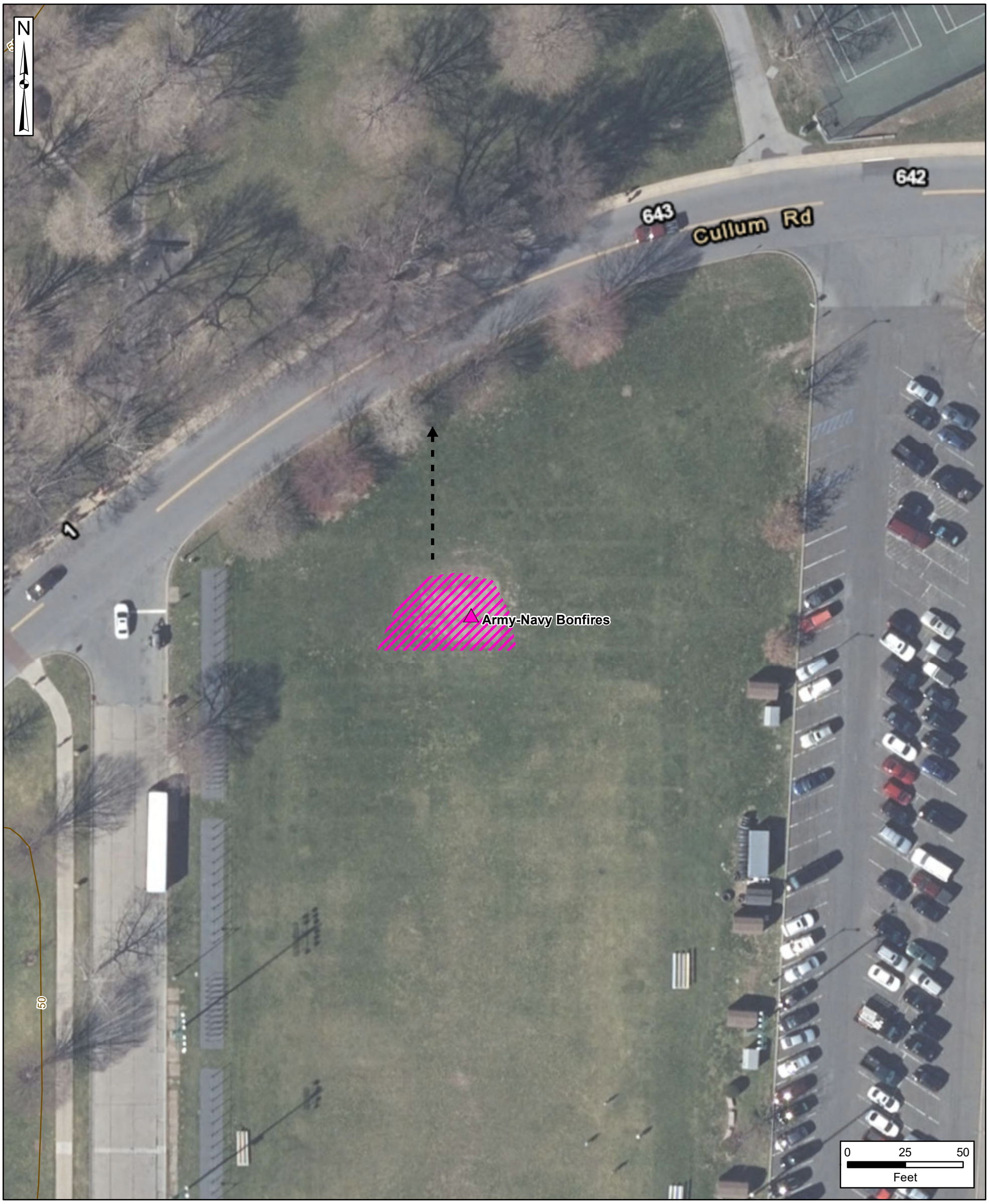


Figure 5-9
Aerial Photo of
Army-Navy Bonfires AOPI



Installation Boundary

AOPI

Approximate Area of AFFF Release

Elevation Contour (feet)

Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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United States Army Garrison - West Point

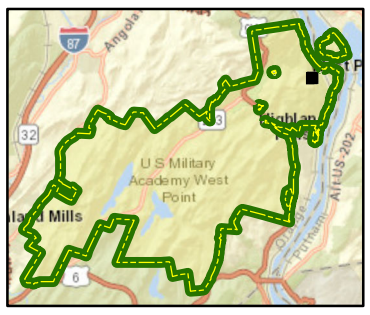
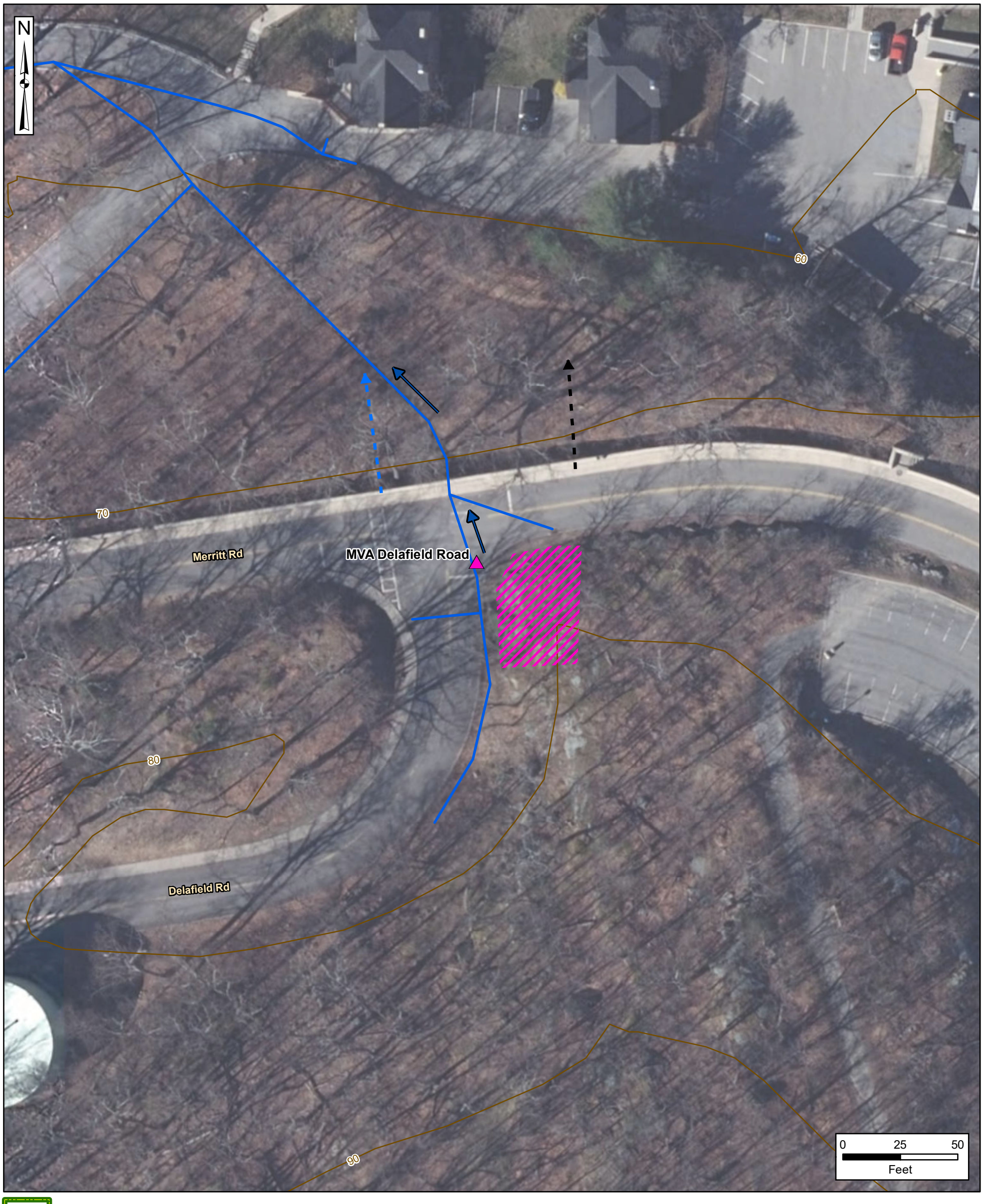


Figure 5-10
Aerial Photo of
MVA - Delafield Road AOPI



- Installation Boundary
- Elevation Contour (feet)
- AOPI
- Approximate Area of AFFF Release
- Surface Water Runoff Flow Direction
- Groundwater Flow Direction (inferred)*
- Storm Sewer Line
- Stormwater Flow Direction

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AFFF = aqueous film-forming foam
AOPI = area of potential interest
MVA = motor vehicle accident

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

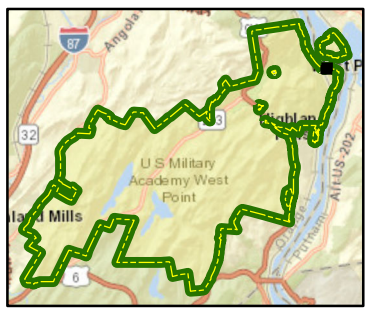
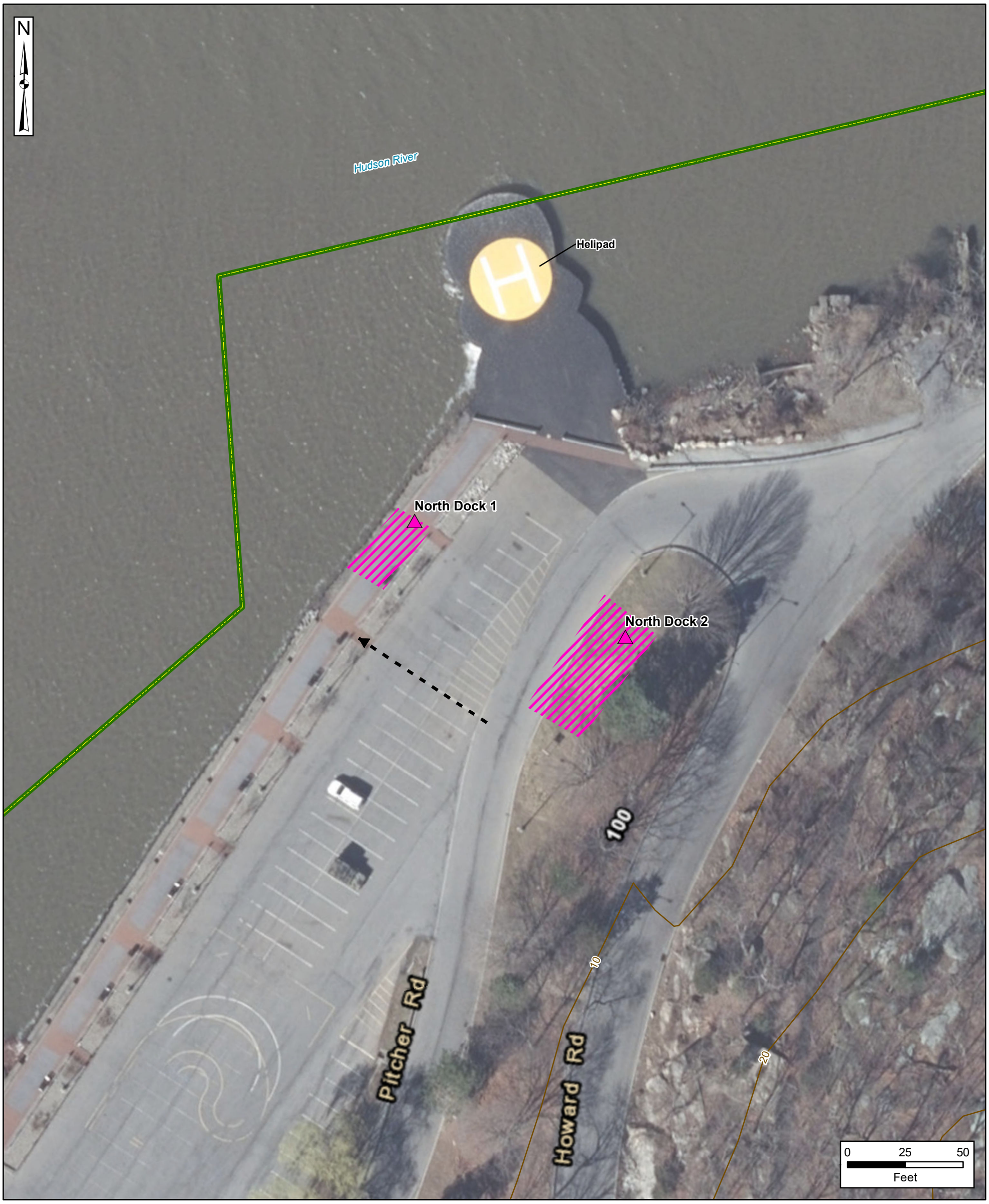


Figure 5-11
Aerial Photo of
North Dock 1 and North Dock 2 AOPIs



Installation Boundary
AOPI
Approximate Area of AFFF Release
Elevation Contour (feet)
Groundwater Flow Direction (inferred)*

AFFF = aqueous film-forming foam
AOPI = area of potential interest

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

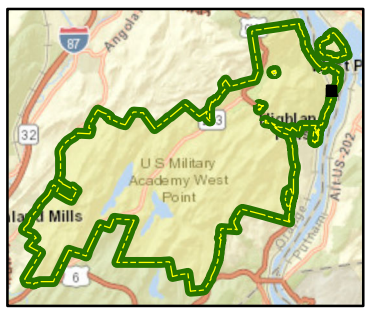


Figure 5-12
Aerial Photo of
Oil Tank Fire AOPI

Installation Boundary

AOPI

Approximate Area of AFFF Release

Elevation Contour (feet)

Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AFFF = aqueous film-forming foam
AOPI = area of potential interest

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

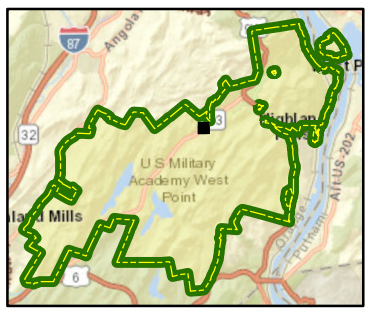


Figure 5-13
Aerial Photo of
Fire Station 1400 AOPI

Notes:
1. Potable well labels indicate the building number associated with the well.

Installation Boundary
AOPI
Wetland
Elevation Contour (feet)
Surface Water Runoff Direction
Groundwater Flow Direction (inferred)*
On-Post Potable Source

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AOPI = area of potential interest
BLDG = building

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

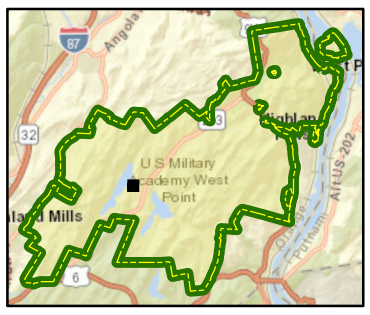


Figure 5-14
Aerial Photo of
Old Camp Buckner Fire Station AOPI

Installation Boundary
AOPI
Wetland
Elevation Contour (feet)

Surface Water Flow Direction
Groundwater Flow Direction (inferred)*

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

AOPI = area of potential interest

Data Sources:
Google Earth, Aerial Imagery, 2019

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

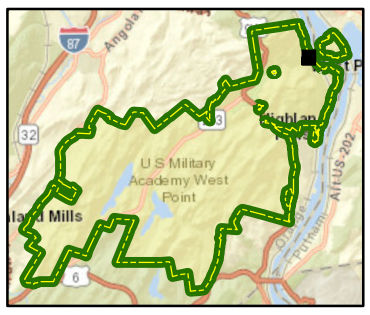


Figure 5-15
Aerial Photo of
Target Hill WWTP AOPI

Installation Boundary
AOPI
Elevation Contour (feet)
Storm Sewer Line
Sanitary Sewer Line
Groundwater Flow Direction (inferred)*

AOPI = area of potential interest
WWTP = wastewater treatment plant

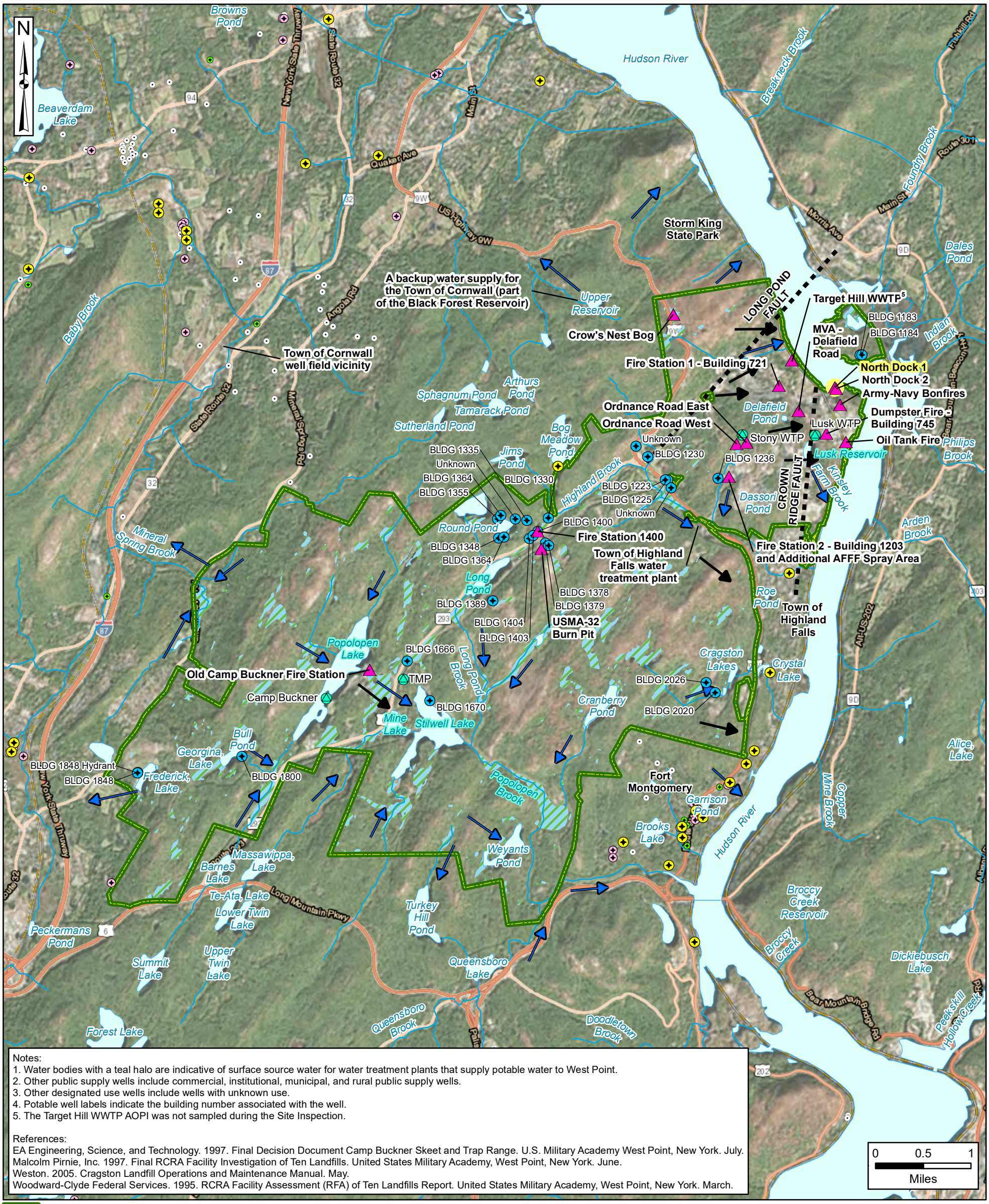
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

Figure 7-1
AOPI Locations and OSD
Risk Screening Level Exceedances



Notes:
1. Water bodies with a teal halo are indicative of surface source water for water treatment plants that supply potable water to West Point.
2. Other public supply wells include commercial, institutional, municipal, and rural public supply wells.
3. Other designated use wells include wells with unknown use.
4. Potable well labels indicate the building number associated with the well.
5. The Target Hill WWTP AOPI was not sampled during the Site Inspection.

References:

EA Engineering, Science, and Technology. 1997. Final Decision Document Camp Buckner Skeet and Trap Range. U.S. Military Academy West Point, New York. July.
Malcolm Pirnie, Inc. 1997. Final RCRA Facility Investigation of Ten Landfills. United States Military Academy, West Point, New York. June.
Weston. 2005. Cragston Landfill Operations and Maintenance Manual. May.
Woodward-Clyde Federal Services. 1995. RCRA Facility Assessment (RFA) of Ten Landfills Report. United States Military Academy, West Point, New York. March.

- Installation Boundary
- AOPI Location
- AOPI with OSD Risk Screening Level Exceedance
- River/Stream
- Water Body
- Wetland
- Surface Water Flow Direction
- General Groundwater Flow Direction
- Approximate Bedrock Fault Location
- Water Treatment Plant
- On-Post Potable Well

EDR Wells

- Public Water Supply System Well
- Other Public Supply Well (Community)
- Domestic Well
- Other Designated Use Water Well

AFFF = aqueous film-forming foam
AOPI = area of potential interest
BLDG = building
MVA = motor vehicle accident
OSD = Office of the Secretary of Defense
TMP= Transportation Motor Pool
USMA = United States Military Academy
WTP = water treatment plant
WWTP = wastewater treatment plant

Data Sources:
EDR Well Data, 2018
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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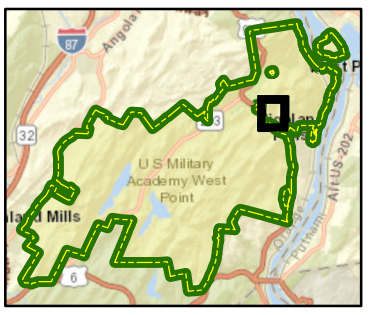
United States Army Garrison - West Point

Figure 7-2
Fire Station 2 - Fire Station 2- Building 1203 and Additional AFFF Spray Area AOPI and Town of Highland Falls Intake Area PFOS, PFOA, and PFBS Analytical Results



WP-ASFS2-1-GW	
PFBS	1.9 [1.8 J]
PFOA	10 M [10 M]
PFOS	2.8 M [2.8 M]
WP-ASFS2-1-SO-(0.5-2)	
PFBS	0.002 U [0.0022 U]
PFOA	0.00059 U [0.00065 U]
PFOS	0.00059 U [0.00065 U]

WP-ASFS2-1-SW	
PFBS	1.9 M
PFOA	8.7 M
PFOS	3.8 M
WP-ASFS2-1-SE	
PFBS	0.0078 U
PFOA	0.0024 U
PFOS	0.0024 U

WP-FS2-1-SW	
PFBS	1.1 J
PFOA	20 M
PFOS	21 M
WP-FS2-1-SE	
PFBS	0.003 U
PFOA	0.0009 U
PFOS	0.0027

WP-THF-1-SW	
PFBS	1.6 U [1.6 U]
PFOA	1.2 J [1.2 J]
PFOS	1.6 U [1.6]
WP-THF-1-SE	
PFBS	0.0035 U [0.0033 U]
PFOA	0.001 U [0.00098 U]
PFOS	0.001 U [0.00098 U]

Additional AFFF Spray at Fire Station 2 - Building 1203

Fire Station 2 - Building 1203

BLDG 1236

Stormwater collection basin

Potential seasonal groundwater discharge to stream

Town of Highland Falls WTP

Cadet Rd

Ordnance Rd

Stony Lonesome Rd

Stony Lonesome Brook

Highland Brook

US-9W

218

Notes:
1. Potable well labels indicate the building number associated with the well.
2. Groundwater and surface water results are in nanograms per liter (ng/L), or parts per trillion.
3. Soil and sediment results are in milligrams per kilogram (mg/kg), or parts per million.
4. Samples were collected July 13 - August 19 2020.
5. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
6. Results in brackets are field duplicate sample results.
7. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

0 100 200
Feet

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- River/Stream
- Culvert
- Wetland
- Elevation Contour (feet)
- On-Post Potable Source
- Surface Water Flow Direction
- Groundwater Flow Direction (inferred)*
- Surface Water / Sediment Sampling Location
- Soil / Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
BLDG = building
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
WTP = water treatment plant

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

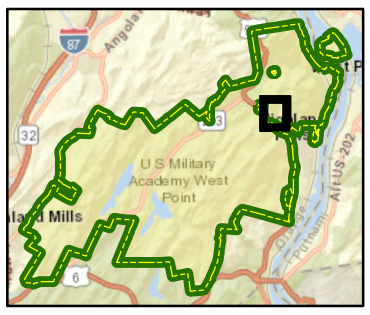


Figure 7-3
Ordnance Road East and Ordnance Road West AOPIs
PFOS, PFOA, and PFBS Analytical Results

N

WP-ORW-1-GW	
PFBS	1.8 U
PFOA	**7.6 M**
PFOS	**3.3 M**
WP-ORW-1-SO-(0.5-2)	
PFBS	0.0021 U
PFOA	0.00062 U
PFOS	0.00062 U

WP-OR-1-SW	
PFBS	**3.4**
PFOA	**8.7 M**
PFOS	2.0 U
WP-OR-1-SE	
PFBS	0.006 U
PFOA	0.0018 U
PFOS	0.0018 U

WP-ORE-1-GW	
PFBS	**3.2**
PFOA	**8.9 M**
PFOS	**2 M**
WP-ORE-1-SO-(0.5-2)	
PFBS	0.002 U
PFOA	0.0006 U
PFOS	0.0006 U

WP-OR-2-SE	
PFBS	0.0022 U
PFOA	0.00067 U
PFOS	0.00067 U

Ordnance Road West
Ordnance Road East
Culvert
WP-OR-2-SW **
Ordnance Rd
Hamilton St
Cochals Trail
Patrick Trail

Notes:
1. AFFF spray area indicated from a marked up figure from the West Point Fire Department, however the location of AFFF use is presumed to be within the vegetated area just north of the pink hash marks.
2. Potable well labels indicate the building number associated with the well.
3. Groundwater and surface water results are in nanograms per liter (ng/L), or parts per trillion.
4. Soil and sediment results are in milligrams per kilogram (mg/kg), or parts per million.
5. Samples were collected July 13 - August 19 2020.
6. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
7. Bolded values indicate detections.

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.
** WP-OR-2-SW could not be collected due to surface water not being present during sampling.

Qualifiers:
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

0 100 200
Feet

Installation Boundary
AOPI
Approximate Area of AFFF Release
Wetland
Elevation Contour (feet)
Surface Water Flow Direction
Groundwater Flow Direction (inferred)*
Surface Water / Sediment Sampling Location
Soil / Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

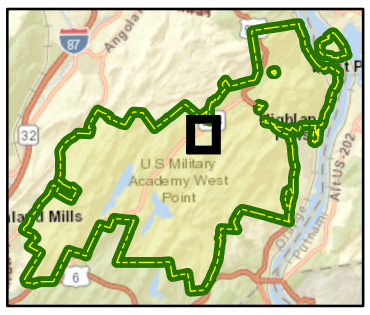
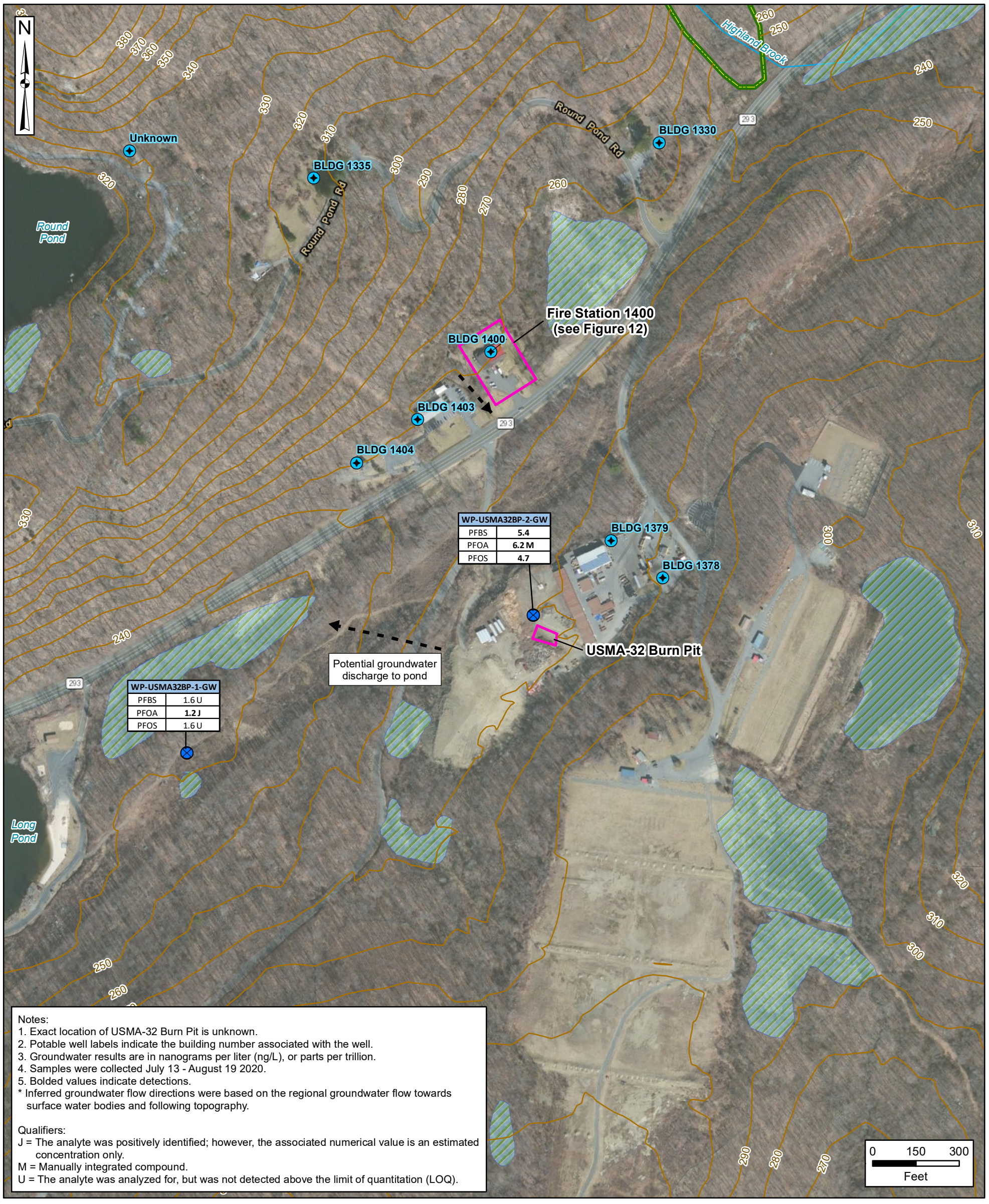


Figure 7-4
USMA-32 Burn Pit AOPI
PFOS, PFOA, and PFBS Analytical Results



Notes:
1. Exact location of USMA-32 Burn Pit is unknown.
2. Potable well labels indicate the building number associated with the well.
3. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
4. Samples were collected July 13 - August 19 2020.
5. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
River/Stream
Wetland
Elevation Contour (feet)
On-Post Potable Source
Groundwater Flow Direction (inferred)*
Groundwater Sampling Location

AOPI = area of potential interest
BLDG = building
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
USMA = United States Military Academy

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

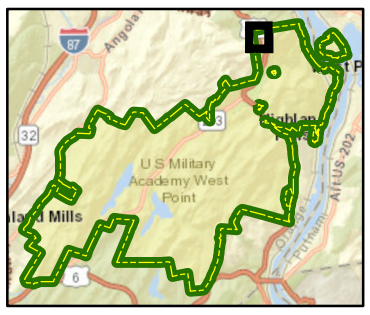


Figure 7-5
Crow's Nest Bog AOPI
PFOS, PFOA, and PFBS Analytical Results

WP-CNB-3-SW	
PFBS	2.1
PFOA	**0.8 J**
PFOS	**13 M**
WP-CNB-3-SE	
PFBS	0.0027 U
PFOA	0.0008 U
PFOS	**0.0027 M**

WP-CNB-1-SW	
PFBS	1.7 U
PFOA	**4.7 M**
PFOS	**1.6 J**
WP-CNB-1-SE	
PFBS	0.0077 U
PFOA	0.0023 U
PFOS	**0.0022 J**

WP-CNB-2-SW	
PFBS	1.8 U
PFOA	**4.6 M**
PFOS	**1.2 J**
WP-CNB-2-SE	
PFBS	0.008 U
PFOA	**0.0023 J**
PFOS	**0.0033**

Notes:
1. Surface water results are in nanograms per liter (ng/L), or parts per trillion.
2. Sediment results are in milligrams per kilogram (mg/kg), or parts per million.
3. Samples were collected July 13 - August 19 2020.
4. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.
** The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival. This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

Installation Boundary
AOPI
Approximate Area of AFFF Release
River/Stream
New York State DEC Class A River/Stream**
Wetland
Elevation Contour (feet)
Groundwater Flow Direction (inferred)*
Surface Water / Sediment Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
DEC = Department of Environmental Conservation
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

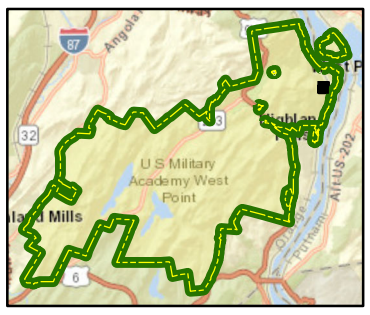


Figure 7-6
Dumpster Fire - Building 745 AOPI
PFOS, PFOA, and PFBS Analytical Results

WP-DF745-1-SE	
PFBS	0.0029 U
PFOA	0.00087 U
PFOS	**0.0007 J**

Stormwater Inlet

WP-DF745-1-GW	
PFBS	**2.2 M**
PFOA	**6.1 M**
PFOS	**4.5**

Dumpster Fire - 745

Brewerton

Notes:
1. Aerial imagery from September 2013 is shown due to shadows in current aerial imagery obscuring the AFFF release area.
2. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
3. Sediment results are in milligrams per kilogram (mg/kg), or parts per million.
4. Samples were collected July 13 - August 19 2020.
5. Bolded values indicate detections.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

0 25 50
Feet

Installation Boundary
AOPI
Approximate Area of AFFF Release
Elevation Contour (feet)
Surface Water Runoff Flow Direction
Storm Sewer Line
Stormwater Flow Direction
Sediment Sampling Location
Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
Google Earth, Aerial Imagery, 2013

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

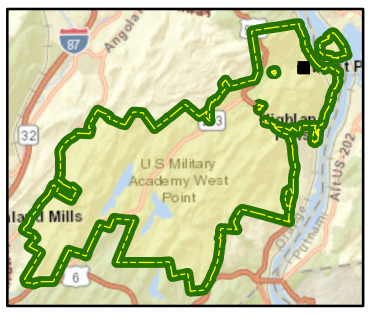
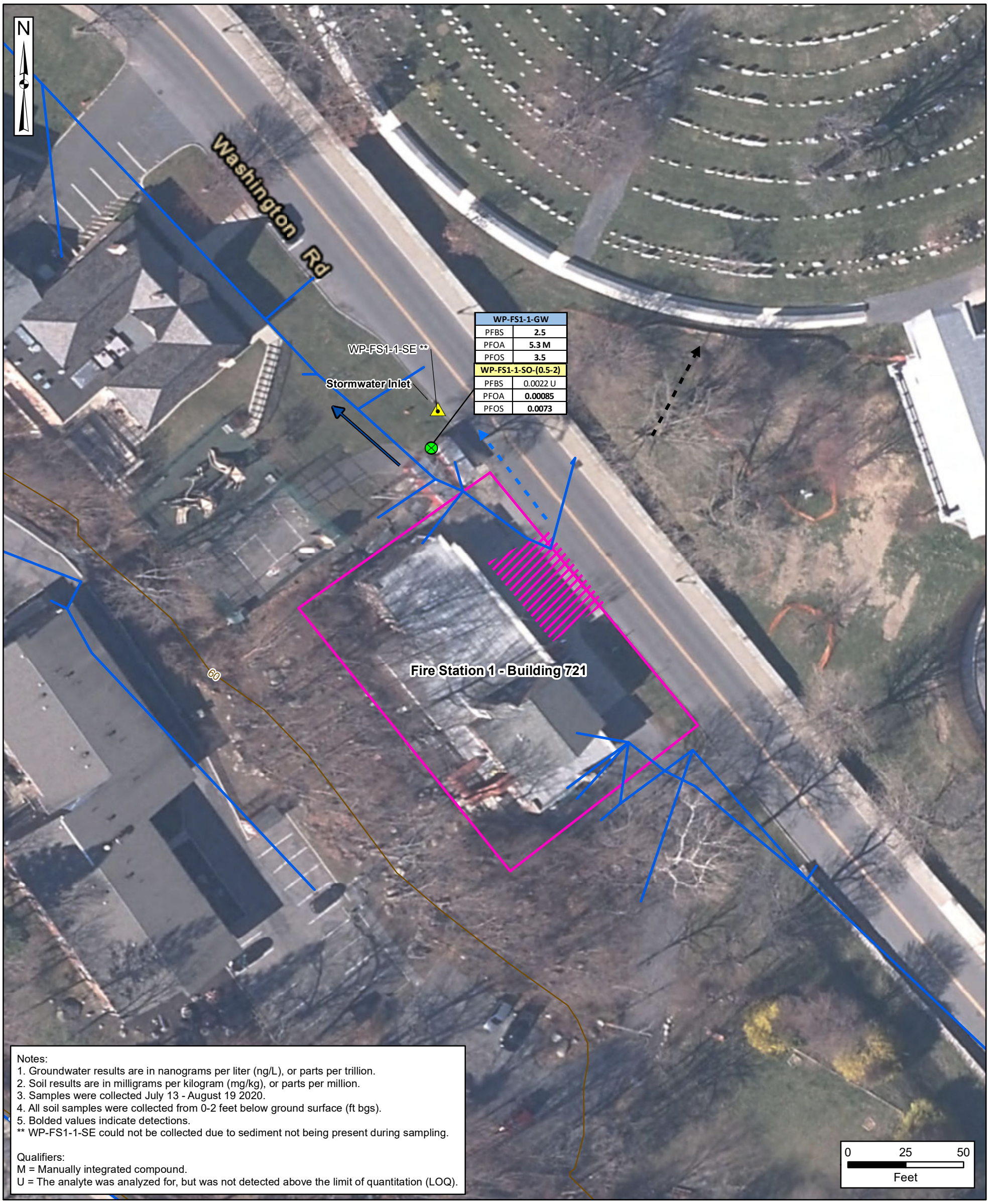


Figure 7-7
Fire Station 1 - Building 721 AOPI
PFOS, PFOA, and PFBS Analytical Results



Notes:
1. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
2. Soil results are in milligrams per kilogram (mg/kg), or parts per million.
3. Samples were collected July 13 - August 19 2020.
4. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
5. Bolded values indicate detections.
** WP-FS1-1-SE could not be collected due to sediment not being present during sampling.

Qualifiers:
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- Elevation Contour (feet)
- Surface Water Runoff Flow Direction
- Groundwater Flow Direction (inferred)
- Storm Sewer Line
- Stormwater Flow Direction
- Sediment Sampling Location
- Soil / Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

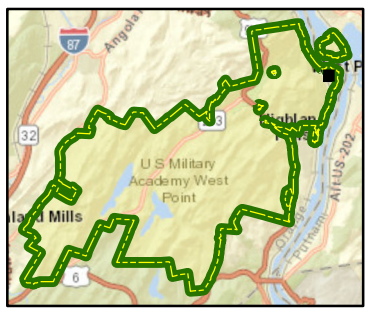
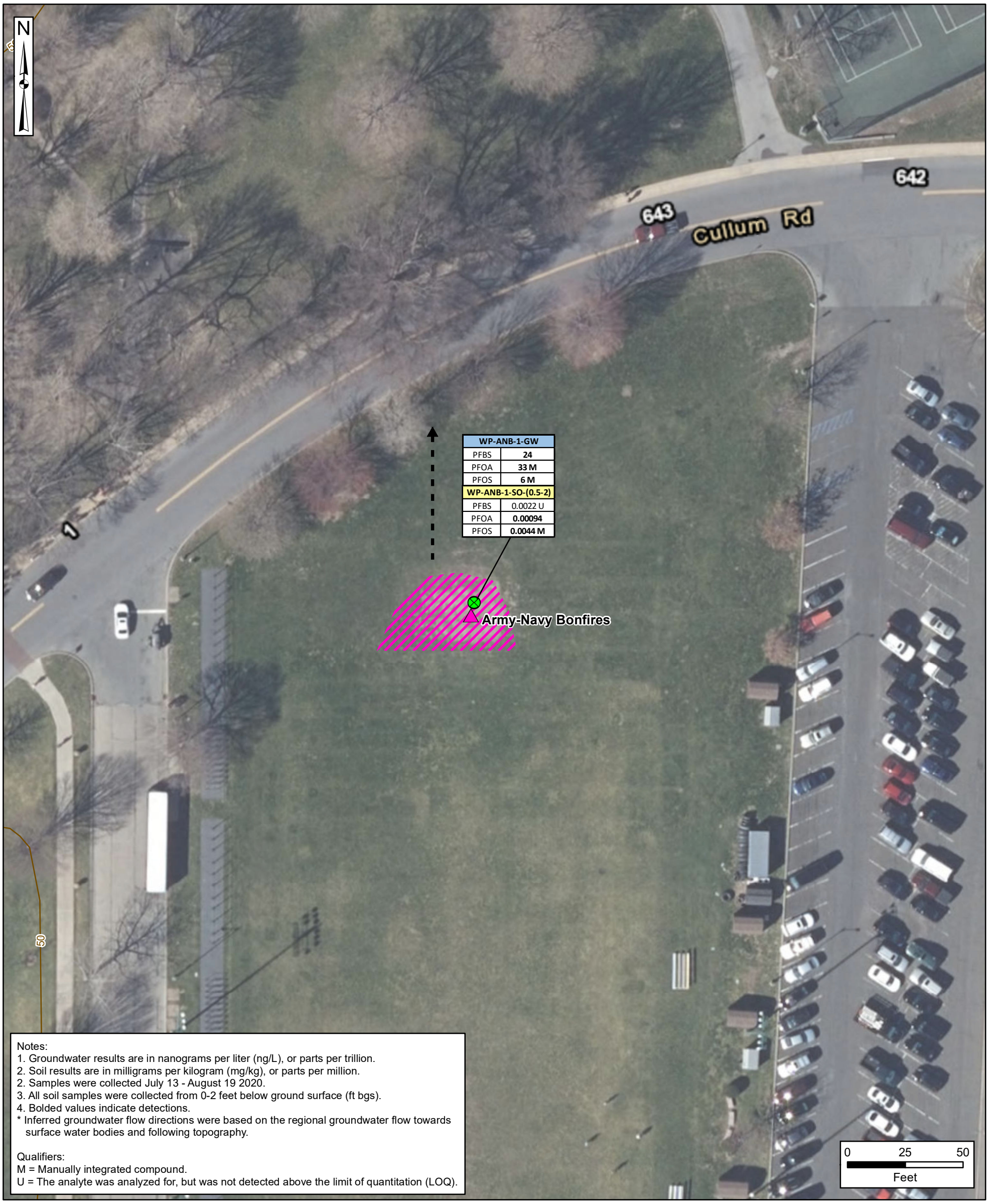


Figure 7-8
Army-Navy Bonfires AOPI
PFOS, PFOA, and PFBS Analytical Results



Notes:
1. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
2. Soil results are in milligrams per kilogram (mg/kg), or parts per million.
2. Samples were collected July 13 - August 19 2020.
3. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
4. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
M = Manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- Elevation Contour (feet)
- Groundwater Flow Direction (inferred)*
- Soil / Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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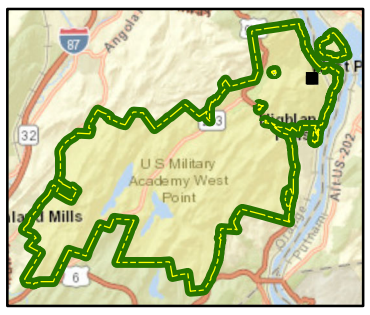

Figure 7-9
MVA - Delafield Road AOPI
PFOS, PFOA, and PFBS Analytical Results

N

WP-MVADR-1-SE	
PFBS	0.0023 U
PFOA	0.00068 U
PFOS	0.00068 U

WP-MVADR-1-GW	
PFBS	1.6 U
PFOA	**2.1**
PFOS	1.6 U

60
70
80
Merritt Rd
MVA Delafield Road
Delafield Rd

Notes:
1. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
2. Soil results are in milligrams per kilogram (mg/kg), or parts per million.
3. Samples were collected July 13 - August 19 2020.
4. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
5. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

0 25 50
Feet

Installation Boundary
Elevation Contour (feet)
AOPI
Approximate Area of AFFF Release
Surface Water Runoff Flow Direction
Groundwater Flow Direction (inferred)*
Storm Sewer Line
Stormwater Flow Direction
Sediment Sampling Location
Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
MVA = motor vehicle accident
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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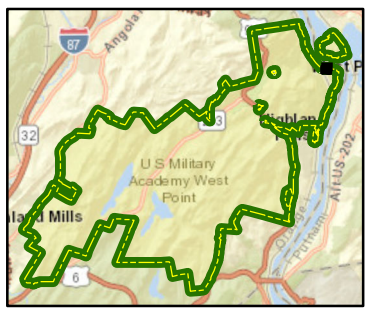
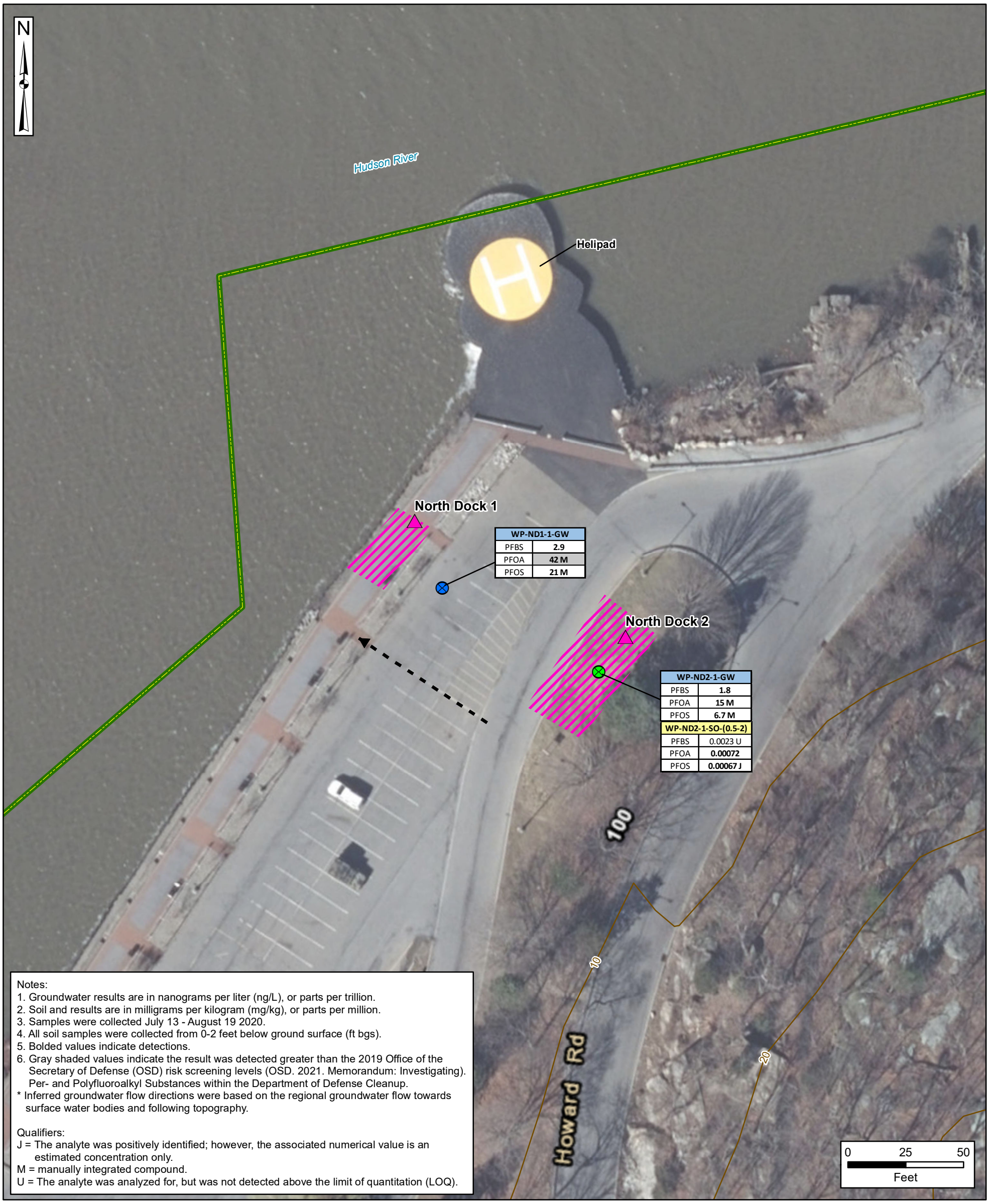


Figure 7-10
North Dock 1 and North Dock 2 AOPIs
PFOS, PFOA, and PFBS Analytical Results



Notes:
1. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
2. Soil and results are in milligrams per kilogram (mg/kg), or parts per million.
3. Samples were collected July 13 - August 19 2020.
4. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
5. Bolded values indicate detections.
6. Gray shaded values indicate the result was detected greater than the 2019 Office of the Secretary of Defense (OSD) risk screening levels (OSD. 2021. Memorandum: Investigating). Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup.

* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

- Installation Boundary
- AOPI
- Approximate Area of AFFF Release
- Elevation Contour (feet)
- Groundwater Flow Direction (inferred)*
- Soil / Groundwater Sampling Location
- Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

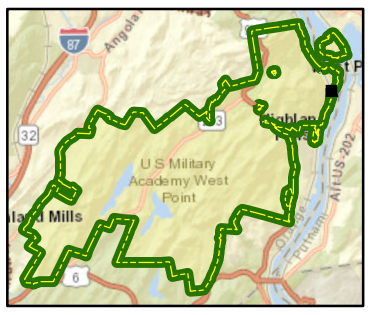


Figure 7-11
Oil Tank Fire AOPI
PFOS, PFOA, and PFBS Analytical Results

Notes:
1. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
2. Samples were collected July 13 - August 19 2020.
3. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.

Qualifiers:
M = manually integrated compound.

Installation Boundary
AOPI
Approximate Area of AFFF Release
Elevation Contour (feet)
Groundwater Flow Direction (inferred)*
Groundwater Sampling Location

AFFF = aqueous film-forming foam
AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

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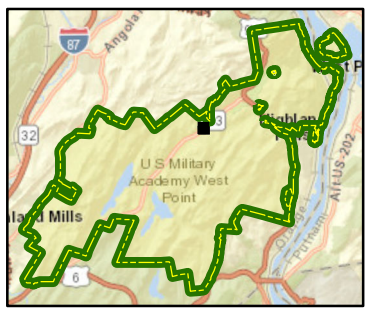


Figure 7-12
Fire Station 1400 AOPI
PFOS, PFOA, and PFBS Analytical Results

Notes:
1. Potable well labels indicate the building number associated with the well.
2. Groundwater results are in nanograms per liter (ng/L), or parts per trillion.
3. Soil results are in milligrams per kilogram (mg/kg), or parts per million.
4. Samples were collected July 13 - August 19 2020.
5. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
6. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.
** WP-FS1400-1-SE could not be collected due to sediment not being present during sampling.

Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

- Installation Boundary
- AOPI
- Wetland
- Elevation Contour (feet)
- Surface Water Runoff Direction
- Groundwater Flow Direction (inferred)*
- On-Post Potable Source
- Sediment Sampling Location
- Soil / Groundwater Sampling Location

AOPI = area of potential interest
BLDG = building
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

Data Sources:
ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
WGS 1984, UTM Zone 18 North

USAEC PFAS Preliminary Assessment / Site Inspection
United States Army Garrison - West Point

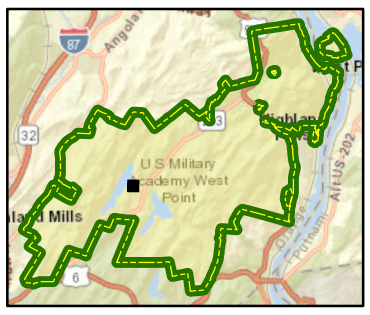
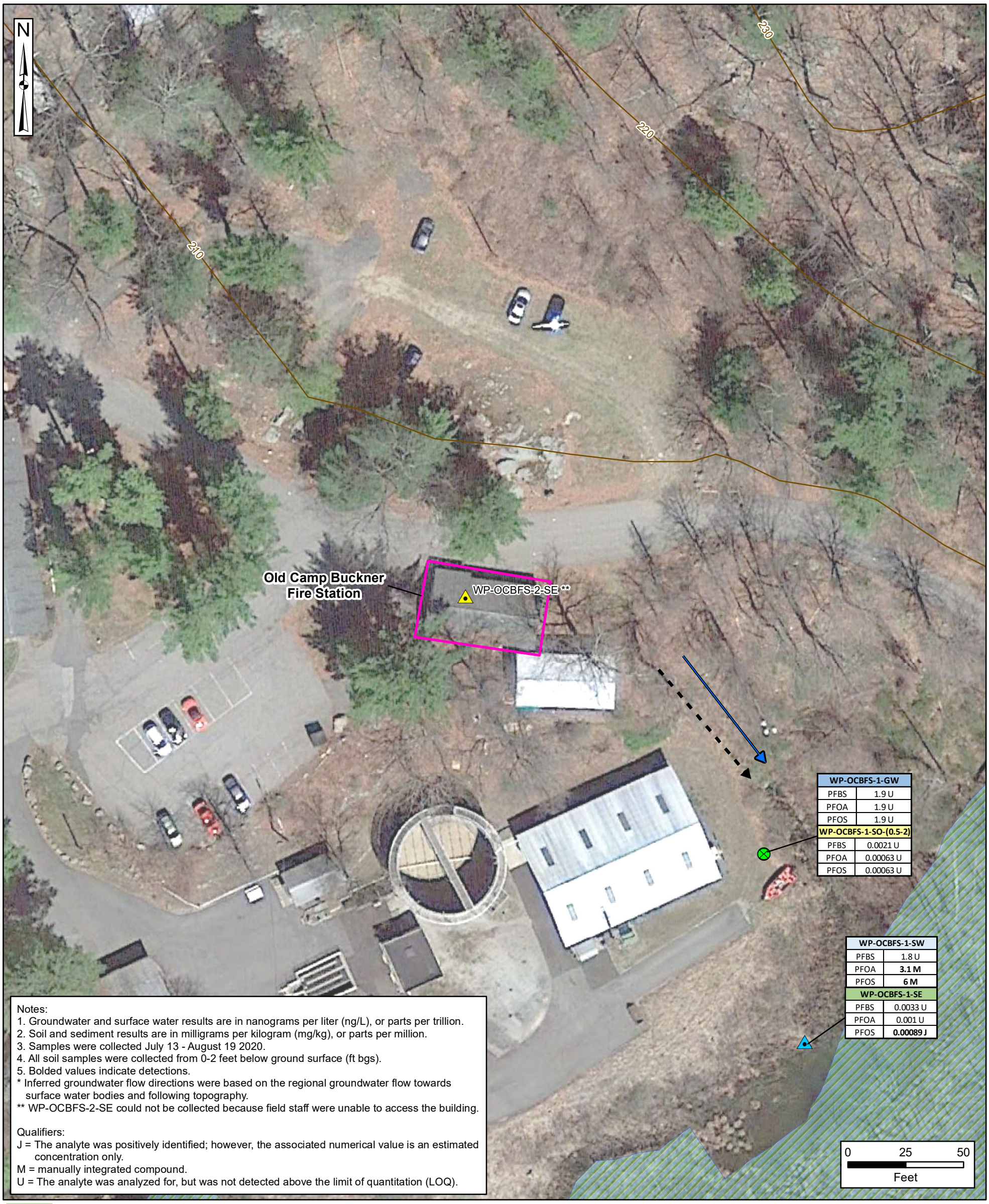


Figure 7-13
Old Camp Buckner Fire Station AOPI
PFOS, PFOA, and PFBS Analytical Results



Notes:
1. Groundwater and surface water results are in nanograms per liter (ng/L), or parts per trillion.
2. Soil and sediment results are in milligrams per kilogram (mg/kg), or parts per million.
3. Samples were collected July 13 - August 19 2020.
4. All soil samples were collected from 0-2 feet below ground surface (ft bgs).
5. Bolded values indicate detections.
* Inferred groundwater flow directions were based on the regional groundwater flow towards surface water bodies and following topography.
** WP-OCBFS-2-SE could not be collected because field staff were unable to access the building.

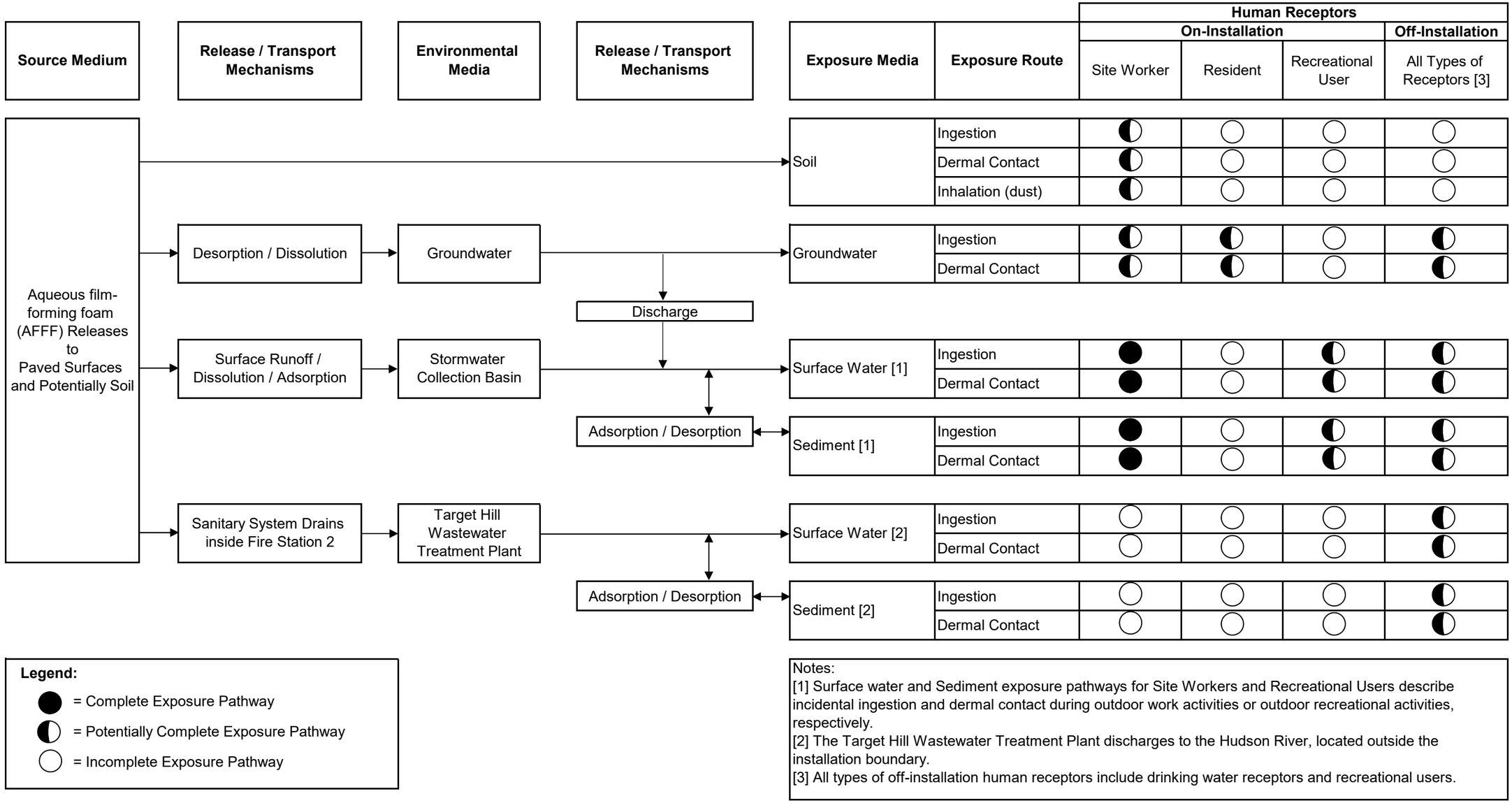
Qualifiers:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
M = manually integrated compound.
U = The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ).

- Installation Boundary
- AOPI
- Wetland
- Elevation Contour (feet)
- Surface Water Flow Direction
- Groundwater Flow Direction (inferred)*
- Surface Water / Sediment Sampling Location
- Sediment Sampling Location
- Soil / Groundwater Sampling Location

AOPI = area of potential interest
PFBS = perfluorobutanesulfonic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate

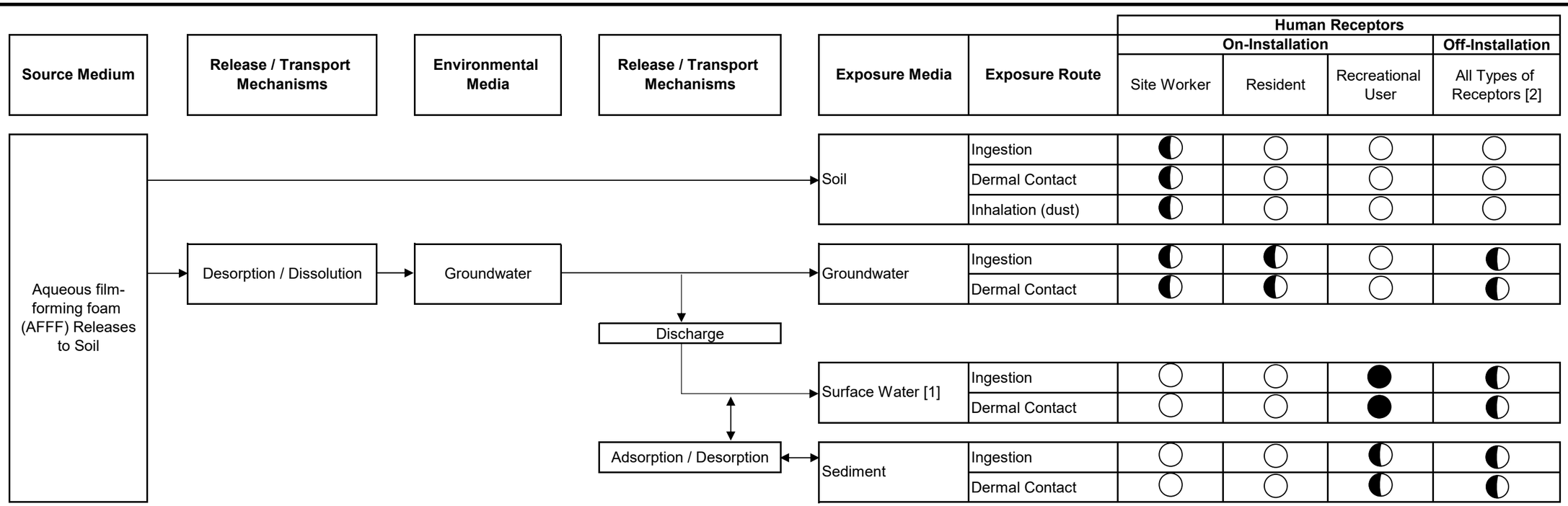
Data Sources:
Google Earth, Aerial Imagery, 2019

Coordinate System:
WGS 1984, UTM Zone 18 North



Conceptual Site Model - AOPI Fire Station 2 - Building 1203 and Additional AFFF Spray
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-14



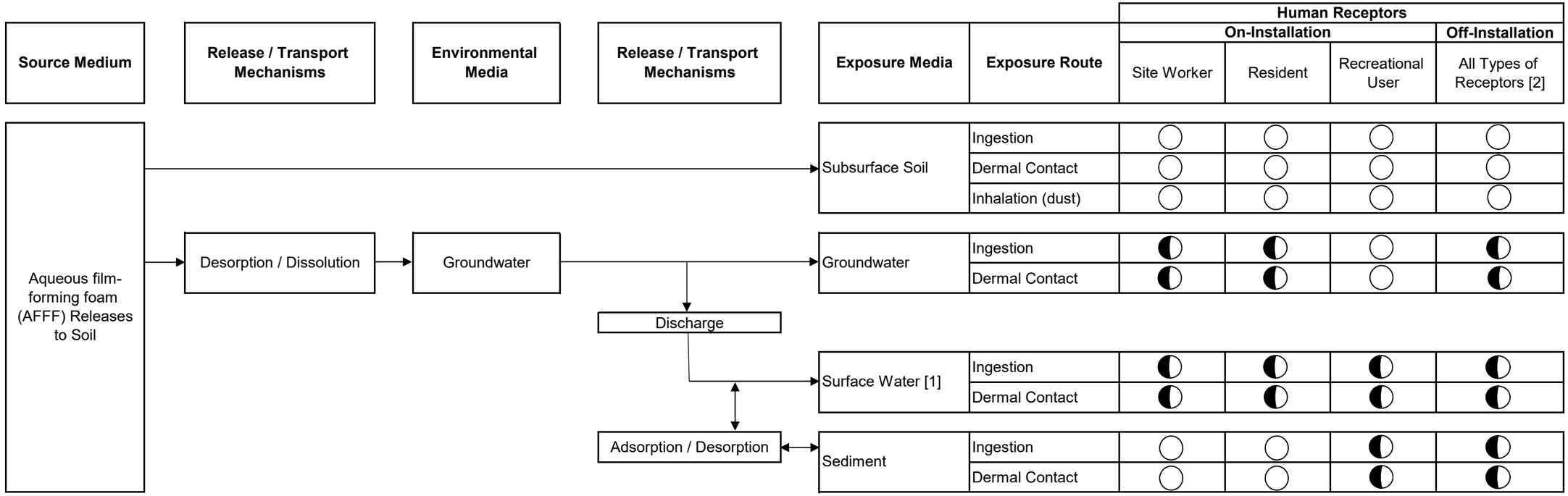
Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

Conceptual Site Model - AOPIs Ordnance Road East and Ordnance Road West
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-15



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPI USMA-32 Burn Pit
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-16

Source Media	Release / Transport Mechanisms	Environmental Media	Release / Transport Mechanisms	Exposure Media	Exposure Route	Human Receptors: On-Installation: Site Worker	On-Installation: Resident	On-Installation: Recreational User	Off-Installation: All Types of Receptors [2]
Aqueous film-forming foam (AFFF) Releases to Surface Water / Sediment	Desorption / Dissolution	Groundwater		Groundwater	Ingestion	◐	◐	○	◐
					Dermal Contact	◐	◐	○	◐
			Discharge / Recharge						
		Surface Water		Surface Water [1]	Ingestion	○	○	●	◐
					Dermal Contact	○	○	●	◐
			Adsorption / Desorption	Sediment	Ingestion	○	○	●	◐
					Dermal Contact	○	○	●	◐

Legend:

● = Complete Exposure Pathway

◐ = Potentially Complete Exposure Pathway

○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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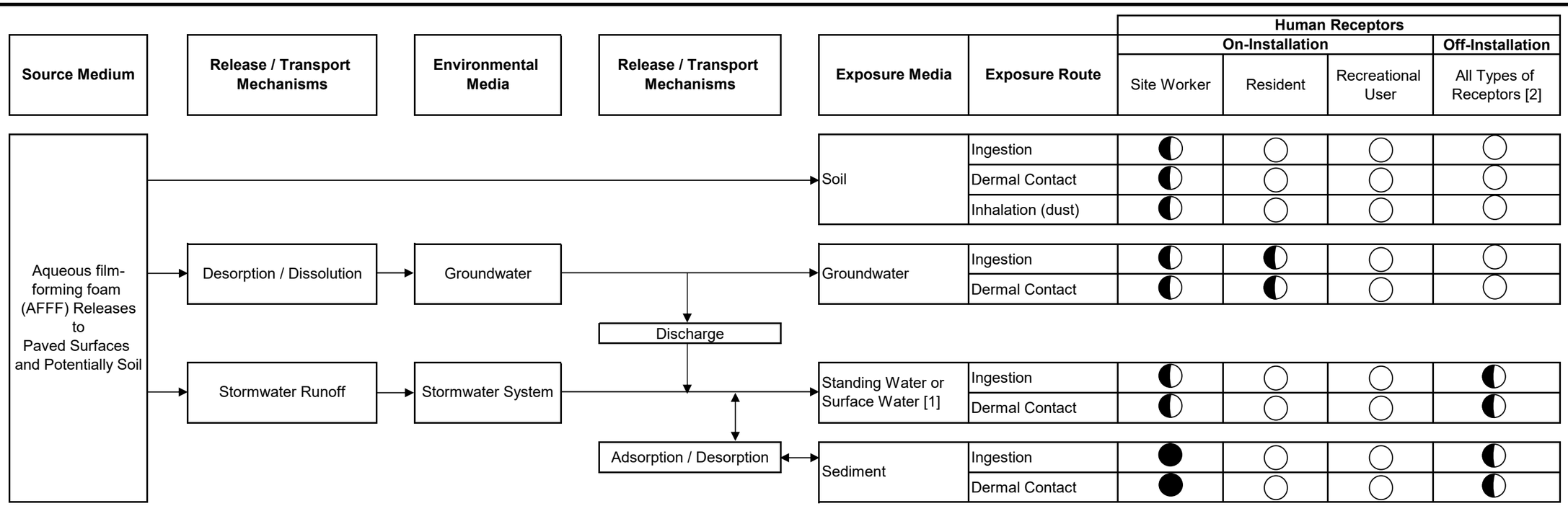
Conceptual Site Model - AOPI Crow's Nest Bog
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-17



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water and Sediment exposure pathways for Site Workers and Recreational Users describe incidental ingestion and dermal contact during outdoor work activities or outdoor recreational activities, respectively.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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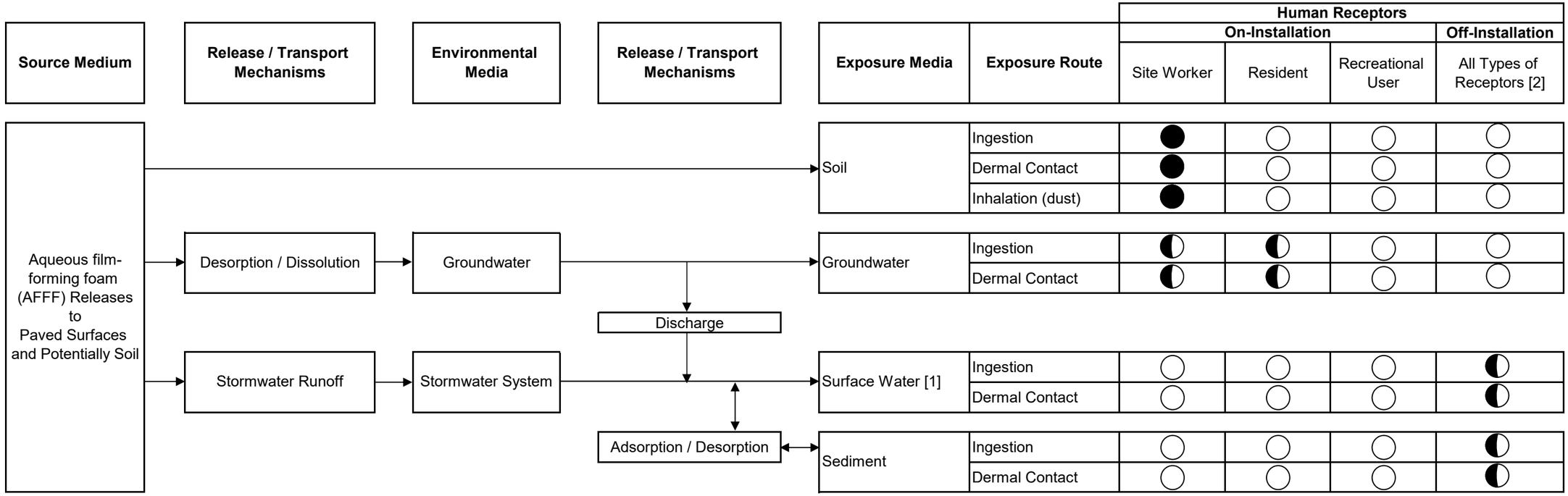
Conceptual Site Model - AOPI Dumpster Fire - Building 745
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-18



Legend:

- = Complete Exposure Pathway
- = Potentially Complete Exposure Pathway
- = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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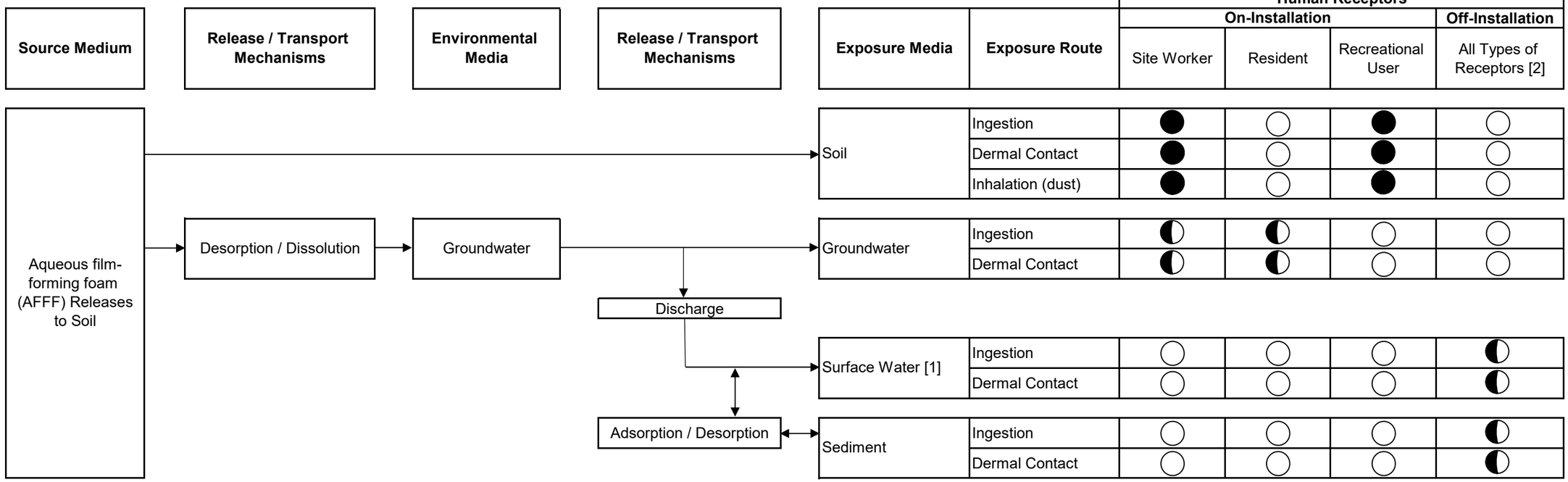
Conceptual Site Model - AOPI Fire Station 1 - Building 721
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-19



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPI Army Navy Bonfires
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-20

Source Medium	Release / Transport Mechanisms	Environmental Media	Release / Transport Mechanisms	Exposure Media	Exposure Route	Human Receptors			
						On-Installation			Off-Installation
						Site Worker	Resident	Recreational User	All Types of Receptors [2]
Aqueous film-forming foam (AFFF) Releases to Paved Surfaces and Potentially Soil				Soil	Ingestion	◐	○	○	○
					Dermal Contact	◐	○	○	○
					Inhalation (dust)	◐	○	○	○
	Desorption / Dissolution	Groundwater		Groundwater	Ingestion	◐	◐	○	○
					Dermal Contact	◐	◐	○	○
			Discharge						
	Stormwater Runoff	Stormwater System		Surface Water [1]	Ingestion	○	○	○	◐
					Dermal Contact	○	○	○	◐
			Adsorption / Desorption	Sediment	Ingestion	○	○	○	◐
					Dermal Contact	○	○	○	◐

Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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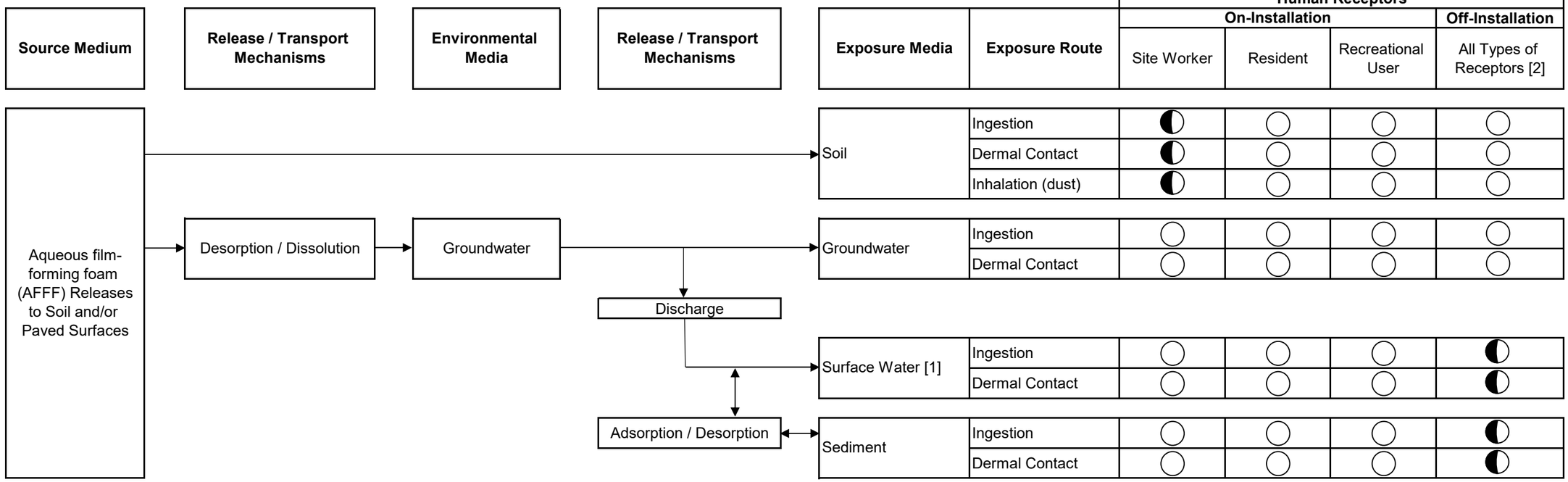
Conceptual Site Model - AOPI MVA Delafield Road
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-21



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPIs North Dock 1 and Oil Tank Fire
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-22

Source Medium	Release / Transport Mechanisms	Environmental Media	Release / Transport Mechanisms	Exposure Media	Exposure Route	Human Receptors: On-Installation: Site Worker	On-Installation: Resident	On-Installation: Recreational User	Off-Installation: All Types of Receptors [2]
Aqueous film-forming foam (AFFF) Releases to Soil and/or Paved Surfaces				Soil	Ingestion	●	○	○	○
					Dermal Contact	●	○	○	○
					Inhalation (dust)	●	○	○	○
	Desorption / Dissolution	Groundwater		Groundwater	Ingestion	◐	◐	○	◐
					Dermal Contact	◐	◐	○	◐
			Discharge						
				Surface Water [1]	Ingestion	◐	◐	◐	◐
					Dermal Contact	◐	◐	◐	◐
			Adsorption / Desorption	Sediment	Ingestion	○	○	◐	◐
					Dermal Contact	○	○	◐	◐

Legend:

● = Complete Exposure Pathway

◐ = Potentially Complete Exposure Pathway

○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPI Fire Station 1400
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-23

Source Medium	Release / Transport Mechanisms	Environmental Media	Release / Transport Mechanisms	Exposure Media	Exposure Route	Human Receptors: On-Installation: Site Worker	On-Installation: Resident	On-Installation: Recreational User	Off-Installation: All Types of Receptors [2]
Aqueous film-forming foam (AFFF) Releases to Soil and/or Paved Surfaces				Soil	Ingestion	◐	○	○	○
					Dermal Contact	◐	○	○	○
					Inhalation (dust)	◐	○	○	○
	Desorption / Dissolution	Groundwater		Groundwater	Ingestion	◐	◐	○	◐
					Dermal Contact	◐	◐	○	◐
			Discharge						
	Surface Runoff / Dissolution / Adsorption	Surface Water		Surface Water [1]	Ingestion	◐	◐	●	◐
					Dermal Contact	◐	◐	●	◐
			Adsorption / Desorption	Sediment	Ingestion	○	○	●	◐
					Dermal Contact	○	○	●	◐

Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPI Old Camp Buckner Fire Station
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-24

Source Medium	Release / Transport Mechanisms	Environmental Media	Release / Transport Mechanisms	Exposure Media	Exposure Route	Human Receptors			
						On-Installation			Off-Installation
						Site Worker	Resident	Recreational User	All Types of Receptors [2]
Anecdotal Evidence of Historical Release to Sanitary Sewer System leading to wastewater treatment plant (WWTP)	Settling / Sedimentation			Sludge from WWTP	Ingestion	◐	○	○	◐
					Dermal Contact	◐	○	○	◐
					Inhalation (dust)	◐	○	○	◐
	Release via Outfall			Surface Water [1]	Ingestion	○	○	○	◐
					Dermal Contact	○	○	○	◐
			Adsorption / Desorption	Sediment	Ingestion	○	○	○	◐
					Dermal Contact	○	○	○	◐

Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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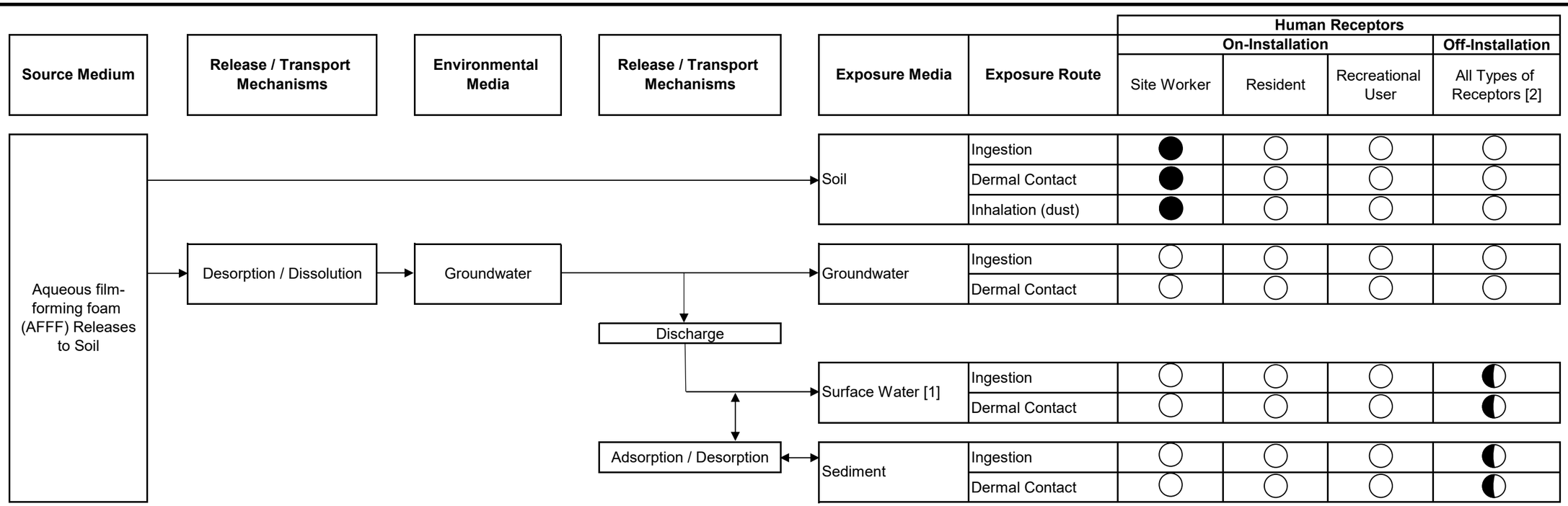
Conceptual Site Model - AOPI Target Hill WWTP
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-25



Legend:

- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Notes:
[1] Surface water exposure pathway for Site Workers and Residents describes a drinking water scenario, and for Recreational Users describes incidental ingestion and dermal contact during an outdoor recreational scenario.
[2] All types of off-installation human receptors include drinking water receptors and recreational users.

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Conceptual Site Model - AOPI North Dock 2
USAEC PFAS Preliminary Assessment / Site Inspection
USAG West Point, New York

Figure 7-26

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