Naval Facilities Engineering Systems Command Northwest
Silverdale, Washington

Final

Site Inspection Report
Per- and Polyfluoroalkyl Substances

Bremerton Naval Complex
Bremerton, Washington

October 2023

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October 2023

Prepared for NAVFAC Northwest
by CH2M HILL, Inc.
Seattle, Washington
Contract N62470-16-D-9000
CTO N4425518F4117

Executive Summary

This Site Inspection (SI) Report was prepared by CH2M HILL, Inc. (CH2M), a wholly owned subsidiary of Jacobs, under Naval Facilities Engineering Systems Command (NAVFAC) Atlantic's Comprehensive Long-term Environmental Action—Navy (CLEAN) Contract Number N62470-16-D-9000, Contract Task Order N4425518F4117, for submittal to NAVFAC Northwest. This report presents the SI data and findings for per- and polyfluoroalkyl substances (PFAS) at Bremerton Naval Complex (BNC) in Bremerton, Washington.

BNC occupies 650 acres (including tidelands and submerged land) along the northern shore of Sinclair Inlet adjacent to the City of Bremerton and approximately 2 miles north of Port Orchard in Kitsap County, Washington. BNC consists of two facilities: Puget Sound Naval Shipyard and Intermediate Maintenance Facility located in the eastern portion of the installation and Naval Base Kitsap Bremerton located in the western portion. Department of the Navy (Navy) operations at BNC began in the 1891 and the installation has been continually active since. Facilities include 6 major piers, 6 large drydocks, and more than 100 large buildings. Land use in the area surrounding BNC currently consists of commercial and residential districts in the City of Bremerton and, to the northeast, water transportation (Washington State Ferries terminal) (Navy, 2017).

A Preliminary Assessment (PA) was conducted in 2019 and 2020 to identify potential and confirmed PFAS release areas[1] at BNC (CH2M, 2020). The PA evaluated 37 areas and identified 22 areas as potential or confirmed PFAS release areas. Of the 22 potential or confirmed PFAS release areas identified, 21 were recommended for further investigation as part of a SI, and 1 was recommended for further investigation as part of a Remedial Investigation (RI) (Operable Unit [OU] B Marine).

Subsequent to the PA, the number of potential and confirmed PFAS release areas to be investigated as part of the SI changed based on updated Navy guidance and reevaluation of PFAS release area conceptual site models (CSMs). As a result, 23 areas were investigated in the SI.

The 23 potential and confirmed PFAS release areas to be investigated as part of the SI include:

- Former Building 513 Parking Lot – Potential release
- Building 435 – Potential release
- Former Building 871 – Potential release
- Former Building 99 – Potential release
- Building 503 – Potential release
- Former Building 432 – Potential release
- Building 494 – Potential release
- Farragut Ave/Barclay Rd Car Crashes – Confirmed release
- Building 434 – Potential release
- Auto/Hobby Shop Fire – Confirmed release
- 2017 United States Ship (USS) Stennis Aqueous Film-forming Foam (AFFF) Release (Marine) – Confirmed release
- 2018 AFFF Spill – Confirmed release
- Building 457 – Potential release

[1] PFAS release areas were previously referred to as PFAS source areas in the PA (CH2M, 2020a).

- USS Missouri Parking Lot (OU A/Zone 2) – Potential release
- Mooring A and Drydock 5 Fill Area – Potential release
- Building 873 – Potential release
- Former Defense Reutilization Marketing Office (DRMO) Drum Storage Area – Potential release
- Lift Station 1 – Potential release
- Lift Station 3 – Potential release
- Former Building 426 – Potential release
- Building 455 – Potential release
- Building 59 – Potential release
- OU D – Potential release

The objectives of the SI were identified in the *Bremerton Naval Complex Sampling and Analysis Plan, Site Inspection for Per- and Polyfluoroalkyl Substances* (SAP) (CH2M, 2022a):

- Determine whether PFAS are present in groundwater and soil at terrestrial potential and confirmed release areas or sediment or surface water at the marine confirmed release area at concentrations warranting further investigation.
- Refine the understanding of the hydrogeologic characteristics at potential and confirmed PFAS release areas.

PFAS are water-soluble and relatively mobile through soils to groundwater. Therefore, if a historical release occurred at a potential PFAS release area, it is likely to be detected within groundwater at the release area and/or downgradient. Based on this rationale, the SI activities focused on collecting groundwater and soil samples at or near potential or confirmed terrestrial release areas and sediment and surface water samples at or near the confirmed marine release area identified in the PA. Groundwater, soil, sediment, and surface water samples were analyzed for the 18 PFAS compounds listed in EPA Method 537.1 via liquid chromatography tandem mass spectrometry compliant with the Department of Defense (DoD) and Department of Energy Consolidated Quality Systems Manual for Environmental Laboratories, Version 5.3, in accordance with the laboratory's Environmental Laboratory Accreditation Program Accreditation letters. A subset of the sediment samples was also analyzed for total organic carbon and soil particle-size analysis, referred to in this document as GRAINSIZE.

In accordance with the June 2022 ASD memorandum (DoD, 2022), groundwater and soil data were screened against the updated SLs (USEPA, 2022). Groundwater data were screened against residential scenario tapwater SLs for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorobutanesulfonic acid (PFBS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA) presented in the May 2023 Regional Screening Level (RSL) Table (USEPA, 2023). Soil data were screened against residential scenario soil SLs for PFOA, PFOS, PFBS, PFHxS, PFNA, and HFPO-DA presented in the May 2023 RSL Table (USEPA, 2023).

The SLs are as follows:

- PFOA – Soil and sediment SL: 19 micrograms per kilogram (µg/kg), Groundwater and surface water SL: 6.0 nanograms per liter (ng/L)
- PFOS – Soil and sediment SL: 13 µg/kg, Groundwater and surface water SL: 4.0 ng/L
- PFBS – Soil and sediment SL: 1,900 µg/kg, Groundwater and surface water SL: 600 ng/L
- PFHxS – Soil and sediment SL: 130 µg/kg, Groundwater and surface water SL: 39 ng/L
- HFPO-DA – Soil and sediment SL: 23 µg/kg, Groundwater and surface water SL: 6.0 ng/L
- PFNA – Soil and sediment SL: 19 µg/kg, Groundwater and surface water SL: 5.9 ng/L

Following completion of the initial data screening and human health risk screening (HHRS), the USEPA published RSLs for two additional PFAS: perfluorobutanoic acid (PFBA) and perfluorohexanoic acid (PFHxA) (USEPA, 2023b). DoD Instruction (DoDI) 4715.18 provides a framework to recognize new or changing toxicity values to ensure DoD uses the best available toxicity data to support CERCLA HHRAs (DoD, 2019). Per this framework, the preferred, or Tier I source for toxicity values is the EPA's Integrated Risk Information System (IRIS) program. As reflected in the USEPA RSLs, IRIS released a new toxicity profile for PFBA in December 2022 and one for PFHxA and related salts in April 2023. Consistent with DoDI 4715.18, and in consideration of the timing of this report, the PFHxA SL was used for screening soil and groundwater data (**Appendix F**) at potential release areas to determine whether the inclusion of these values had the potential to impact site management decisions (that is, the potential release areas not already recommended for RIs). The SL for PFHxA is as follows:

- PFHxA – residential soil SL: 3,200 ng/g, tapwater SL: 990 ng/L

There were no exceedances; therefore, PFHxA does not impact site management decisions and is not included in **Section 4** tables or **Appendix I**. PFBA was not included in the analyte list for the SI but will be included during further investigations.

Two depth intervals of subsurface soil samples were collected while installing new groundwater monitoring wells at suspected release areas (potential and confirmed) except for the marine release area, the 2017 USS Stennis AFFF Release. Stand-alone surface soil samples were also collected at Former Building 513 Parking Lot, Building 503, Building 434, and the Auto/Hobby Shop Fire. PFAS were detected in soil at all potential or confirmed release areas investigated except for Building 455 and OU D; however, detections only exceeded the SLs at Former Building 871, Former Building 432, and the USS Missouri Parking Lot.

Groundwater samples were collected from existing groundwater monitoring wells and newly installed monitoring wells at suspected release areas (potential and confirmed) except for the marine release area, the 2017 USS Stennis AFFF Release. PFAS were detected in groundwater in exceedance of the SLs at all potential or confirmed release areas investigated.

Six sediment samples were collected from two depth intervals at three locations adjacent to the 2017 USS Stennis AFFF Release. PFAS were detected in three samples at concentrations below the SLs.

Surface water samples were collected at three locations adjacent to the 2017 USS Stennis AFFF Release. No PFAS were detected in surface water samples.

At this time, no further investigation is recommended for the following six areas:

- Former Building 99
- Farragut Ave/Barclay Rd Car Crashes
- Auto/Hobby Shop Fire
- 2017 USS Stennis AFFF Release
- 2018 AFFF Spill
- OU D

RIs are recommended for several areas to evaluate the nature and extent of PFAS, obtain additional hydrogeologic and environmental data to update the CSMs, and further evaluate potential human health and ecological risks from exposure to PFAS. For portions of BNC with multiple release areas located in close proximity to one another with PFAS concentrations warranting further investigation and similar CSMs, combined RIs were recommended. RIs are recommended for the following 17 areas:

- Former Building 513 Parking Lot
- Building 435
- Former Building 871
- Building 503
- Building 494
- Former Building 432

- Building 434
- Building 457
- USS Missouri Parking Lot
- Mooring A and Drydock 5 Fill Area
- Lift Station 3
- Building 873
- Former DRMO Drum Storage Area
- Lift Station 1
- Former Building 426
- Building 455
- Building 59

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Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid
11Cl-pF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
ADONA	4,8-dioxa-3H-perfluorononanoic acid
AFFF	aqueous film-forming foam
bgs	below ground surface
BNC	Bremerton Naval Complex
bss	below sediment surface
CAA	Central Accumulation Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
DoD	Department of Defense
DOH	Washington State Department of Health
DRMO	Defense Reutilization Marketing Office
EPA	United States Environmental Protection Agency [Method]
EPP	Environmental Protection Plan
GW	groundwater
HDPE	high-density polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid
HHRS	Human Health Risk Screening
HQ	hazard quotient
IAS	Initial Assessment Study
IDW	investigation-derived waste
IMF	Intermediate Maintenance Facility
mg/kg	milligram(s) per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NAVFAC	Naval Facilities Engineering Systems Command
NBK	Naval Base Kitsap
ND	not detected

ng/L	nanogram(s) per liter
Navy	Department of the Navy
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NTU	nephelometric turbidity unit
ORP	oxidation-reduction potential
OU	operable unit
OWS	oil/water separator
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexoanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFTA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
ppt	parts per trillion
PSNS	Puget Sound Naval Shipyard
PVC	polyvinyl chloride
PWS	public water system
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level

SAP	Sampling and Analysis Plan
SB	subsurface soil
SCH	Schedule
SL	screening level
SI	Site Inspection
SOP	standard operating procedure
SS	surface soil
TPH	total petroleum hydrocarbons
UCMR 3	Third Unregulated Contaminant Monitoring Rule
UCMR 4	Fourth Unregulated Contaminant Monitoring Rule
UCMR 5	Fifth Unregulated Contaminant Monitoring Rule
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USS	United States Ship
VOC	volatile organic compound
WMP	Waste Management Plan
WQP	water quality parameter

SECTION 1

Introduction

This Site Inspection (SI) Report was prepared by CH2M HILL, Inc. (CH2M), a wholly owned subsidiary of Jacobs, under Naval Facilities Engineering Systems Command (NAVFAC) Atlantic's Comprehensive Long-term Environmental Action—Navy (CLEAN) Contract Number N62470-16-D-9000, Contract Task Order N4425518F4117, for submittal to NAVFAC Northwest. This report presents the SI data and findings for per- and polyfluoroalkyl substances (PFAS) at Bremerton Naval Complex (BNC) in Bremerton, Washington.

The objectives of the SI were defined in the Final Sampling and Analysis Plan, SI for PFAS, BNC, Bremerton, Washington (SAP) (CH2M, 2022a). The objectives were as follows:

- Determine whether PFAS are present in groundwater and soil at terrestrial potential and confirmed release areas or sediment or surface water at the marine confirmed release area at concentrations warranting further investigation.
- Refine the understanding of the hydrogeologic characteristics at potential and confirmed PFAS release areas.

The approach taken to achieve the listed objectives was to collect soil (surface and subsurface) and groundwater samples or sediment and surface water samples in locations likely to have been impacted by PFAS (if released) in each of the potential or confirmed PFAS release areas identified in the PA. This SI report documents the SI field investigation, presents the results and conclusions regarding data collected, and provides recommendations based on those conclusions.

1.1 PFAS Background

PFAS are of environmental concern because of their persistence in the environment and in organisms, their migration potential in aqueous systems (for example, groundwater), their historically widespread use in commercial products, and their possible health effects at low levels of exposure. PFAS are anthropogenic compounds with multiple, strong carbon-fluorine bonds.

The chemical properties of PFAS make them useful for many commercial products because they are heat-resistant and can repel oil, grease, and water. PFAS have been manufactured for use in a wide variety of products, including firefighting foam, nonstick cookware, fiber and fabric stain protection, food packaging, and personal care products. The pervasive use of PFAS in commercial and industrial products has led to the discovery of PFAS in soil, air, and groundwater worldwide.

PFAS have been used in a variety of military applications, including as a component of aqueous film-forming foam (AFFF). PFAS from AFFF used in firefighting, firefighting training and equipment testing, and fire suppression systems are considered to have the greatest potential for release of PFAS to the environment in terms of mass and concentration at Department of the Navy (Navy) installations. Other potential sources of PFAS to the environment include operations wastes (for example, from chromium electroplating), historical onsite land disposal areas and landfills, and wastewater treatment sludges and effluents.

Additional research is needed to more clearly understand the potential health effects that may be caused by exposure to PFAS compounds. To date, only limited information exists on a few of the thousands of PFAS.

SECTION 2

Site Background and Physical Setting

This section presents background information on BNC, including site history, potential sources of PFAS, and relevant information on the physical and hydrogeologic setting at the site.

2.1 Facility Background

2.1.1 Description and History

In 1891, the Navy purchased 190 acres of land on Sinclair Inlet for construction of a ship drydock, repair, and overhaul base. The original area was substantially expanded beginning in the early 1900s by filling and grading shallow areas with soil, dredged material, and construction debris and through the purchase of additional adjacent property. BNC currently occupies 650 acres (including tidelands and submerged land) along the northern shore of Sinclair Inlet adjacent to the City of Bremerton and approximately 2-miles north of Port Orchard in Kitsap County, Washington (**Figure 2-1**). The land occupied by Naval Base Kitsap (NBK) Bremerton and Puget Sound Naval Shipyard (PSNS) and Intermediate Maintenance Facility (IMF) are owned by Commander, Navy Installations Command (CNIC). PSNS and IMF is located on the eastern portion of the installation and is a tenant command of CNIC. Naval Base Kitsap (NBK) Bremerton is located on the western portion of the installation and is the proper installation name as recognized by the Navy. The National Priorities List refers to the installation as Puget Sound Naval Shipyard Superfund Site. Furthermore, Bremerton Naval Complex (BNC) has been used as the installation name in CERCLA documents since the 1990s. For consistency with other CERCLA and PFAS documents, the site will be hereby referred to as BNC. The Navy also owns approximately 1,000 acres of railroad area contiguous with the shipyard area (**Figure 2-1**). In over 115 years of industrial shipyard operations, primary land uses at BNC have included the following:

- Heavy industry (shipbuilding, ship maintenance and repair, and ship conversion, inactivation and deconstruction)
- Light industry (vehicle maintenance)
- Ship berthing/homeporting
- Commercial (providing for purchase of supplies, meals)
- Residential (officers' and other quarters, barracks)

BNC facilities include 6 major piers, 6 large drydocks, and more than 100 large buildings (**Figure 2-2**). Land use in the area surrounding BNC currently consists of commercial and residential districts in the City of Bremerton and, to the northeast, water transportation (Washington State Ferries terminal) (Navy, 2017) (**Figure 2-1**).

Miscellaneous waste materials have been a normal byproduct of PSNS and IMF industrial activities since the early 1900s. Before the establishment of environmental regulations, some wastes were disposed of at BNC using practices considered acceptable at the time (i.e., use as fill material).The waste materials reportedly have included metal plating wastes, metal filings and shavings, transformers and other electrical components containing polychlorinated biphenyls (PCB), batteries, acids, oxidizing materials, paint and paint chips, degreasing and cleaning solvents, miscellaneous materials from shipbuilding and ship demolition, and petroleum products. Disposal of wastes, particularly in conjunction with the placement of fill during shipyard expansion, as well as spills and leaks of industrial materials, has led to elevated levels of various chemicals in the subsurface.

2.1.2 Previous Environmental Investigations

An Initial Assessment Survey (IAS) was performed at BNC in 1983 and resulted in the identification of several areas of potential environmental contamination (NEESA, 1983). As a result of industrial operations and associated waste handling, storage, and disposal, six operable units (OUs) have been established at BNC, five OUs under CERCLA

(including OU A, OU B Marine, OU B Terrestrial, OU D, and OU NSC) and one OU (OU C) being addressed under Subchapter IX of the RCRA and the Washington State Model Toxics Control Act (**Figure 2-2**). In 2002, the Navy began investigating the potential of transferring a portion of OU B Terrestrial to the City of Bremerton for the development of a public park (Navy, 2005). This portion of OU B Terrestrial was redefined as OU D and, in 2003, underwent a subsequent investigation for the potential change in land use from industrial to recreational (Navy, 2005). A brief background for the OUs is described as follows:

- OU A (**Figure 2-2**): OU A is located in the southwest portion of the BNC and was created through the filling of tidelands from the 1940s to early 1970s with various types of fill material including dredge spoils, construction debris, sandblast grit, industrial wastes, and other miscellaneous materials (Navy, 1996). Contaminants of concern (COCs) for OU A include metals, polycyclic aromatic hydrocarbons (PAHs), PCBs, and total petroleum hydrocarbons (TPH) for soil and metals, PAHs, PCBs, pesticides, and TPH for groundwater (Navy, 2017). The OU A Record of Decision (ROD) was finalized in 1996 and the selected remedy included upgrades to the pavement cap, erosion protection upgrades, institutional controls, long-term monitoring, routine inspections and maintenance, and marine and terrestrial habitat enhancements (Navy, 2017).
- OU B Marine (**Figure 2-2**): OU B Marine consists of approximately 230 acres of subtidal and intertidal area adjacent to the terrestrial portion of the installation (Navy, 2000). COCs for OU B Marine include metals, PCBs, mercury, pesticides, and PAHs for marine sediment and tissue (Navy, 2017). The OU B Marine ROD was finalized in 2000 and the selected remedy included dredging, in situ capping, habitat restoration, shoreline stabilization at Site 1, monitoring, maintenance, and institutional controls (Navy, 2017).
- OU B Terrestrial (**Figure 2-2**): OU B Terrestrial is a large industrial portion of the installation adjacent to OU B Marine and consists of fill material placed from 1905 to 1970s. Fill material included dredge spoils, construction debris, sandblast grit, industrial process wastes, and other miscellaneous materials (Navy, 2003). COCs for OU B Terrestrial include metals (arsenic), trichloroethylene, pesticides, PAHs, and PCBs for soil and metals (arsenic) and PCBs for groundwater (Navy, 2017). The OU B Terrestrial ROD was finalized in 2003 and the selected remedy included paving, stormwater system restoration, shoreline stabilization, groundwater monitoring, maintenance, and institutional controls (Navy, 2017).
- OU D (**Figure 2-2**): OU D was established in 2002 from a portion of OU B Terrestrial located near the eastern border of BNC. Similar to OU B Terrestrial, OU D was formed from fill materials that included dredge spoils, construction debris, sandblast grit, industrial process wastes, and other miscellaneous materials (Navy, 2005). COCs for OU D include volatile organic compounds (VOCs), pesticides, and metals for soil and metals and pesticides for groundwater (Navy, 2017). The OU D ROD was finalized in 2005 prior to the transfer of the OU D property to the City of Bremerton in 2006 and 2007 (Navy, 2017). The selected remedy included sitewide capping, stormwater system contaminated sediment removal, institutional controls, and groundwater monitoring (Navy, 2017).
- OU NSC (**Figure 2-2**): OU NSC which has documented soil and groundwater contamination associated with spills and releases resulting from historical material and waste handling practices at buildings located within the OU (NEESA, 1983; Navy, 2017). COCs for OU NSC include metals (lead), TPH, PAHs, and PCBs for soil and metals, pesticides, PCBs, and TPH for groundwater (Navy, 2017). The OU NSC ROD was finalized in 1996 and the selected remedy included existing site paving, accumulated soil and debris removal, institutional controls, and groundwater monitoring (Navy, 2017).
- OU C (**Figure 2-2**): OU C is a non-CERCLA site contaminated with petroleum hydrocarbons that is associated with the operation of former petroleum underground storage tanks. Remedial actions at OU C include land use controls, a groundwater remediation system, and groundwater monitoring (Navy, 2017).

PFAS were not COCs at the time of the IAS or subsequent investigations, and thus were not investigated.

In 2020, a PA was conducted to identify potential PFAS release areas at BNC (CH2M, 2020). The PA evaluated 37 areas and identified 22 areas as potential or confirmed PFAS release areas. Of the 22 potential or confirmed PFAS release areas identified, 21 were recommended for further investigation as part of an SI, and 1 was recommended

for further investigation as part of a Remedial Investigation (RI) (OU B Marine). Subsequent to the PA, the number of potential and confirmed PFAS release areas to be investigated as part of the SI changed based on updated Navy guidance and reevaluation of PFAS release area conceptual site models (CSMs). As a result, 23 areas were identified as potential or confirmed PFAS release areas and recommended for further investigation as part of an SI (**Figure 2-3**). Background information and historical descriptions for the 23 areas investigated are provided in **Tables 4-1** through **4-23** and are discussed in **Section 4**.

2.2 Environmental Setting

This section provides the environmental setting of BNC.

2.2.1 Climate

BNC and the surrounding area have a temperate marine climate with warm, dry summers, and cool, wet winters (USGS**,** 2016). Temperatures are moderated by proximity to the Pacific Ocean and Puget Sound (USGS, 2016). Average high temperatures during the summer months range from 70 to 80 degrees Fahrenheit**,** while winter highs are typically range from 40 to 50 degrees Fahrenheit (WRCC, 2019). Average annual precipitation is approximately 56 inches, the majority of which falls between October and April (URS, 1994). The Bremerton area receives approximately 7 inches of snowfall annually (WRCC, 2019).

2.2.2 Hydrologic and Topographic Setting

BNC spans approximately 3 miles of shoreline along Sinclair Inlet (**Figure 2-4**). Sinclair Inlet is the only surface water body associated with BNC. Fresh water recharge to the groundwater in the BNC area is limited to infiltration from precipitation (USGS, 2016). No perennial or intermittent streams or freshwater bodies exist within the BNC Installation boundary. The majority of PSNS and IMF and the southern portion of NBK Bremerton is covered in impermeable surfaces and runoff is controlled by stormwater infrastructure. The paved surfaces consist of concrete and asphalt with varied degrees of weathering and cracking. Joints are present between concrete slabs and concrete and asphalt sections. Precipitation collected by the stormwater infrastructure at BNC is directed through several oil/water separators (OWSs) prior to being discharged to Sinclair Inlet through a series of outfalls located in between the various piers and drydocks. Portions of the stormwater infrastructure at BNC are known to be degraded. The Navy is actively working to repair damaged or degraded stormwater infrastructure. Overland flow in the northern portion of BNC drains toward Sinclair Inlet away from the City of Bremerton and a topographically high small knoll located in the north central portion of the installation (**Figure 2-4**). The topography of upland the nearshore areas of NBK Bremerton and PSNS are predominantly flat (**Figure 2-4**).

2.2.3 Geologic Setting

BNC is located within the Puget Sound Lowland, a north-south trending structural basin that is partially filled with unconsolidated glacial and interglacial deposits overlying sedimentary and igneous bedrock (USGS, 2016). The Puget Lobe of the Cordilleran ice sheet advanced and retreated several times into the Puget Sound Lowland from the mountains of British Columbia during the Pleistocene and left behind a complex sequence of alternating glacial and interglacial sediments (USGS, 2016). Glacial sediment deposited in the Puget Sound Lowland includes (in order of deposition) outwash sand and gravels deposited by the advancing ice; glacial till deposited beneath and adjacent to the ice; and outwash sand and gravels at the top of the sequence deposited by the retreating ice. Each major glacial interval was followed by an extended interglacial period during which fluvial, lacustrine, bog, and marsh deposition dominated (USGS, 2016). Nine stratigraphic units are in the BNC area. Details about each stratigraphic unit are listed from the youngest to oldest units below (URS, 1992):

- Holocene Alluvium: localized, thin layer of sand, gravel, silt, and peat.
- Vashon Recessional Outwash: discontinuous, unconsolidated units of sand, gravel and silt (up to 100 feet thick).

- Vashon Till: dense unit of gravel and cobble in silt, fine sand, and clay forming an aquiclude (up to 80 feet thick).
- Vashon Advance Outwash: coarse sand and gravel with some silt lenses (up to 50 feet thick).
- Colvos Sand: well-stratified sand with some lenses of fine gravel and clay (typically less than 150 feet thick) (not present at BNC).
- Clover Park Formation: laminated silt and clay with lenses of sand, gravel, and peat forming a laterally extensive aquiclude (between 70 and 150 feet thick).
- Glacial Drift Unit: gravel and coarse sand with localized till and clay (between 100 and 200 feet thick).
- Early Pleistocene deposits: clay and silt with lenses of sand, gravel, and some till (over 400 feet thick).

In the vicinity of BNC, the total thickness of sedimentary deposits ranges from 600 to 1,800 feet (Prych, 1997). The most common units exposed at the surface at BNC are Vashon Till and Vashon Recessional Outwash (Prych, 1997).

In addition to native sediments, a large portion of BNC (primarily the coastal areas and PSNS and IMF) are built on fill consisting of miscellaneous debris, riprap, and dredged material from nearby excavations (USGS, 2016). In some locations near the shoreline, the fill may be up to 50 feet thick (URS, 1994).

2.2.4 Hydrogeologic Setting

Four groundwater aquifers occur at BNC (USGS, 2016). In order of depth, they are:

- Vashon advance aquifer (Qva); Also referred to as the upper aquifer in older studies (URS, 1994) – correlates to the Vashon Recessional Outwash and Vashon Advance Outwash stratigraphic units.
- Sea-level aquifer (QA1); Also referred to as the lower aquifer in older studies (URS, 1994) – correlates to the Glacial Drift stratigraphic unit.
- Glaciomarine aquifer (QA2) – correlates to water-bearing stratigraphic units underlying the Early Pleistocene stratigraphic unit at depths ranging from 400 to 600 feet below ground surface (bgs).
- Deep aquifer (QA3) – correlates to water-bearing stratigraphic units underlying the Early Pleistocene stratigraphic unit at depths ranging from 750 to 900 feet bgs.

The four aquifer units are bounded by low permeability aquitards composed of dense glacial till and fluvial silts and clays. Depths and thicknesses of the aquifers vary significantly regionally due to the heterogeneous nature of glacial deposits.

The Vashon advance aquifer (Qva), or upper aquifer, exists under confined and unconfined conditions at BNC; however, it is primarily confined or semi-confined, bounded at the surface across much of the installation by either the Vashon till or fill (USGS, 2016). Recharge to the Vashon advance aquifer occurs through infiltration of precipitation through the Vashon till or at locations where the Qva is exposed at the surface. Static groundwater elevations within the Qva are typically between 4 and 20 feet above mean sea level with localized tidally influenced water level fluctuations of between 0 and 6 feet depending on well location and screened interval (URS, 1994) however, drydock dewatering and groundwater pumping in some locations near drydocks may draw in groundwater levels down to -30 to -40 feet below mean sea level (USGS, 2016). Under static conditions (no drydock pumping), groundwater flow within the Qva generally mimics topography and flows toward Sinclair Inlet (**Figure 2-4**).

The sea-level aquifer (QA1), or lower aquifer, occupies elevations between sea level and approximately 300 feet below sea level. QA1 exists under confined conditions beneath BNC, with artesian conditions in some topographically low areas along the coast (URS, 1994). QA1 and Qva are separated by the Clover Park Formation which varies in thickness from 70 to 150 feet. Due to the thickness of the Clover Park unit, hydraulic communication between Qva and QA1 is unlikely.

Groundwater flow within the glaciomarine aquifer (QA2) and the deep aquifer (QA3) is not well understood due to a lack of wells and relative proximity of the wells within the two aquifers. QA2 is present below depths of approximately 400 feet bgs and extends to depths of approximately 600 feet bgs, while QA3 is present below depths of approximately 750 feet bgs and extends to depths of approximately 900 feet bgs.

A groundwater model for BNC was developed by the United States Geological Survey (USGS), which provides insight into how groundwater flow directions in Qva and QA1 are influenced by groundwater pumping at the six drydocks at BNC (**Figure 2-4**) (USGS, 2016). To prevent flooding and failure of the side walls due to hydrostatic pressure when the drydocks are empty, groundwater within the fill surrounding the drydocks is continuously pumped to lower groundwater levels to a predetermined level (Navy, 2002b). Additionally, several small groundwater seeps are positioned within the base of the drydock to provide additional pressure relief. Groundwater captured by drydock dewatering is diverted to 4 outfalls to Sinclair Inlet (**Figure 2-4**) (Navy, 2002b). As a result of the continuous pumping, each drydock forms a large cone of depression altering the groundwater flow direction in the surrounding area (**Figure 2-4**). The area influenced by drydock dewatering is significant and impacts the majority of PSNS and lowland portion of NBK Bremerton (**Figure 2-4**) (Prych, 1997; USGS, 2016). The exception is the far western end of BNC where shallow groundwater discharges directly to Sinclair Inlet (Prych, 1997; USGS, 2016) (**Figure 2-4**). When drydocks are flooded periodically to support installation activities, the groundwater flow is impacted depending on which drydock or drydocks are flooded, and groundwater flow patterns deviate from those present during drydock dewatering. The drydocks are empty the majority of the time, exceptions include when floating vessels in and out of the drydocks and during dewatering system maintenance. Refer to **Section 3.5** and **Figures 3-1** through **3-6** for information on drydock operations and impact during fieldwork.

2.3 On-Base and Off-Base Drinking Water Source Evaluation

This section discusses the sources of drinking water at BNC and in the adjacent off-Base areas and whether on-Base or off-Base drinking water could have been impacted by potential or confirmed PFAS release areas investigated as part of the SI.

The BNC drinking water supply comes from the Bremerton Water System which serves BNC, City of Bremerton, and Navy Yard City (**Figure 2-5**). Surface water from the Union River Reservoir located 5 miles west of BNC provides approximately 60 percent of the Bremerton Water System supply (**Figure 2-5**). PFAS were not detected in Union River Reservoir drinking water samples collected under UCMR 3, and no other surface water sources are used as drinking water at BNC or the surrounding area (COB, 2014; COB, 2023). Forty percent of the drinking water in the Bremerton Water System is groundwater obtained from three well fields, North Bremerton Well Field, Belfair Valley Well Field, and Anderson Creek Well Field, located 3.8 miles to the north, 2.8 miles to the southwest, and 5.9 miles to the west-southwest of BNC, respectively (**Figure 2-5**). Aside from three wells within the Anderson Creek Well Field which are screened in Glaciomarine aquifer at depths ranging from 578 to 645 feet bgs, Bremerton Water System supply wells are screened within the sea-level aquifer at depths ranging from 183 to 316 feet bgs (COB, 2019). The Bremerton Water System well fields are not located downgradient of the potential PFAS release areas under investigation at BNC, and PFAS were not detected during previous sampling of Bremerton Water System supply wells tested under UCMR 3 (COB, 2014). Additionally, in accordance with the July 2020 ASD memorandum (Navy, 2020), on-Base drinking water obtained from the Bremerton Water System was sampled for PFAS in November 2021 and the results were non-detect for all PFAS analyzed.

Based on simulated groundwater flow directions (USGS, 2016) and the locations of the potential and confirmed PFAS release areas, there are no private drinking water wells within 1 mile downgradient of the potential and confirmed PFAS release areas. In addition, data obtained from the Washington State Department of Ecology and DOH indicates that there are no private drinking water wells within 1 mile of the BNC Base boundary. According to Department of Ecology and DOH driller well logs, well usage in the area surrounding BNC is limited to dewatering and resource protection and monitoring wells. In addition, the 2023 water service area map indicates that the sole provider of drinking water within 1 mile is the Bremerton Water System operated by the COB (COB, 2023). Therefore, there are no known current PFAS exposure pathways to residents or workers through private drinking water sources.

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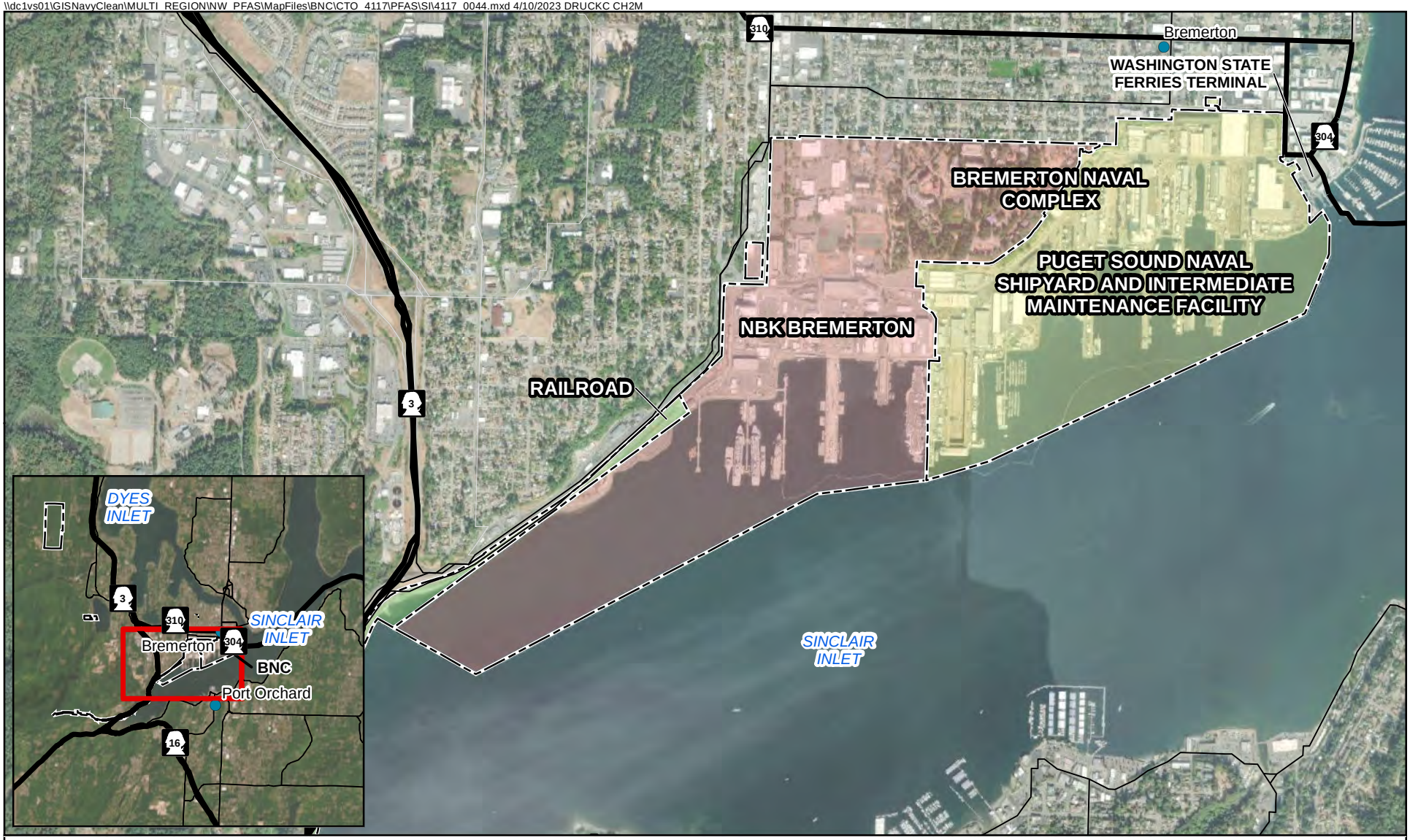


LEGEND

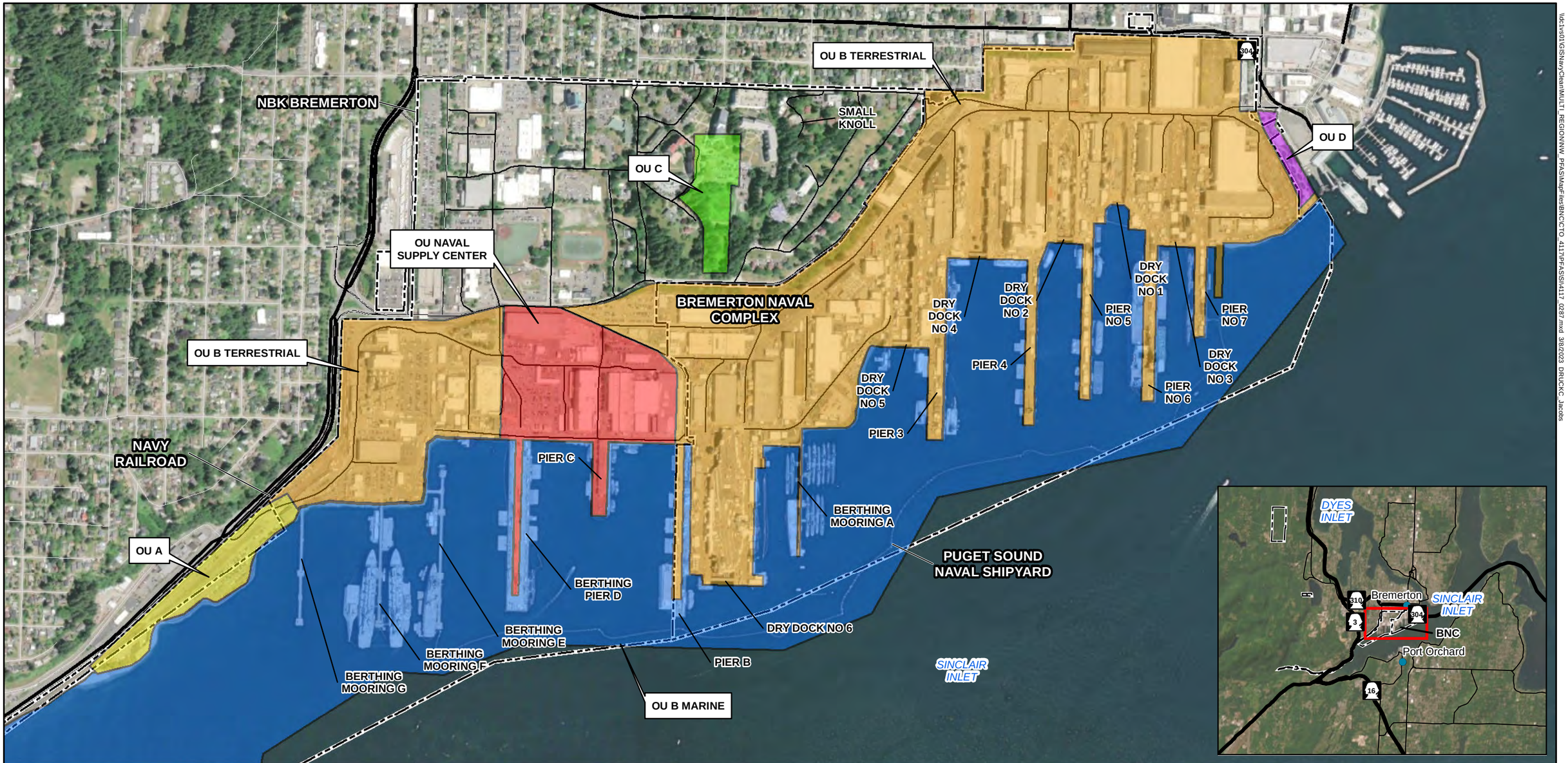
- State Route
- Local Connecting Road
- Important Local Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Railroad
- Installation Boundary

NOTE:
BNC = Bremerton Naval Complex
NBK = Naval Base Kitsap
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
Maxar, 2022

Figure 2-1
Location Map
Site Inspection for PFAS
BNC, Bremerton, Washington

0 880 1,760 Feet
1 inch = 1,760 feet
N



LEGEND

- State Route
- Important Local Road
- OU A
- OU B MARINE
- OU B TERRESTRIAL
- OU C
- OU D
- OU NAVAL SUPPLY CENTER
- Installation Boundary

NOTE:
BNC = Bremerton Naval Complex
NBK = Naval Base Kitsap
PFAS = Per- and Polyfluoroalkyl Substances
OU = Operable Unit

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery, Maxar, 2022

Figure 2-2
Operable Units
Site Inspection for PFAS
BNC, Bremerton, Washington

0 375 750
1 inch = 750 feet
N

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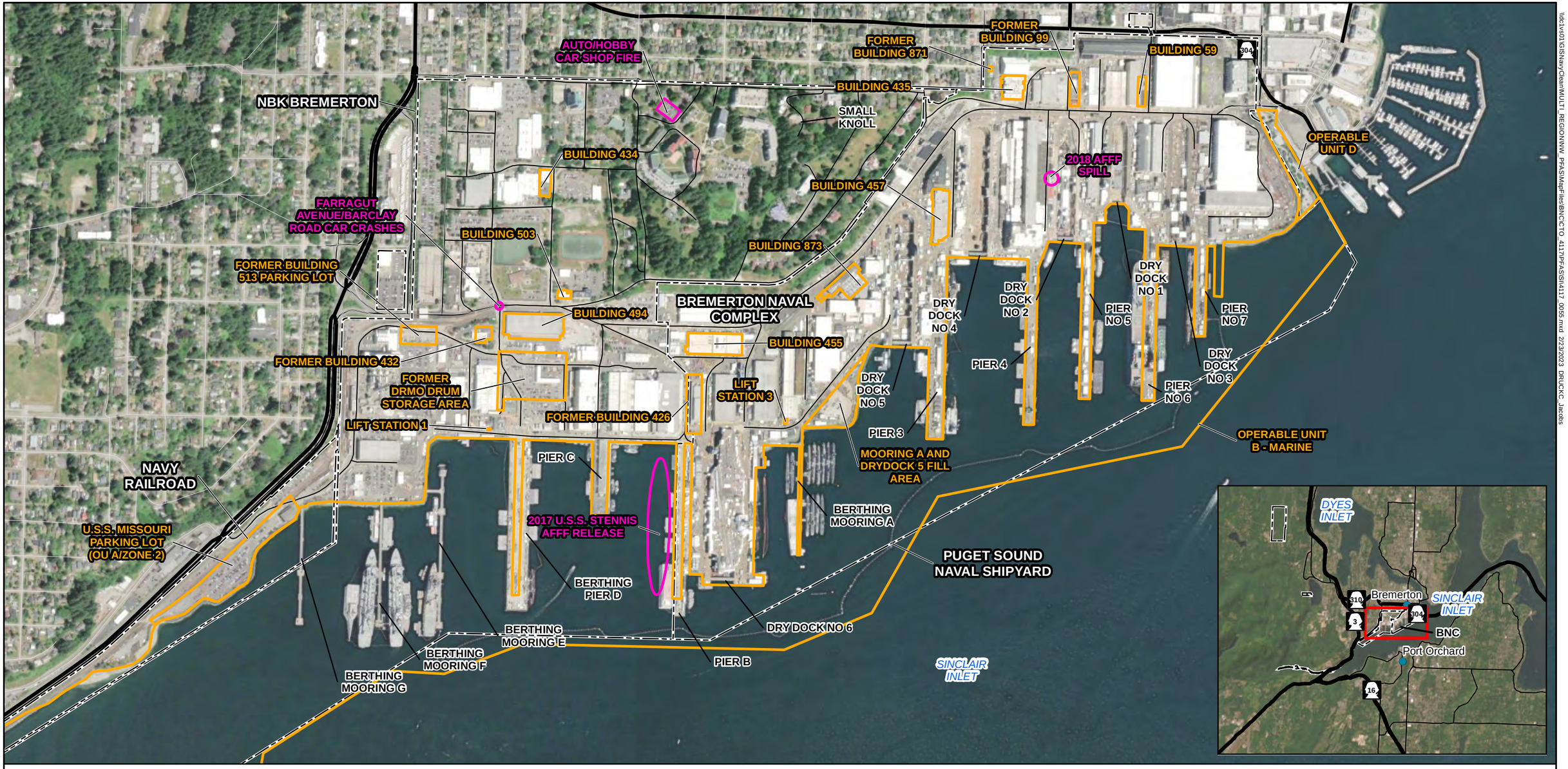

LEGEND

- State Route
- Important Local Road
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary

NOTE:
BNC = Bremerton Naval Complex
NBK = Naval Base Kitsap
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery, Maxar, 2022

0 375 750
1 inch = 750 feet
N

Figure 2-3
Areas Investigated
Site Inspection for PFAS
BNC, Bremerton, Washington

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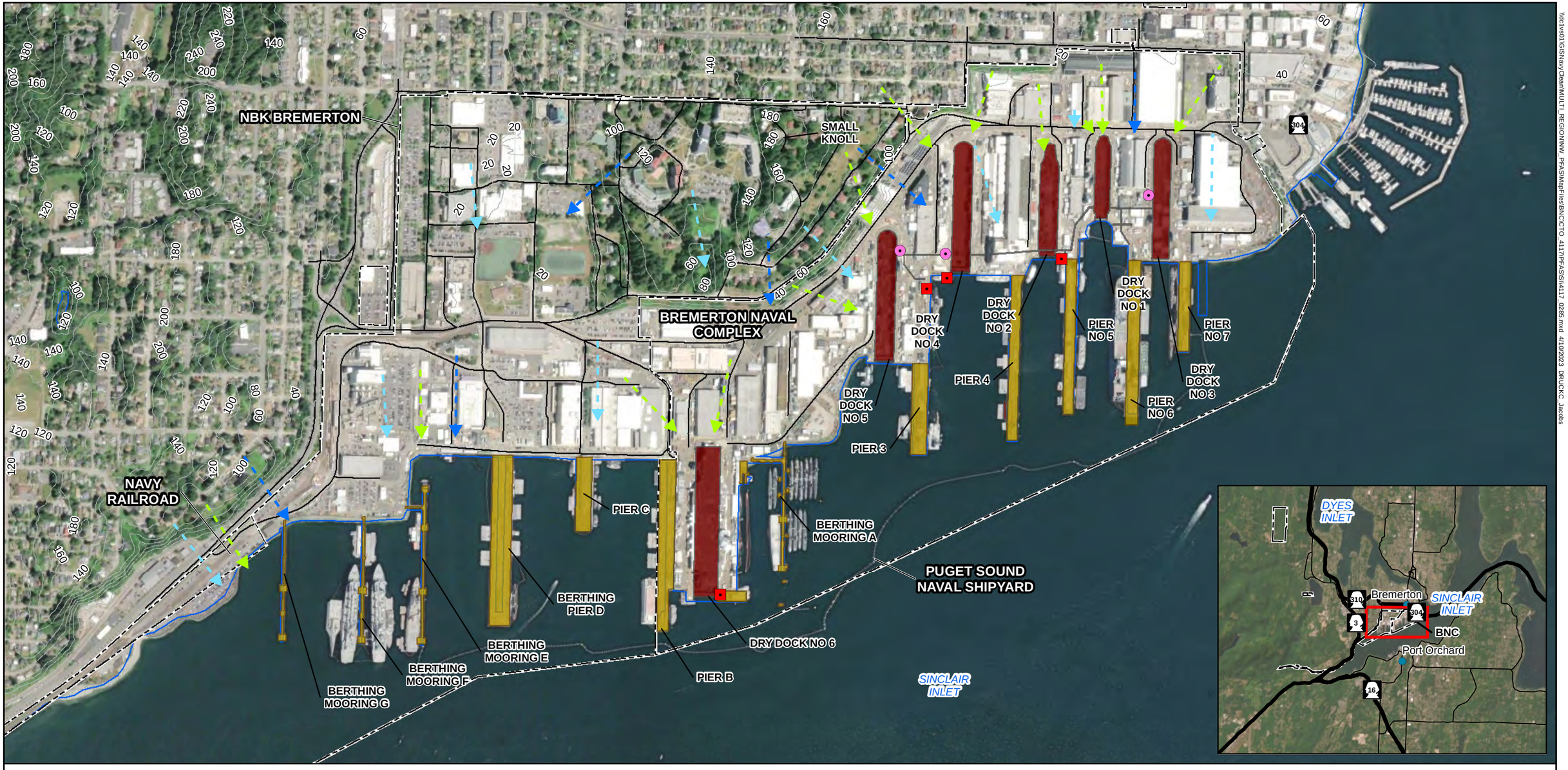

LEGEND

- Drydock Dewatering Pumpwell
- Drydock Discharge Outfall
- State Route
- Local Connecting Road
- Important Local Road
- Approximate Upper Aquifer Groundwater Flow Direction (With Drydock Pumping)
- Approximate Upper Aquifer Groundwater Flow Direction (Without Drydock Pumping)
- Approximate Surface Water Flow Direction
- 20' Topographic Contours
- Surface Waterbodies
- Dock
- Drydock
- Installation Boundary

NOTE:
BNC = Bremerton Naval Complex
NBK = Naval Base Kitsap
PFAS = Per- and Polyfluoroalkyl Substances
USGS = United States Geological Survey

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery, Maxar, 2022

Figure 2-4
Facility Layout
Site Inspection for PFAS
BNC, Bremerton, Washington

0 375 750
1 inch = 750 feet
N

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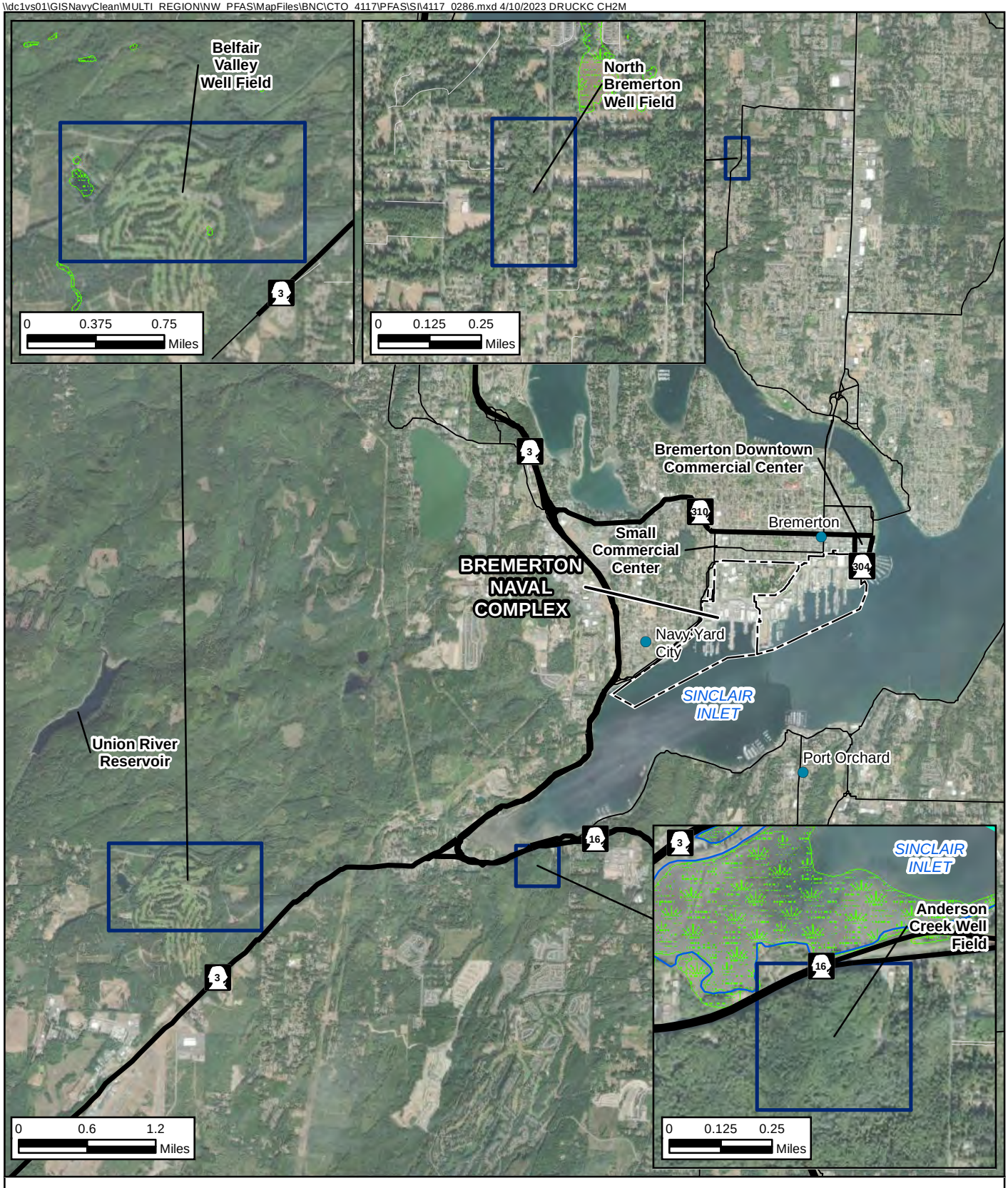

LEGEND

- City
- State Route
- Local Connecting Road
- Well Field
- Installation Boundary

Figure 2-5
Drinking Water Sources
Site Inspection for PFAS
BNC, Bremerton, Washington

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery, Maxar, 2022

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SECTION 3

Field Activities

This section describes the field activities performed in accordance with the SAP (CH2M, 2022a). Deviations from the SAP are summarized in **Section 3.16** (**Table 3-1**). Field activities were conducted from July 2022 to January 2023 and included site reconnaissance preparation, utility clearance, drilling and installing monitoring wells, soil, groundwater, sediment, and surface water sampling, and surveying. Field notes are provided in **Appendix A**.

3.1 Site Walk and Utility Clearance

Prior to mobilization, a site walk was conducted on June 23, 2022, with the drilling subcontractor and BNC Remedial Project Manager (RPM) to assess the proposed drilling locations for drill rig accessibility, vegetation reduction needs, presence of utility infrastructure (aboveground powerlines, indications of subsurface utilities, etc.) and other potential hazards. A utility locate ticket was submitted to Washington 811 to notify private and public utilities entities of the intended ground disturbing work. Responses from public utilities indicated that no public utilities are present at BNC. Subsequent 811 tickets were submitted as work progressed to renew the permit.

Prior to intrusive investigation activities, a third-party utility clearance subcontractor marked subsurface utilities with spray paint near proposed boring locations. Utility locates were provided periodically over the course of the field event as drilling progressed to ensure compliance with permit time requirements. Subsurface utilities were marked within 5 feet of the proposed boring locations. Conductive and non-conductive utility locate techniques, including ground penetrating radar, were applied to mark utilities present within drilling areas. Excavation and area outage permits were obtained from BNC for each investigation area prior to ground disturbance at the respective areas.

Subsurface utilities, emergency fire access routes, and crane tracks forced the relocation of several proposed monitoring wells. Additional details are provided in **Section 3.16**.

3.2 Archaeological Monitoring

Consultation with the NBK Environmental cultural resources manager prior to mobilization concluded that archaeological monitoring was not required during drilling activities.

3.3 Soil Borings and Monitoring Well Installation

Advancing soil borings and installing monitoring wells was conducted from July 20, 2022, to January 13, 2023. In accordance with the SAP, monitoring wells were drilled and installed while adjacent drydocks were empty. Due to unanticipated prolonged flooding of Drydock 6 (October 2022 to March 2023), several wells located in the eastern portion of facility were installed while Drydock 6 was flooded; however, groundwater on the eastern portion of BNC is not likely influenced by Drydock 6 operations. Fifty-eight monitoring wells were planned for construction at BNC; however, due to the presence of unanticipated utility, fire lane, and access conflicts, 54 monitoring wells were constructed. These deviations from the SAP are further detailed in **Section 3.16. Table 3-2** provides a summary of the soil borings and monitoring wells installations at each of the investigation areas. Soil boring logs are provided in **Appendix B**.

New monitoring wells were installed in accordance with the State of Washington well construction standards by a Washington-licensed driller. Well construction reports were submitted to Washington State Department of Ecology following construction. Borehole advancement was conducted using a rotosonic drill rig. During drilling, continuous soil cores were extruded and collected in plastic sleeves and logged for lithology. Borehole advancement and soil logging were conducted in accordance with the SAP (CH2M, 2022a). The locations of the monitoring wells installed are shown on **Figures 4-1** through **4-12**.

Newly installed monitoring wells were constructed with 2-inch-inside-diameter Schedule (SCH) 40 polyvinyl chloride (PVC) risers connected to 2-inch inside diameter factory slotted 0.020-inch SCH 40 PVC screen with a bottom cap. The depth of the screened intervals varied at each well to screen across the groundwater table, as described in the SAP (CH2M, 2022a). Twenty-seven of the monitoring wells were installed with 10-foot screens while 27 wells were constructed with a 20-foot screen to either obtain water production from multiple productive zones interspersed with less productive zones or due to potential fluctuations in groundwater elevations due to proximity to drydocks. The annular space between the borehole wall and well screen was backfilled with a 12/20 sand filter from the bottom of the boring extending to a minimum height of 2 feet above the top of the well screen. Uncoated bentonite chips were used to form a seal above the top of the sand pack with a minimum thickness of 5 feet. The bentonite seal was hydrated before the remaining annular space was filled with additional bentonite chips and hydrated. Well heads were completed with flush-mount manholes. Monitoring well construction information is provided in **Table 3-3**. Well completion diagrams are provided in **Appendix B**.

To avoid introducing PFAS during the well installation process, drill tooling and well development equipment did not have PFAS-containing components (such as parts or O-rings containing Teflon, Viton, polytetrafluoroethylene and all other fluorinated compounds). Additionally, thread lubricant used on the drilling tools and well materials (such as riser, screen, sand, and grout) did not contain polytetrafluoroethylene or any other fluorine-containing substance. Coated bentonite pellets were not used to avoid possible introduction of PFAS.

3.4 Monitoring Well Development

After completing the well installation, each newly installed monitoring well was developed by the drilling subcontractor using a combination of surging, bailing, and pumping. During monitoring well development, the CH2M field crew measured water quality parameters (WQPs), including potential of hydrogen (pH), temperature, specific conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity with a water quality meter. Development continued until either turbidity was below 10 nephelometric turbidity units (NTUs) or at least 10 well volumes of groundwater were removed. For wells with slow recharge, development was performed by pumping the well dry and allowing to recover to at least 90 percent three times.

Development information, including turbidity, pH, specific conductivity, temperature, and gallons of water removed, were recorded as field notes. In addition, the water quality meter was calibrated daily (at a minimum). Well development logs are provided in **Appendix C**. Surge blocks, bailers, and pumps used during development did not contain PFAS.

3.5 Groundwater Level Measurements

Three separate synoptic groundwater elevation surveys were conducted at all newly installed monitoring wells using a water level indicator. Groundwater elevations were measured at least 24 hours after well installation and development had been completed. Depth to water was measured from the top of the PVC riser and recorded to the nearest 0.01 foot. The initial survey was conducted on September 22 and 23, 2022 on newly installed wells completed at the time and was intended to collect groundwater elevation data prior to the scheduled flooding of Drydock 6 on September 30, 2022. A second complete survey was conducted on November 28, 29, and 30, 2022 and included newly installed monitoring wells in addition to existing monitoring wells from which groundwater samples were collected. All drydocks were empty during the September synoptic water level survey and all drydocks other than Drydock 6 were dry during the November survey. A third survey was conducted on January 20, 2023, following the final installation of the wells at the Auto/Hobby Shop Fire. Synoptic groundwater elevations are presented in **Table 3-4**.

3.6 Groundwater Sampling

Groundwater samples were collected from the 54 newly installed monitoring wells in addition to 19 existing monitoring wells under low flow/low stress conditions with a PFAS-free bladder pump. The pump intake was placed at the middle of the well screen interval. Prior to collecting the sample, depth-to-water readings and WQPs

were measured and recorded (approximately every 5 minutes) using a depth-to-water meter and water quality meter, which was calibrated daily (at a minimum). Sampling began when three well volumes had been purged or when minimal water level drawdown requirements (less than 0.33 feet) were met and WQPs had stabilized for three consecutive readings, as follows:

- Temperature within 3 percent
- pH within 0.1 pH units
- Conductivity within 3 percent
- Dissolved oxygen within 10 percent
- ORP within 10 millivolts
- Turbidity measurements are less than 5 NTU; if 3 turbidity values were less than 5 NTU, the values were considered as stabilized

Groundwater sampling data sheets are provided in **Appendix D** and field WQPs are presented in **Table 3-5**.

Groundwater was collected in laboratory-supplied high-density polyethylene (HDPE) bottles and placed into coolers containing enough ice to keep the samples less than or equal to 10°C (but not frozen) until they were received by the laboratory. Field quality assurance (QA) and quality control (QC) samples and frequencies are discussed in **Section 3.10**.

To avoid introducing PFAS during groundwater sampling, PFAS-containing equipment and components were not used. The use of PFAS-containing clothing and sunscreen, insect repellant, and other personal hygiene products that may contain PFAS were avoided. Sample tubing was HDPE.

3.7 Soil Sampling

Seven stand-alone surface soil samples were collected from unpaved areas at or near Former Building 513 Parking Lot (BR-B513-SS01 and BR-B513-SS02), Building 503 (BR-B503-SS01 and BR-B503-SS02), Building 434 (BR-B434-SS01), and the Auto/Hobby Shop Fire (BR-AHSF-SS01 and BR-AHSF-SS02). Surface soil samples were collected from a depth interval of 0 to 0.5 feet bgs using a stainless-steel hand trowel. Surface soil sample locations are biased toward topographically low areas where surface water pooling and would be most likely to occur.

Subsurface soil samples were collected from each soil boring at either one or two depth intervals determined by the geologists in the field according to the following guidelines as prescribed by the SAP:

- One sample from 2 to 3 feet bgs below asphalt or concrete surfaces (not collected from soil boring located downgradient of potential or confirmed release areas). However, there were several downgradient locations where the 2 to 3 feet bgs sample was mistakenly collected where field conditions resulted in the relocation of the soil boring from near a release area to downgradient. Additional details are provided in **Section 3.16**.
- One sample at the capillary fringe in the unsaturated soil (where lithologic conditions allowed) at the time of drilling. Due to drydock operations and pumping and the nature of unconfined aquifers, the capillary fringe will rise and fall with the fluctuating groundwater levels.

Soil sample locations are presented in **Figures 4-1** through **4-12**. Subsurface soil samples were collected during sonic drilling from the extruded soil core recovered from the sonic tooling in PFAS-free 4-inch core bags. Soil was collected in laboratory-supplied HDPE jars using reusable and decontaminated single-use dedicated equipment. Soil samples were placed into coolers on ice for overnight shipment to the laboratory. Field QA/QC samples and frequencies are discussed in **Section 3.10**.

To avoid introducing PFAS during soil sampling, PFAS-containing equipment and components were not used. The use of PFAS-containing clothing and sunscreen, insect repellant, and other personal hygiene products that may contain PFAS were avoided.

3.8 Sediment Sampling

Six sediment samples were collected from three locations adjacent to the 2017 United States Ship (USS) Stennis AFFF Release. Sediment sampling locations were collocated with surface water sampling locations. Sediment samples were collected from 0 to 4 inches and 4 to 24 inches below sediment surface (bss) at each sediment sampling location. The sampling approach described in the SAP was to use a vibracore to collect both sampling intervals; however, due to potential disturbance of the shallow sediment interval with the vibracore method, the 0 to 4-inch interval sample was collected using a Van Veen grab sampler. Additional details are provided in **Section 3.16**.

Sediment samples from each interval were homogenized before filling laboratory-provided sample jars for analysis of PFAS, total organic carbon, and soil particle-size analysis, referred to in this document as GRAINSIZE. The sediment samples were packed on ice for overnight shipment to the laboratory. Additional sediment sampling details are presented in **Table 3-6**. Sediment sampling locations are presented on **Figure 4-5**.

To avoid introducing PFAS during sediment sampling, PFAS-containing equipment and components were not used. The use of PFAS-containing clothing and sunscreen, insect repellant, and other personal hygiene products that may contain PFAS were avoided.

3.9 Surface Water Sampling

Three surface water samples were collected from three locations adjacent to the 2017 USS Stennis AFFF Release. Surface water sampling locations were collocated with sediment sampling locations. Surface water samples were collected prior to sediment sampling to prevent potential cross contamination. Prior to collection, in situ WQP (pH, conductivity, turbidity, DO, temperature, salinity, and ORP) were measured with a Horiba U-52 or similar water quality meter(s). Water depth was also measured before sampling using a Seabird Conductivity-Temperature-Depth profiler. Surface water samples were collected using a PFAS-free peristaltic pump approximately two feet below the water surface to avoid collecting any potential foam(s) that can form at the water-air interface.

The surface water samples were collected into laboratory-provided sample bottles and packed on ice for overnight shipment to the laboratory. Additional surface water sampling details are presented in **Table 3-7**. Surface water sampling locations are presented on **Figure 4-5**.

To avoid introducing PFAS during sediment sampling, PFAS-containing equipment and components were not used. The use of PFAS-containing clothing and sunscreen, insect repellant, and other personal hygiene products that may contain PFAS were avoided.

3.10 Quality Assurance and Quality Control

Field QA/QC samples were collected during sampling, in accordance with the SAP (CH2M, 2022a). These samples were obtained to:

- Confirm that disposable and reusable sampling equipment were free of PFAS
- Evaluate field methodology
- Establish ambient field background conditions
- Evaluate whether cross contamination occurred during sampling and/or shipping

Field QA/QC samples were collected as follows:

- Equipment rinsate blank samples were collected from decontaminated sampling equipment once per day during soil (only when reusable sampling equipment [stainless-steel trowel, hand auger] was used) and groundwater sampling. A total of 32 equipment blanks were collected during sampling.

- Field blank samples were collected at each potential PFAS source area. A total of 40 field blanks were collected during sampling.
- Field duplicate samples were collected at the frequency of one per 10 normal field samples of similar matrix. Eighteen field duplicate samples were collected during sampling.
- Matrix spike (MS) and matrix spike duplicate (MSD) samples were collected for every 20 environmental samples collected (or greater than or equal to 5 percent of the samples collected) per medium, including field duplicates. Eight MS/MSD samples were collected during sampling.

3.11 Sample Packaging and Shipping

After collection, soil and groundwater samples were placed in coolers on ice with a corresponding chain-of-custody. Samples were stored with sufficient ice to maintain temperatures of 0 to 10 °C (but not frozen). Coolers were then managed, secured, and shipped on ice via FedEx to Battelle Norwell Operations, Norwell, Massachusetts for analysis. During shipment, precautions were taken to monitor and track the shipments and coordinate arrival with the lab. Sample coolers arrived at the laboratory with no issues and within acceptable temperatures.

3.12 Decontamination Procedures

Decontamination activities including decontaminating non-disposable equipment were conducted in accordance with the standard operating procedures (SOPs) provided in the SAP (CH2M, 2022a).

Rinse water used as part of the decontamination process was obtained from a spigot at Building 503, which is supplied by the Bremerton Water System (**Section 2.3**). Water generated while decontaminating sampling equipment was collected and disposed as investigation-derived waste (IDW) as described in **Section 3.14**. Disposable sampling equipment and personal protective equipment, such as HDPE tubing and nitrile gloves, were also disposed of as IDW.

Reusable heavy equipment, such as drilling rods and associated tooling, were decontaminated before and after collecting each sample. The fluid generated was disposed as IDW. Heavy equipment decontamination procedures were conducted in accordance with the Decontamination of Drilling Rigs and Equipment SOP provided in the SAP (CH2M, 2022a).

3.13 Surveying

Newly installed permanent monitoring well locations were horizontally and vertically located by a CH2M Washington-licensed surveyor from January 17 through 22, 2023. The surveyor collected coordinates of all horizontal points X, Y, to the nearest 0.5 foot and vertical point Z to the nearest 0.01 foot (0.1 foot for unpaved ground surface elevations). The Survey Report is provided as **Appendix E**.

3.14 Investigation-derived Waste Management

IDW generated during the SI included drill cuttings produced during monitoring well installations, purge water from well development and groundwater sampling, decontamination fluids, disposable sampling equipment, and personal protective equipment. Solid IDW was contained in five 20-yard roll off dumpster and 7 drums, aqueous IDW was containerized into 20 new 275-gallon United States Department of Transportation-approved intermediate bulk container totes. Containers were properly sealed and labeled in accordance with BNC waste management procedures. The roll off dumpsters and drums were staged and subsequently sampled at the BNC hazardous waste storage facility. The totes were staged at the project Central Accumulation Area (CAA) located at the Former Building 513 Parking Lot until they were sampled, after which they were transferred to the BNC hazardous waste storage facility. Inspections to monitor the CAA staging area and container integrity were conducted at least every 7 days from date of generation until transport to the BNC hazardous waste storage facility.

Upon completing sampling activities and prior to disposal, CH2M field staff members collected waste characterization samples from the IDW containers. Solid IDW samples were analyzed for VOCs, SVOCs, PCBs, herbicides, total metals, TPH, hexavalent chromium, and the 18 PFAS compounds listed in EPA Method 537.1 and aqueous IDW samples were analyzed for VOCs, SVOCs, PCBs, pesticides, herbicides, total RCRA metals plus copper, nickel, and zinc, and TPH in accordance with the Environmental Protection Plan (EPP)/Waste Management Plan (WMP) (CH2M, 2022b).

Waste characterization, manifesting, transportation, and disposal were managed by the BNC waste program (Code 106.33) in accordance with the EPP/WMP (CH2M, 2022b).

3.15 Laboratory Analysis and Data Usability Assessment

Groundwater and soil samples were submitted to Battelle Norwell Operations, Norwell, Massachusetts, a DoD Environmental Laboratory Accreditation Program accredited laboratory, in accordance with chain-of-custody procedures. Raw analytical data are provided in **Appendix F**. Samples were analyzed for the 18 PFAS compounds listed in EPA Method 537.1 via liquid chromatography tandem mass spectrometry compliant with Quality Systems Manual 5.1 Table B-15, in accordance with current Navy guidance:

- PFBS
- PFOA
- PFOS
- Perfluorodecanoic Acid (PFDA)
- Perfluorododecanoic Acid (PFDoA)
- PFHpA
- PFHxS
- Perfluorohexanoic Acid (PFHxA)
- PFNA
- Perfluorotetradecanoic Acid (PFTA)
- Perfluorotridecanoic Acid (PFTrDA)
- Perfluoroundecanoic Acid (PFUnA)
- 4,8-dioxa-3H-perfluorononanoic acid (ADONA)
- 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)
- 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)
- N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)
- N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)
- Perfluoro-2-methyl-3-oxahexanoic acid (HFPO-DA)

After laboratory analysis of samples was complete, data usability was assessed. Data validation was conducted by an independent third-party data validator. Complete validation findings are presented in the data validation reports included in **Appendix G**. Data were then verified and prepared for upload to the Naval Installation Restoration Information Solution database and a Data Quality Assessment is included in **Appendix H**. The data validation review demonstrated that the analytical systems were generally in control and data results can be used in the project decision making process.

3.16 Deviations from the Sampling and Analysis Plan

Table 3-1 summarizes deviations from the SAP (CH2M, 2022a) that were necessary due to unexpected field conditions and information gathered during the pre-drilling site walk and utility clearance activities. Based on historical groundwater records, the groundwater table in many areas of the installation is highly variable due to the influence of the drydock dewatering systems and tidal fluctuation. For monitoring wells located within these areas, a 20-foot screen was used to attempt to screen across the water table under any tidal or drydock pumping condition. Areas where 20-foot screens were installed include: Building 435, Former Building 871, Former Building

99, Building 503, Building 494, 2018 AFFF Spill, Building 457, USS Missouri Parking Lot, Lift Station 1, Former Building 426, Building 455, and Building 59. Other deviations are captured in **Table 3-1**.

Table 3-1. Summary of SAP Deviations

Investigation Area	Sampling Station(s)	SAP Deviation	Rationale
Former Building 513 Parking Lot	BR-B513-SS01 (planned as BR-B513-SB04)	The sampling location was relocated approximately 15-foot to the north and changed from a shallow soil boring (2-3 feet bgs) to a surface soil sample. The sample was collected from 0-1 feet bgs and redefined as a surface soil sample (BR-B513-SS01).	A small unpaved area in a topographically low area was identified during a site reconnaissance. In discussions with the Navy RPM, it was decided that a surface soil sample would be more beneficial to the investigation than a shallow subsurface soil sample beneath the pavement.
	BR-B513-SS02 (planned as BR-B513-SB05)	The sampling location was relocated approximately 30-foot to the north and changed from a shallow soil boring (2-3 feet bgs) to a surface soil sample. The sample was collected from 0-1 foot bgs and redefined as a surface soil sample (BR-B513-SS02).	A small unpaved area in a topographically low area was identified during a site reconnaissance. In discussions with the Navy RPM, it was decided that a surface soil sample would be more beneficial to the investigation than a shallow subsurface soil sample beneath the pavement.
	BR-B513-MW02	The monitoring well was constructed with 20-foot screen.	Groundwater at this location was under confined hydrogeologic conditions. A 20-foot screen was utilized to capture the productive unit and attempt to screen across the higher elevation water table.
Former Building 871	BR-B871-MW01	The monitoring well was relocated approximately 30 feet to the south adjacent to BR-B871-MW02.	The monitoring well location was moved due to an underground vault and numerous underground utilities.
Former Building 99	BR-B99-MW01	The monitoring well was relocated approximately 75 feet to the north.	The monitoring well location was moved due to numerous underground utilities.
	BR-B99-MW02	The monitoring well was relocated approximately 50 feet to the north.	The monitoring well location was moved due to a tunnel in the vicinity and numerous underground utilities.
	BR-B99-SB03	The stand-alone shallow subsurface soil sample BR-B99-SB03 was not collected.	Monitoring well BR-B99-MW02 was relocated to the proposed BR-B99-SB03 location. Due to the overlap, a stand-alone shallow subsurface soil sample was not collected. However, a shallow subsurface soil sample was collected during the installation of BR-B99-MW02.
Building 503	BR-B503-MW02	The monitoring well was relocated approximately 100 feet to the northwest.	During the site walk, the fire training facility/trailer was staged in the asphalt lot north of Building 503. The decision was made to move one of the downgradient monitoring wells to a topographically low point adjacent to the trailer.
Building 494	BR-B494-MW02	The monitoring well was relocated approximately 300 feet to the southeast.	The monitoring well location was moved due to a large newly installed reinforced concrete slab.
Former Building 432	BR-B432-MW03	The monitoring well was relocated approximately 75 feet to the south of the originally proposed location.	The monitoring well location was moved due to a tunnel in the vicinity and numerous underground utilities.

Table 3-1. Summary of SAP Deviations

Investigation Area	Sampling Station(s)	SAP Deviation	Rationale
Farragut Avenue/ Barclay Road Car Crashes	BR-FBCC-MW02	The monitoring well location was relocated approximately 100 feet to the east.	The monitoring well location was moved downgradient due to access issues related to the railroad tracks and proximity to a high voltage electrical station.
	BR-FBCC-MW03	The monitoring well location was relocated approximately 75 feet to the east.	The monitoring well location was moved further downgradient due to the relocation of BR-FBCC-MW02 as a downgradient well.
Building 434	BR-B434-MW02	The monitoring well was relocated approximately 50 feet to the south.	The monitoring well location was moved further downgradient due to underground utilities.
Auto/Hobby Shop Fire	BR-AHSF-MW01	The monitoring well was relocated approximately 110 feet to the southwest.	The monitoring well location was moved due to underground utilities and access issues.
	BR-AHSF-MW03	The monitoring well was relocated approximately 50 feet to the north.	The monitoring well location was moved due to underground utilities and access issues.
2017 USS Stennis AFFF Release	BR-17AS-SW01/SD01	The surface water and sediment sampling location was relocated approximately 100 feet to the west-southwest.	The sampling location was moved due to a barge and boom preventing access.
	BR-17AS-SW03/SD02	The surface water and sediment sampling location was relocated approximately 200 feet to the west.	The sampling location was moved due to a boom preventing access.
2018 AFFF Spill	BR-18AF-MW01	The monitoring well was relocated approximately 50 feet to the north along the east side of Building 431.	The monitoring well location was moved due to numerous underground utilities and inability to block the only fire lane on this side of Building 431.
	BR-18AF-MW02 BR-18AF-MW03	Monitoring well BR-18AF-MW02 and BR-18AF-MW03 were not drilled or constructed.	During the site walk and utility locate, it was determined that, other than the location of BR-18AF-MW01, there were no additional locations along the east or west sides of Building 431 clear of utilities and the fire lanes. Blocking the fire lanes in this portion of the Base was not permitted by BNC emergency response personnel.
Building 873	BR-B873-MW01 BR-B873-MW02	The monitoring wells were relocated to the south and west along the south side of Building 873.	The two wells were relocated due to above ground equipment, rig access issues, and underground utilities.
	BR-B873-MW03	Monitoring well BR-B873-MW03 was not drilled or constructed.	During the site walk and utility locate, it was determined that there were no additional locations along the south, east, or north sides of Building 873 clear of utilities and above ground equipment with suitable room for the drill rig. Moving the above ground equipment, fencing, and temporary structures in this area was not an option according to outage department personnel.

Table 3-1. Summary of SAP Deviations

Investigation Area	Sampling Station(s)	SAP Deviation	Rationale
Lift Station 1	BR-LS1-MW01	The monitoring well location was relocated approximately 30 feet to the east.	The monitoring well location was moved due to numerous underground utilities.
	BR-LS1-MW02	The monitoring well location was relocated approximately 200 feet to the east.	The monitoring well location was moved due to numerous underground utilities.
Building 59	BR-B59-MW01	The monitoring well location was relocated approximately 75 feet to the northeast.	The monitoring well location was moved due to numerous underground utilities and a tunnel.
	BR-B59-MW02	The monitoring well location was relocated approximately 50 feet to the south across Farragut Avenue.	The monitoring well location was moved downgradient due to numerous underground utilities and a tunnel.

Table 3-2. Soil Borings Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Soil Boring	Drilling Start Date	Drilling End Date	Boring Depth (ft bgs)	Sample Depths (ft bgs)	Boring Status
Former Building 513 Parking Lot					
BR-B513-SB01	7/27/2022	7/27/2022	14	2-3	Monitoring Well
BR-B513-SB02	7/25/2022	7/26/2022	47	2-3 36-37	Monitoring Well
BR-B513-SB03	7/27/2022	7/27/2022	17	2-3 6-7	Monitoring Well
Building 435					
BR-B435-SB01	9/14/2022	9/14/2022	66.5	2-3 53-54	Monitoring Well
BR-B435-SB02	9/15/2022	9/15/2022	67	2-3 53-54	Monitoring Well
BR-B435-SB03	9/21/2022	9/21/2022	68	2-3 54-55	Monitoring Well
BR-B435-SB04	9/22/2022	9/22/2022	3	2-3	Abandoned 9/22/2022
Former Building 871					
BR-B871-SB01	9/7/2022	9/7/2022	68	2-3 54-55	Monitoring Well
BR-B871-SB02	9/8/2022	9/8/2022	69	2-3 55-56	Monitoring Well
Former Building 99					
BR-B99-SB01	10/4/2022	10/4/2022	40	2-3 26.5-27.5	Monitoring Well
BR-B99-SB02	10/3/2022	10/3/2022	37	2-3 24-25	Monitoring Well
BR-B99-SB03	NOT DRILLED				
BR-B99-SB04	9/22/2022	9/22/2022	3	2-3	Abandoned 7/15/2022
Building 503					
BR-B503-SB01	8/5/2022	8/5/2022	31	2-3 10-11	Monitoring Well
BR-B503-SB02	8/9/2022	8/9/2022	25	2-3 12-13	Monitoring Well
BR-B503-SB03	8/8/2022	8/8/2022	30	2-3 19-20	Monitoring Well
Former Building 432					
BR-B432-SB01	8/10/2022	8/10/2022	17	2-3 4-5	Monitoring Well
BR-B432-SB02	8/10/2022	8/10/2022	27	2-3 12-13	Monitoring Well
BR-B432-SB03	8/16/2022	8/16/2022	26	14-15	Monitoring Well

Table 3-2. Soil Borings Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Soil Boring	Drilling Start Date	Drilling End Date	Boring Depth (ft bgs)	Sample Depths (ft bgs)	Boring Status
Building 494					
BR-B494-SB01	8/3/2022	8/3/2022	35	2-3 14-15	Monitoring Well
BR-B494-SB02	8/4/2022	8/4/2022	37	2-3 16-17	Monitoring Well
BR-B494-SB03	8/15/2022	8/15/2022	26.5	14-15	Monitoring Well
Farragut Ave/Barvlay St Car Crashes					
BR-FBCC-SB01	10/10/2022	10/10/2022	17	2-3 6-7	Monitoring Well
BR-FBCC-SB02	8/15/2022	8/15/2022	20	2-3 11-12	Monitoring Well
BR-FBCC-SB03	8/16/2022	8/16/2022	20	8-9	Monitoring Well
Building 434					
BR-B434-SB01	7/28/2022	7/28/2022	20	2-3 10-11	Monitoring Well
BR-B434-SB02	7/27/2022	7/27/2022	37	2-3 27-27.5	Monitoring Well
BR-B434-SB03	7/26/2022	7/26/2022	38.5	2-3 26.5-27.5	Monitoring Well
Auto/Hobby Shop Fire					
BR-AHSF-SB01R	1/10/2023	1/11/2023	121	2-3 102-103	Monitoring Well
BR-AHSF-SB02	8/5/2022	8/8/2022	115.5	2-3 104-105	Monitoring Well
BR-AHSF-SB03R	1/12/2023	1/13/2023	116	2-3 106-107	Monitoring Well
2017 USS Stennis AFFF Release					
NO SOIL BORINGS DRILLED					
2018 AFFF Spill					
BR-18AS-SB01	9/23/2022	9/23/2022	46	2-3 32-33	Monitoring Well
BR-18AS-SB02	NOT DRILLED				
BR-18AS-SB03	NOT DRILLED				
Building 457					
BR-B457-SB01	8/31/2022	8/31/2022	62	2-3 49-50	Monitoring Well
BR-B457-SB02	9/2/2022	9/2/2022	55	2-3 39-40	Monitoring Well
BR-B457-SB03	8/30/2022	8/30/2022	59	2-3 45-46	Monitoring Well

Table 3-2. Soil Borings Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Soil Boring	Drilling Start Date	Drilling End Date	Boring Depth (ft bgs)	Sample Depths (ft bgs)	Boring Status
USS Missouri Parking Lot					
BR-UMPL-SB01	7/21/2022	7/21/2022	28	2-3 9-10	Monitoring Well
BR-UMPL-SB02	7/20/2022	7/20/2022	28	2-3 9-9.5	Monitoring Well
Mooring A and Drydock 5 Fill Area					
BR-MAD5-SB01	8/24/2022	8/24/2022	25	2-3 12-13	Monitoring Well
BR-MAD5-SB02	8/23/2022	8/23/2022	22	2-3 10-11	Monitoring Well
Building 873					
BR-B873-SB01	8/24/2022	8/24/2022	59	2-3 44-45	Monitoring Well
BR-B873-SB02	8/25/2022	8/25/2022	62	2-3 56-57	Monitoring Well
Former DRMO Drum Storage Area					
BR-DRMO-SB01	7/28/2022	7/28/2022	25.5	2-3 14-15	Monitoring Well
BR-DRMO-SB02	8/2/2022	8/2/2022	24	2-3 12-13	Monitoring Well
BR-DRMO-SB03	7/28/2022	7/28/2022	29	2-3 19-20	Monitoring Well
BR-DRMO-SB04	8/1/2022	8/1/2022	27	2-3 14-15	Monitoring Well
Lift Station 1					
BR-LS1-SB01	8/17/2022	8/17/2022	20	2-3 9-10	Monitoring Well
BR-LS1-SB02	10/6/2022	10/6/2022	26	7-8	Monitoring Well
Lift Station 3					
BR-LS3-SB01	8/24/2022	8/24/2022	24	2-3 13-14	Monitoring Well
Former Building 426					
BR-B426-SB01	8/22/2022	8/22/2022	63	2-3 49-50	Monitoring Well
BR-B426-SB02	8/18/2022	8/18/2022	69	2-3 53-54	Monitoring Well
Building 455					
BR-B455-SB01	8/16/2022	8/16/2022	65	2-3 48-49	Monitoring Well
BR-B455-SB02	8/17/2022	8/17/2022	55	41-42	Monitoring Well
BR-B455-SB03	8/18/2022	8/18/2022	65	49-50	Monitoring Well

Table 3-2. Soil Borings Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Soil Boring	Drilling Start Date	Drilling End Date	Boring Depth (ft bgs)	Sample Depths (ft bgs)	Boring Status
Building 59					
BR-B59-SB01	9/27/2022	9/27/2022	26	2-3 7-8	Monitoring Well
BR-B59-SB02	9/28/2022	9/28/2022	28	7-8	Monitoring Well
BR-B59-SB03	NOT DRILLED				
OU D					
BR-OUD-SB01	9/28/2022	9/28/2022	131	2-3 8-8.5	Monitoring Well
BR-OUD-SB02	9/29/2022	9/29/2022	119	9-10	Monitoring Well

bgs = below ground surface

ft = feet

Table 3-3. Monitoring Well Construction Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Monitoring Well	Installation Date	Northing (ft NAD83 WA State Plane North Zone)	Easting (ft NAD83 WA State Plane North Zone)	Ground Surface Elevation (ft NAVD88)	Top of PVC Casing Elevation (ft NAVD88)	Well Diameter (in)	Total Depth (ft btoc)	Length of Screen (ft)	Depth of Top of Screen (ft btoc)	Depth of Bottom of Screen (ft btoc)	Elevation of Top of Screen (ft amsl)	Elevation of Bottom of Screen (ft amsl)
Former Building 513 Parking Lot												
BR-B513-MW01	7/27/2022	208951.43	1191061.24	15.58	15.21	2	14.0	10.0	4.0	14.0	11.21	1.21
BR-B513-MW02	7/26/2022	208948.82	1191207.15	15.55	15.03	2	47.0	20.0	27.0	47.0	-11.97	-31.97
BR-B513-MW03	7/27/2022	208717.62	1191252.78	15.43	14.60	2	17.0	10.0	7.0	17.0	7.60	-2.40
MW718*	8/30/1995	208310.10	1191312.40	15.67	15.40	2	30.0	20.0	7.0	27.0	8.40	-11.60
Building 435												
BR-B435-MW01	9/14/2022	210739.27	1195760.52	15.53	15.31	2	66.5	20.0	46.5	66.5	-31.19	-51.19
BR-B435-MW02	9/15/2022	210613.18	1195807.25	15.80	15.36	2	67.0	20.0	47.0	67.0	-31.64	-51.64
BR-B435-MW03	9/21/2022	210614.86	1195662.12	15.65	15.45	2	68.0	20.0	48.0	68.0	-32.56	-52.56
MW425*	4/5/1994	210731.60	195809.90	15.69	15.28	2	67.0	20.0	47.0	67.0	-31.72	-51.72
Former Building 871												
BR-B871-MW01	9/7/2022	211007.10	1195620.22	16.38	16.11	2	68.0	20.0	48.0	68.0	-31.89	-51.89
BR-B871-MW02	9/8/2022	210986.37	1195618.65	16.45	16.22	2	69.0	20.0	49.0	69.0	-32.78	-52.78
MW707*	10/17/1995	210612.00	1195441.80	15.32	14.91	2	67.0	20.0	45.0	65.0	-30.09	-50.09
MW907*	6/9/2011	210740.10	1195523.00	23.90	23.50	2	75.0	20.0	55.0	75.0	-31.50	-51.50
Former Building 99												
BR-B99-MW01	10/4/2022	210793.40	1196153.74	15.59	15.02	2	40.0	20.0	20.0	40.0	-4.98	-24.98
BR-B99-MW02	10/3/2022	210752.98	1196270.03	15.61	15.37	2	37.0	20.0	17.0	37.0	-1.63	-21.63
MW432*	3/18/1994	210621.10	1196141.00	14.98	14.59	2	52.0	20.0	30.0	50.0	-15.41	-35.41
MW433*	4/6/1994	210628.80	1196429.40	15.06	14.48	2	63.0	15.0	48.0	63.0	-33.5	-48.52
MW904*	6/8/2011	210878.50	1196151.90	15.39	15.10	2	27.0	20.0	7.0	27.0	8.1	-11.9
Building 503												
BR-B503-MW01	8/5/2022	209233.21	1192208.20	15.98	15.60	2	31.0	20.0	11.0	31.0	4.60	-15.40
BR-B503-MW02	8/9/2022	209348.22	1192232.47	17.30	16.97	2	25.0	10.0	15.0	25.0	1.97	-8.04
BR-B503-MW03	8/8/2022	209143.89	1192495.89	15.55	15.32	2	30.0	10.0	20.0	30.0	-4.68	-14.68
Former Building 432												
BR-B432-MW01	8/10/2022	208948.73	1191447.66	16.41	16.16	2	17.0	10.0	7.0	17.0	9.16	-0.84
BR-B432-MW02	8/10/2022	208872.59	1191700.77	17.45	16.68	2	27.0	10.0	17.0	27.0	-0.32	-10.32
BR-B432-MW03	8/16/2022	208809.76	1191896.12	15.91	15.57	2	26.0	10.0	16.0	26.0	-0.43	-10.43
Building 494												
BR-B494-MW01	8/3/2022	208864.87	1192163.82	15.35	15.12	2	35.0	20.0	15.0	35.0	0.12	-19.89
BR-B494-MW02	8/4/2022	208789.59	1192658.73	15.14	14.64	2	37.0	20.0	17.0	37.0	-2.36	-22.36
BR-B494-MW03	8/15/2022	208941.80	1192641.57	15.49	14.95	2	26.5	10.0	16.5	26.5	-1.55	-11.55
Farragut Ave/Barvlay St Car Crashes												
BR-FBCC-MW01	10/10/2022	209251.53	1191789.57	15.48	15.04	2	17.0	10.0	7.0	17.0	8.04	-1.96
BR-FBCC-MW02	8/15/2022	209144.58	1191870.40	15.24	14.77	2	20.0	10.0	10.0	20.0	4.77	-5.23
BR-FBCC-MW03	8/16/2022	209141.33	1191958.68	15.42	14.59	2	20.0	10.0	10.0	20.0	4.59	-5.41

Table 3-3. Monitoring Well Construction Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Monitoring Well	Installation Date	Northing (ft NAD83 WA State Plane North Zone)	Easting (ft NAD83 WA State Plane North Zone)	Ground Surface Elevation (ft NAVD88)	Top of PVC Casing Elevation (ft NAVD88)	Well Diameter (in)	Total Depth (ft btoc)	Length of Screen (ft)	Depth of Top of Screen (ft btoc)	Depth of Bottom of Screen (ft btoc)	Elevation of Top of Screen (ft amsl)	Elevation of Bottom of Screen (ft amsl)
Building 434												
BR-B434-MW01	7/28/2022	210218.77	1192066.27	25.37	25.11	2	20.0	10.0	10.0	20.0	15.11	5.11
BR-B434-MW02	7/27/2022	210092.08	1192252.38	38.85	38.59	2	37.0	10.0	27.0	37.0	11.59	1.59
BR-B434-MW03	7/26/2022	209968.49	1192251.80	37.74	37.38	2	38.5	10.0	28.5	38.5	8.88	-1.12
Auto/Hobby Shop Fire												
BR-AHSF-MW01R	1/11/2023	210635.96	1193051.88	122.27	122.04	2	121.0	10.0	111.0	121.0	11.04	1.04
BR-AHSF-MW02	8/8/2022	210601.91	1193110.60	125.18	124.65	2	115.5	10.0	105.5	115.5	19.15	9.15
BR-AHSF-MW03R	1/13/2023	210543.25	1193184.00	125.40	125.12	2	116.0	10.0	106.0	116.0	19.12	9.12
2017 USS Stennis AFFF Release												
NO SOIL BORINGS DRILLED												
2018 AFFF Spill												
BR-18AS-MW01	8/24/2022	210280.75	1196007.49	15.54	15.22	2	46.0	20.0	26.0	46.0	-10.78	-30.78
Building 457												
BR-B457-MW01	8/31/2022	209868.77	1195263.43	14.88	14.38	2	62.0	20.0	42.0	62.0	-27.62	-47.62
BR-B457-MW02	9/2/2022	209609.46	1195139.72	14.62	13.85	2	55.0	20.0	35.0	55.0	-21.15	-41.15
BR-B457-MW03	8/30/2022	209787.81	1195085.10	15.10	14.75	2	59.0	20.0	39.0	59.0	-24.26	-44.26
USS Missouri Parking Lot												
BR-UMPL-MW01	7/21/2022	207333.01	1189918.15	14.83	14.31	2	28.0	20.0	8.0	28.0	6.31	-13.69
BR-UMPL-MW02	7/20/2022	206957.89	1189513.47	14.61	14.31	2	28.0	20.0	8.0	28.0	6.31	-13.69
MW203*	12/6/1990	207019.20	1189695.40	14.68	14.72	2	17.0	9.5	7.0	16.5	7.72	-1.78
MW204*	5/12/1993	206822.40	1189284.10	14.24	13.91	2	23.0	15.0	8.0	23.0	5.91	-9.09
MW206*	4/28/1993	207153.90	1189841.70	12.80	12.54	2	23.0	15.0	8.0	23.0	4.54	-10.46
MW241*	6/14/1994	207607.40	1190206.80	14.12	14.13	2	15.0	15.0	6.0	15.0	8.13	-0.87
Mooring A and Drydock 5 Fill Area												
BR-MAD5-MW01	8/24/2022	208497.84	1194345.06	15.05	14.76	2	25.0	10.0	15.0	25.0	-0.24	-10.24
BR-MAD5-MW02	8/23/2022	208343.75	1194253.18	14.84	14.59	2	22.0	10.0	12.0	22.0	2.59	-7.41
MW709*	8/14/1995	208369.50	1194430.20	13.77	13.42	2	52.0	20.0	8.0	28.0	5.42	-14.58
Building 873												
BR-B873-MW01	8/24/2022	209176.77	1194264.68	15.28	15.10	2	59.0	20.0	39.0	59.0	-23.91	-43.91
BR-B873-MW02	8/25/2022	209240.73	1194374.13	15.59	15.37	2	62.0	20.0	42.0	62.0	-26.63	-46.63
Former DRMO Drum Storage Area												
BR-DRMO-MW01	7/28/2022	208715.54	1191896.16	15.45	15.23	2	25.5	10.0	15.5	25.5	-0.27	-10.27
BR-DRMO-MW02	8/2/2022	208501.05	1192103.78	15.77	15.37	2	24.0	10.0	14.0	24.0	1.37	-8.63
BR-DRMO-MW03	7/28/2022	208654.70	1192322.18	15.38	14.97	2	29.0	10.0	19.0	29.0	-4.03	-14.03
BR-DRMO-MW04	8/1/2022	208457.67	1192327.24	15.39	14.93	2	27.0	10.0	17.0	27.0	-2.07	-12.07

Table 3-3. Monitoring Well Construction Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Monitoring Well	Installation Date	Northing (ft NAD83 WA State Plane North Zone)	Easting (ft NAD83 WA State Plane North Zone)	Ground Surface Elevation (ft NAVD88)	Top of PVC Casing Elevation (ft NAVD88)	Well Diameter (in)	Total Depth (ft btoc)	Length of Screen (ft)	Depth of Top of Screen (ft btoc)	Depth of Bottom of Screen (ft btoc)	Elevation of Top of Screen (ft amsl)	Elevation of Bottom of Screen (ft amsl)
Lift Station 1												
BR-LS1-MW01	8/17/2022	208209.11	1191825.57	14.47	14.14	2	20.0	10.0	10.0	20.0	4.14	-5.86
BR-LS1-MW02	10/6/2022	208194.25	1191976.05	14.57	13.84	2	26.0	20.0	6.0	26.0	7.84	-12.16
MW392*	7/21/1992	208190.10	1192046.30	14.48	14.48	2	26.0	20.0	6.0	26.0	8.48	-11.52
Lift Station 3												
BR-LS3-MW01	8/24/2022	208256.29	1193910.43	15.60	15.31	2	24.0	10.0	14.0	24.0	1.31	-8.69
MW412*	2/8/1991	208256.30	1193992.90	15.12	14.97	2	27.0	9.5	14.5	24.0	0.47	-9.03
MW713*	8/28/1995	208161.00	1193836.80	15.28	14.96	2	52.0	20.0	8.0	28.0	6.96	-13.04
Former Building 426												
BR-B426-MW01	8/22/2022	208501.12	1193369.27	15.56	15.18	2	63.0	20.0	43.0	63.0	-27.82	-47.82
BR-B426-MW02	8/18/2022	208217.83	1193345.27	15.09	14.67	2	69.0	20.0	49.0	69.0	-34.33	-54.33
MW310R*	10/10/2007	208473.30	1193220.80	15.38	15.41	2	70.0	10.0	58.7	68.7	-43.29	-53.29
Building 455												
BR-B455-MW01	8/16/2022	208858.40	1193712.10	15.59	15.28	2	65.0	20.0	45.0	65.0	-29.72	-49.72
BR-B455-MW02	8/17/2022	208698.26	1193537.24	15.41	15.07	2	55.0	20.0	35.0	55.0	-19.93	-39.93
BR-B455-MW03	8/18/2022	208708.06	1193260.35	15.44	15.15	2	65.0	20.0	45.0	65.0	-29.85	-49.85
MW382*	7/5/1994	208849.90	1193175.90	15.48	15.55	2	62.0	20.0	38.0	58.0	-22.45	-42.45
Building 59												
BR-B59-MW01	9/27/2022	210771.19	1196775.37	15.42	15.11	2	26.0	20.0	6.0	26.0	9.11	-10.89
BR-B59-MW02	9/28/2022	210622.34	1196705.99	15.49	15.06	2	28.0	20.0	8.0	28.0	7.06	-12.94
MW704*	8/22/1995	210618.60	1196900.00	15.28	14.92	2	22.0	15.0	6.0	21.0	8.92	-6.08
OU D												
BR-OUD-MW01	9/28/2022	210315.60	1197726.13	15.50	15.26	2	18.0	10.0	8.0	18.0	7.26	-2.74
BR-OUD-MW02	9/29/2022	210211.91	1197610.55	15.51	14.90	2	19.0	10.0	9.0	19.0	5.90	-4.10
MW903*	6/7/2011	210202.70	1197815.00	16.16	15.71	2	25.0	20.0	5.0	25.0	10.71	-9.29

* Existing monitoring well installed during previous investigation

amsl = above mean sea level. Vertical elevation references the North American Vertical Datum of 1988 (NAD88)

btoc = below top of casing

ft = feet

in = inches

NAD83 = North American Datum of 1983

PVC = polyvinyl chloride

Table 3-4. Groundwater Elevations

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

	September 2022 (All Drydocks Empty)				November 2022/January/February 2023 (Drydock 6 Full; All Other Empty)			
Monitoring Well	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**
Former Building 513 Parking Lot								
BR-B513-MW01	9/22/2022	15.21	5.41	9.80	11/30/2022	15.21	3.13	12.08
BR-B513-MW02	9/22/2022	15.03	4.69	10.34	11/28/2022	15.03	4.07	10.96
BR-B513-MW03	9/22/2022	14.60	8.57	6.03	11/28/2022	14.60	6.67	7.93
MW718[a]	--	--	--	--	11/29/2022	15.40	8.36	7.04
Building 435								
BR-B435-MW01	9/23/2022	15.31	55.35	-40.04	11/28/2022	15.31	54.78	-39.47
BR-B435-MW02	9/23/2022	15.36	54.83	-39.47	11/28/2022	15.36	54.45	-39.09
BR-B435-MW03	9/23/2022	15.45	55.77	-40.33	11/28/2022	15.45	55.15	-39.71
MW425[a]	--	--	--	--	11/29/2022	15.28	53.85	-38.57
Former Building 871								
BR-B871-MW01	9/23/2022	16.11	56.04	-39.93	11/29/2022	16.11	55.70	-39.59
BR-B871-MW02	9/23/2022	16.22	56.15	-39.93	11/29/2022	16.22	62.02	-45.80
MW707[a]	--	--	--	--	11/29/2022	14.91	55.70	-40.79
MW907[a]	--	--	--	--	11/29/2022	23.50	62.02	-38.52
Former Building 99								
BR-B99-MW01	--	--	--	--	11/28/2022	15.02	24.52	-9.50
BR-B99-MW02	--	--	--	--	11/28/2022	15.37	22.09	-6.72
MW432[a]	--	--	--	--	11/29/2022	14.59	27.61	-13.02
MW433[a]	--	--	--	--	11/29/2022	14.48	6.90	7.58
MW904[a]	--	--	--	--	11/29/2022	15.10	11.42	3.68
Building 503								
BR-B503-MW01	9/22/2022	15.60	14.72	0.88	11/28/2022	15.60	8.29	7.31
BR-B503-MW02	9/22/2022	16.97	13.61	3.36	11/28/2022	16.97	9.07	7.90
BR-B503-MW03	9/22/2022	15.32	18.19	-2.87	11/28/2022	15.32	8.99	6.33

Table 3-4. Groundwater Elevations

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

	September 2022 (All Drydocks Empty)				November 2022/January/February 2023 (Drydock 6 Full; All Other Empty)			
Monitoring Well	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**
Former Building 432								
BR-B432-MW01	9/22/2022	16.16	12.48	3.68	11/28/2022	16.16	9.47	6.69
BR-B432-MW02	9/22/2022	16.68	16.74	-0.06	11/28/2022	16.68	10.69	5.99
BR-B432-MW03	--	--	--	--	11/28/2022	15.57	9.98	5.59
Building 494								
BR-B494-MW01	9/22/2022	15.12	17.56	-2.45	11/28/2022	15.12	9.11	6.01
BR-B494-MW02	9/22/2022	14.64	18.41	-3.77	11/28/2022	14.64	9.07	5.57
BR-B494-MW03	9/22/2022	14.95	18.61	-3.66	11/28/2022	14.95	8.12	6.83
Farragut Ave/Barvlay St Car Crashes								
BR-FBCC-MW01	--	--	--	--	11/28/2022	15.04	5.93	9.11
BR-FBCC-MW02	9/22/2022	14.77	9.99	4.78	11/28/2022	14.77	6.53	8.24
BR-FBCC-MW03	9/22/2022	14.59	12.26	2.33	11/28/2022	14.59	8.04	6.55
Building 434								
BR-B434-MW01	9/22/2022	25.11	13.72	11.39	11/28/2022	25.11	12.70	12.41
BR-B434-MW02	9/22/2022	38.59	28.08	10.51	11/28/2022	38.59	26.95	11.64
BR-B434-MW03	9/22/2022	37.38	27.35	10.03	11/28/2022	37.38	26.18	11.20
Auto/Hobby Shop Fire								
BR-AHSF-MW01R[b]	--	--	--	--	1/20/2023	122.04	107.26	14.78
BR-AHSF-MW02	9/22/2022	124.65	106.56	18.09	1/20/2023	124.65	106.75	17.90
BR-AHSF-MW03R[b]	--	--	--	--	1/20/2023	125.12	107.51	17.61
2017 USS Stennis AFFF Release								
NO SOIL BORINGS DRILLED								
2018 AFFF Spill								
BR-18AS-MW01	--	--	--	--	11/28/2022	15.22	32.59	-17.37
Building 457								
BR-B457-MW01	9/23/2022	14.38	48.67	-34.29	11/28/2022	14.38	47.80	-33.42
BR-B457-MW02	9/23/2022	13.85	41.98	-28.13	11/28/2022	13.85	37.21	-23.36
BR-B457-MW03	9/23/2022	14.75	48.28	-33.54	11/28/2022	14.75	44.06	-29.32

Table 3-4. Groundwater Elevations

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

	September 2022 (All Drydocks Empty)				November 2022/January/February 2023 (Drydock 6 Full; All Other Empty)			
Monitoring Well	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**
USS Misouri Parking Lot								
BR-UMPL-MW01	9/22/2022	14.31	12.89	1.42	11/29/2022	14.31	8.04	6.27
BR-UMPL-MW02	9/22/2022	14.31	10.55	3.76	11/29/2022	14.31	7.05	7.26
MW203[a]	--	--	--	--	--	--	--	--
MW204[a]	--	--	--	--	11/29/2022	13.91	7.26	6.65
MW206[a]	--	--	--	--	11/29/2022	12.54	4.52	8.02
MW241[a]	--	--	--	--	11/29/2022	14.13	7.15	6.98
Mooring A and Drydock 5 Fill Area								
BR-MAD5-MW01	9/22/2022	14.76	15.17	-0.41	11/28/2022	14.76	10.61	4.15
BR-MAD5-MW02	9/22/2022	14.59	12.93	1.66	11/28/2022	14.59	9.42	5.17
MW709[a]	--	--	--	--	11/29/2022	13.42	11.32	2.10
Building 873								
BR-B873-MW01	9/22/2022	15.10	47.54	-32.45	11/28/2022	15.10	20.24	-5.15
BR-B873-MW02	9/22/2022	15.37	52.23	-36.86	11/28/2022	15.37	26.06	-10.69
Former DRMO Drum Storage Area								
BR-DRMO-MW01	9/22/2022	15.23	16.66	-1.43	11/28/2022	15.23	9.97	5.26
BR-DRMO-MW02	9/22/2022	15.37	14.02	1.35	11/28/2022	15.37	10.96	4.41
BR-DRMO-MW03	9/22/2022	14.97	19.65	-4.68	11/28/2022	14.97	9.81	5.16
BR-DRMO-MW04	9/22/2022	14.93	14.42	0.51	11/28/2022	14.93	10.37	4.56
Lift Station 1								
BR-LS1-MW01	9/22/2022	14.14	11.11	3.03	11/28/2022	14.14	10.79	3.35
BR-LS1-MW02	--	--	--	--	11/28/2022	13.84	10.02	3.82
MW392[a]	--	--	--	--	11/29/2022	14.48	5.22	9.26

Table 3-4. Groundwater Elevations

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

	September 2022 (All Drydocks Empty)				November 2022/January/February 2023 (Drydock 6 Full; All Other Empty)			
Monitoring Well	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**	**Date Measured**	**Top of Casing Elevation (ft amsl)**	**Depth to Water (ft btoc)**	**Groundwater Elevation (ft amsl)**
Lift Station 3								
BR-LS3-MW01	9/22/2022	15.31	15.02	0.29	11/28/2022	15.31	10.96	4.35
MW412[a]	--	--	--	--	11/29/2022	14.97	10.36	4.61
MW713[a]	--	--	--	--	11/29/2022	14.96	6.49	8.47
Former Building 426								
BR-B426-MW01	9/22/2022	15.18	53.85	-38.67	11/28/2022	15.18	13.96	1.22
BR-B426-MW02	9/22/2022	14.67	53.86	-39.19	11/28/2022	14.67	13.57	1.10
MW310R[a]	--	--	--	--	11/29/2022	15.41	13.59	1.82
Building 455								
BR-B455-MW01	9/22/2022	15.28	53.57	-38.29	11/28/2022	15.28	14.80	0.48
BR-B455-MW02	9/22/2022	15.07	46.70	-31.63	11/28/2022	15.07	14.13	0.94
BR-B455-MW03	9/22/2022	15.15	53.01	-37.86	11/28/2022	15.15	13.99	1.16
MW382[a]	--	--	--	--	11/29/2022	15.55	13.94	1.61
Building 59								
BR-B59-MW01	--	--	--	--	11/28/2022	15.11	10.53	4.58
BR-B59-MW02	--	--	--	--	11/28/2022	15.06	10.09	4.97
MW704[a]	--	--	--	--	11/29/2022	14.92	12.16	2.76
OU D								
BR-OUD-MW01	--	--	--	--	2/27/2022	15.26	7.93	7.33
BR-OUD-MW02	--	--	--	--	2/27/2022	14.90	7.74	7.16
MW903[a]	--	--	--	--	2/27/2022	15.71	8.63	7.08

[a] Existing monitoring well installed during previous investigation

[b] Water level recorded on redrilled wells BR-AHSF-MW1R and BR-AHSF-MW03R

amsl = above mean sea level

btoc = below top of casing

ft = feet

Table 3-5. Water Quality Parameters

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex
Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Depth to Water (ft btoc)	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
Former Building 513 Parking Lot									
BR-B513-MW01	10/24/2022	16:20	13.38	4.48	0.498	22.27	3.82	-157	54.0
BR-B513-MW02	10/26/2022	15:48	28.42	5.38	0.405	19.97	2.63	-243	32.1
BR-B513-MW03	10/20/2022	15:10	8.89	4.33	0.517	18.65	0.00	-44	99.7
MW718[a]	10/27/2022	9:40	9.02	4.74	2.40	17.60	0.08	-262	0.0
Building 435									
BR-B435-MW01	10/31/2022	12:32	54.94	6.43	0.518	15.42	9.02	206	0.0
BR-B435-MW02	11/3/2022	15:26	54.62	4.38	2.05	15.65	5.88	-32	452
BR-B435-MW03	11/4/2022	12:28	55.28	4.54	1.14	14.80	4.61	70	208
MW425[a]	11/21/2022	14:30	54.01	6.70	1.16	15.34	7.58	201	0.0
Former Building 871									
BR-B871-MW01	11/4/2022	16:13	55.50	7.06	0.239	14.42	6.03	-45	106
BR-B871-MW02	11/9/2022	12:41	55.60	7.28	0.198	13.35	7.12	88	4.2
MW707[a]	11/17/2022	11:17	55.88	6.67	7.56	15.23	6.58	162	4.7
MW907[a]	11/11/2022	15:15	62.21	6.94	1.75	16.77	7.71	104	0.0
Former Building 99									
BR-B99-MW01	11/15/2022	14:00	24.70	7.40	0.313	14.35	0.00	-67	0.9
BR-B99-MW02	11/18/2022	11:45	22.29	6.84	0.176	13.62	2.16	17	75.7
MW432[a]	11/15/2022	13:57	27.79	7.16	0.335	17.68	5.85	108	1.7
MW433[a]	11/11/2022	13:30	7.93	8.12	0.217	16.05	0.00	-32	9.6
MW904[a]	11/9/2022	14:18	11.48	6.80	0.195	16.37	5.87	182	0.0
Building 503									
BR-B503-MW01	11/1/2022	11:08	10.98	4.54	0.181	15.36	2.02	192	0.0
BR-B503-MW02	10/25/2022	15:15	11.85	4.68	0.169	15.53	2.18	99	0.8
BR-B503-MW03	10/31/2022	16:31	12.45	6.48	0.311	25.88	0.62	91	2.8
Former Building 432									
BR-B432-MW01	10/30/2022	15:16	12.19	6.32	0.355	18.60	0.00	-12	0.0
BR-B432-MW02	11/4/2022	11:10	12.53	6.08	25.0	16.11	0.00	169	0.0
BR-B432-MW03	10/21/2022	10:23	13.77	4.29	8.59	19.70	1.40	-236	7.9

Table 3-5. Water Quality Parameters

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex
Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Depth to Water (ft btoc)	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
Building 494									
BR-B494-MW01	11/2/2022	10:42	12.05	4.93	7.68	28.29	0.00	-181	21.1
BR-B494-MW02	11/2/2022	14:47	12.22	7.04	0.321	19.00	0.00	-37	9.7
BR-B494-MW03	11/2/2022	12:57	12.03	4.97	0.47	18.72	1.21	53	0.0
Farragut Ave/Barvlay St Car Crashes									
BR-FBCC-MW01	11/16/2022	10:27	6.80	6.02	0.337	21.12	0.00	-70	4.2
BR-FBCC-MW02	10/20/2022	13:00	8.98	4.20	4.820	17.23	0.00	-90	14.0
BR-FBCC-MW03	10/20/2022	11:00	12.19	4.34	0.413	15.53	0.00	-180	0.0
Building 434									
BR-B434-MW01	11/1/2022	15:14	13.40	4.65	0.216	17.99	2.56	188	0.0
BR-B434-MW02	11/1/2022	13:30	27.40	4.55	0.401	16.79	4.80	154	47
BR-B434-MW03	11/1/2022	15:15	26.74	6.16	0.245	15.76	3.07	243	37
Auto/Hobby Shop Fire									
BR-AHSF-MW01R[b]	1/19/2023	9:45	121.11	7.87	0.279	16.82	0.72	-163	17.0
BR-AHSF-MW02	1/18/2023	14:53	114.37	7.75	0.201	16.35	3.56	27	9.0
BR-AHSF-MW03R[b]	1/19/2023	12:35	116.02	7.39	0.290	15.85	3.98	-47	7.0
2017 USS Stennis AFFF Release									
NO SOIL BORINGS DRILLED									
2018 AFFF Spill									
BR-18AS-MW01	11/16/2022	15:36	32.72	6.39	24.2	14.99	0.57	127	32.1
Building 457									
BR-B457-MW01	11/11/2022	12:32	48.01	7.11	35.4	13.28	3.99	-38	48.2
BR-B457-MW02	11/8/2022	17:32	37.15	7.21	34.7	12.05	4.60	50	28.9
BR-B457-MW03	11/14/2022	16:00	44.50	7.78	30.8	13.97	2.96	-91	5.8
USS Misouri Parking Lot									
BR-UMPL-MW01	10/18/2022	13:45	6.24	4.58	40.5	16.51	6.09	160	0.0
BR-UMPL-MW02	10/18/2022	11:00	9.98	4.34	11.4	15.63	1.30	-277	2.7
MW203[a]	10/28/2022	11:10	5.77	7.10	27.8	16.83	7.09	-133	0.0
MW204[a]	10/28/2022	13:50	8.38	7.25	34.4	16.06	7.24	160	0.0
MW206[a]	10/28/2022	11:54	5.60	7.11	0.531	15.63	0.00	-24	0.0
MW241[a]	11/4/2022	18:43	9.11	6.77	39.9	16.21	0.00	-146	42.0

Table 3-5. Water Quality Parameters

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex
Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Depth to Water (ft btoc)	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
Mooring A and Drydock 5 Fill Area									
BR-MAD5-MW01	11/8/2022	11:35	11.15	6.70	21.3	16.96	4.95	126	4.0
BR-MAD5-MW02	11/8/2022	10:20	10.00	7.39	49.9	11.37	4.65	170	0.0
MW709[a]	11/8/2022	15:40	11.78	7.30	43.2	14.86	0.22	97	9.5
Building 873									
BR-B873-MW01	11/8/2022	11:18	21.01	6.86	0.578	32.78	3.27	175	0.0
BR-B873-MW02	11/14/2022	11:07	26.48	6.53	0.857	23.12	3.69	210	3.1
Former DRMO Drum Storage Area									
BR-DRMO-MW01	10/21/2022	12:06	13.46	4.58	16.1	16.97	0.00	-195	6.2
BR-DRMO-MW02	11/15/2022	11:07	11.48	6.91	36.1	16.68	0.60	-70	8.1
BR-DRMO-MW03	10/25/2022	9:50	13.57	4.55	7.62	16.81	0.00	-223	11.3
BR-DRMO-MW04	10/25/2022	11:45	12.40	4.59	1.75	16.94	0.39	-105	2.2
Lift Station 1									
BR-LS1-MW01	10/24/2022	11:20	12.43	4.20	20.7	17.38	0.10	-264	0.3
BR-LS1-MW02	10/19/2022	13:40	10.54	4.48	28.7	17.92	1.38	12	2.3
MW392[a]	10/27/2022	14:30	5.97	4.75	5.29	25.63	0.00	169	20.0
Lift Station 3									
BR-LS3-MW01	11/7/2022	11:30	11.76	6.83	39.1	16.18	5.33	205	0.0
MW412[a]	11/7/2022	13:00	10.97	7.35	44.9	14.17	0.00	159	0.0
MW713[a]	11/7/2022	14:25	7.14	7.86	44.0	18.50	5.12	133	0.0
Former Building 426									
BR-B426-MW01	11/7/2022	13:52	14.49	7.19	1.52	15.17	2.25	4	0.4
BR-B426-MW02	11/7/2022	16:22	13.82	6.31	47.8	12.51	4.81	159	0.0
MW310R[a]	11/11/2022	16:13	14.32	6.87	1.53	19.25	3.52	187	16.8
Building 455									
BR-B455-MW01	11/21/2022	9:50	15.65	6.60	2.75	14.12	3.19	219	0.0
BR-B455-MW02	11/21/2022	11:25	14.85	5.99	11.1	14.84	4.00	233	0.0
BR-B455-MW03	11/21/2022	12:40	14.71	6.77	4.00	16.77	2.58	188	0.0
MW382[a]	11/17/2022	15:34	14.88	6.64	0.618	18.73	5.89	196	25.3

Table 3-5. Water Quality Parameters

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex
Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Depth to Water (ft btoc)	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
Building 59									
BR-B59-MW01	11/10/2022	11:02	10.72	6.82	15.7	14.88	2.33	145	4.0
BR-B59-MW02	11/10/2022	14:55	10.55	5.84	9.50	14.85	0.00	174	4.1
MW704[a]	11/22/2022	10:05	12.79	5.51	4.40	13.98	2.38	220	0.0
OU D									
BR-OUD-MW01	11/9/2022	14:48	8.43	6.39	8.42	14.61	0.00	83	5.4
BR-OUD-MW02	11/9/2022	12:41	8.50	6.44	8.60	15.84	0.00	-60	2.9
MW903[a]	11/9/2022	10:23	8.84	6.65	0.499	12.58	0.00	-98	1.8

[a] Existing monitoring well installed during previous investigation

[b] Water level recorded on redrilled wells BR-AHSF-MW1R and BR-AHSF-MW03R

°C = degrees Celsius
btoc = below top of casing
ft = feet
mg/L = milligrams per liter
mS/cm = millisiemens per centimeter
mV = millivolts
NTU = nephelometric turbidity units

Table 3-6. Sediment Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Sample Interval (in bss)	Water Depth (ft)	Lithology/ Observations	Comments
2017 U.S.S. Stennis AFFF Release						
BR-17AS-SD01-0004	10/19/2022	11:25	0-4	49.2	Silt, gray	Moved approximately 100' west-southwest because of barge and boom blocking access to proposed sampling location.
BR-17AS-SD01-0424	10/19/2022	10:50	4-24	49.2	Silty sand, gray; some pebbles and wood chips	See above.
BR-17AS-SD02-0004	10/19/2022	11:50	0-4	52.0	Silt, gray; jellyfish in sampler	
BR-17AS-SD02-0424	10/19/2022	10:15	4-24	52.0	Silty sand, brownish gray	
BR-17AS-SD03-0004	10/19/2022	12:10	0-4	22.5	Silt, gray	Moved approximately 200’ west because of boom in water around aircraft carrier.
BR-17AS-SD03-0424	10/19/2022	9:40	4-24	22.5	Silt, gray	See above.

bss = below sediment surface

ft = feet

in = inches

Table 3-7. Surface Water Summary

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Monitoring Well	Sample Date	Sample Time	Sample Depth (ft below water surface)	Water Depth (ft)	pH	Conductivity (mS/cm)	Temperature (°C)	Observations	Comments
2017 U.S.S. Stennis AFFF Release									
BR-17AS-SW01	10/19/2022	8:50	2	49.2	5.91	45.9	13.14	No sea foam or floating debris on water surface.	Moved approximately 100' west-southwest because of barge and boom blocking access to proposed sampling location.
BR-17AS-SW02	10/19/2022	9:00	2	52.0	6.75	46.8	13.27	No sea foam or floating debris on water surface.	
BR-17AS-SW03	10/19/2022	9:40	2	22.5	7.94	47.0	13.53	No sea foam or floating debris on water surface.	Moved approximately 200’ west because of boom in water around aircraft carrier.

°C = degrees Celsius

ft = feet

mS/cm = millisiemens per centimeter

SECTION 4

Field Investigation Results

This section presents updated conceptual site models (CSMs) for the 23 investigation areas reflecting the data obtained during this SI. The CSMs are presented in **Tables 4-1** through **4-23**. The CSMs include area-specific descriptions of the potential or confirmed PFAS release, the SI approach, lithology, groundwater conditions, summaries of PFAS concentrations in soil and groundwater, conclusions, and recommendations. Soil, groundwater, sediment, and surface water analytical results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA are presented in **Tables 4-24** and **4-27**. Figures presenting detailed area-specific features are presented in **Figures 4-1** through **4-12**. Potentiometric surface maps are presented on **Figures 4-13a** through **4-19.** Drydock 6 influence was observed in the water levels in the southwestern portion of PSNS (**Figures 4-18a** and **4-18b**) and the southern portion of NBK Bremerton (**Figures 4-13a** and **4-13b**). The two separate sets of potentiometric maps were developed to show the impact of Drydock 6 pumping on groundwater. Sampling results are presented in **Figures 4-20** through **4-36**.

Data Screening Criteria

The analytical results for soil, groundwater, sediment, and surface water were compared to the residential scenario soil and tapwater SLs, respectively, for PFOA, PFOS, PFBS, PFNA, PFHxS, HFPO-DA, and, PFHxA presented in the May 2023 RSL Table (USEPA, 2023), consistent with DoD technical guidance (DoD, 2022).

Thus, the SLs are as follows:

	Soil and Sediment Project Action Limit (µg/kg)	**Groundwater and Surface Water Project Action Limit (ng/L)**
PFBS	1,900	600
PFOA	19	6
PFOS	13	4
PFNA	19	5.9
PFHxS	130	39
HFPO-DA	23	6
PFHxA	3,200	990

Screening criteria do not exist for the remaining 11 PFAS for soil or groundwater; therefore, SLs were not developed for those compounds. Full analytical results including data for PFAS other than PFBS, PFOA, PFOS, PFNA, PFHxS, HFPO-DA, and PFHxA are provided in **Appendix F**. The data may be further evaluated in the future if criteria are established.

Human Health Risk Screening

Consistent with Navy and EPA SI guidance (Pioneer Technologies Corporation, 2008), the human health risk screening (HHRS) evaluation is a preliminary risk screening tool used as a line of evidence to support site management decisions, path forward, and prioritization of future phases. The HHRS was conducted based on a future residential exposure and potable use of groundwater for all of the investigation areas[2] and is presented in detail in **Appendix I**. The analytical results used in the HHRS were limited to those PFAS identified in the SAP (PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA). Following completion of the initial data screening and HHRS, the

[2] Although the SAP indicated a HHRS would only be prepared if concentrations exceeded SLs, HHRS were conducted for all investigations areas to formalize the documentation that unacceptable risks were not identified and to confirm that the reporting limits were satisfactory to meet the objectives.

USEPA published RSLs for two additional PFAS: PFBA and PFHxA (USEPA, 2023). PFBA was not included in the analyte list for the SI but will be included during future investigations. There were no exceedances of the PFHxA RSL; therefore, these constituents do not impact site management decisions and are not included in **Section 4** tables or **Appendix I**.

4.1 Former Building 513 Parking Lot

Table 4-1. Former Building 513 Parking Lot Conceptual Site Model

Description and Potential for PFAS Release	Former Building 513 was located in the southwestern portion of BNC within the NBK Bremerton facility (**Figure 4-1**). The area is bordered by South Avenue to the north, the steam plant facility to the west and southwest, a large parking lot and Building 944 to the south, and Former Building 432 (now Wendy's Restaurant) to the east (**Figure 4-1**). Building 513 was a former radioactive material storage facility. The building was demolished in 2011 and the area where it was located is now an asphalt-paved parking lot (**Figure 4-1**). Fire training activities were performed in the small parking area located to the north of Building 513 until the 1980s and involved the use of foam and water (NEESA, 1983). It is not known whether the foam referred to was AFFF. The PA identified the Former Building 513 Parking Lot as a potential PFAS release area and recommended investigation as part of an SI based on the operational time frame (during the Navy's use of AFFF) of the fire training activities and documented use of foam.					
SI Approach	• Three new monitoring wells were installed in locations within and in the assumed downgradient direction (south-southeast) from Former Building 513 Parking Lot (**Figure 4-20**). • Two surface soil samples were collected from unpaved areas located near the Former Building 513 Parking Lot (**Figure 4-20**). • Shallow subsurface soil samples were collected from each newly installed monitoring well location from 2 to 3 feet bgs and two subsurface soil samples were collected from two of the newly installed monitoring well locations within the capillary fringe. A capillary fringe soil sample was not collected from one newly installed groundwater monitoring well since groundwater was observed at 3 feet bgs (**Table 3-4**). • One groundwater sample was collected from each newly installed monitoring well. During groundwater sampling at one of the newly installed wells (BR-B513-MW03), an odor resembling paint stripper was noted. • One groundwater sample was collected from an existing monitoring well in the assumed downgradient direction to the south-southeast.					
Sample Stations	**Monitoring Wells**	**Well ID**	BR-B513-MW01	BR-B513-MW02	BR-B513-MW03	MW718
		Screen Interval (feet bgs)	4-14	27-47	7-17	7-27
	Surface Soil Samples	**Station ID**	BR-B513-SS01		BR-B513-SS02	
		Sample Depth (feet bgs)	0-1			
	Subsurface Soil Samples	**Station ID**	BR-B513-MW01	BR-B513-MW02	BR-B513-MW03	
		Sample Depths (feet bgs)	2-3	2-3	36-37	2-3	6-7
Lithology	Subsurface lithology observed during drilling at Building 513 consisted of a thick clay unit from 6 to 17.5 feet bgs to as deep as 70 feet bgs overlain by fill material that consisted of silty sands and gravels. An upper water-bearing unit comprised of silty sand was observed above the clay unit in BR-B513-MW01 and BR-B513-MW03. No upper water-bearing unit was observed in BR-B513-MW02; however, a lower water-bearing unit consisting of silty sand and gravel was observed below the clay unit at approximately 35 feet bgs. The lower water-bearing unit was observed to be under confined conditions. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in **Appendix B**.					

Table 4-1. Former Building 513 Parking Lot Conceptual Site Model

Groundwater	Groundwater at Building 513 is present above the clay unit in BR-B513-MW01 and BR-B513-MW03. Groundwater is present in a confined aquifer overlain by the predominant clay in BR-B513-MW02. Depth to groundwater ranges from 3.5 to 6 feet bgs. Synoptic groundwater level measurements collected on September 22 (all drydocks empty) and November 28, 2022, (Drydock 6 flooded) suggest the influence of Drydock 6 dewatering on groundwater flow direction at Former Building 513 Parking Lot is minimal. Groundwater flow in the vicinity of Building 513 is to the southeast (**Figures 4-13a** and **4-13b**).									
PFAS Results Compared to SLs	**Analyte**	**SS (Table 4-24)**			**SB (Table 4-24)**			**GW (Table 4-25)**		
		Frequency of Detection	**Frequency of Exceedance**	**Max Conc. (µg/kg)**	**Frequency of Detection**	**Frequency of Exceedance**	**Max Conc. (µg/kg)**	**Frequency of Detection**	**Frequency of Exceedance**	**Max Conc. (ng/L)**
	PFBS	0/2	0/2	ND	0/5	0/5	ND	3/4	0/4	9.27
	PFOA	0/2	0/2	ND	0/5	0/5	ND	3/4	2/4	185
	PFOS	2/2	0/2	1.22	1/5	0/5	0.297 J	3/4	3/4	51.6
	PFNA	0/2	0/2	ND	0/5	0/5	ND	1/4	1/4	9.47
	PFHxS	0/2	0/2	ND	0/5	0/5	ND	3/4	1/4	53.9
	HFPO-DA	0/2	0/2	ND	0/5	0/5	ND	0/4	0/4	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no contaminants of potential concern (COPCs) were identified for surface soil or subsurface soil at Former Building 513 Parking Lot. PFOA, PFOS, and PFNA were identified as preliminary COPCs in groundwater at the Former Building 513 Parking Lot and may result in potential unacceptable human health risks associated with PFOA, PFOS, and PFNA.									
Results Summary, Conclusions, and Recommendations	PFOS was detected in surface soil samples at concentrations below the SL. PFOS was detected in one shallow subsurface soil sample at concentrations below the SL. PFBS was detected in groundwater samples at concentrations below the SL. PFOA, PFOS, PFNA, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOS in groundwater at concentrations above the SLs at locations at the Former Building 513 Parking Lot (BR-B513-MW01) indicates that a release of PFAS-containing substance(s) likely occurred at or near the Former Building 513 Parking Lot. The absence of PFAS in groundwater at BR-B513-MW02, which was screened below the clay unit, indicates that PFAS is limited to the unconfined aquifer at this location. Although the existing monitoring well (MW718) is not directly downgradient of the Former 513 Parking Lot, it is downgradient and adjacent to the Former Building 513 footprint. The presence of PFOA, PFOS, PFNA, and PFHxS above the SLs in groundwater at MW718 suggests a release occurred at or near the Former Building 513 footprint and may not be associated with the Former Building 513 Parking Lot. MW718 may also be influenced by drydock operations which will be further investigated during the RI. PFOA, PFOS and PFNA were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Former Building 513 Parking Lot to Building 503, Former Building 432, Building 494, Former DRMO Drum Storage Area, and Lift Station 1, a combined RI is recommended for these six release areas.									

µg/kg = microgram(s) per kilogram

GW = Groundwater samples

J = Analyte present, value may or may not be accurate or precise

ND = Not detected

ng/L = nanogram(s) per liter

SB = Subsurface soil samples

SS = Surface soil samples

4.2 Building 435

Table 4-2. Building 435 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="9">Building 435 is located in the northeastern portion of BNC within the PSNS and IMF facility and is bordered by Building 469 to the north, an electrical substation to the west, Decatur and Farragut Avenue to the south, and Building 427 to the east (Figure 4-2).

Building 435 was constructed in 1936 and has served as the sole fire station for the PSNS and IMF portion of BNC since construction (Navy, 2018a; NEESA, 1983). The fire truck ramp is located on the southern portion of the building facing Farragut Avenue (Figure 4-2). After AFFF usage during emergency responses, fire hoses were flushed to remove any residual AFFF within the lines. This practice often occurred on the truck ramps outside Building 435 (or at the emergency response location) (CH2M, 2020). Transfer and refilling of AFFF from storage containers to the tanks on the fire trucks commonly resulted in minor spills and splashing of AFFF on the fire truck ramp or within the fire truck bays (CH2M, 2020).

The PA identified Building 435 as a potential PFAS release area and recommended investigation as part of an SI based on known storage and transfer of AFFF and historical accounts of potential AFFF releases on the fire truck ramp.</td></tr>
<tr><td>SI Approach</td><td colspan="9">• Three new monitoring wells were installed in locations near the fire truck ramp and parking area and in the assumed downgradient direction (southwest) from Building 435 (Figure 4-21).
• Shallow subsurface soil samples were collected from each new monitoring well location and a stand-alone soil boring location from 2 to 3 feet bgs. Subsurface soil samples were also collected from each new monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well adjacent to Building 435.</td></tr>
<tr><td rowspan="3">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B435-MW01</td><td colspan="2">BR-B435-MW02</td><td colspan="2">BR-B435-MW03</td><td colspan="2">MW425</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">46.5-66.5</td><td colspan="2">47-67</td><td colspan="2">48-68</td><td colspan="2">47-67</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B435-MW01</td><td colspan="2">BR-B435-MW02</td><td colspan="2">BR-B435-MW03</td><td colspan="2">BR-B435-SB04</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>53-54</td><td>2-3</td><td>53-54</td><td>2-3</td><td>54-55</td><td>2-3</td></tr>
<tr><td>Lithology</td><td colspan="9">Subsurface lithology observed in soil boring drilled southwest of Building 435 included fill material that consisted of discontinuous silty units interbedded with sands and gravels. Lithology observed in soil borings to the southeast of Building 435 included fill material and discontinuous sand and gravel units with interbedded silt lenses. Saturated soil was observed at approximately 53 to 55 feet bgs. Water-bearing units consist of poor and well-graded sands and gravels. Drilling was performed while Drydock 4 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="9">Groundwater at Building 435 is present in an unconfined aquifer comprised of poorly and well-graded sands and gravels. Depth to groundwater is between approximately 54 to 55 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, suggest the general groundwater flow in the vicinity of Building 435 is to the southwest toward Drydock 4; however, groundwater flow near the fire truck ramp is directly west (Figure 4-14).</td></tr>
</table>

Table 4-2. Building 435 Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/7	0/7	ND	4/4	0/4	20.7
	PFOA	0/7	0/7	ND	4/4	3/4	71.6
	PFOS	3/7	0/7	1.11	3/4	3/4	217
	PFNA	0/7	0/7	ND	3/4	0/4	2.52 J
	PFHxS	0/7	0/7	ND	4/4	2/4	141
	HFPO-DA	0/7	0/7	ND	0/4	0/4	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 435. PFOA and PFOS were identified as COPCs at Building 435 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.						
Results Summary, Conclusions, and Recommendations	PFOS was detected in subsurface soil samples at concentrations below the SL. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to Building 435 (BR-B435-MW01 and MW425) indicates that a release of PFAS-containing substance(s) likely occurred at or adjacent to Building 435. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Building 435 to Former Building 871, a combined RI is recommended for Building 435 and Former Building 871.						

4.3 Former Building 871

Table 4-3. Former Building 871 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="7">Former Building 871 operated as the old industrial wastewater treatment plant and is located in the eastern portion of BNC within the PSNS and IMF facility (Figure 4-2). The location of Former Building 871 is bordered by a large concrete retaining wall (approximately 30 feet high) to the north and west, an electrical substation to the south, and Buildings 469 and 435 to the west and southwest, respectively (Figure 4-2). The BNC perimeter fence lies atop the retaining wall to the north and the west (Figure 2-5).
Former Building 871 was constructed in 1979 to treat the large volumes of wastewater generated by industrial operations at BNC (NEESA, 1983). Wastewater treated at Former Building 871 was generated from a variety of industrial operations, including, chrome, zinc, and copper plating; sandblasting; metal forging; Teflon-coating; and painting (NEESA, 1983). Therefore, it is likely that wastewater from chrome plating and Teflon-coating operations, potentially containing PFAS, were treated at Former Building 871. Treated wastewater from Former Building 871 was discharged to the City of Bremerton sanitary sewer system (NEESA, 1983). Building 871 operated until 2006, when Building 1109 was constructed, and was later demolished in 2008 (CH2M, 2020).
The PA identified Former Building 871 as a potential PFAS release area and recommended investigation as part of an SI based on historical descriptions of hazardous waste practices (handling, disposal, storage) and likely storage and treatment of PFAS-containing materials or waste.</td></tr>
<tr><td>SI Approach</td><td colspan="7">• Two new monitoring wells were installed in locations near Former Building 871 (Figure 4-21).
• Shallow subsurface soil samples were collected from each new monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• Two groundwater samples were collected from existing monitoring wells located in the assumed downgradient direction to the south-southwest.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B871-MW01</td><td colspan="2">BR-B871-MW02</td><td>MW707</td><td>MW907</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">48-68</td><td colspan="2">49-69</td><td>45-65</td><td>55-75</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="3">BR-B871-MW01</td><td colspan="3">BR-B871-MW02</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td colspan="2">2-3</td><td>54-55</td><td colspan="2">2-3</td><td>55-56</td></tr>
<tr><td>Lithology</td><td colspan="7">Subsurface lithology observed during drilling at Former Building 871 included fill material and discontinuous units of interbedded silty sand, well-graded sand, and gravel. Saturated soil was observed at approximately 57 feet bgs. Water-bearing units consist of well-graded sands and gravels. Drilling was performed while Drydock 4 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="7">Groundwater at Former Building 871 is present in an unconfined aquifer comprised of well-graded sands and gravels. Depth to groundwater is approximately 55 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, suggest groundwater flow in the vicinity of Former Building 871 is to the south toward Drydock 4 (Figure 4-14).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/4</td><td>0/4</td><td>ND</td><td>3/4</td><td>0/4</td><td>8.32</td></tr>
<tr><td>PFOA</td><td>0/4</td><td>0/4</td><td>ND</td><td>4/4</td><td>3/4</td><td>22</td></tr>
<tr><td>PFOS</td><td>3/4</td><td>1/4</td><td>18.2</td><td>4/4</td><td>4/4</td><td>2,160</td></tr>
<tr><td>PFNA</td><td>0/4</td><td>0/4</td><td>ND</td><td>3/4</td><td>0/4</td><td>2.34 J</td></tr>
<tr><td>PFHxS</td><td>1/4</td><td>0/4</td><td>0.223 J</td><td>4/4</td><td>1/4</td><td>48</td></tr>
<tr><td>HFPO-DA</td><td>0/4</td><td>0/4</td><td>ND</td><td>0/4</td><td>0/4</td><td>ND</td></tr>
</table>

Table 4-3. Former Building 871 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Former Building 871. PFOS was identified as a COPC at Building 871 in groundwater and may result in potential unacceptable human health risk associated with PFOS.
Results Summary, Conclusions, and Recommendations	PFHxS was detected in subsurface soil samples at concentrations below the SL. PFOS was detected in a subsurface soil sample at a concentration above the SL. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOS in soil at a concentration above the SL and PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to Former Building 871 (BR-B871-MW01 and BR-B871-MW02) indicate that a release of PFAS-containing substance(s) likely occurred at or near Former Building 871. PFOS was identified as a preliminary COPC in groundwater. Based on these findings and the proximity of Building 435 to Former Building 871, a combined RI is recommended for Building 435 and Former Building 871.

4.4 Former Building 99

Table 4-4. Former Building 99 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="7">Former Building 99 is located in the northeastern portion of BNC within the PSNS and IMF facility (Figure 4-2). The building is bordered by Building 147 to the north-northeast, K Street and Building 427 to the west, Farragut Avenue to the south, and Building 856 Annex to the east (Figure 2-5). Drydock 2 lies beyond Farragut Avenue to the south (Figure 4-2).
Building 99 was constructed in the early 1900s and was demolished in the late 1970s. The building was used for several types of metal plating, including chrome plating, before plating operations were moved to Building 873 in the late 1970s (CH2M, 2020). The Former Building 99 footprint is currently used for staging and open- air storage of Conex boxes, metal piping, and sheet metal.
Chrome plating typically includes the use of mist suppressants, known to contain PFAS to prevent inhalation of chromic acid mist by employees. It is not known whether mist suppressants were used at Former Building 99; however, mist suppressants have been used in the past at Building 873, which suggests that mist suppressants were likely also used at Former Building 99. While Building 99 was operational in the 1970s, industrial wastes from plating operations, potentially containing PFAS, were disposed of in storm drains at or near Building 99 that flowed directly to Sinclair Inlet (NEESA, 1983). Stormwater drains near Former Building 99 are discharged to Sinclair Inlet at stormwater outfall 115.
The PA identified Former Building 99 as a potential PFAS release area and recommended investigation as part of an SI based on the potential usage of PFAS-containing materials and historical accounts of poor waste practices (handling, disposal, storage).</td></tr>
<tr><td>SI Approach</td><td colspan="7">• Two new monitoring wells were installed in locations near the Former Building 99 footprint (Figure 4-22).
• Shallow subsurface soil samples were collected from each new monitoring well location and a stand-alone soil boring location from 2 to 3 feet bgs. Subsurface soil samples were also collected from each new monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from existing monitoring wells located near the Former Building 99 footprint and two groundwater samples from existing monitoring wells located in the assumed downgradient directions to the south-southwest toward Drydock 2 and southeast toward Drydock 1. During planning, a north-south trending groundwater divide was assumed to located in the vicinity of Former Building 99.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td>BR-B99-MW01</td><td>BR-B99-MW02</td><td>MW432</td><td>MW433</td><td>MW904</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td>20-40</td><td>17-37</td><td>30-50</td><td>48-63</td><td>7-27</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B99-MW01</td><td colspan="2">BR-B99-MW02</td><td>BR-B99-SB04</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>26.5-27.5</td><td>2-3</td><td>24-25</td><td>2-3</td></tr>
<tr><td>Lithology</td><td colspan="7">Subsurface lithology observed during drilling at Former Building 99 included fill material that consisted of discontinuous silty units interbedded with well-graded sand. Saturated soil was observed at approximately 24 to 26 feet bgs. Water-bearing units vary from sandy silt to poorly and well-graded sand. Drilling was performed while drydocks 1 and 2 were empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="7">Groundwater at Former Building 99 is present in an unconfined aquifer comprised of sandy silt in the western portion of the area and poorly and well-graded sand to the east. Depth to groundwater is between approximately 22 and 25 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, indicate a north-south groundwater divide is present east of the area rather than through the center of the area, as assumed during planning. Groundwater flow in the vicinity of Former Building 99 is to the southwest (Figure 4-14).</td></tr>
</table>

Table 4-4. Former Building 99 Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/5	0/5	ND	5/5	0/5	6.23
	PFOA	0/5	0/5	ND	5/5	2/5	21.1
	PFOS	2/5	0/5	0.628 J	5/5	3/5	26.4
	PFNA	0/5	0/5	ND	1/5	0/5	2.14 J
	PFHxS	1/5	0/5	0.368 J	4/5	0/5	19.3
	HFPO-DA	0/5	0/5	ND	0/5	0/5	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil or groundwater at Former Building 99.						
Results Summary, Conclusions, and Recommendations	PFOS and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. Based on the following lines of evidence, no further investigation is recommended at this time for Former Building 99: • No PFAS were identified in the HHRS as COPCs for soil. • No PFAS were identified in the HHRS as COPCs for groundwater. Although two of the monitoring well locations were moved from proposed locations and one shallow subsurface soil samples was not collected, samples were collected from locations downgradient of and adjacent to the former building footprint where the release would have occurred and where PFAS are likely to be detected if present. Therefore, the data collected are sufficient to determine that PFAS are not present at concentrations that indicate potential unacceptable human health risk at Former Building 99.						

4.5 Building 503

Table 4-5. Building 503 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Building 503 located in the western portion of BNC within the NBK Bremerton facility (Figure 4-3). The building is bordered by an unpaved grass-covered area, parking lot, and Building C-002 (fire department storage building) to the north, Chapel Way to the west, Decatur and Farragut Avenue to the south, and Building 506 to the east (Figure 4-3). A small unpaved landscaped area is located at the southwest corner of the building (Figure 4-3).
Building 503 was constructed in 1942 and has served as the sole fire station for the NBK Bremerton portion of BNC since construction (Navy, 2018b; NEESA, 1983). Building 503 was constructed with the fire truck ramp on the southern portion of the building facing Farragut Avenue (Figure 4-3). After AFFF usage during emergency responses, fire hoses were flushed to remove any residual AFFF within the lines. This practice often occurred on the truck ramp outside Building 503 (or at the emergency response location) (CH2M, 2020). During a July 2022 site walk, a large mobile fire training apparatus was parked in the parking lot behind Building 503 (Figure 4-3). Approximately 100 gallons of AFFF concentrate was stored in 5-gallon containers at Building 503 in 1983 (NEESA, 1983). Transfer and refilling of AFFF from storage containers to the tanks on the fire trucks commonly resulted in minor spills and splashing of AFFF on the fire truck ramps or within the fire truck bays (CH2M, 2020).
The PA identified Building 503 as a potential PFAS release area and recommended investigation as part of an SI based on the known storage and transfer of AFFF and historical accounts of potential AFFF releases.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations near and in the assumed downgradient direction (southeast) from Building 503 (Figure 4-23).
• Two surface soil samples were collected from unpaved areas located adjacent to Building 503 and suspected release areas (Figure 4-23).
• Shallow subsurface soil samples were collected from each new monitoring well locations from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="5">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B503-MW01</td><td colspan="2">BR-B503-MW02</td><td colspan="2">BR-B503-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">11-31</td><td colspan="2">15-25</td><td colspan="2">20-30</td></tr>
<tr><td rowspan="2">Surface Soil Samples</td><td>Station ID</td><td colspan="3">BR-B503-SS01</td><td colspan="3">BR-B503-SS02</td></tr>
<tr><td>Sample Depth (feet bgs)</td><td colspan="3">0-1</td><td colspan="3">0-1</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B503-MW01</td><td colspan="2">BR-B503-MW02</td><td colspan="2">BR-B503-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>10-11</td><td>2-3</td><td>12-13</td><td>2-3</td><td>19-20</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at Building 503 included fill material and discontinuous units of silty sand interbedded with silty sand with gravel and well-graded sand. Saturated soil was observed at approximately 10 to 18 feet bgs. Water-bearing units vary from well-graded sand with gravel to sandy silt. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Building 503 is present in an unconfined aquifer comprised of sand and sandy silt. Depth to groundwater was between approximately 14 and 18 feet bgs while Drydock 6 was empty and approximately 8 and 9 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (all drydocks empty) and November 28, 2022, (Drydock 6 flooded) suggest the influence of Drydock 6 on groundwater flow direction is minimal. Groundwater flow in the vicinity of Building 503 is to the southeast (Figures 4-13a and 4-13b).</td></tr>
</table>

Table 4-5. Building 503 Conceptual Site Model

	Analyte	SS (Table 4-24)			SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/2	0/2	ND	0/6	0/6	ND	3/3	0/3	4.5 J
	PFOA	1/2	0/2	0.38 J	1/6	0/6	0.422 J	3/3	3/3	208
	PFOS	2/2	0/2	12.8	4/6	0/6	4.08	3/3	3/3	29.6
	PFNA	1/2	0/2	0.162 J	0/6	0/6	ND	2/3	0/3	1.53 J
	PFHxS	1/2	0/2	0.392 J	3/6	0/6	0.355 J	3/3	0/3	31.8
	HFPO-DA	0/2	0/2	ND	0/6	0/6	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for surface soil or subsurface soil at Building 503. PFOA and PFOS were identified as COPCs at Building 503 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.									
Results Summary, Conclusions, and Recommendations	PFOA, PFOS, PFNA, and PFHxS were detected in surface and subsurface soil samples at concentrations below the SLs. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA and PFOS in groundwater at concentrations above the SLs at locations adjacent to and downgradient of Building 503 indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 503. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Building 503 to the Former Building 513 Parking Lot, Former Building 432, Building 494, Former DRMO Drum Storage Area, and Lift Station 1, a combined RI is recommended for these six release areas.									

4.6 Building 494

Table 4-6. Building 494 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Building 494 is located in the western portion of BNC within the NBK Bremerton facility (Figure 4-3). The building is bordered by railroad tracks and Farragut Avenue to the north, Z Street and Former Building 432 to the west, open-air storage areas and parking lots to the south, and an open-air storage area to the east (Figure 4-3).
Building 494 was constructed in the 1940s and historically has been used as a hazardous waste storage facility (NEESA, 1983). Like Former Building 426, Building 494 was operated by the Navy Supply Center while operational (NEESA, 1983). It is currently listed as a general warehouse and miscellaneous storage area. Hazardous materials were stored in Building 494 and in an outdoor storage area to the east (NEESA, 1983). A wide range of hazardous material classifications were stored at Building 494 and the outdoor drum storage area included materials used in metal plating and Teflon-coating operations (NEESA, 1983) and potentially containing PFAS.
The PA identified Building 494 as a potential PFAS release area and recommended investigation as part of an SI based on the potential storage of PFAS-containing materials and historical accounts of poor waste practices (handling, disposal, storage).</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations within and in the assumed downgradient direction (east-southeast) from Building 494 (Figure 4-23).
• Shallow subsurface soil samples were collected from two new monitoring well locations 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B494-MW01</td><td colspan="2">BR-B494-MW02</td><td colspan="2">BR-B494-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">15-25</td><td colspan="2">17-27</td><td colspan="2">16-26</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B494-MW01</td><td colspan="2">BR-B494-MW02</td><td colspan="2">BR-B494-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>14-15</td><td>2-3</td><td>16-17</td><td>14-15</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during the drilling at Building 494 included fill material that consisted of silty sand. Saturated soil was observed at approximately 16 to 17 feet bgs. Water-bearing units consisted of silty sand and silty sand with gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Building 494 is present in an unconfined aquifer comprised of lithologies ranging from silty sand to well-graded sand with gravel. Depth to groundwater was between approximately 17 and 18 feet bgs during drilling while Drydock 6 was empty and approximately 8 and 9 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 flooded) suggest there is influence of Drydock 6 on groundwater flow direction. Groundwater flow in the vicinity of Building 494 is to the south when Drydock 6 is flooded and to the southeast when Drydock 6 is empty (Figures 4-13a and 4-13b).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>3/3</td><td>3.31 J</td></tr>
<tr><td>PFOA</td><td>1/5</td><td>0/5</td><td>0.251 J</td><td>3/3</td><td>3/3</td><td>41.7</td></tr>
<tr><td>PFOS</td><td>4/5</td><td>0/5</td><td>1.45</td><td>3/3</td><td>3/3</td><td>471</td></tr>
<tr><td>PFNA</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>0/3</td><td>3.1 J</td></tr>
<tr><td>PFHxS</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>1/3</td><td>124</td></tr>
<tr><td>HFPO-DA</td><td>0/5</td><td>0/5</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
</table>

Table 4-6. Building 494 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 494. PFOA and PFOS were identified as COPCs at Building 494 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.
Results Summary, Conclusions, and Recommendations	PFOA and PFOS were detected in subsurface soil samples at concentrations below the SLs. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to and downgradient of Building 494 indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 494. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Building 494 to the Former Building 513 Parking Lot, Former Building 432, Building 503, Former DRMO Drum Storage Area, and Lift Station 1, a combined RI is recommended for these six release areas.

4.7 Former Building 432

Table 4-7. Former Building 432 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Former Building 432 was located in the western portion of BNC within the NBK Bremerton facility (Figure 4-3). The area where Former Building 432 was located is currently a Wendy’s Restaurant and associated parking lot (Figure 4-3). Railroad tracks and Farragut Avenue are located to the north, Z Street and Building 494 to the east, and South Avenue to the south (Figure 4-3).
Former Building 432 served as a fire department storage area until it was demolished in 1997 (NEESA, 1983). Approximately 300 to 400 gallons of AFFF were stored at Former Building 432 (NEESA, 1983). Given the large volume of AFFF reportedly stored at Former Building 432, it is possible that transfer of AFFF, and potentially spills, occurred within or outside of the building along the loading dock on the western side of the building. It is not known where the equipment and AFFF that was stored in Former Building 432 was moved.
The PA identified Former Building 432 as a potential PFAS release area and recommended investigation as part of an SI based on the reported storage of large volumes of AFFF and historical accounts of poor waste practices (handling, disposal, storage).</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations within and in the assumed downgradient direction (east-southeast) from Former Building 432 (Figure 4-24).
• Shallow subsurface soil samples were collected from two new monitoring well locations near Former Building 432 from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B432-MW01</td><td colspan="2">BR-B432-MW02</td><td colspan="2">BR-B432-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">7-17</td><td colspan="2">17-27</td><td colspan="2">16-26</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B432-MW01</td><td colspan="2">BR-B432-MW02</td><td colspan="2">BR-B432-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>4-5</td><td>12-13</td><td>2-3</td><td>14-15</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at Former Building 432 included fill material that consisted of silty sand interbedded with discontinuous silty sand with gravel units. In the western soil boring, BR-B432-MW01, a fat clay unit was observed at approximately 11.5 feet bgs, the unit was not observed in the two soil borings to the east. Saturated soil was observed at approximately 10 to 15 feet bgs. Water-bearing units consist of silty sand and well-graded sand with gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Former Building 432 is present in an unconfined aquifer comprised of silty sand with gravel. Depth to groundwater was between approximately 12 and 16 feet bgs while Drydock 6 was empty and approximately 9 and 11 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Former Building 432 is minimal. Groundwater flow in the vicinity of Former Building 432 is to the south-southeast (Figures 4-13a and 4-13b).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/5</td><td>0/5</td><td>ND</td><td>2/3</td><td>0/3</td><td>16.8</td></tr>
<tr><td>PFOA</td><td>1/5</td><td>0/5</td><td>0.447 J</td><td>3/3</td><td>3/3</td><td>603</td></tr>
<tr><td>PFOS</td><td>3/5</td><td>1/5</td><td>14.2</td><td>3/3</td><td>3/3</td><td>2,040</td></tr>
<tr><td>PFNA</td><td>0/5</td><td>0/5</td><td>ND</td><td>2/3</td><td>1/3</td><td>17.9</td></tr>
<tr><td>PFHxS</td><td>2/5</td><td>0/5</td><td>3.43</td><td>3/3</td><td>1/3</td><td>448</td></tr>
<tr><td>HFPO-DA</td><td>0/5</td><td>0/5</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
</table>

Table 4-7. Former Building 432 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Former Building 432. PFOA and PFOS were identified as COPCs at Former Building 432 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.
Results Summary, Conclusions, and Recommendations	PFOA and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFOS was detected in a subsurface soil sample at a concentration above the SL. PFBS was detected in groundwater samples at concentrations below the SL. PFOA, PFOS, PFNA, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOS in soil at a concentration above the SL and PFOA, PFOS, PFNA, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to (BR-B432-MW01 and BR-B432-MW02) and downgradient of Former Building 432 (BR-B432-MW03) indicates that a release of PFAS-containing substance(s) likely occurred at or near Former Building 432. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Former Building 432 to the Former Building 513 Parking Lot, Building 494, Building 503, Former DRMO Drum Storage Area, and Lift Station 1, a combined RI is recommended for these six release areas.

4.8 Farragut Ave/Barclay Road Car Crashes

Table 4-8. Farragut Ave/Barclay Road Car Crashes Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">The Farragut Ave/Barclay Road Car Crashes were located in the southwestern portion of BNC within the NBK Bremerton facility (Figure 4-3). The car crashes occurred at the intersection of Farragut Avenue and Barclay Road located northwest of Building 494 (Figure 4-3).
Navy Region Northwest Fire Department personnel recalled two car crashes at the intersection of Farragut Avenue and Barclay Road that resulted in car fires (CH2M, 2020). On both occasions, AFFF was applied to extinguish the flames (CH2M, 2020). The dates that the crashes occurred and volume of AFFF applied could not be verified; however, based on the tenure of the fire department personnel, the dates of the crashes occurred after 1987. Stormwater drains near the Farragut Ave/Barclay Road Car Crashes are discharged to Sinclair Inlet at stormwater outfall 15. The outfall 15 drainage basin covers a large area in the northwest portion of BNC which includes Building 434, Building 503, Building 494, and Former Building 432.
The PA identified the Farragut Ave/Barclay Rd Car Crashes as a confirmed PFAS release area and recommended investigation as part of an SI based on historical accounts detailing the use and release of AFFF.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed within and in the assumed downgradient direction (southeast) from Farragut Ave/Barclay Rd Car Crashes (Figure 4-24).
• Shallow subsurface soil samples were collected from two new monitoring well locations from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring wells within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-FBCC-MW01</td><td colspan="2">BR-FBCC-MW02</td><td colspan="2">BR-FBCC-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">7-27</td><td colspan="2">10-20</td><td colspan="2">10-20</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-FBCC-MW01</td><td colspan="2">BR-FBCC-MW02</td><td colspan="2">BR-FBCC-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>6-7</td><td>2-3</td><td>11-12</td><td>8-9</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at the Farragut Ave/Barclay Rd Car Crashes included fill material and discontinuous units consisting of poorly graded sands to the west and silty sands to the east. Saturated soil was observed at approximately 6 to 10 feet bgs. Water-bearing units consist of a range of lithologies from silty gravel with sand to poorly graded sand. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at the Farragut Ave/Barclay Rd Car Crashes is present in an unconfined aquifer comprised of silty gravel with sand to poorly graded sand. Depth to groundwater was between approximately 10 and 12 feet bgs while Drydock 6 was empty and approximately 6 and 8 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (at BR-FBCC-MW02 and BR-FBCC-MW03; Drydock 6 empty) and November 28, 2022, (at all three sample stations; Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Farragut Ave/Barclay Rd Car Crashes is minimal. Groundwater flow in the vicinity of Farragut Ave/Barclay Rd Car Crashes is to the southeast (Figures 4-13a and 4-13b).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>0/3</td><td>7.31</td></tr>
<tr><td>PFOA</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>3/3</td><td>29.6</td></tr>
<tr><td>PFOS</td><td>1/5</td><td>0/5</td><td>0.23 J</td><td>3/3</td><td>2/3</td><td>30.3</td></tr>
<tr><td>PFNA</td><td>0/5</td><td>0/5</td><td>ND</td><td>1/3</td><td>0/3</td><td>1.71 J</td></tr>
<tr><td>PFHxS</td><td>0/5</td><td>0/5</td><td>ND</td><td>3/3</td><td>0/3</td><td>10.6</td></tr>
<tr><td>HFPO-DA</td><td>0/5</td><td>0/5</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
</table>

Table 4-8. Farragut Ave/Barclay Road Car Crashes Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil or groundwater at the Farragut Ave/Barclay St Car Crashes.
Results Summary, Conclusions, and Recommendations	PFOS was detected in a subsurface soil sample at a concentration below the SL. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. Based on the following lines of evidence, no further investigation is recommended at this time for the Farragut Ave/Barclay St Car Crashes: • No PFAS were identified in the HHRS as COPCs for soil. • No PFAS were identified in the HHRS as COPCs for groundwater. Although two of the monitoring well locations were moved from proposed locations, samples were collected from locations downgradient of and adjacent to the intersection where the release would have occurred and where PFAS are likely to be detected if present. Therefore, the data collected are sufficient to determine that PFAS are not present at concentrations that indicate potential unacceptable human health risk at the Farragut Ave/Barclay St Car Crashes.

4.9 Building 434

Table 4-9. Building 434 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Building 434 is located in the northwestern portion of BNC within the NBK Bremerton facility (Figure 4-4). Building 434 is bordered by Cole Avenue to the north, Sampson Avenue to the south, Building 502 to the west, and Chapel Way and a parking lot to the east (Figure 4-4). Building 434 was constructed in 1936 (Navy, 2018c). The northern portion of the building was temporarily used for fire department storage, although the duration of time it was used by the fire department is unknown (CH2M, 2020). The southern section of the building is the Sam Adams Bar and Grill (Figure 4-4).
The August 2018 Navy Region Northwest Quarterly Foam Inventory Log detailed twenty-five 5-gallon pails of high expansion foam and one 55-gallon drum of 3% AFFF stored in Building 434 (Navy, 2018d). After the demolition of the Former Building 432 in 1997, contents, including large volumes of AFFF, may have been transferred and stored at Building 434 (Navy, 2018d).
The PA identified Building 434 as a potential PFAS release area and recommended investigation as part of an SI based on the reported storage of AFFF, uncertainty about past operations, and historical accounts of poor waste practices (handling, disposal, storage).</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations adjacent to and in the assumed downgradient direction (south-southeast) of Building 434 (Figure 4-25).
• One surface soil sample was collected from an unpaved area located northwest of Building 434 (Figure 4-25).
• Shallow subsurface soil samples were collected from each new monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each new monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="6">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B434-MW01</td><td colspan="2">BR-B434-MW02</td><td colspan="2">BR-B434-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">10-20</td><td colspan="2">27-37</td><td colspan="2">28.5-38.5</td></tr>
<tr><td rowspan="2">Surface Soil Samples</td><td>Station ID</td><td colspan="6">BR-B434-SS01</td></tr>
<tr><td>Sample Depth (feet bgs)</td><td colspan="6">0-1</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B434-MW01</td><td colspan="2">BR-B434-MW02</td><td colspan="2">BR-B434-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>10-11</td><td>2-3</td><td>27-27.5</td><td>2-3</td><td>26.5-27</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at Building 434 included fill material and discontinuous units of silty sand, poorly graded sand, and gravel. Saturated soil was observed at approximately 11 to 33 feet bgs. At approximately 30 feet, lithology transitions to courser material. Water-bearing units consist of a range of lithologies from sandy silts to well-graded gravels. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Building 434 is present in an unconfined aquifer comprised of silt, sand, and gravel. Depth to groundwater is between approximately 12 and 27 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, suggest groundwater flow in the vicinity of Building 434 is to the south (Figure 4-15).</td></tr>
</table>

Table 4-9. Building 434 Conceptual Site Model

	Analyte	SS (Table 4-24)			SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/1	0/1	ND	0/6	0/6	ND	3/3	0/3	99.1
	PFOA	1/1	0/1	0.357 J	3/6	0/6	16.1	3/3	3/3	423
	PFOS	1/1	0/1	0.453 J	3/6	0/6	2.98	2/3	1/3	7.56 J
	PFNA	0/1	0/1	ND	0/6	0/6	ND	1/3	0/3	1.06 J
	PFHxS	0/1	0/1	ND	2/6	0/6	3.57	3/3	1/3	89.3
	HFPO-DA	0/1	0/1	ND	0/6	0/6	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for surface soil or subsurface soil at Building 434. PFOA was identified as a COPC at Building 434 in groundwater and may result in potential unacceptable human health risk associated with PFOA.									
Results Summary, Conclusions, and Recommendations	PFOA, PFOS, and PFHxS were detected in surface or subsurface soil samples at concentrations below the SLs. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to (BR-B434-MW01 and BR-B434-MW02) and downgradient of Building 434 (BR-B434-MW03) indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 434. PFOA was identified as a preliminary COPC in groundwater. Based on these findings, an RI is recommended for Building 434.									

4.10 Auto/Hobby Shop Fire

Table 4-10. Auto/Hobby Shop Fire Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">The Auto/Hobby Shop (Former Building 437) was located in the northwest portion of BNC within the NBK Bremerton facility (Figure 4-4). The Auto/Hobby Shop was located directly to the north of the area where Ambler Avenue and Gatewood Drive nearly intersect (Figure 4-4). The area is now a small parking lot bordered by another parking lot to the north, and Ambler and Gatewood Roads to the west, south and east (Figure 4-4).
Navy Region Northwest Fire Department personnel recalled a car fire at the old automobile hobby shop that required AFFF to be extinguished. The fire reportedly started while electrical work was being conducted on one of the cars (CH2M, 2020). The fire occurred sometime between 1998 and 1999 (CH2M, 2020). It is not known whether the building was equipped with a sump or some other type of secondary containment system. Stormwater drains near the Auto/Hobby Shop Fire are discharged to Sinclair Inlet at stormwater outfall 15. The outfall 15 drainage basin covers a large area in the northwest portion of BNC which includes Building 434, Building 503, Building 494, and Former Building 432.
The PA identified the Auto/Hobby Shop Fire as a confirmed PFAS release area and recommended investigation as part of an SI based on historical accounts detailing the use and release of AFFF.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations within and in the assumed downgradient direction (south) of the Auto/Hobby Shop Fire (Figure 4-26).
• Two surface soil sample were collected from unpaved areas located south and southwest of the Auto/Hobby Shop Fire (Figure 4-26).
• Shallow subsurface soil samples were collected from each new monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each new monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring.</td></tr>
<tr><td rowspan="6">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-AHSF-MW01R</td><td colspan="2">BR-AHSF-MW02</td><td colspan="2">BR-AHSF-MW01R</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">111-121</td><td colspan="2">105.5-115.5</td><td colspan="2">106-116</td></tr>
<tr><td rowspan="2">Surface Soil Samples</td><td>Station ID</td><td colspan="3">BR-AHSF-SS01</td><td colspan="3">BR-AHSF-SS02</td></tr>
<tr><td>Sample Depth (feet bgs)</td><td colspan="3">0-1</td><td colspan="3">0-1</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-AHSF-MW01R</td><td colspan="2">BR-AHSF-MW02</td><td colspan="2">BR-AHSF-MW01R</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>102-103</td><td>2-3</td><td>104-105</td><td>2-3</td><td>106-107</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at the Auto/Hobby Shop Fire consisted of discontinuous units of interbedded silt and sand to the west with courser material, sands and gravels, to the east. Saturated soil was observed at approximately 103 to 107 feet bgs. Water-bearing units consist of a range of lithologies from poorly graded sands with silt to well-graded gravel with clay and sand. Drilling at BR-AHSF-MW02 was performed while Drydock 6 was empty, drilling at BR-AHSF-MW01R and BR-AHSF-MW03R was performed while Drydock 6 was full. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at the Auto/Hobby Shop Fire is present in an unconfined aquifer comprised of poorly graded sand with silt and well-graded gravel with clay and sand. Depth to groundwater is between approximately 107 and 113 feet bgs. Synoptic groundwater level measurements collected on February 27, 2023, suggest groundwater flow in the vicinity of the Auto/Hobby Shop Fire is to the south (Figure 4-15).</td></tr>
</table>

Table 4-10. Auto/Hobby Shop Fire Conceptual Site Model

	Analyte	SS (Table 4-24)			SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/2	0/2	ND	0/6	0/6	ND	2/3	0/3	3.99 J
	PFOA	0/2	0/2	ND	0/6	0/6	ND	2/3	2/3	14.3
	PFOS	2/2	0/2	0.437 J	2/6	0/6	0.4 J	2/3	1/3	9.52
	PFNA	0/2	0/2	ND	0/6	0/6	ND	0/3	0/3	ND
	PFHxS	0/2	0/2	ND	0/6	0/6	ND	3/3	0/3	23.2
	HFPO-DA	0/2	0/2	ND	0/6	0/6	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for surface soil, subsurface soil, or groundwater at the Auto/Hobby Shop Fire.									
Results Summary, Conclusions, and Recommendations	PFOS was detected in surface and subsurface soil samples at concentrations below the SL. PFBS and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. Based on the following lines of evidence, no further investigation is recommended at this time for the Auto/Hobby Shop Fire: • No PFAS were identified in the HHRS as COPCs for soil. • No PFAS were identified in the HHRS as COPCs for groundwater. Although two of the monitoring well locations were moved from proposed locations, samples were collected from locations downgradient of and adjacent to the former building footprint where the release would have occurred and where PFAS are likely to be detected if present. Therefore, the data collected are sufficient to determine that PFAS are not present at concentrations that indicate potential unacceptable human health risk at the Auto/Hobby Shop Fire.									

4.11 2017 USS Stennis AFFF Release

Table 4-11. 2017 USS Stennis AFFF Release Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">In June 2017, an AFFF release occurred on the USS Stennis while it was moored on the west side of Pier B (Figure 4-5). Pier B is located in the southern portion of BNC within the PSNS and IMF facility; however, the area the USS Stennis was docked is located in the NBK Bremerton facility (Figure 4-5).
The spill occurred within a hangar bay on the deck of the aircraft carrier, although the cause of the spill is not known. Approximately 50 gallons of AFFF were released and approximately 5 gallons of AFFF flowed directly into Sinclair Inlet and quickly dissipated (CH2M, 2020). Approximately 1 gallon of AFFF was captured in the ship’s sanitary sewer system. The remaining AFFF and water was containerized in drums and transported to an approved disposal facility (CH2M, 2020). The AFFF within the sanitary sewer system was discharged, along with defoamer, to the City of Bremerton’s sanitary sewer system at Lift Station 1 (Figure 4-5) (CH2M, 2020).
The PA identified the 2017 USS Stennis AFFF Release as a confirmed PFAS release area and recommended investigation as part of the SI due to the confirmed release of AFFF to surface water.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Sediment samples were collected from three locations from 0 to 4 inches and 4 to 24 inches bss (Figure 4-27). At the time of sampling, an aircraft carrier was moored along the west side of Pier B. As a result, sampling locations were selected as close to the release area as allowed. The initial release was from an aircraft carrier to Sinclair Inlet so it is anticipated that the presence of an aircraft carrier moored at Pier B at the time of sampling would mimic site conditions at the time of release.
• Surface water samples were collected from three locations and were collected from 2 feet below the water surface (Figure 4-27).</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Sediment Samples</td><td>Station ID</td><td colspan="2">BR-17AS-SD01</td><td colspan="2">BR-17AS-SD02</td><td colspan="2">BR-17AS-SD03</td></tr>
<tr><td>Sample Depths (in bss)</td><td>0-4</td><td>4-24</td><td>0-4</td><td>4-24</td><td>0-4</td><td>4-24</td></tr>
<tr><td rowspan="2">Surface water Samples</td><td>Station ID</td><td colspan="2">BR-17AS-SW01</td><td colspan="2">BR-17AS-SW02</td><td colspan="2">BR-17AS-SW03</td></tr>
<tr><td>Sample Depths (feet below water surface)</td><td colspan="2">2</td><td colspan="2">2</td><td colspan="2">2</td></tr>
<tr><td>Lithology</td><td colspan="8">Based on observations from sediment samples, the subsurface lithology at the 2017 USS Stennis AFFF Release consists of predominantly silts and silty sands. Sediment descriptions are within the field notes provided in Appendix B.</td></tr>
<tr><td>Surface Water</td><td colspan="8">Surface water was observed as clear, green, and free of foam at the time of sampling. Sinclair Inlet is the only surface water body associated with BNC. It is a shallow embayment lined with tidelands and marshes. Precipitation collected by the stormwater infrastructure at BNC is directed through several OWSs and discharged to Sinclair Inlet through a series of outfalls located in between the various piers and drydocks.</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SD (Table 4-26)</td><td colspan="3">SW (Table 4-27)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
<tr><td>PFOA</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
<tr><td>PFOS</td><td>3/6</td><td>0/6</td><td>1.85 J</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
<tr><td>PFNA</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
<tr><td>PFHxS</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
<tr><td>HFPO-DA</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
</table>

Table 4-11. 2017 USS Stennis AFFF Release Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for sediment or groundwater at the 2017 USS Stennis AFFF Release.
Results Summary, Conclusions, and Recommendations	PFOS was detected in sediment samples at concentrations below the SL. No PFAS were detected in surface water samples. Based on the following lines of evidence, no further investigation is recommended at this time for the 2017 USS Stennis AFFF Release: • No PFAS were detected in surface water. • No PFAS were identified in the HHRS as COPCs for sediment Although two of the surface water and sediment sampling locations were moved from proposed locations, samples were collected from locations adjacent to where the 2017 USS Stennis AFFF Release would have occurred and where PFAS are likely to be detected if present. The recommendation of no further investigation at this time for the 2017 USS Stennis Release does not preclude sampling of sediment and surface water in this area as part of downgradient PFAS sampling conducted for alternate RIs at BNC.

4.12 2018 AFFF Spill

Table 4-12. 2018 AFFF Spill Conceptual Site Model

Description and Potential for PFAS Release	The 2018 AFFF Spill occurred in the eastern portion of BNC within the PSNS and IMF facility (**Figure 4-6**). The spill location was approximately midway between K Street and Dry Dock No. 2 along the eastern side of Building 431 (**Figure 4-6**). The spill reportedly occurred in January of 2018 when a 55-gallon drum developed a hole during transport to a Navy vessel moored on Pier 4. Reportedly, approximately 2 pints of AFFF were spilled along the east side of Building 431, the Machine Shop (**Figure 4-6**). Absorbents were reportedly placed around the storm drains while the spill was cleaned up (CH2M, 2020). The disposal location of materials used to clean up the spill and remaining AFFF within the 55-gallon drum is unknown. Stormwater drains along the east side of Building 431 are discharged to Sinclair Inlet at stormwater outfalls 106 and 107. The PA identified the 2018 AFFF Spill as a confirmed PFAS release area and recommended investigation as part of an SI based on known release of AFFF.						
SI Approach	• One new monitoring well was installed near the location of the 2018 AFFF Spill (**Figure 4-28**). • One shallow subsurface soil sample was collected from the new monitoring well location from 2 to 3 feet bgs. One subsurface soil sample was collected from the newly installed monitoring well location within the capillary fringe. • One groundwater sample was collected from the newly installed monitoring well.						
Sample Stations	**Monitoring Well**	**Well ID**	BR-18AS-MW01				
		Screen Interval	26-46				
	Subsurface Soil Samples	**Station ID**	BR-18AS-MW01				
		Sample Depths	2-3	32-33			
Lithology	Subsurface lithology observed during drilling at 2018 AFFF Spill included fill material and what appeared to be engineered stabilizing material at approximately 4-8 feet bgs. Below the engineered material, lithology consisted of approximately 50 feet of poorly graded sand with interbedded units of gravel. Saturated soil was observed at approximately at 34 feet bgs. Water-bearing units consist of poorly graded sand and poorly grade sand with gravel. Drilling was performed while Drydocks 2 and 4 were empty. Soil boring logs are provided in **Appendix B**.						
Groundwater	Groundwater at the 2018 AFFF Spill is present in an unconfined aquifer comprised of poorly graded sand and poorly grade sand with gravel. Depth to groundwater is 33 feet bgs. Synoptic groundwater level measurements were collected on November 28, 2022. Groundwater flow in the vicinity of the 2018 AFFF Spill is to the west toward Drydock 4 (**Figures 4-14**).						
PFAS Results Compared to SLs	**Analyte**	**SB (Table 4-24)**			**GW (Table 4-25)**		
		Frequency of Detection	**Frequency of Exceedance**	**Max Conc. (µg/kg)**	**Frequency of Detection**	**Frequency of Exceedance**	**Max Conc. (ng/L)**
	PFBS	0/2	0/2	ND	1/1	0/1	5.04 J
	PFOA	0/2	0/2	ND	1/1	1/1	6.93
	PFOS	½	0/2	0.635 J	1/1	1/1	30.7
	PFNA	0/2	0/2	ND	0/1	0/1	ND
	PFHxS	0/2	0/2	ND	1/1	0/1	2.64 J
	HFPO-DA	0/2	0/2	ND	0/1	0/1	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil or groundwater at the 2018 AFFF Spill.						

Table 4-12. 2018 AFFF Spill Conceptual Site Model

Results Summary, Conclusions, and Recommendations	PFOS was detected in a subsurface soil sample at a concentration below the SL. PFBS and PFHxS were detected in the groundwater sample at concentrations below the SL. PFOA and PFOS were detected in the groundwater sample at concentrations above the SL. Based on the following lines of evidence, no further investigation is recommended at this time for the 2018 AFFF Spill: • No PFAS were identified in the HHRS as COPCs for soil. • No PFAS were identified in the HHRS as COPCs for groundwater. Migration of groundwater at the 2018 AFFF Spill is strongly influenced by Drydock 4. The recommendation of no further investigation at this time for the 2018 AFFF Spill does not preclude sampling of groundwater or soil in this area to determine the extent of the Drydock 4 drainage system as part of the combined RI for Building 435 and Former Building 871.

4.13 Building 457

Table 4-13. Building 457 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Building 457 serves as a paint and rigger shop and is located in the eastern portion of BNC within the PSNS and IMF facility (Figure 4-6). Building 457 is bordered by Building 1106 to the north, Farragut Avenue to the northwest, Drydock 5 to the southwest, and N Street and Drydock 4 to the east (Figure 4-6).
Building 457 was constructed in 1940 and has been used for a variety of industrial operations, including Teflon-coating, industrial scale paint application, and sandblasting. Teflon handling operations, including coating and removal, were temporarily performed in Building 457 around 1993 (CH2M, 2020). Wastes generated at Building 457 and Building 873 are accumulated in drums, stored at Building 944 (Figure 4-6), and shipped to an approved off-Base disposal facility (CH2M, 2020).
The PA identified building 457 as a potential PFAS release area and recommended investigation as part of an SI based on historical storage and usage of PFAS-containing materials.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed adjacent to and in the assumed downgradient directions (west in the west portion of the site and east in the east portion of the site, assumed groundwater divide running north-south through the site) from Building 457. (Figure 4-29).
• Shallow subsurface soil samples were collected from each newly installed monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B457-MW01</td><td colspan="2">BR-B457-MW02</td><td colspan="2">BR-B457-MW03</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">42-62</td><td colspan="2">35-55</td><td colspan="2">39-59</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B457-MW01</td><td colspan="2">BR-B457-MW02</td><td colspan="2">BR-B457-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>49-50</td><td>2-3</td><td>39-40</td><td>2-3</td><td>45-46</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at Building 457 consisted of fill material and generally discontinuous units consisting of silty sand and gravel. Saturated soil was observed at approximately 40 to 50 feet bgs. Water-bearing units consist of a range of lithologies from silty sand with gravel to well-graded gravel with silt and sand. Drilling was performed while drydocks 4 and 5 were empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Building 457 is present in an unconfined aquifer comprised of silty sand with gravel to well-graded gravel with silt and sand. Depth to groundwater is between approximately 37 and 48 feet bgs. Synoptic groundwater level measurements collected on September 23 and November 28, 2022, suggest a groundwater divide running north-south through the site. Groundwater in the western portion of the site flows to the west toward Drydock 5, groundwater in the eastern portion flows to the east toward Drydock 4 (Figure 4-16).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/6</td><td>0/6</td><td>ND</td><td>3/3</td><td>0/3</td><td>11</td></tr>
<tr><td>PFOA</td><td>0/6</td><td>0/6</td><td>ND</td><td>3/3</td><td>2/3</td><td>14.5</td></tr>
<tr><td>PFOS</td><td>4/6</td><td>0/6</td><td>1.97</td><td>3/3</td><td>3/3</td><td>103</td></tr>
<tr><td>PFNA</td><td>0/6</td><td>0/6</td><td>ND</td><td>3/3</td><td>0/3</td><td>3.06 J</td></tr>
<tr><td>PFHxS</td><td>1/6</td><td>0/6</td><td>0.297 J</td><td>3/3</td><td>0/3</td><td>33.1</td></tr>
<tr><td>HFPO-DA</td><td>0/6</td><td>0/6</td><td>ND</td><td>0/3</td><td>0/3</td><td>ND</td></tr>
</table>

Table 4-13. Building 457 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 457. PFOA and PFOS were identified as COPCs at Building 457 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.
Results Summary, Conclusions, and Recommendations	PFOS and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA and PFOS in groundwater at concentrations above the SLs at locations adjacent to Building 457 (BR-B457-MW01, BR-B457-MW02, and BR-B457-MW03) indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 457. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings, an RI is recommended for Building 457.

4.14 USS Missouri Parking Lot (OU A/Zone 2)

Table 4-14. USS Missouri Parking Lot Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">The USS Missouri Parking Lot (OU A/Zone 2) is located in the southwestern portion of BNC (Figure 4-7). The parking lot is bordered by Navy-owned railroad and the Upland Parking Lot (OU A/Zone 3) to the north and west, the Charleston Beach Parking Lot (OU A/Zone 1) to the southwest, Sinclair Inlet to the southeast, and the Vehicle Inspection Gate to the northeast (Figure 4-7).

The USS Missouri Parking Lot was formerly a helicopter pad and is now a parking lot for Navy and civilian personnel who work at BNC. The USS Missouri Parking Lot is made of fill that was placed between 1946 and the early 1970s (Navy, 1996). Fill consisted of dredge spoils from the construction of Drydock 6 and slag grit from sandblasting operations at BNC (Navy, 1996). Between 1963 and 1972, approximately 30,000 gallons of liquid industrial and municipal wastes, including plating operations where PFOS was used in mist suppressants and Teflon-coating waste potentially containing PFAS, were disposed of in unlined pits at the USS Missouri Parking Lot (NEESA, 1983). Refer to Section 2.1.2 for additional information on OU A.

The PA identified USS Missouri Parking Lot (OU A/Zone 2) as a potential PFAS release area and recommended investigation as part of an SI based on historical records detailing the disposal of large amounts of plating and Teflon-coating operations waste potentially containing PFAS.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Two new monitoring wells were installed in locations within the USS Missouri Parking Lot The assumed groundwater flow direction is to the southeast (Figure 4-30).
• Shallow subsurface soil samples were collected from the newly installed monitoring wells from 2 to 3 feet bgs. Subsurface soil samples were collected from the newly installed monitoring wells within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• Four groundwater samples were collected from existing monitoring wells within the USS Missouri Parking Lot.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td>BR-UMPL-MW01</td><td>BR-UMPL-MW02</td><td>MW203</td><td>MW204</td><td>MW206</td><td>MW241</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td>8-28</td><td>8-28</td><td>7-16.5</td><td>8-23</td><td>8-23</td><td>6-21</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="3">BR-UMPL-MW01</td><td colspan="3">BR-UMPL-MW02</td></tr>
<tr><td>Sample Depth (feet bgs)</td><td colspan="2">2-3</td><td colspan="2">9-10</td><td colspan="2">2-3</td><td>9-9.5</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at USS Missouri Parking Lot (OU A/Zone 2) consisted of fill material and discontinuous units consisting of predominantly sands and gravels. Saturated soil was observed at approximately 11 to 12.5 feet bgs. Water-bearing units range from sandy silt to well-graded sand with gravel. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at USS Missouri Parking Lot (OU A/Zone 2) is present in an unconfined aquifer comprised of sandy silt to well-graded sand with gravel. Depth to groundwater is between approximately 6 and 12 feet bgs. Synoptic groundwater level measurements collected on September 22 and November 29, 2022, suggest groundwater flow in the vicinity of USS Missouri Parking Lot (OU A/Zone 2) is to the southeast toward the Sinclair Inlet (Figures 4-17).</td></tr>
</table>

Table 4-14. USS Missouri Parking Lot Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	1/4	0/4	0.35 J	4/6	0/6	4.39 J
	PFOA	2/4	0/4	1.5	4/6	2/6	11.9
	PFOS	2/4	1/4	73.7	4/6	4/6	748
	PFNA	1/4	0/4	0.318 J	0/6	0/6	ND
	PFHxS	3/4	0/4	7.05 J	4/6	1/6	133
	HFPO-DA	0/4	0/4	ND	0/6	0/6	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at USS Missouri Parking Lot. PFOS was identified as a COPC at the USS Missouri Parking Lot in groundwater and may result in potential unacceptable human health risk associated with PFOS.						
Results Summary, Conclusions, and Recommendations	PFBS, PFOA, PFNA, and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFOS was detected in a subsurface soil sample at a concentration above the SL. PFBS was detected in groundwater samples at concentrations below the SL. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOS in soil at a concentration above the SL and PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations within the USS Missouri Parking Lot indicates that a release of PFAS-containing substance(s) likely occurred at or near the USS Missouri Parking Lot. PFOS was identified as a preliminary COPC in groundwater. Based on these findings, an RI is recommended for the USS Missouri Parking Lot. Sampling groundwater and/or soil in OU A Zones 1 and 3 may be warranted as part of the RI to determine the extent of PFAS for the USS Missouri Parking Lot.						

4.15 Mooring A and Drydock 5 Fill Area

Table 4-15. Mooring A and Drydock 5 Fill Area Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="6">The Mooring A and Drydock 5 Fill Area is located in the southern portion of BNC within the PSNS and IMF facility (Figure 4-8). The fill area is bordered by Wycoff Way to the north and west, Lift Station 3 to the west, and Sinclair Inlet to the south and east (Figure 4-8). The area currently serves as a metal recycling and storage area consisting of dumpsters, pallets, truck trailers, and other miscellaneous materials.

The Mooring A and Drydock 5 Fill Area was formed out of fill from the construction of Berthing Mooring A and Drydock 5 from 1960 to 1974 and is made of approximately 70,000 yards of fill (NEESA, 1983). The fill used in this area consisted of dredge spoils, construction debris, rubble, and spent abrasive grit (NEESA, 1983). It is unknown whether AFFF or PFAS- containing materials were used as fill.

The PA identified Mooring A and Drydock 5 Fill Area as a potential PFAS release area and recommended investigation as part of an SI based on historical records detailing the use of large amounts of construction debris, rubble, and other miscellaneous materials as fill during a period in which AFFF and PFAS-containing materials were in use at BNC.</td></tr>
<tr><td>SI Approach</td><td colspan="6">• Two new monitoring wells were installed in locations within the Mooring A and Drydock 5 Fill Area (Figure 4-31).
• Shallow subsurface soil samples were collected from each newly installed monitoring well locations from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well located within the Mooring A and Drydock 5 Fill Area.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-MAD5-MW01</td><td colspan="2">BR-MAD5-MW02</td><td>MW709</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">15-25</td><td colspan="2">12-22</td><td>8-28</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-MAD5-MW01</td><td colspan="2">BR-MAD5-MW02</td><td></td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>12-13</td><td>2-3</td><td>10-11</td><td></td></tr>
<tr><td>Lithology</td><td colspan="6">Subsurface lithology observed during drilling at Mooring A and Drydock 5 Fill Area consisted of fill material and discontinuous units of well-graded sand and silty sand. Saturated soil was observed at approximately 11 to 13 feet bgs. Water-bearing units range from silty sands with gravel to well-graded sands. Drilling was performed while drydocks 5 and 6 were empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="6">Groundwater at Mooring A and Drydock 5 Fill Area is present in an unconfined aquifer comprised of silty sand with gravel and well-graded sand. Depth to groundwater was between approximately 13 and 15 feet bgs while Drydock 6 was empty and approximately 9 and 11 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Mooring A and Drydock 5 Fill Area is significant. With Drydock 6 empty, groundwater flow in the vicinity of Mooring A and Drydock 5 Fill Area is to the north. With Drydock 6 full, there is a groundwater divide oriented southwest to northeast running through the site; groundwater flow to the northwest of the divide is to the northwest, groundwater flow to the southeast of the divide is to the southeast toward the Sinclair Inlet (Figures 4-18a and 4-18b).</td></tr>
</table>

Table 4-15. Mooring A and Drydock 5 Fill Area Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/4	0/4	ND	2/3	0/3	12
	PFOA	2/4	0/4	0.594 J	2/3	2/3	292
	PFOS	4/4	0/4	1.42	2/3	2/3	163
	PFNA	0/4	0/4	ND	0/3	0/3	ND
	PFHxS	1/4	0/4	0.173 J	2/3	1/3	55.8
	HFPO-DA	0/4	0/4	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Mooring A and Drydock 5 Fill Area. PFOA and PFOS were identified as COPCs at Mooring A and Drydock 5 Fill Area in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.						
Results Summary, Conclusions, and Recommendations	PFOA, PFOS, and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFBS was detected in groundwater samples at concentrations below the SL. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations within the Mooring A and Drydock 5 Fill Area indicates that a release of PFAS-containing substance(s) likely occurred at or near the Mooring A and Drydock 5 Fill Area. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of the Mooring A and Drydock 5 Fill Area to Lift Station 3, a combined RI is recommended for the Mooring A and Drydock 5 Fill Area and Lift Station 3.						

4.16 Lift Station 3

Table 4-16. Lift Station 3 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="5">Lift Station 3 is located in the central portion of BNC within the PSNS and IMF facility (Figure 4-10). Lift Station 3 is bordered by Building 368 to the north, Mooring A and Drydock 5 Fill Area to the east and Wycoff Way and Sinclair Inlet to the south (Figure 4-10).

Lift Station 3 is connected to the City of Bremerton’s sanitary sewer system. Sanitary waste from the Base is directed to lift stations located throughout BNC where it connects to the City of Bremerton’s sanitary sewer infrastructure and eventually is pumped to the City of Bremerton’s wastewater treatment plant (CH2M, 2020). According to the Pretreatment Program Manager, AFFF-contaminated bilge water is containerized and discharged to the City of Bremerton’s sanitary sewer system at Lift Station 1 and Lift Station 3 (Figure 4-10) (CH2M, 2020). During these discharge events, defoamer is applied to prevent foaming at the City of Bremerton wastewater treatment plant. In 2005, approximately 400 gallons of AFFF was accidentally discharged from an aircraft carrier within Drydock 6 (CH2M, 2020). Following the release, approximately 40,000 gallons of wastewater containing AFFF were collected in the oily water treatment system containment/settling tanks located on the west side of Drydock 6 (CH2M, 2020). The wastewater was the combination of AFFF and water used to flush and clean the drydocks after the event. The wastewater was treated with defoamer, run through the oily water treatment system, and discharged to the City of Bremerton’s sanitary sewer system at Lift Stations 1 and 3 (CH2M, 2020).

The PA identified Lift Station 3 as a potential PFAS release area and recommended investigation as part of an SI based on the reported transfer and discharge of bilge and wastewater containing AFFF and the potential for spills.</td></tr>
<tr><td>SI Approach</td><td colspan="5">• One new monitoring well was installed in a location near Lift Station (Figure 4-31).
• One shallow subsurface soil sample was collected from the newly installed monitoring well from 2 to 3 feet bgs. One subsurface soil sample was also collected from the newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from the newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well located near Lift Station 3 and one groundwater sample was collected from an existing monitoring well in the assumed downgradient direction to the southeast of Lift Station 3.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td>BR-LS3-MW01</td><td>MW412</td><td>MW713</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td>14-24</td><td>14.5-24</td><td>8-28</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="3">BR-LS3-MW01</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td colspan="2">2-3</td><td>13-14</td></tr>
<tr><td>Lithology</td><td colspan="5">Subsurface lithology observed during drilling at Building 435 included fill material and consisted of well-graded sand and gravel with clay and silt. Saturated soil was observed at approximately 14.5 feet bgs. The water-bearing unit consists of well-graded gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="5">Groundwater at Lift Station 3 is present in an unconfined aquifer comprised of well-graded gravel. Depth to groundwater was approximately 15 feet bgs while Drydock 6 was empty and between approximately 6 and 11 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Lift Station 3 is significant. With Drydock 6 empty, groundwater flow in the vicinity of Lift Station 3 is to the west-northwest. With Drydock 6 full, groundwater flow is to the north-northwest (Figures 4-18a and 4-18b).</td></tr>
</table>

Table 4-16. Lift Station 3 Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/2	0/2	ND	1/3	0/3	71.5
	PFOA	0/2	0/2	ND	2/3	2/3	28.6
	PFOS	1/2	0/2	1.55	2/3	2/3	170
	PFNA	0/2	0/2	ND	0/3	0/3	ND
	PFHxS	1/2	0/2	0.236 J	2/3	2/3	940
	HFPO-DA	0/2	0/2	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Lift Station 3. PFOA, PFOS, and PFHxS were identified as COPCs at Lift Station 3 in groundwater and may result in potential unacceptable human health risk associated with PFOA, PFOS and PFHxS.						
Results Summary, Conclusions, and Recommendations	PFOS and PFHxS were detected in a subsurface soil sample at concentrations below the SLs. PFBS was detected in groundwater samples at concentrations below the SL. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to (BR-LS3-MW02 and MW412) Lift Station 3 indicates that a release of PFAS-containing substance(s) likely occurred at or near Lift Station 3. PFOA, PFOS, and PFHxS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Lift Station 3 to Mooring A and Drydock 5 Fill Area, a combined RI is recommended for the Mooring A and Drydock 5 Fill Area and Lift Station 3.						

4.17 Building 873

Table 4-17. Building 873 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="7">Building 873 is located in the central portion of BNC within the PSNS and IMF facility (Figure 4-8). Building 873 is bordered by Farragut Avenue to the north and west, Building 983 to the south, and Building 1109 to the east (Figure 4-8).
Building 873 was constructed in the late 1970s following the closure of Building 99 (the former metal plating shop) and currently operates as the metal plating shop. Mist suppressants containing PFAS, specifically PFOS, have been used at Building 873 to suppress vapors associated with chromium plating; however, mist suppressants are not currently used (CH2M, 2020). Since 2006, waste generated from Building 873 is either pumped directly to the adjoining Building 1109 or drummed and transported to Building 944 (Figure 4-1) for transportation to an approved off-Base disposal facility (CH2M, 2020). From 1979 to 2006, plating waste was transferred to Former Building 871 (Figure 4-2) for treatment. Building 873 is equipped with secondary containment tanks to control potential spills; however, the date the secondary containment infrastructure was installed was not able to be confirmed (CH2M, 2020).
The PA identified Building 873 as a potential PFAS release area and recommended for investigation as part of an SI based on the historical use of PFAS-containing materials and uncertainty about the installation date of secondary containment infrastructure.</td></tr>
<tr><td>SI Approach</td><td colspan="7">• Two new monitoring wells were installed in locations near Building 873 (Figure 4-32).
• Shallow subsurface soil samples were collected from each newly installed monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B873-MW01</td><td colspan="2">BR-B873-MW02</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">39-59</td><td colspan="2">42-62</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B873-MW01</td><td colspan="2">BR-B873-MW02</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>44-45</td><td>2-3</td><td>56-57</td></tr>
<tr><td>Lithology</td><td colspan="7">Subsurface lithology observed during drilling at Building 873 consists of fill material and discontinuous units consisting of silty sand with gravels and well-graded gravel with sand. Saturated soil was observed at approximately at 52 and 57 feet bgs. Water-bearing units consist of gravel. Drilling was performed while drydocks 5 and 6 were empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="7">Groundwater at Building 873 is present in an unconfined aquifer comprised of well-graded gravel with sand. Depth to groundwater was between approximately 48 and 52 feet bgs while Drydock 6 was empty and approximately 20 and 26 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Building 873 is minimal. Groundwater flow in the vicinity of Building 873 is to the east-northeast toward Drydock 5 (Figures 4-18a and 4-18b).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/4</td><td>0/4</td><td>ND</td><td>2/2</td><td>0/2</td><td>4.07 J</td></tr>
<tr><td>PFOA</td><td>0/4</td><td>0/4</td><td>ND</td><td>2/2</td><td>2/2</td><td>40.2</td></tr>
<tr><td>PFOS</td><td>1/4</td><td>0/4</td><td>0.205 J</td><td>2/2</td><td>2/2</td><td>634</td></tr>
<tr><td>PFNA</td><td>0/4</td><td>0/4</td><td>ND</td><td>1/2</td><td>0/2</td><td>4.26 J</td></tr>
<tr><td>PFHxS</td><td>0/4</td><td>0/4</td><td>ND</td><td>2/2</td><td>0/2</td><td>28.2</td></tr>
<tr><td>HFPO-DA</td><td>0/4</td><td>0/4</td><td>ND</td><td>0/2</td><td>0/2</td><td>ND</td></tr>
</table>

Table 4-17. Building 873 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 873. PFOA and PFOS were identified as COPCs at Building 873 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.
Results Summary, Conclusions, and Recommendations	PFOS was detected in a subsurface soil sample at a concentration below the SL. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. Due to the number of utilities, structures, and operations downgradient of Building 873, the two wells installed were located upgradient (BR-B873-MW01) and cross-gradient of Building 873 (BR-B873-MW02). The presence of PFOA, PFOS, PFNA, and PFHxS in groundwater at concentrations above the SLs at locations upgradient and cross-gradient from Building 873 indicates that PFAS may have been released in these areas. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings, an RI is recommended for Building 873.

4.18 Former Defense Reutilization Marketing Office Drum Storage Area

Table 4-18. Former DRMO Drum Storage Area Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="11">The Former DRMO Drum Storage Area is located in the western portion of BNC within the NBK Bremerton facility (Figure 4-9). The storage area is bordered by Building 494 to the north, Building 997 to the west, a parking lot and Wycoff Avenue to the south, and Building 467 to the east (Figure 4-9).
From the 1930s to 1996, the DRMO operated this area and was responsible for supervising, recycling, and disposing of all surplus material at BNC (Navy, 2002a). The Former DRMO Drum Storage Area is completely paved and is currently used as a parking lot. However, portions of the DRMO were unpaved until 1994 (Navy, 2002a). The DRMO Drum Storage Area received wastes potentially containing PFAS from chrome plating and Teflon-coating operations (Navy, 2002a).
The PA identified the Former Defense Reutilization Marketing Office Drum Storage Area as a potential PFAS release area and recommended investigation as part of an SI based on the known handling of PFAS-containing materials.</td></tr>
<tr><td>SI Approach</td><td colspan="11">• Four new monitoring wells were installed in locations within and in the assumed downgradient direction (southeast) from the Former DRMO Drum Storage Area (Figure 4-33).
• Shallow subsurface soil samples were collected from each newly installed monitoring well location from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-DRMO-MW01</td><td colspan="2">BR-DRMO-MW02</td><td colspan="2">BR-DRMO-MW03</td><td colspan="2">BR-DRMO-MW04</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">15.5-25.5</td><td colspan="2">14-24</td><td colspan="2">19-29</td><td colspan="2">17-27</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-DRMO-MW01</td><td colspan="2">BR-DRMO-MW02</td><td colspan="2">BR-DRMO-MW03</td><td colspan="2">BR-DRMO-MW04</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>14-15</td><td>2-3</td><td>12-13</td><td>2-3</td><td>19-20</td><td>2-3</td><td>14-15</td></tr>
<tr><td>Lithology</td><td colspan="11">Subsurface lithology observed during drilling at the Former DRMO Drum Storage Area consists of fill material and discontinuous units of silty sand with interbedded poorly and well-graded sands. Saturated soils were observed at approximately 13 to 20 feet bgs. Water-bearing units include silty sand and well-graded sand with gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="11">Groundwater at the Former DRMO Drum Storage Area is present in an unconfined aquifer comprised of silty sand to well-graded sand with gravel. Depth to groundwater was between approximately 14 and 20 feet bgs while Drydock 6 was empty and approximately 10 and 11 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at the Former DRMO Drum Storage Area is significant. With Drydock 6 empty, groundwater flow in the vicinity of the Former DRMO Drum Storage Area is in three directions; in the north of the site groundwater flow is to the east-southeast, in the center of the site groundwater flow is to the east, and in the south of the site groundwater flow is to the northeast. With Drydock 6 full, groundwater flow is to the south (Figures 4-13a and 4-13b).</td></tr>
</table>

Table 4-18. Former DRMO Drum Storage Area Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/8	0/8	ND	¾	0/4	10.7
	PFOA	1/8	0/8	0.29 J	4/4	4/4	665
	PFOS	4/8	0/8	3.94	4/4	4/4	180
	PFNA	0/8	0/8	ND	¼	0/4	2.53 J
	PFHxS	1/8	0/8	0.826 J	4/4	2/4	103
	HFPO-DA	0/8	0/8	ND	0/4	0/4	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Former DRMO Drum Storage Area. PFOA and PFOS were identified as COPCs at Former DRMO Drum Storage Area in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.						
Results Summary, Conclusions, and Recommendations	PFOA, PFOS, and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SL at locations within (BR-DRMO-MW01 and BR-DRMO-MW02) and downgradient of the Former DRMO Drum Storage Area (BR-DRMO-MW03 and BR-DRMO-MW04) indicates that a release of PFAS-containing substance(s) likely occurred at or near the Former DRMO Drum Storage Area. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of the Former DRMO Drum Storage Area to the Former Building 513 Parking Lot, Building 494, Building 503, Former Building 432, and Lift Station 1, a combined RI is recommended for these six release areas.						

4.19 Lift Station 1

Table 4-19. Lift Station 1 Conceptual Site Model

Description and Potential for PFAS Release	Lift Station 1 is located in the southwest portion of BNC within the NBK Bremerton facility (**Figure 4-9**). Lift Station 1 is bordered by Building 997 to the north, several operation and maintenance buildings to the east and west, and Wycoff Avenue to the south (**Figure 4-9**). Lift Station 1 is connected to the City of Bremerton's sanitary sewer system. Sanitary waste from the Base is directed to lift stations located throughout BNC where it connects to the City of Bremerton's sanitary sewer infrastructure and eventually is pumped to the City of Bremerton's wastewater treatment plant (CH2M, 2020). Refer to **Section 4.16** for additional information on Lift Station 1. The PA identified Lift Station 1 as a potential PFAS release area and recommended investigation as part of an SI based on the reported transfer and discharge of bilge and wastewater containing AFFF and the potential for spills.						
SI Approach	• Two new monitoring wells were installed in locations near and in the assumed downgradient direction (east) from Lift Station 1 (**Figure 4-33**). • One shallow subsurface soil sample was collected from the newly installed monitoring well located near Lift Station 1 from 2 to 3 feet bgs. Subsurface soil samples were also collected from each newly installed monitoring well location within the capillary fringe. • One groundwater sample was collected from each newly installed monitoring well. • One groundwater sample was collected from an existing monitoring well located in the assumed downgradient direction to the east of Lift Station 1.						
Sample Stations	**Monitoring Wells**	**Well ID**	BR-LS1-MW01		BR-LS1-MW02		MW392
		Screen Interval (feet bgs)	10-20		6-26		6-26
	Subsurface Soil Samples	**Station ID**	BR-LS1-MW01			BR-LS1-MW02	
		Sample Depths (feet bgs)	2-3		9-10		7-8
Lithology	Subsurface lithology observed during drilling at Lift Station 1 included fill material and discontinuous units of silty sand and gravel. Saturated soil was observed at approximately 10 to 11 feet below ground surface. Water-bearing units range from silty sands to well-graded gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in **Appendix B**.						
Groundwater	Groundwater at Lift Station 1 is present in an unconfined aquifer ranging in lithology from silty sand to well-graded gravel. Depth to groundwater was approximately 11 feet bgs while Drydock 6 was empty and between approximately 5 and 11 feet bgs while Drydock 6 was flooded (**Table 3-4**). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Lift Station 1 is significant. With Drydock 6 empty, groundwater flow in the vicinity of Lift Station 1 is to the northeast. With Drydock 6 full, groundwater flow is to the south-southeast (**Figures 4-13a** and **4-13b**).						
PFAS Results Compared to SLs	**Analyte**	**SB (Table 4-24)**			**GW (Table 4-25)**		
		Frequency of Detection	**Frequency of Exceedance**	**Max Conc. (µg/kg)**	**Frequency of Detection**	**Frequency of Exceedance**	**Max Conc. (ng/L)**
	PFBS	0/3	0/3	ND	3/3	0/3	16.6
	PFOA	1/3	0/3	0.31 J	2/3	2/3	41.5
	PFOS	3/3	0/3	2.77	3/3	3/3	167
	PFNA	0/3	0/3	ND	3/3	0/3	3.07 J
	PFHxS	3/3	0/3	0.68 J	3/3	2/3	708
	HFPO-DA	0/3	0/3	ND	0/3	0/3	ND

Table 4-19. Lift Station 1 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Lift Station 1. PFOA, PFOS, and PFHxS were identified as COPCs at Lift Station 1 in groundwater and may result in potential unacceptable human health risk associated with PFOA, PFOS and PFHxS.
Results Summary, Conclusions, and Recommendations	PFOA, PFOS, and PFHxS were detected in subsurface soil samples at concentrations below the SLs. PFBS and PFNA were detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to (BR-LS1-MW01) indicates that a release of PFAS-containing substance(s) likely occurred at or near Lift Station 1. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Lift Station 1 to the Former Building 513 Parking Lot, Former DRMO Drum Storage Area, Building 494, Building 503, and Former Building 432, a combined RI is recommended for these six release areas.

4.20 Former Building 426

Table 4-20. Former Building 426 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="6">Former Building 426 located in the central portion of BNC within the PSNS and IMF facility and is bordered by South Avenue to the north, the PSNS and IMF facility perimeter fence and T Street to the west, Pier B and Drydock 6 to the south, and S Street to the east (Figure 4-10).

Building 426 was constructed in 1932 and was used as a hazardous materials storage facility until it was demolished in 2005 (CH2M, 2020). The building was operated by the Navy Supply Center to store materials and wastes generated from industrial operations in the PSNS and IMF facility (NEESA, 1983). After Building 426 was demolished in 2005, Building 1124, a maintenance complex for industrial and shipyard equipment, was constructed within the former building's footprint (Figure 4-10). Up to 185 different types of hazardous materials and waste were stored in Former Building 426 and in an outdoor storage area to the west (NEESA, 1983). Waste streams from chrome plating and Teflon-coating operations, potentially containing PFAS, were stored here.

The PA identified Building 426 as a potential PFAS release area and recommended investigation as part of an SI based on the potential storage of PFAS-containing materials and historical accounts of poor waste practices (handling, disposal, storage) at BNC.</td></tr>
<tr><td>SI Approach</td><td colspan="6">• Two new monitoring wells were installed in locations near Former Building 426 (Figure 4-34).
• Shallow subsurface soil samples were collected from each newly installed monitoring well from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well location within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well located near Former Building 426.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B426-MW01</td><td colspan="2">BR-B426-MW02</td><td>MW310R</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">43-63</td><td colspan="2">49-69</td><td>58.7-68.7</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B426-MW01</td><td colspan="3">BR-B426-MW02</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>49-50</td><td>2-3</td><td colspan="2">53-54</td></tr>
<tr><td>Lithology</td><td colspan="6">Subsurface lithology observed during drilling at Building 426 consisted of fill material and discontinuous units of silty sand interbedded with gravel. Saturated soil was observed at approximately 50 to 54 feet bgs. Water-bearing units range from clayey sand to well-graded sand with silt and gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="6">Groundwater at Building 426 is present in an unconfined aquifer comprised of a range of lithologies from clayey sands to well-graded sand with silt and gravel. Depth to groundwater was approximately 54 feet bgs while Drydock 6 was empty and approximately 14 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 22 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Building 426 is significant. With Drydock 6 empty, groundwater flow in the vicinity of Building 426 is to the southeast. With Drydock 6 full, groundwater flow is to the east-northeast (Figures 4-18a and 4-18b).</td></tr>
</table>

Table 4-20. Former Building 426 Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/4	0/4	ND	2/3	0/3	15.2
	PFOA	0/4	0/4	ND	2/3	2/3	56.8
	PFOS	2/4	0/4	1.22 J	2/3	2/3	46.6
	PFNA	0/4	0/4	ND	1/3	0/3	2.59 J
	PFHxS	0/4	0/4	ND	2/3	1/3	118
	HFPO-DA	0/4	0/4	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Former Building 426. PFOA and PFOS were identified as COPCs at Former Building 426 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.						
Results Summary, Conclusions, and Recommendations	PFOS was detected in subsurface soil samples at concentrations below the SL. PFBS and PFNA was detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS was detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to Former Building 426 (BR-B426-MW01 and MW310R) indicates that a release of PFAS-containing substance(s) likely occurred at or near Former Building 426. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Former Building 426 to Building 455, a combined RI is recommended for Former Building 426 and Building 455.						

4.21 Building 455

Table 4-21. Building 455 Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="8">Building 455 is located in the central portion of BNC within the PSNS and IMF facility and is bordered by Farragut Avenue to the north, the PSNS and IMF main gate (Farragut Gate) to the west, South Avenue to the south, and R Street to the east (Figure 4-10).
Building 455 functions as an Auto/Crane/Hobby Shop and wash rack (CH2M, 2020). Two outdoor wash racks were located on the eastern and western ends of Building 455; however, the eastern wash rack is no longer operational (Figure 4-10) (CH2M, 2020). The western wash rack is equipped with drains to capture rinse water. A Lieutenant for the Jackson Park fire station indicated that after AFFF usage during emergency response events, firetrucks were taken to the PSNS wash rack to flush out the firefighting equipment (CH2M, 2020).
The PA identified Building 455 as a potential PFAS release area and recommended investigation as part of an SI based on historical accounts of potential AFFF releases at this location.</td></tr>
<tr><td>SI Approach</td><td colspan="8">• Three new monitoring wells were installed in locations near and in the assumed downgradient direction (south) from Building (Figure 4-34).
• One shallow subsurface soil sample was collected from a newly installed monitoring well from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td colspan="2">BR-B455-MW01</td><td colspan="2">BR-B455-MW02</td><td colspan="2">BR-B455-MW03</td><td>MW382</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td colspan="2">45-65</td><td colspan="2">35-55</td><td colspan="2">45-65</td><td>38-58</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-B455-MW01</td><td colspan="3">BR-B455-MW02</td><td colspan="2">BR-B455-MW03</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td colspan="2">2-3</td><td colspan="2">48-49</td><td colspan="2">41-42</td><td>49-50</td></tr>
<tr><td>Lithology</td><td colspan="8">Subsurface lithology observed during drilling at Building 455 consists of fill material and discontinuous units of gravel with silt and sand. Saturated soil was observed at approximately 40 to 50 feet bgs. Water-bearing units are predominantly gravel. Drilling was performed while Drydock 6 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="8">Groundwater at Building 455 is present in an unconfined aquifer comprised of gravel. Depth to groundwater was between approximately 47 and 54 feet bgs while Drydock 6 was empty and approximately 14 and 15 feet bgs while Drydock 6 was flooded (Table 3-4). Synoptic groundwater level measurements collected on September 23 (Drydock 6 empty) and November 28, 2022, (Drydock 6 full) suggest the influence of Drydock 6 on groundwater flow direction at Building 455 is significant. With Drydock 6 empty, groundwater flow in the vicinity of Building 455 is to the south-southwest. With Drydock 6 full, groundwater flow is to the east-southeast (Figures 4-18a and 4-18b).</td></tr>
<tr><td rowspan="8">PFAS Results Compared to SLs</td><td rowspan="2">Analyte</td><td colspan="3">SB (Table 4-24)</td><td colspan="3">GW (Table 4-25)</td></tr>
<tr><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (µg/kg)</td><td>Frequency of Detection</td><td>Frequency of Exceedance</td><td>Max Conc. (ng/L)</td></tr>
<tr><td>PFBS</td><td>0/4</td><td>0/4</td><td>ND</td><td>4/4</td><td>0/4</td><td>16.1</td></tr>
<tr><td>PFOA</td><td>0/4</td><td>0/4</td><td>ND</td><td>4/4</td><td>4/4</td><td>215</td></tr>
<tr><td>PFOS</td><td>0/4</td><td>0/4</td><td>ND</td><td>4/4</td><td>4/4</td><td>148</td></tr>
<tr><td>PFNA</td><td>0/4</td><td>0/4</td><td>ND</td><td>¼</td><td>0/4</td><td>0.87 J</td></tr>
<tr><td>PFHxS</td><td>0/4</td><td>0/4</td><td>ND</td><td>4/4</td><td>¾</td><td>113</td></tr>
<tr><td>HFPO-DA</td><td>0/4</td><td>0/4</td><td>ND</td><td>0/4</td><td>0/4</td><td>ND</td></tr>
</table>

Table 4-21. Building 455 Conceptual Site Model

Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 455. PFOA and PFOS were identified as COPCs at Building 455 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.
Results Summary, Conclusions, and Recommendations	PFAS were not detected in any soil samples at this area. PFBS and PFNA was detected in groundwater samples at concentrations below the SLs. PFOA, PFOS, and PFHxS was detected in groundwater samples at concentrations above the SLs. The presence of PFOA, PFOS, and PFHxS in groundwater at concentrations above the SLs at locations adjacent to (BR-B455-MW01 and MW382) and downgradient of Building 455 (BR-B455-MW02 and BR-B455-MW03) indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 455. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings and the proximity of Building 455 to Former Building 426, a combined RI is recommended for Former Building 426 and Building 455.

4.22 Building 59

Table 4-22. Building 59 Conceptual Site Model

Description and Potential for PFAS Release	Building 59 is located in the northeastern portion of BNC within the PSNS and IMF facility and is bordered by Building 856 to the west, Farragut Avenue to the south, and Building 107 to the east (**Figure 4-11**). Building 59 was constructed in 1904 and was historically used as a chemical research and metallurgical facility (NEESA, 1983). Building 59 has been operational since it was constructed in 1904 (Navy, 2018e). It currently operates as an office building and metallurgical research and testing facility. According to the Former Lead Environmental Protection Specialist, many chemicals have been used at Building 59 (CH2M, 2020). It is not known what types of chemicals have been used at Building 59; however, given the operational timeframe and industrial history of BNC, it is possible that some of the chemicals or wastes generated may have contained PFAS. The PA identified Building 59 as a potential PFAS release area and recommended investigation as part of an SI based on the potential storage, transfer, and use of PFAS-containing materials.				
SI Approach	• Two new monitoring wells were installed in locations near and in the assumed downgradient direction (southwest) from Building 59 (**Figure 4-35**). There was an assumed groundwater divide running north-south through the site, with an assumed groundwater flow to the southwest in the west portion of the site and to the southeast in the east. • One shallow subsurface soil sample was collected from a newly installed monitoring well from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe. • One groundwater sample was collected from each newly installed monitoring well. • One groundwater sample was collected from an existing monitoring well located in an assumed downgradient direction to the southeast of Building 59.				
Sample Stations	**Monitoring Wells**	**Well ID**	BR-B59-MW01	BR-B459-MW02	MW704
		Screen Interval (feet bgs)	6-26	8-28	6-21
	Subsurface Soil Samples	**Station ID**	BR-B59-MW01		BR-B59-MW02
		Sample Depths (feet bgs)	2-3	7-8	7-8
Lithology	Subsurface lithology observed during drilling at Building 59 consisted of fill material and discontinuous units of silty sand and gravel. Saturated soil was observed at approximately 8.5 to 9 feet bgs. Water-bearing units range from silty sand to poorly and well-graded sand. Drilling was performed while drydocks 1 and 3 were empty. Soil boring logs are provided in **Appendix B**.				
Groundwater	Groundwater at Building 59 is present in an unconfined aquifer comprised of silty sand to well-graded sand. Depth to groundwater is between approximately 10 to 12 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, suggest groundwater flow in the vicinity of Building 59 is to the east-southeast toward Drydock 3. A groundwater divide trending north-south is present west of Building 59 (**Figure 4-14**).				

Table 4-22. Building 59 Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/3	0/3	ND	3/3	0/3	42.1
	PFOA	0/3	0/3	ND	3/3	3/3	31.1
	PFOS	1/3	0/3	0.413 J	3/3	3/3	49.3
	PFNA	0/3	0/3	ND	1/3	0/3	5.36
	PFHxS	0/3	0/3	ND	3/3	0/3	19.4
	HFPO-DA	0/3	0/3	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil at Building 59. PFOA and PFOS were identified as COPCs at Building 59 in groundwater and may result in potential unacceptable human health risk associated with PFOA and PFOS.						
Results Summary, Conclusions, and Recommendations	PFOS was detected in a subsurface soil sample at a concentration below the SL. PFBS, PFNA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOA and PFOS were detected in groundwater samples at concentrations above the SLs. The presence of PFOA and PFOS in groundwater at concentrations above the SLs at locations adjacent to (BR-B59-MW01) and downgradient of Building 59 (MW704) indicates that a release of PFAS-containing substance(s) likely occurred at or near Building 59. PFOA and PFOS were identified as preliminary COPCs in groundwater. Based on these findings, an RI is recommended for Building 59.						

4.23 OU D

Table 4-23. OU D Conceptual Site Model

<table>
<tr><td>Description and Potential for PFAS Release</td><td colspan="5">OU D is located just beyond the eastern boundary of BNC and is bordered by a First Street to the north, the Washington State Ferry Terminal to the east, the PSNS and IMF facility to the west, and Sinclair Inlet to the south (Figure 4-12).

OU D was formerly used for administrative support functions, scrap metal storage, and small canister fire training (Navy, 2005; NEESA, 1983). Several buildings were located within OU D, including the BNC police station, welding school, and metal and general storage buildings (Navy, 2005). OU D is comprised of four properties transferred via three Quitclaim Deeds to the City of Bremerton in 2006 and 2007 (Navy, 2007). The area is now a park and naval museum operated by the City of Bremerton (Figure 4-12). Refer to Section 2.1.2 for additional information on OU D.

The fire department would conduct fire training by putting out small cannister fires in a concrete area outside of the welding school, formerly Building 289, which was located within OU D (Figure 4-12) (NEESA, 1983). Building 289 was demolished in 2003. During the small cannister fire training, a 55-gallon drum with the lid removed was half-filled with waste diesel oil, ignited, and controlled within the drum until extinguished. Simulations were performed 12 times from 1982 to 1983 (NEESA, 1983). It is possible that AFFF was used in small cannister fire training since the fire training activities occurred during the Navy’s use of AFFF at BNC and diesel oil was used as a fuel source.

The PA identified OU D as a potential PFAS release area and recommended investigation as part of an SI based on the potential use and release of AFFF during to fire training activities.</td></tr>
<tr><td>SI Approach</td><td colspan="5">• Two new monitoring wells were installed in locations near and in the assumed downgradient direction (west-southwest) from of OU D (Figure 4-36).
• One shallow subsurface soil sample was collected from a newly installed monitoring well from 2 to 3 feet bgs. Subsurface soil samples were collected from each newly installed monitoring well within the capillary fringe.
• One groundwater sample was collected from each newly installed monitoring well.
• One groundwater sample was collected from an existing monitoring well located in the assumed downgradient direction to the west-southwest.</td></tr>
<tr><td rowspan="4">Sample Stations</td><td rowspan="2">Monitoring Wells</td><td>Well ID</td><td>BR-OUD-MW01</td><td>BR-OUD-MW02</td><td>MW903</td></tr>
<tr><td>Screen Interval (feet bgs)</td><td>8-18</td><td>7-17</td><td>5-25</td></tr>
<tr><td rowspan="2">Subsurface Soil Samples</td><td>Station ID</td><td colspan="2">BR-OUD-MW01</td><td>BR-OUD-MW02</td></tr>
<tr><td>Sample Depths (feet bgs)</td><td>2-3</td><td>8-8.5</td><td>9-10</td></tr>
<tr><td>Lithology</td><td colspan="5">Subsurface lithology observed during drilling at OU D consists of fill material and discontinuous units of silt, silty sand, and gravel. Saturated soil was observed at approximately 10 feet bgs. Water-bearing units range from silty sand with gravel to poorly graded sand. Drilling was performed while Drydock 3 was empty. Soil boring logs are provided in Appendix B.</td></tr>
<tr><td>Groundwater</td><td colspan="5">Groundwater at OU D is present in an unconfined aquifer comprised of a range of lithologies from silty sand with gravel to poorly graded sand. Depth to groundwater is between approximately 7 and 8 feet bgs. Synoptic groundwater level measurements collected on November 28, 2022, show groundwater flow in the vicinity of OU D is to the south-southeast (Figure 4-19).</td></tr>
</table>

Table 4-23. OU D Conceptual Site Model

	Analyte	SB (Table 4-24)			GW (Table 4-25)		
		Frequency of Detection	Frequency of Exceedance	Max Conc. (µg/kg)	Frequency of Detection	Frequency of Exceedance	Max Conc. (ng/L)
PFAS Results Compared to SLs	PFBS	0/3	0/3	ND	3/3	0/3	15.5
	PFOA	0/3	0/3	ND	3/3	0/3	4.08 J
	PFOS	0/3	0/3	ND	3/3	3/3	15.1
	PFNA	0/3	0/3	ND	0/3	0/3	ND
	PFHxS	0/3	0/3	ND	3/3	0/3	4.03 J
	HFPO-DA	0/3	0/3	ND	0/3	0/3	ND
Human Health Risk Screening	Based on available data used in the HHRS (**Appendix I**), no COPCs were identified for subsurface soil or groundwater at OU D.						
Results Summary, Conclusions, and Recommendations	PFAS were not detected in any soil samples at this area. PFBS, PFOA, and PFHxS were detected in groundwater samples at concentrations below the SLs. PFOS was detected in groundwater samples at concentrations above the SL. • Based on the following lines of evidence, no further investigation is recommended at this time for OU D. • No PFAS were detected in soil. • No PFAS were identified in the HHRS as COPCs for groundwater.						

Table 4-24. Soil Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

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Sample Station	Sample ID	Sample Depth (ft bgs)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
Former Building 513 Parking Lot									
BR-B513-MW01	BR-B513-SB01-0203*	2-3	7/27/2022	0.499 U	0.499 U	**0.297 J**	0.499 U	0.499 U	0.499 U
BR-B513-MW02	BR-B513-SB02-0203	2-3	7/21/2022	0.496 U	0.496 U	0.496 U	0.496 U	0.496 U	0.496 U
	BR-B513-SB02-3637	36-37	7/26/2022	0.493 U	0.493 U	0.493 U	0.493 U	0.493 U	0.493 UJ
BR-B513-MW03	BR-B513-SB03-0203	2-3	7/27/2022	0.494 U	0.494 U	0.494 U	0.494 U	0.494 U	0.494 U
	BR-B513-SB03-0607	6-7	7/27/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
BR-B513-SS01	BR-B513-SS01-0001	0-1	8/26/2022	0.501 U	0.501 U	**1.22**	0.501 U	0.501 U	0.501 U
BR-B513-SS02	BR-B513-SS02-0001	0-1	8/26/2022	0.501 U	0.501 U	**0.314 J**	0.501 U	0.501 U	0.501 U
Building 435									
BR-B435-MW01	BR-B435-SB01-0203*	2-3	9/1/2022	0.501 U	0.501 U	**0.441 J**	0.501 U	0.501 U	0.501 U
	BR-B435-SB01-5354	53-54	9/14/2022	0.5 U	0.5 U	**1.11**	0.5 U	0.5 U	0.5 U
BR-B435-MW02	BR-B435-SB02-0203	2-3	9/1/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
	BR-B435-SB02-5354	53-54	9/15/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
BR-B435-MW03	BR-B435-SB03-0203	2-3	8/24/2022	0.5 U	0.5 U	**0.852 J**	0.5 U	0.5 U	0.5 U
	BR-B435-SB03-5455	54-55	9/21/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B435-SB04	BR-B435-SB04-0203	2-3	9/22/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
Former Building 871									
BR-B871-MW01	BR-B871-SB01-0203	2-3	8/24/2022	0.499 U	0.499 U	**2.52**	0.499 U	0.499 U	0.499 U
	BR-B871-SB01-5455	54-55	9/7/2022	0.5 U	0.5 U	**8.97 J**	0.5 U	0.5 U	0.5 U
BR-B871-MW02	BR-B871-SB02-0203	2-3	8/29/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	BR-B871-SB02-5556*	55-56	9/8/2022	0.499 U	0.499 U	**18.2**	0.499 U	**0.223 J**	0.499 U
Former Building 99									
BR-B99-MW01	BR-B99-SB01-0203	2-3	9/27/2022	0.499 U	0.499 U	**0.213 J**	0.499 U	0.499 U	0.499 U
	BR-B99-SB01-26H27H	26.5-27.5	10/4/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B99-MW02	BR-B99-SB02-0203	2-3	9/27/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	BR-B99-SB02-2425*	24-25	10/3/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B99-SB04	BR-B99-SB04-0203	2-3	9/22/2022	0.499 U	0.499 U	**0.628 J**	0.499 U	**0.368 J**	0.499 U

Table 4-24. Soil Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Depth (ft bgs)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
Building 503									
BR-B503-MW01	BR-B503-SB01-0203	2-3	8/3/2022	0.547 U	0.547 U	**1.96**	0.547 U	**0.355 J**	0.547 U
	BR-B503-SB01-1011	10-11	8/5/2022	0.617 U	**0.422 J**	**0.237 J**	0.617 U	**0.272 J**	0.617 U
BR-B503-MW02	BR-B503-SB02-0203	2-3	8/2/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
	BR-B503-SB02-1213*	12-13	8/9/2022	0.501 U	0.501 U	**4.08**	0.501 U	**0.184 J**	0.501 U
BR-B503-MW03	BR-B503-SB03-0203	2-3	8/3/2022	0.591 U	0.591 U	**2.16**	0.591 U	0.591 U	0.591 U
	BR-B503-SB03-1920*	19-20	8/8/2022	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U
BR-B503-SS01	BR-B503-SS01-0001	0-1	8/4/2022	0.501 U	0.501 U	**1.79**	0.501 U	0.501 U	0.501 U
BR-B503-SS02	BR-B503-SS02-0001*	0-1	8/4/2022	0.502 U	**0.38 J**	**12.8**	**0.162 J**	**0.392 J**	0.502 U
Former Building 432									
BR-B432-MW01	BR-B432-SB01-0203*	2-3	8/5/2022	0.502 U	**0.447 J**	**14.2**	0.502 U	**3.43**	0.502 U
	BR-B432-SB01-0405	4-5	8/10/2022	0.498 U	0.498 U	**1.45**	0.498 U	**0.192 J**	0.498 U
BR-B432-MW02	BR-B432-SB02-0203	2-3	8/5/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
	BR-B432-SB02-1213	12-13	8/10/2022	0.5 U	0.5 U	**0.344 J**	0.5 U	0.5 U	0.5 UJ
BR-B432-MW03	BR-B432-SB03-1415	14-15	8/16/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Building 494									
BR-B494-MW01	BR-B494-SB01-0203	2-3	8/2/2022	0.5 U	0.5 U	**1.45**	0.5 U	0.5 U	0.5 U
	BR-B494-SB01-1415	14-15	8/3/2022	0.576 U	0.576 U	**0.335 J**	0.576 U	0.576 U	0.576 U
BR-B494-MW02	BR-B494-SB02-0203	2-3	8/2/2022	0.501 U	**0.251 J**	**0.32 J**	0.501 U	0.501 U	0.501 U
	BR-B494-SB02-1617	16-17	8/4/2022	0.562 U	0.562 U	0.562 U	0.562 U	0.562 U	0.562 U
BR-B494-MW03	BR-B494-SB03-1415	14-15	8/15/2022	0.498 U	0.498 U	**0.704 J**	0.498 U	0.498 U	0.498 U
Farragut Ave/Barvlay St Car Crashes									
BR-FBCC-MW01	BR-FBCC-SB01-0203	2-3	10/10/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	BR-FBCC-SB01-0607	6-7	10/10/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
BR-FBCC-MW02	BR-FBCC-SB02-0203	2-3	8/12/2022	0.502 U	0.502 U	0.502 U	0.502 U	0.502 U	0.502 U
	BR-FBCC-SB02-1112	11-12	8/15/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 UJ
BR-FBCC-MW03	BR-FBCC-SB03-0809	8-9	8/16/2022	0.499 U	0.499 U	**0.23 J**	0.499 U	0.499 U	0.499 U

Table 4-24. Soil Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Depth (ft bgs)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
Building 434									
BR-B434-MW01	BR-B434-SB01-0203*	2-3	7/22/2022	0.503 U	**1.18**	**2.98**	0.503 U	**0.288 J**	0.503 U
	BR-B434-SB01-1011	10-11	7/28/2022	0.501 UJ	**16.1**	0.501 U	0.501 U	**3.57**	0.501 U
BR-B434-MW02	BR-B434-SB02-0203	2-3	7/22/2022	0.501 U	0.501 U	**0.718 J**	0.501 U	0.501 U	0.501 U
	BR-B434-SB02-2727H	27-27.5	7/27/2022	0.499 UJ	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
BR-B434-MW03	BR-B434-SB03-0203	2-3	7/22/2022	0.496 U	**0.419 J**	**1.2**	0.496 U	0.496 U	0.496 UJ
	BR-B434-SB03-26H27	26.5-27.5	7/26/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B434-SS01	BR-B434-SS01-0001	0-1	8/4/2022	0.502 U	**0.357 J**	**0.453 J**	0.502 U	0.502 U	0.502 U
Auto/Hobby Shop Fire									
BR-AHSF-MW01	BR-AHSF-SB01-0203*	2-3	7/26/2022	0.501 U	0.501 U	**0.4 J**	0.501 U	0.501 U	0.501 U
	BR-AHSF-SB01-102103	102-103	8/10/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
BR-AHSF-MW02	BR-AHSF-SB02-0203	2-3	7/22/2022	0.495 U	0.495 U	0.495 U	0.495 U	0.495 U	0.495 UJ
	BR-AHSF-SB02-104105	104-105	8/8/2022	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
BR-AHSF-MW03	BR-AHSF-SB03-0203	2-3	7/22/2022	0.495 U	0.495 U	**0.325 J**	0.495 U	0.495 U	0.495 U
	BR-AHSF-SB03-106107	106-107	8/2/2022	0.577 U	0.577 U	0.577 U	0.577 U	0.577 U	0.577 U
BR-AHSF-SS01	BR-AHSF-SS01-0001	0-1	8/4/2022	0.519 U	0.519 U	**0.437 J**	0.519 U	0.519 U	0.519 U
BR-AHSF-SS02	BR-AHSF-SS02-0001	0-1	8/4/2022	0.521 U	0.521 U	**0.318 J**	0.521 U	0.521 U	0.521 U
2018 AFFF Spill									
BR-18AS-MW01	BR-18AS-SB01-0203*	2-3	8/24/2022	0.502 U	0.502 U	**0.635 J**	0.502 U	0.502 U	0.502 U
	BR-18AS-SB01-3233	32-33	9/23/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
Building 457									
BR-B457-MW01	BR-B457-SB01-0203	2-3	8/24/2022	0.498 U	0.498 U	**0.503 J**	0.498 U	0.498 U	0.498 U
	BR-B457-SB01-4950	49-50	8/31/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
BR-B457-MW02	BR-B457-SB02-0203	2-3	8/23/2022	0.501 U	0.501 U	**1.97**	0.501 U	**0.297 J**	0.501 U
	BR-B457-SB02-3940	39-40	9/2/2022	0.5 U	0.5 U	**1.49**	0.5 U	0.5 U	0.5 U
BR-B457-MW03	BR-B457-SB03-0203	2-3	8/24/2022	0.498 U	0.498 U	**1.23**	0.498 U	0.498 U	0.498 U
	BR-B457-SB03-4546	45-46	8/30/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 4-24. Soil Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Depth (ft bgs)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
USS Missouri Parking Lot									
BR-UMPL-MW01	BR-UMPL-SB01-0203	2-3	7/18/2022	0.491 U	0.491 U	0.491 U	0.491 U	**0.541 J**	0.491 U
	BR-UMPL-SB01-0910	9-10	7/21/2022	0.503 U	0.503 U	**0.246 J**	0.503 U	0.503 U	0.503 UJ
BR-UMPL-MW02	BR-UMPL-SB02-0203	2-3	7/18/2022	**0.35 J**	**1.5**	0.503 UJ	0.503 UJ	**7.05 J**	0.503 UJ
	BR-UMPL-SB02-099H	9-9.5	7/20/2022	0.503 U	**0.538 J**	**73.7**	**0.318 J**	**1.31**	0.503 U
Mooring A and Drydock 5 Fill Area									
BR-MAD5-MW01	BR-MAD5-SB01-0203	2-3	8/19/2022	0.501 U	0.501 U	**0.58 J**	0.501 U	0.501 U	0.501 U
	BR-MAD5-SB01-1213	12-13	8/24/2022	0.5 U	**0.594 J**	**0.227 J**	0.5 U	**0.173 J**	0.5 U
BR-MAD5-MW02	BR-MAD5-SB02-0203	2-3	8/19/2022	0.499 U	**0.439 J**	**1.42**	0.499 U	0.499 U	0.499 U
	BR-MAD5-SB02-1011*	10-11	8/23/2022	0.501 U	0.501 U	**0.541 J**	0.501 U	0.501 U	0.501 U
Building 873									
BR-B873-MW01	BR-B873-SB01-0203	2-3	8/23/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
	BR-B873-SB01-4445	44-45	8/24/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
BR-B873-MW02	BR-B873-SB02-0203	2-3	8/23/2022	0.5 U	0.5 U	**0.205 J**	0.5 U	0.5 U	0.5 U
	BR-B873-SB02-5657	56-57	8/25/2022	0.502 U	0.502 U	0.502 U	0.502 U	0.502 U	0.502 U
Former DRMO Drum Storage Area									
BR-DRMO-MW01	BR-DRMO-SB01-0203	2-3	7/25/2022	0.499 U	**0.29 J**	**3.94**	0.499 U	**0.826 J**	0.499 U
	BR-DRMO-SB01-1415	14-15	7/28/2022	0.501 UJ	0.501 U	**1.23**	0.501 U	0.501 U	0.501 U
BR-DRMO-MW02	BR-DRMO-SB02-0203	2-3	7/26/2022	0.501 U	0.501 U	**1.15**	0.501 U	0.501 U	0.501 U
	BR-DRMO-SB02-1213	12-13	8/2/2022	0.561 U	0.561 U	**0.831 J**	0.561 U	0.561 U	0.561 U
BR-DRMO-MW03	BR-DRMO-SB03-0203	2-3	7/20/2022	0.503 U	0.503 U	0.503 U	0.503 U	0.503 U	0.503 U
	BR-DRMO-SB03-1920	19-20	7/28/2022	0.499 UJ	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U
BR-DRMO-MW04	BR-DRMO-SB04-0203	2-3	7/26/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	BR-DRMO-SB04-1415	14-15	8/1/2022	0.541 U	0.541 U	0.541 U	0.541 U	0.541 U	0.541 U
Lift Station 1									
BR-LS1-MW01	BR-LS1-SB01-0203	2-3	8/16/2022	0.499 U	0.499 U	**1.08 J**	0.499 U	**0.395 J**	0.499 UJ
	BR-LS01-SB01-0910	9-10	8/17/2022	0.498 U	0.498 U	**2.32**	0.498 U	**0.551 J**	0.498 U
BR-LS1-MW02	BR-LS1-SB02-0708	7-8	10/6/2022	0.5 U	**0.31 J**	**2.77**	0.5 U	**0.68 J**	0.5 U

Table 4-24. Soil Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Depth (ft bgs)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
Lift Station 3									
BR-LS3-MW01	BR-LS3-SB01-0203	2-3	8/23/2022	0.499 U	0.499 U	**1.55**	0.499 U	**0.236 J**	0.499 U
	BR-LS3-SB01-1314	13-14	8/24/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Former Building 426									
BR-B426-MW01	BR-B426-SB01-0203	2-3	8/17/2022	0.499 UJ	0.499 UJ	**1.22 J**	0.499 UJ	0.499 UJ	0.499 UJ
	BR-B426-SB01-4950	49-50	8/22/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B426-MW02	BR-B426-SB03-0203	2-3	8/16/2022	0.499 U	0.499 U	**0.269 J**	0.499 U	0.499 U	0.499 U
	BR-B426-SB02-5354	53-54	8/18/2022	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ
Building 455									
BR-B455-MW01	BR-B455-SB01-0203	2-3	8/15/2022	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U
	BR-B455-SB01-4849	48-49	8/16/2022	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U
BR-B455-MW02	BR-B455-SB02-4142	41-42	8/17/2022	0.498 UJ	0.498 UJ	0.498 UJ	0.498 UJ	0.498 UJ	0.498 UJ
BR-B455-MW03	BR-B455-SB03-4950	49-50	8/18/2022	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ	0.499 UJ
Building 59									
BR-B59-MW01	BR-B59-SB01-0203	2-3	9/22/2022	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U	0.501 U
	BR-B59-SB01-0708	7-8	9/27/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-B59-MW02	BR-B59-SB02-0708	7-8	9/28/2022	0.499 U	0.499 U	**0.413 J**	0.499 U	0.499 U	0.499 U
OU D									
BR-OUD-MW01	BR-OUD-SB01-0203	2-3	9/6/2022	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U	0.498 U
	BR-OUD-SB01-0808H	8-8.5	9/28/2022	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BR-OUD-MW02	BR-OUD-SB02-0910	9-10	9/29/2022	0.499 U	0.499 UJ	0.499 U	0.499 UJ	0.499 U	0.499 UJ

* indicates results is for a duplicate sample that was higher than the result for the parent sample

µg/kg = micrograms per kilogram

J = Analyte present. Value may or may not be accurate or precise

U = The material was analyzed for but not detected

Bolding indicates detection

Shading indicates exceedance

Table 4-25. Groundwater Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Screen Interval (ft btoc)	Sample Date	PFBS (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	HFPO-DA (ng/L)
Project Action Limits				600	6	4	5.9	39	6
Former Building 513 Parking Lot									
BR-B513-MW01	BR-B513-MW01-1022	4-14	10/24/2022	**2.37 J**	**3.07 J**	**9.24**	2.45 U	**5.98**	2.45 U
BR-B513-MW02	BR-B513-MW02-1022	27-47	10/26/2022	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U	2.22 U
BR-B513-MW03	BR-B513-MW03-1022	7-17	10/20/2022	**3.77 J**	**6.55**	**10.4**	2.36 U	**5.87**	2.36 U
MW718	BR-MW718-1022	7-27	10/27/2022	**9.27**	**185**	**51.6**	**9.47**	**53.9**	2.41 U
Building 435									
BR-B435-MW01	BR-B435-MW01-1022	46.5-66.5	10/31/2022	**11.1**	**18.2**	**47**	**1.15 J**	**18.9**	2.36 U
BR-B435-MW02	BR-B435-MW02-1122	47-67	11/3/2022	**20.7**	**71.4**	**40.6**	**2.49 J**	**102**	2.29 U
BR-B435-MW03	BR-B435-MW03-1122	48-68	11/4/2022	**8.47**	**2.59 J**	2.29 U	2.29 U	**9.43 J**	2.29 U
MW425	BR-MW425-1122	47-67	11/21/2022	**16.1**	**71.6**	**217**	**2.52 J**	**141**	2.33 U
Former Building 871									
BR-B871-MW01	BR-B871-MW01-1122*	48-68	11/4/2022	2.26 U	**4.2 J**	**61.7**	2.26 U	**9.05**	2.26 U
BR-B871-MW02	BR-B871-MW02-1122	49-69	11/9/2022	**8.32**	**22**	**2160**	**1.14 J**	**48**	2.43 U
MW707	BR-MW707-1122	45-65	11/17/2022	**3.39 J**	**12.1**	**47.6**	**0.822 J**	**13.9**	2.31 U
MW907	BR-MW907-1122	55-75	11/11/2022	**2.88 J**	**7.5**	**9**	**2.34 J**	**7.12 J**	2.31 U
Former Building 99									
BR-B99-MW01	BR-B99-MW01-1122	20-40	11/15/2022	**2.71 J**	**21.1**	**15.5**	2.19 U	**19.3**	2.19 U
BR-B99-MW02	BR-B99-MW02-1122*	17-37	11/18/2022	**2.24 J**	**5.2**	**7.01**	2.33 U	**6.26**	2.33 U
MW432	BR-MW432-1122	30-50	11/15/2022	**3.14 J**	**6.3**	**26.4**	2.28 U	**4.61**	2.28 U
MW433	BR-MW433-1122	48-63	11/11/2022	**2.64 J**	**3.46 J**	**2.87 J**	**2.14 J**	2.37 U	2.37 U
MW904	BR-MW904-1122	7-27	11/9/2022	**6.23**	**3.42 J**	**3.87 J**	2.24 U	**3.22 J**	2.24 U
Building 503									
BR-B503-MW01	BR-B503-MW01-1122	11-31	11/1/2022	**3.74 J**	**208**	**16.8**	**1.53 J**	**23.7**	2.42 U
BR-B503-MW02	BR-B503-MW02-1022*	15-25	10/25/2022	**4.39 J**	**193**	**29.6**	2.3 U	**31.1**	2.3 U
BR-B503-MW03	BR-B503-MW03-1022	20-30	10/31/2022	**4.5 J**	**36.5**	**25.1 J**	**1.12 J**	**31.8**	2.29 U
Former Building 432									
BR-B432-MW01	BR-B432-MW01-1022	7-17	10/30/2022	**16.8**	**603**	**2040**	**17.9**	**448**	2.52 U
BR-B432-MW02	BR-B432-MW02-1122	17-27	11/4/2022	2.41 U	**56.6**	**47.5**	**1.01 J**	**17.3**	2.41 U
BR-B432-MW03	BR-B432-MW03-1022	16-26	10/21/2022	**4.86**	**14.8**	**50.5**	2.31 U	**20.9**	2.31 U

Table 4-25. Groundwater Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Screen Interval (ft btoc)	Sample Date	PFBS (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	HFPO-DA (ng/L)
Project Action Limits				600	6	4	5.9	39	6
Building 494									
BR-B494-MW01	BR-B494-MW01-1122	15-35	11/2/2022	**1.83 J**	**11.6**	**62.7**	**1.31 J**	**24.7**	2.41 U
BR-B494-MW02	BR-B494-MW02-1122	17-37	11/2/2022	**1.68 J**	**41.7**	**56.4**	**2.36 J**	**28.8**	2.26 U
BR-B494-MW03	BR-B494-MW03-1122	16.5-26.5	11/2/2022	**3.31 J**	**25.7**	**471**	**3.1 J**	**124**	2.49 U
Farragut Ave/Barvlay St Car Crashes									
BR-FBCC-MW01	BR-FBCC-MW01-1122	7-17	11/16/2022	**0.935 J**	**8.98**	**21.7**	**1.71 J**	**7.49**	2.25 U
BR-FBCC-MW02	BR-FBCC-MW02-1022	10-20	10/20/2022	**7.31**	**29.6**	**30.3**	2.35 U	**10.6**	2.35 U
BR-FBCC-MW03	BR-FBCC-MW03-1022*	10-20	10/20/2022	**4.24 J**	**19**	**3.3 J**	2.38 U	**5.68**	2.38 U
Building 434									
BR-B434-MW01	BR-B434-MW01-1122	10-20	11/1/2022	**99.1**	**344**	**3.62 J**	2.32 U	**89.3**	2.32 U
BR-B434-MW02	BR-B434-MW02-1122	27-37	11/1/2022	**5.17**	**322**	2.39 U	2.39 U	**12.5**	2.39 U
BR-B434-MW03	BR-B434-MW03-1122	28.5-38.5	11/1/2022	**8.25**	**423**	**7.56 J**	**1.06 J**	**33**	2.24 U
Auto/Hobby Shop Fire									
BR-AHSF-MW01R	BR-AHSF-MW01R-0123	111-121	1/19/2023	2.21 U	2.21 U	2.21 U	2.21 U	**1.13 J**	2.21 U
BR-AHSF-MW02	BR-AHSF-MW02-0123	105.5-115.5	1/18/2023	**2.91 J**	**11.9**	**9.52**	2.13 U	**23.2**	2.13 U
BR-AHSF-MW03R	BR-AHSF-MW03R-0123	106-116	1/19/2023	**3.99 J**	**14.3**	**3.26 J**	2.24 U	**12.2**	2.24 U
2018 AFFF Spill									
BR-18AS-MW01	BR-18AS-MW01-1122	26-46	11/16/2022	**5.04 J**	**6.93**	**30.7**	2.28 U	**2.64 J**	2.28 U
Building 457									
BR-B457-MW01	BR-B457-MW01-1122	42-62	11/11/2022	**1.89 J**	**3.5 J**	**11.6**	**2.06 J**	**2.72 J**	2.31 U
BR-B457-MW02	BR-B457-MW02-1122	35-55	11/8/2022	**4.46**	**14.5**	**103**	**0.832 J**	**33.1**	2.19 U
BR-B457-MW03	BR-B457-MW03-1122	39-59	11/14/2022	**11**	**7.11 J**	**34.3**	**3.06 J**	**9.49**	2.44 U
USS Misouri Parking Lot									
BR-UMPL-MW01	BR-UMPL-MW01-1022	8-28	10/18/2022	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
BR-UMPL-MW02	BR-UMPL-MW02-1022	8-28	10/18/2022	**2.41 J**	**6.47**	**38.2**	2.19 U	**18.1**	2.19 U
MW203	BR-MW203-1022	7-16.5	10/28/2022	**1.38 J**	**5.14**	**27.3**	2.3 U	**11.7**	2.3 U
MW204	BR-MW204-1022	8-23	10/28/2022	**4.39 J**	**11.9**	**748**	2.32 U	**133**	2.32 U
MW206	BR-MW206-1022	8-23	10/28/2022	**3.56 J**	**2.95 J**	**9.1**	2.71 U	**16.4**	2.71 U
MW241	BR-MW241-1122	6-15	11/4/2022	2.39 U	2.39 U	2.39 U	2.39 U	2.39 U	2.39 U

Table 4-25. Groundwater Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Screen Interval (ft btoc)	Sample Date	PFBS (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	HFPO-DA (ng/L)
Project Action Limits				600	6	4	5.9	39	6
Mooring A and Drydock 5 Fill Area									
BR-MAD5-MW01	BR-MAD5-MW01-1122	15-25	11/8/2022	**12**	**136**	**163**	2.42 U	**55.8**	2.42 U
BR-MAD5-MW02	BR-MAD5-MW02-1122*	12-22	11/8/2022	2.26 U	2.26 UJ	2.26 U	2.26 UJ	2.26 U	2.26 UJ
MW709	BR-MW709-1122	8-28	11/8/2022	**2.74 J**	**292**	**43**	2.22 U	**19.2**	2.22 U
Building 873									
BR-B873-MW01	BR-B873-MW01-1122	39-59	11/8/2022	**4.07 J**	**24.5**	**634**	2.31 U	**28.2**	2.31 U
BR-B873-MW02	BR-B873-MW02-1122	42-62	11/14/2022	**3.89 J**	**40.2**	**65.8**	**4.26 J**	**24.6**	2.27 U
Former DRMO Drum Storage Area									
BR-DRMO-MW01	BR-DRMO-MW01-1022	15.5-25.5	10/21/2022	**10.7**	**30.4**	**113**	2.4 U	**103**	2.4 U
BR-DRMO-MW02	BR-DRMO-MW02-1122	14-24	11/15/2022	2.3 U	**8.51**	**64.1**	2.3 U	**29.6**	2.3 U
BR-DRMO-MW03	BR-DRMO-MW03-1022	19-29	10/25/2022	**6.23**	**665**	**180**	2.46 U	**75.4**	2.46 U
BR-DRMO-MW04	BR-DRMO-MW04-1022	17-27	10/25/2022	**4.86 J**	**20.7**	**53.2**	**2.53 J**	**18.7**	2.45 U
Lift Station 1									
BR-LS1-MW01	BR-LS1-MW01-1022	10-20	10/24/2022	**11.3**	**26.7**	**167**	**1.72 J**	**91.1**	2.47 U
BR-LS1-MW02	BR-LS1-MW02-1022	6-26	10/19/2022	**2.46 J**	2.24 U	**15.5**	**0.867 J**	**10.2**	2.24 U
MW392	BR-MW392-1022	6-26	10/27/2022	**16.6**	**41.5**	**138**	**3.07 J**	**708**	2.45 U
Lift Station 3									
BR-LS3-MW01	BR-LS3-MW01-1122	14-24	11/7/2022	2.25 U	**10.6**	**170**	2.25 U	**60.4**	2.25 U
MW412	BR-MW412-1122*	14.5-24	11/7/2022	**71.5**	**28.6**	**67.8**	2.19 U	**940**	2.3 U
MW713	BR-MW713-1122	8-28	11/7/2022	2.28 U	2.28 U	2.28 U	2.28 U	2.28 U	2.28 U
Former Building 426									
BR-B426-MW01	BR-B426-MW01-1122	43-63	11/7/2022	**15.2**	**56.8**	**46.6**	2.21 U	**118**	2.21 U
BR-B426-MW02	BR-B426-MW02-1122	49-69	11/7/2022	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U
MW310R	BR-MW-310R-1122	58.7-68.7	11/11/2022	**2.77 J**	**28.7**	**45.8**	**2.59 J**	**20.1**	2.28 U
Building 455									
BR-B455-MW01	BR-B455-MW01-1122*	45-65	11/21/2022	**16.1**	**72.3**	**69.7**	2.31 U	**113**	2.31 U
BR-B455-MW02	BR-B455-MW02-1122*	35-55	11/21/2022	**13**	**215**	**105**	**0.934 J**	**69.8**	2.18 U
BR-B455-MW03	BR-B455-MW03-1122	45-65	11/21/2022	**4.61**	**81.3**	**106**	2.2 U	**41**	2.2 U
MW382	BR-MW382-1122	38-58	11/17/2022	**6.73**	**89.2**	**148**	**0.87 J**	**35.9**	2.39 U

Table 4-25. Groundwater Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Screen Interval (ft btoc)	Sample Date	PFBS (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	HFPO-DA (ng/L)
Project Action Limits				600	6	4	5.9	39	6
Building 59									
BR-B59-MW01	BR-B59-MW01-1122	6-26	11/10/2022	**4.54 J**	**6.03**	**16.1**	2.32 U	**4.37 J**	2.32 U
BR-B59-MW02	BR-B59-MW02-1122	8-28	11/10/2022	**42.1**	**31.1**	**35.9**	**5.36**	**18.9**	2.34 U
MW704	BR-MW704-1122	6-21	11/22/2022	**5.04 J**	**10.1**	**49.3**	2.55 U	**19.4**	2.55 U
OU D									
BR-OUD-MW01	BR-OUD-MW01-1122	8-18	11/9/2022	**2.25 J**	**3.29 J**	**5.03**	2.22 U	**2.28 J**	2.22 U
BR-OUD-MW02	BR-OUD-MW02-1122	9-19	11/9/2022	**15.5**	**4.08 J**	**15.1**	2.2 U	**4.03 J**	2.2 U
MW903	BR-MW903-1122	5-25	11/9/2022	**2.73 J**	**2.14 J**	**4.8**	2.19 U	**1.68 J**	2.19 U

* indicates results is for a duplicate sample that was higher than the result for the parent sample

btoc = below top of casing

ft = feet

ng/L = nanograms per liter

J = Analyte present. Value may or may not be accurate or precise

U = The material was analyzed for but not detected

Bolding indicates detection

Shading indicates exceedance

Table 4-26. Sediment Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Depth (in bss)	Sample Date	PFBS (µg/kg)	PFOA (µg/kg)	PFOS (µg/kg)	PFNA (µg/kg)	PFHxS (µg/kg)	HFPO-DA (µg/kg)
Project Action Limits				1,900	19	13	19	130	23
2017 U.S.S. Stennis AFFF Release									
BR-17AS-SD01	BR-17AS-SD01-0004	0-4	10/19/2022	0.643 U	0.643 U	**0.640 J**	0.643 U	0.643 U	0.643 U
	BR-17AS-SD01-0424	4-24	10/19/2022	0.781 U	0.781 U	0.781 U	0.781 U	0.781 U	0.781 U
BR-17AS-SD02	BR-17AS-SD02-0004	0-4	10/19/2022	1.17 U	1.17 U	**1.78 J**	1.17 U	1.17 U	1.17 U
	BR-17AS-SD02-0424*	4-24	10/19/2022	0.765 U	0.765 U	0.765 U	0.765 U	0.765 U	0.765 U
BR-17AS-SD03	BR-17AS-SD03-0004	0-4	10/19/2022	1.46 U	1.46 U	**1.85 J**	1.46 U	1.46 U	1.46 U
	BR-17AS-SD03-0424	4-24	10/19/2022	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U	0.499 U

* indicates results is for a duplicate sample that was higher than the result for the parent sample

in = inches

bss = below sediment surface

µg/kg = micrograms per kilogram

J = Analyte present. Value may or may not be accurate or precise

U = The material was analyzed for but not detected

Bolding indicates detection

Shading indicates exceedance

Table 4-27. Surface Water Analytical Results for PFBS, PFOA, PFOS, PFNA, PFHxS, and HFPO-DA

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Sample Station	Sample ID	Sample Date	PFBS (ng/L)	PFOA (ng/L)	PFOS (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	HFPO-DA (ng/L)
Project Action Limits			600	6	4	5.9	39	6
2017 U.S.S. Stennis AFFF Release								
BR-17AS-SW01	BR-17AS-SW01-1022	10/19/2022	2.33 U	2.33 UJ	2.33 U	2.33 UJ	2.33 U	2.33 UJ
BR-17AS-SW02	BR-17AS-SW02-1022*	10/19/2022	2.48 U	2.48 U	2.48 U	2.48 U	2.48 U	2.48 U
BR-17AS-SW03	BR-17AS-SW03-1022	10/19/2022	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U

* indicates results is for a duplicate sample that was higher than the result for the parent sample

ng/L = nanograms per liter

U = The material was analyzed for but not detected

Bolding indicates detection

Shading indicates exceedance

Table 4-28. Data Qualifiers

Site Inspection Report for Per- and Polyfluoroalkyl Substances at Bremerton Naval Complex

Bremerton, Washington

Soil Qualifiers	**Meaning**	**Description**
J	Estimated	Analyte is estimated because is is below the quantitation limit or because of an associated QC exceedance. The result may be in accurate or imprecise
U	Nondetect	Analyte is not detected at a concentration greater than the quantitation limit.
UJ	Nondetect, estimated quantitation limit	Analyte is not detected. The quantitation limit may be inaccurate or imprecise.
[none]	detected	Analyte is usable at the concentration reported.
Groundwater Qualifiers	**Meaning**	**Description**
J	Estimated	Analyte is estimated because is is below the quantitation limit or because of an associated QC exceedance. The result may be in accurate or imprecise
U	Nondetect	Analyte is not detected at a concentration greater than the quantitation limit.
UJ	Nondetect, estimated quantitation limit	Analyte is not detected. The quantitation limit may be inaccurate or imprecise.
[none]	detected	Analyte is usable at the concentration reported.

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LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Discharge
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Sinclair Inlet
- 20' Topographic Contours
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-1
Potential PFAS Release Area:
West NBK Bremerton
Site Inspection for PFAS
BNC, Bremerton, Washington

0 75 150 Feet
1 inch = 150 feet
N

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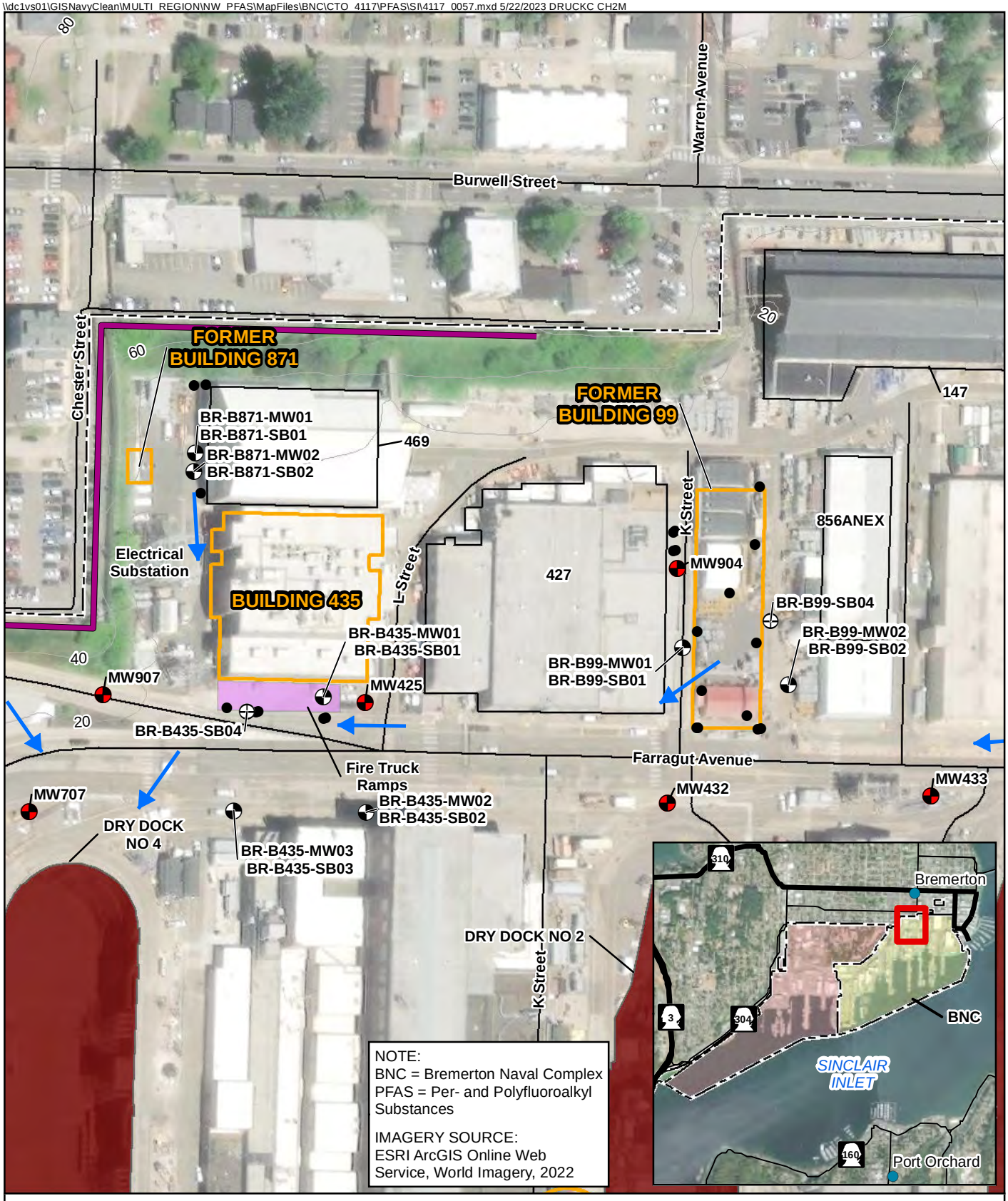

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Shallow Subsurface Soil Sampling Location
- Existing Monitoring Well
- Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Local Connecting Road
- 20' Topographic Contours
- Wall
- Building/Structure
- Fire Truck Ramp
- Drydock
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-2
Potential PFAS Release Areas:
North PSNS and IMF
Site Inspection for PFAS
BNC, Bremerton, Washington

0 75 150 Feet
1 inch = 150 feet
N

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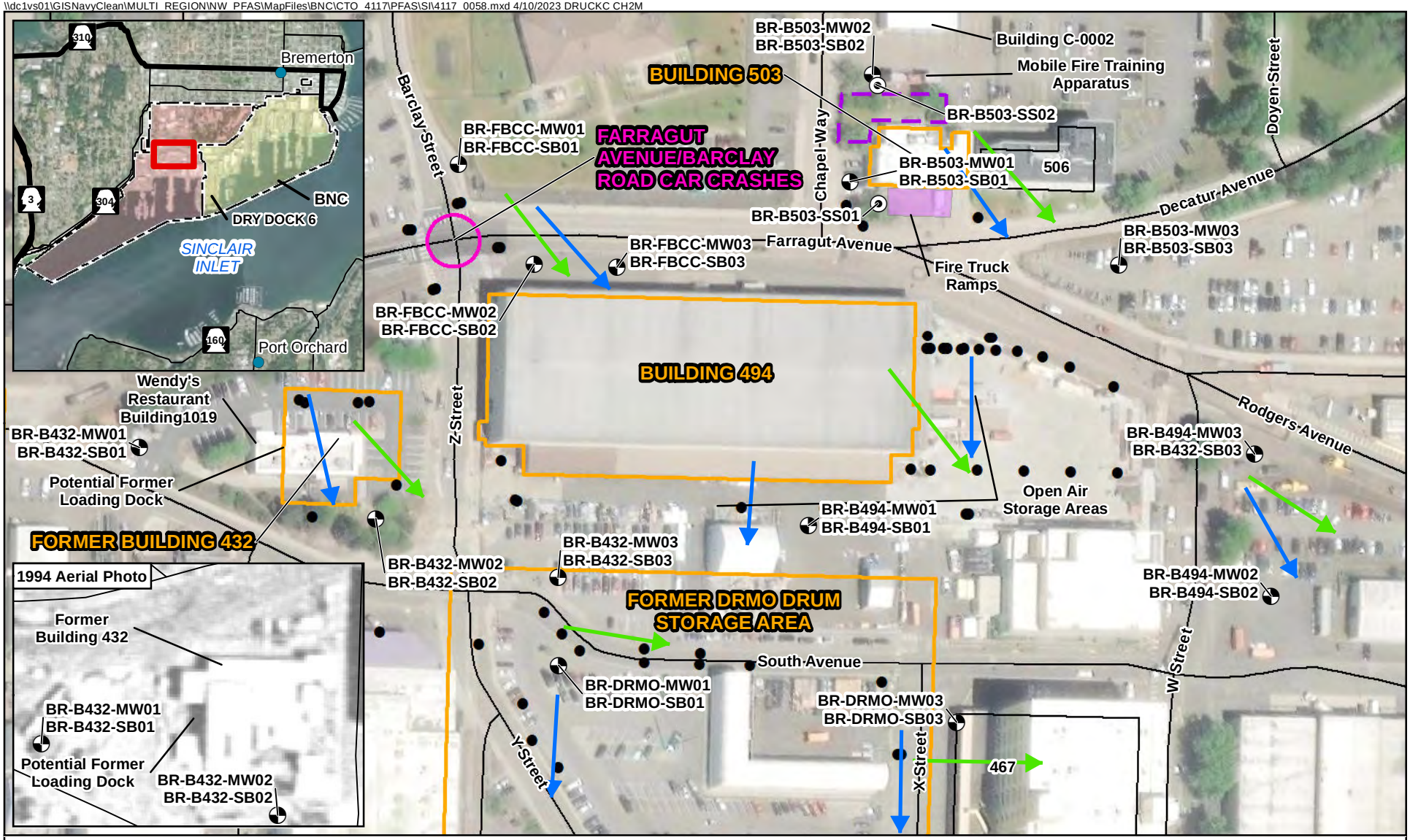

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- 20' Topographic Contours
- Unpaved Area
- Building/Structure
- Fire Truck Ramp
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-3

Potential and Confirmed PFAS Release Areas: Central NBK Bremerton

Site Inspection for PFAS

BNC, Bremerton, Washington

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 75 150 Feet

1 inch = 150 feet

N

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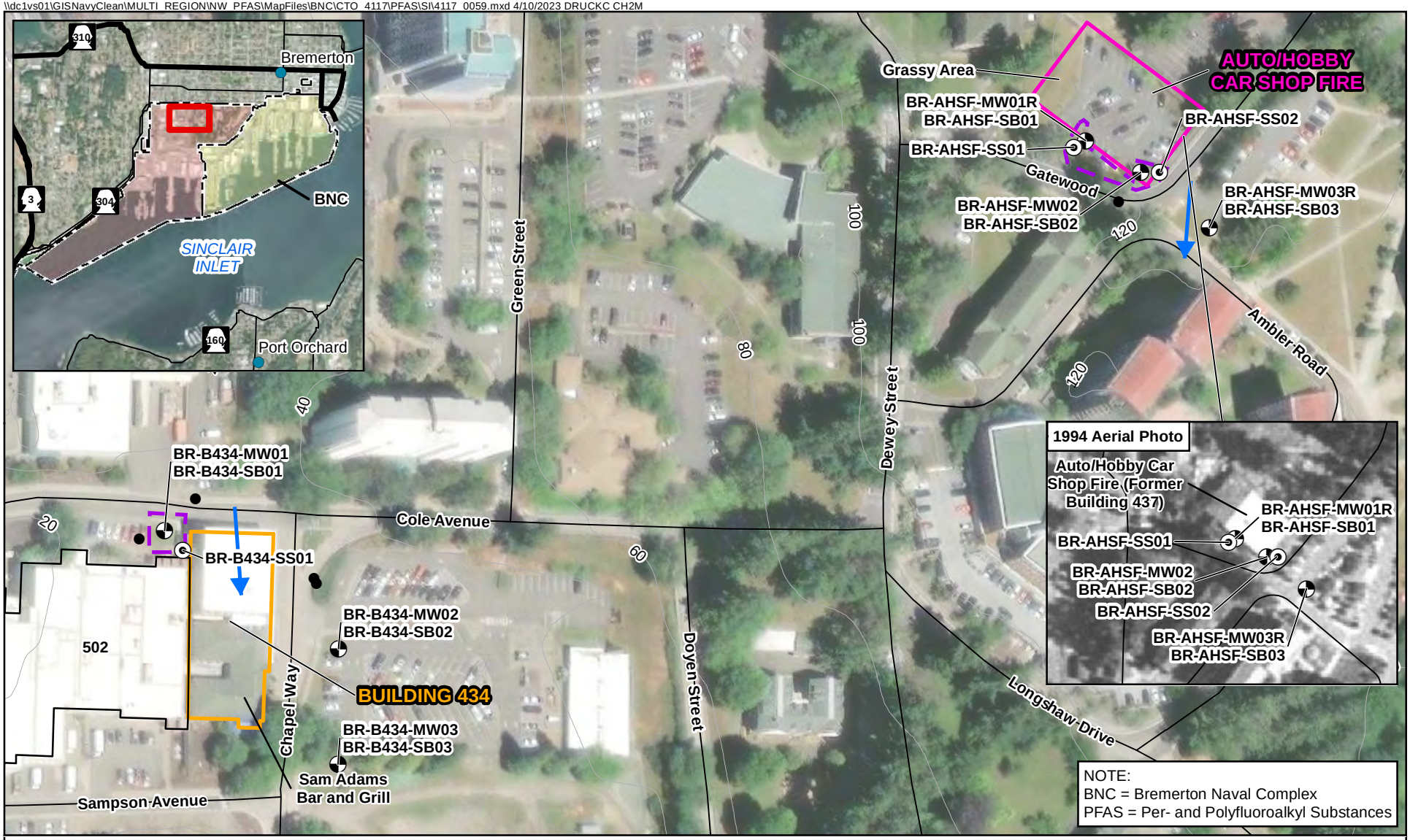

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Local Connecting Road
- 20' Topographic Contours
- Unpaved Area
- Building/Structure
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

Figure 4-4
Potential and Confirmed PFAS Release Areas:
North NBK Bremerton
Site Inspection for PFAS
BNC, Bremerton, Washington

0 75 150 Feet
1 inch = 150 feet
N

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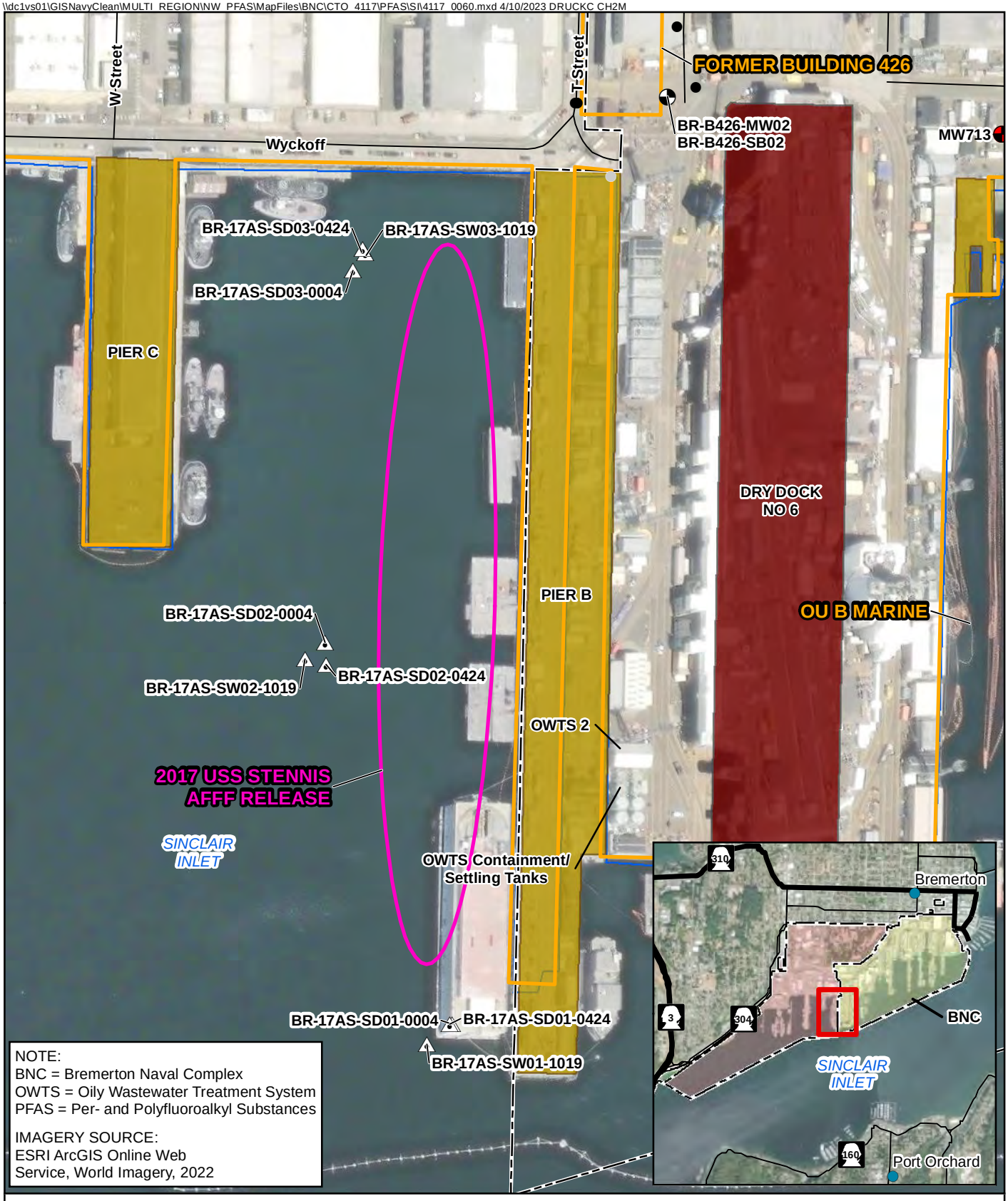

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Sediment and Surface Water Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Discharge
- Stormwater Catch Basin
- Local Connecting Road
- Sinclair Inlet
- Dock
- Drydock
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Railroad

Figure 4-5
Confirmed PFAS Release Areas: South BNC
Site Inspection for PFAS
BNC, Bremerton, Washington

0 100 200 Feet
1 inch = 200 feet
N

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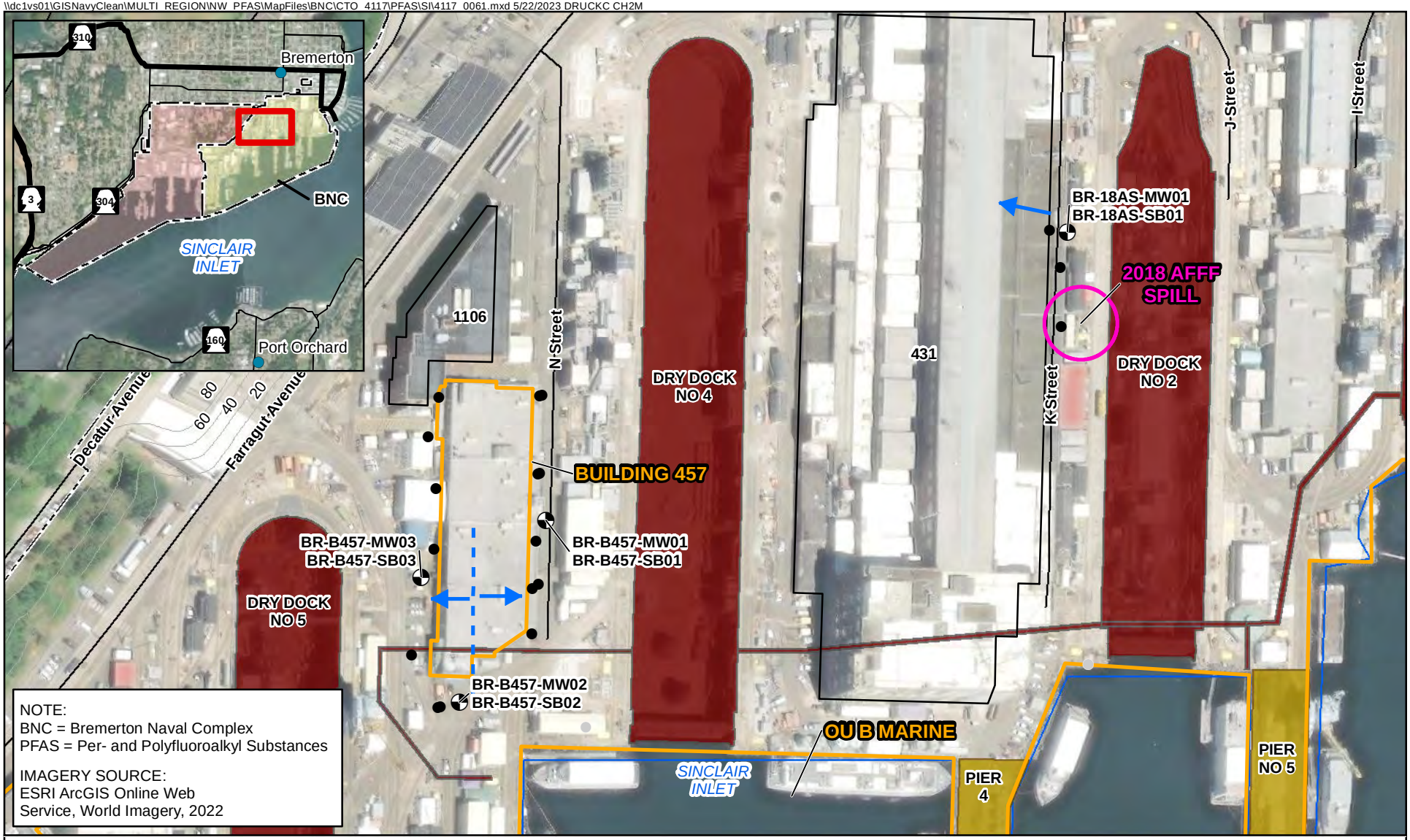

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Discharge
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Divde (drydock 6 flooded)
- Local Connecting Road
- Sinclair Inlet
- 20' Topographic Contours
- Building/Structure
- Dock
- Drydock
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-6
Potential and Confirmed PFAS Release Areas:
Central PSNS and IMF
Site Inspection for PFAS
BNC, Bremerton, Washington

0 100 200 Feet

1 inch = 200 feet

N

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NOTE:
BNC = Bremerton Naval Complex
OU = Operable Unit
PFAS = Per- and Polyfluoroalkyl Substances

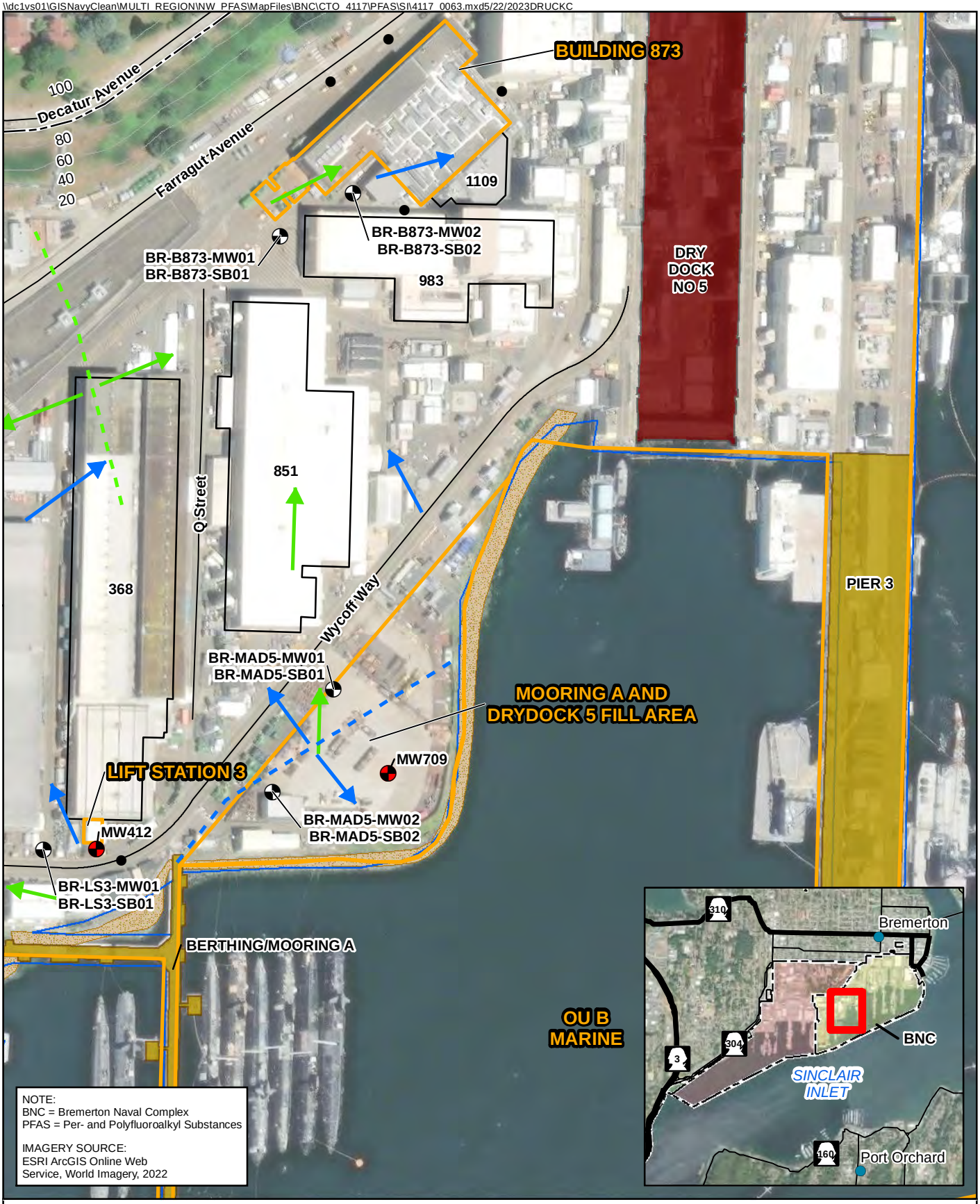
IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- State Route
- Local Connecting Road
- Important Local Road
- Sinclair Inlet
- 20' Topographic Contours
- Dock
- Riprap Shore Protection
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-7
Potential PFAS Release Area: Southwest BNC
Site Inspection for PFAS
BNC, Bremerton, Washington

0 150 300 Feet
1 inch = 300 feet
N



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Groundwater Divide (drydock 6 flooded)
- Groundwater Divide (all drydocks empty)
- Local Connecting Road
- Sinclair Inlet
- 20' Topographic Contours
- Building/Structure
- Dock
- Drydock
- Potential PFAS Release Area
- Riprap Shore Protection
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-8
Potential PFAS Release Areas: South PSNS and IMF
Site Inspection for PFAS
BNC, Bremerton, Washington

0 100 200 Feet

1 inch = 200 feet

N

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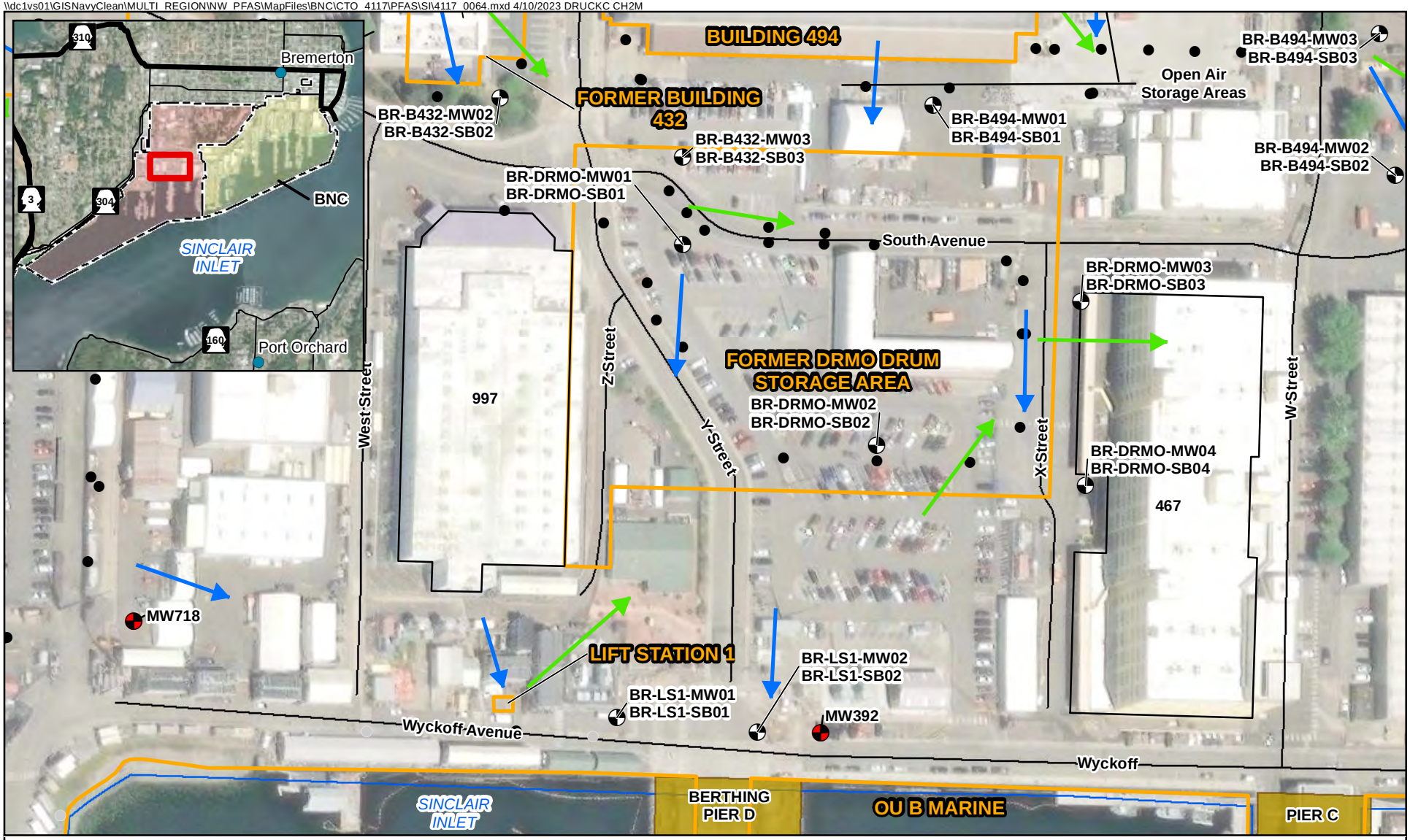

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Sinclair Inlet
- Building/Structure
- Potential PFAS Release Area
- Dock
- Installation Boundary
- NBK Bremerton
- Puget Sound
- Naval Shipyard
- Navy Railroad

Figure 4-9

Potential PFAS Release Areas: South Central NBK Bremerton

Site Inspection for PFAS

BNC, Bremerton, Washington

NOTE:
BNC = Bremerton Naval Complex
DRMO = Drum Reutilization Marketing Office
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 75 150 Feet

1 inch = 150 feet

N

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LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well
- Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Groundwater Divide (drydock 6 flooded)
- Groundwater Divide (all drydocks empty)
- Local Connecting Road
- Sinclair Inlet
- Building/Structure
- Drydock
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 87.5 175 Feet

1 inch = 175 feet

N

Figure 4-10
Potential PFAS Release Areas: Central BNC
Site Inspection for PFAS
BNC, Bremerton, Washington

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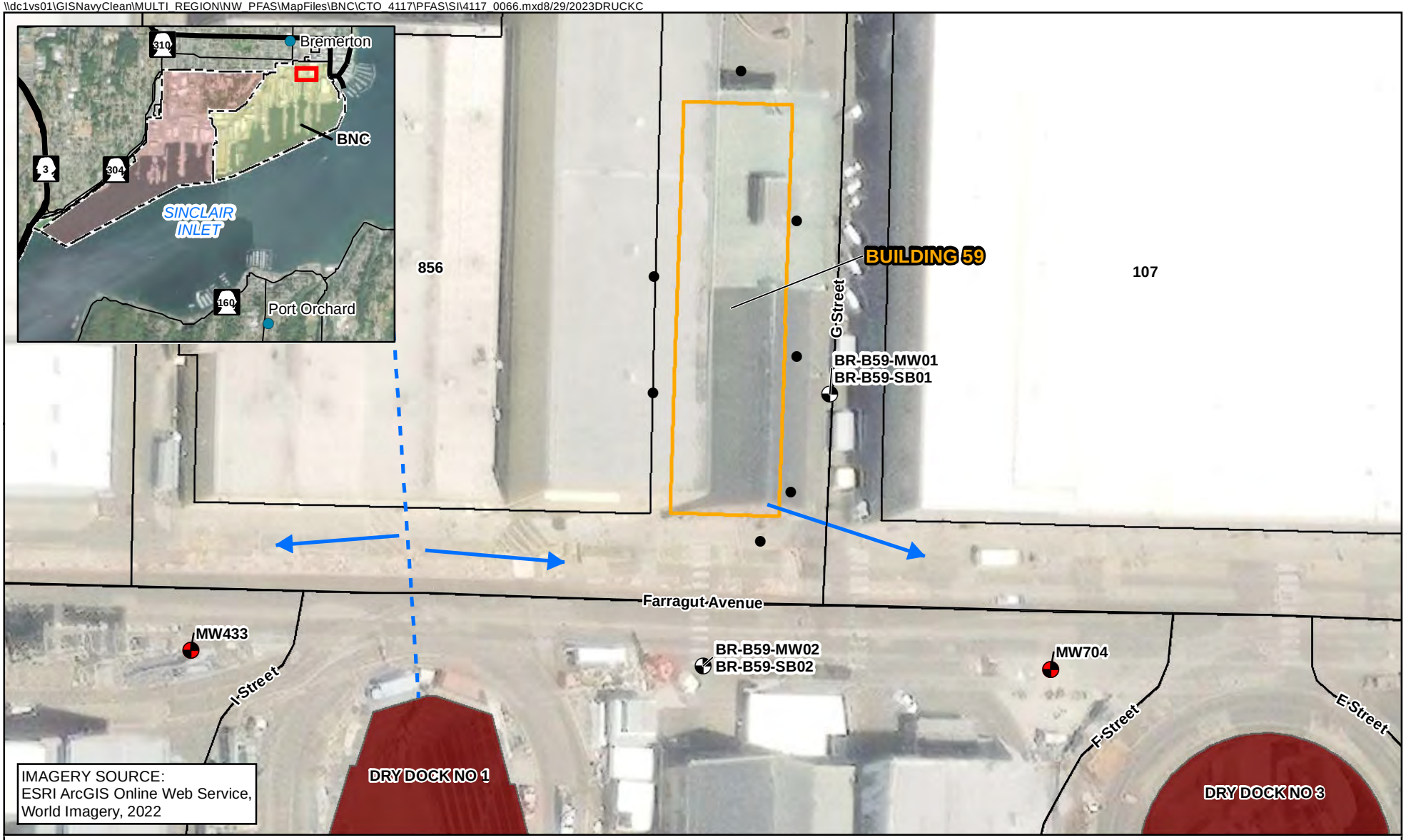

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well
- Groundwater Sampling Location
- Stormwater Catch Basin
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Divide (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Building/Structure
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
Location of 2001 Aircraft Carrier AFFF Spill is not known
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

0 37.5 75 Feet

1 inch = 75 feet

N

Figure 4-11
Potential PFAS Release Area - Northeast PSNS and IMF
Site Inspection for PFAS
BNC, Bremerton, Washington

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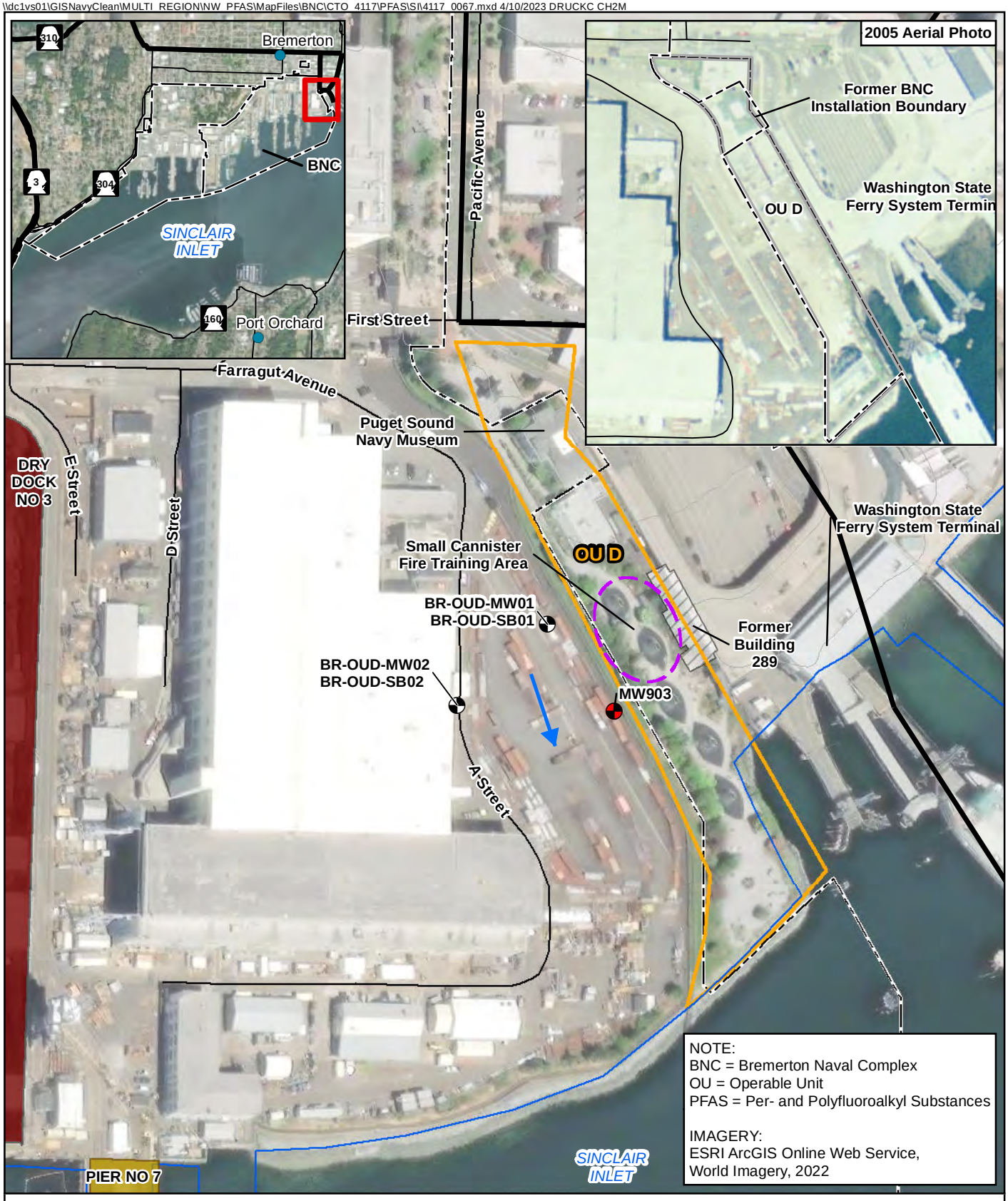
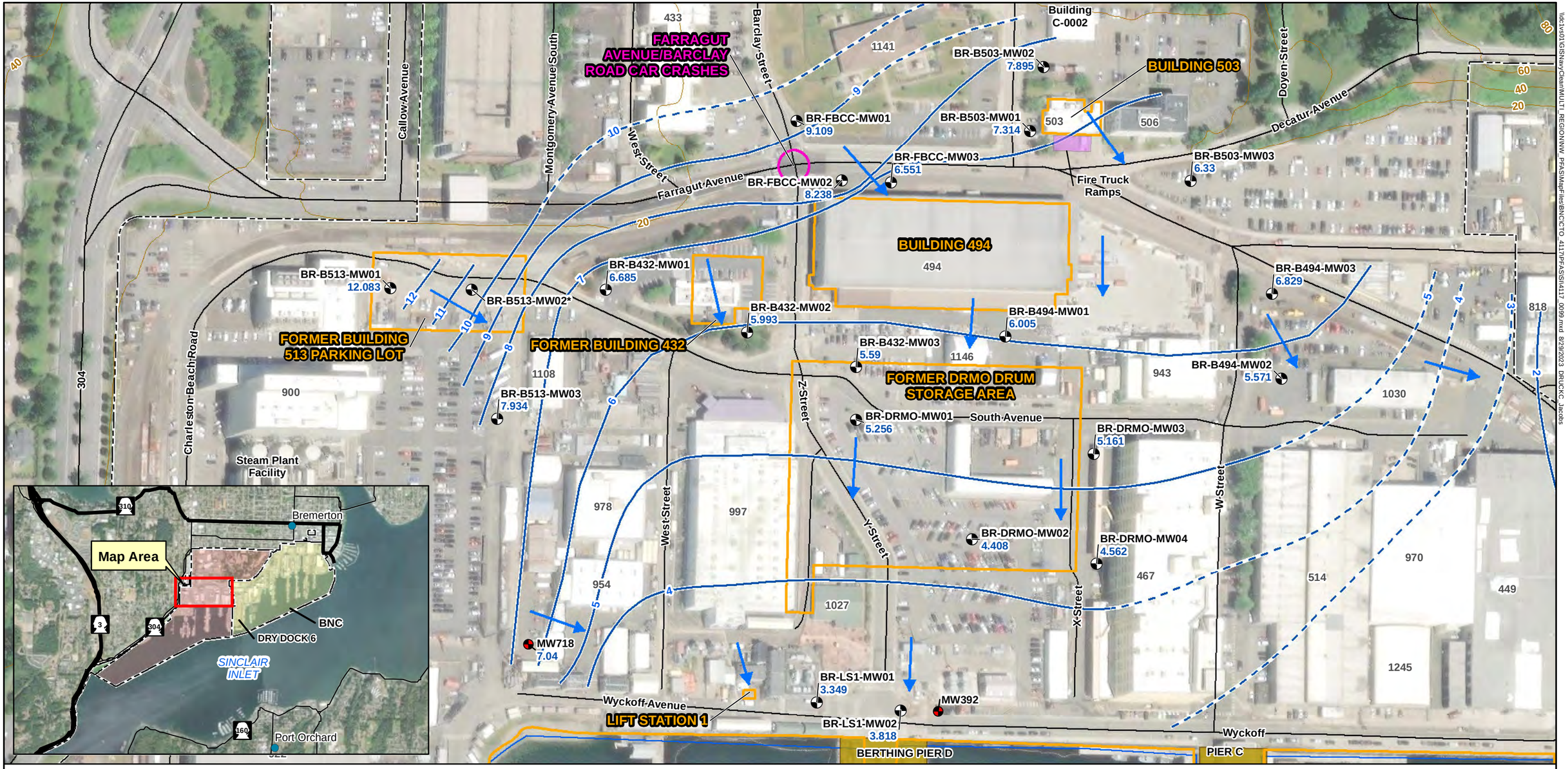


LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- State Route
- Local Connecting Road
- Sinclair Inlet
- Potential PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- Approximate Small Cannister Fire Training Area Boundary

Figure 4-12
Potential PFAS Release Area - OU D
Site Inspection for PFAS
BNC, Bremerton, Washington

0 87.5 175 Feet
1 inch = 175 feet
N



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (dashed where inferred) (drydock 6 flooded)
- 20' Topographic Contours
- Local Connecting Road
- Fire Truck Ramp
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Dock
- WA_Waterbodies
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances
* The groundwater elevation measured at BR-B513-MW02 is not displayed because the well is screened in a deeper formation than the rest of the wells on this figure.

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 75 150
1 inch = 175 feet

N

Figure 4-13a
Potentiometric Map (Drydock 6 Flooded): Central NBK Bremerton
Site Inspection for PFAS
BNC, Bremerton, Washington

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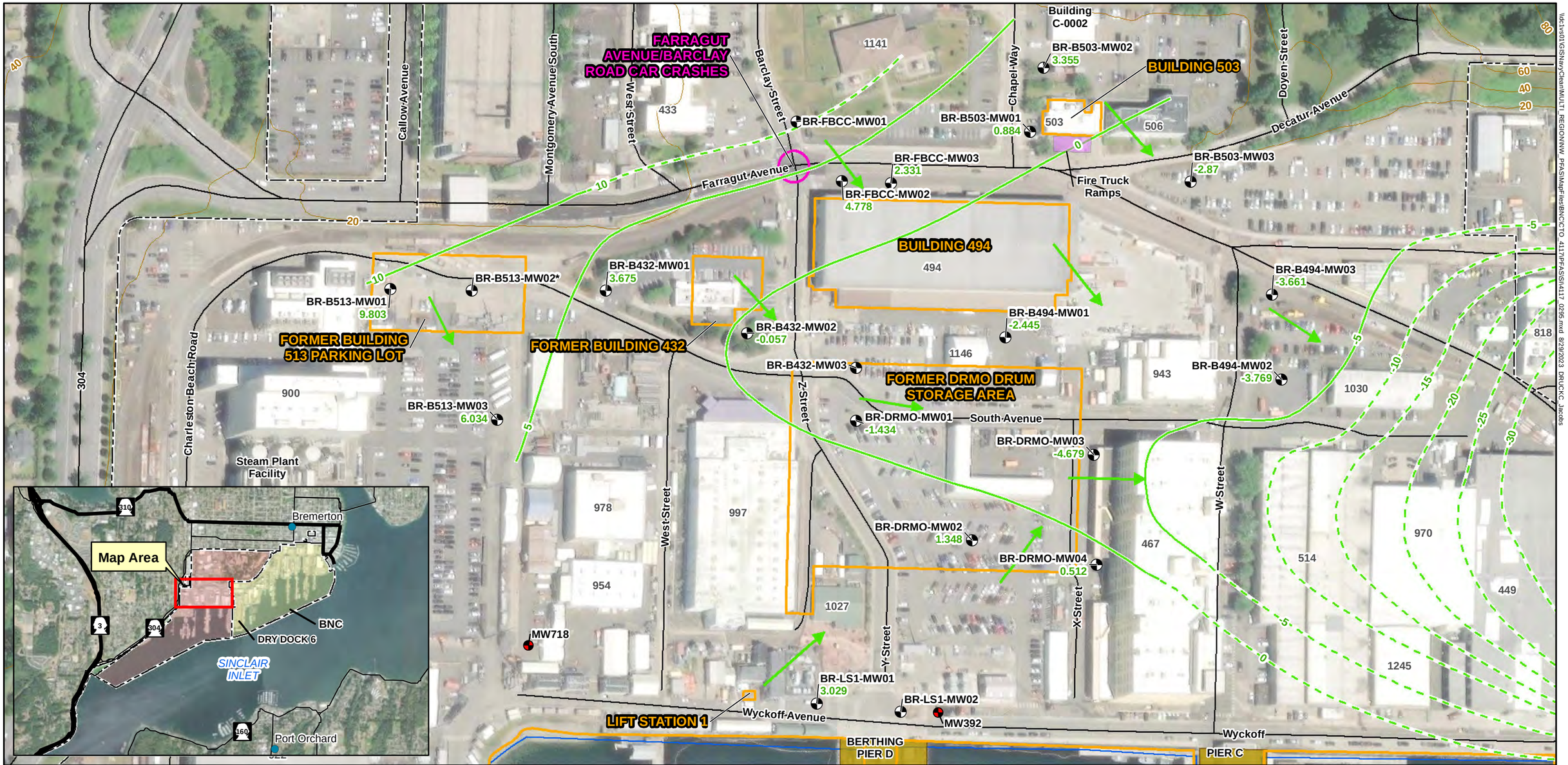

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (all drydocks empty)
- Groundwater Elevation Contour (dashed where inferred) (all drydocks empty)
- 20' Topographic Contours
- Local Connecting Road
- Fire Truck Ramp
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Dock
- WA_Waterbodies
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

Figure 4-13b
Potentiometric Map (All Drydocks Empty): Central NBK Bremerton
Site Inspection for PFAS
BNC, Bremerton, Washington

BR-B513-MW01 = well ID
12.083 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances
* The groundwater elevation measured at BR-B513-MW02 is not displayed because the well is screened in a deeper formation than the rest of the wells on this figure.

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 75 150
1 inch = 175 feet

N

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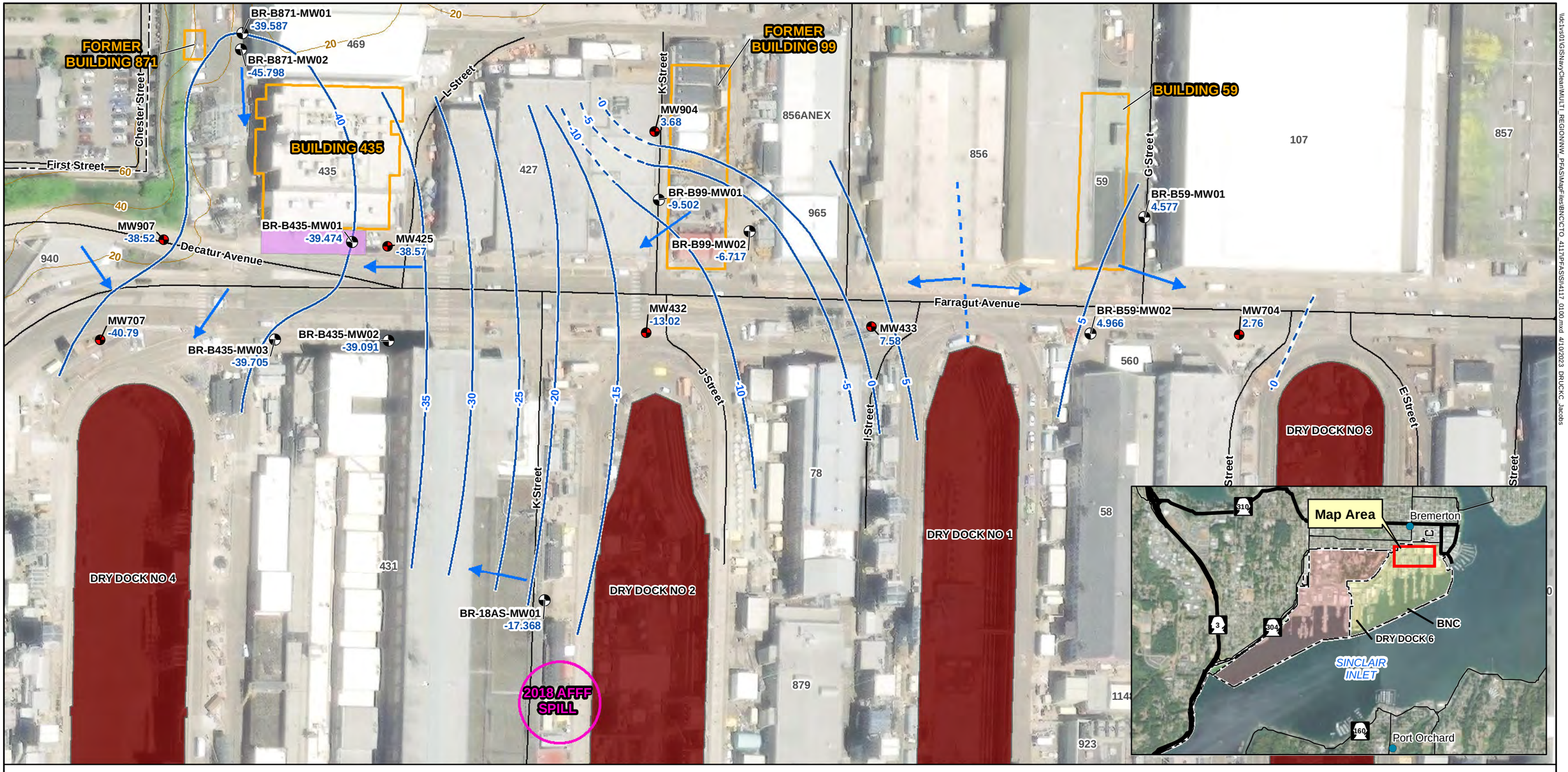

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (dashed where inferred) (drydock 6 flooded)
- Groundwater Divide (drydock 6 flooded)
- Local Connecting Road
- 20' Topographic Contours
- Fire Truck Ramp
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

Figure 4-14
Potentiometric Map: North PSNS
Site Inspection for PFAS
BNC, Bremerton, Washington

0 62.5 125
1 inch = 125 feet
N

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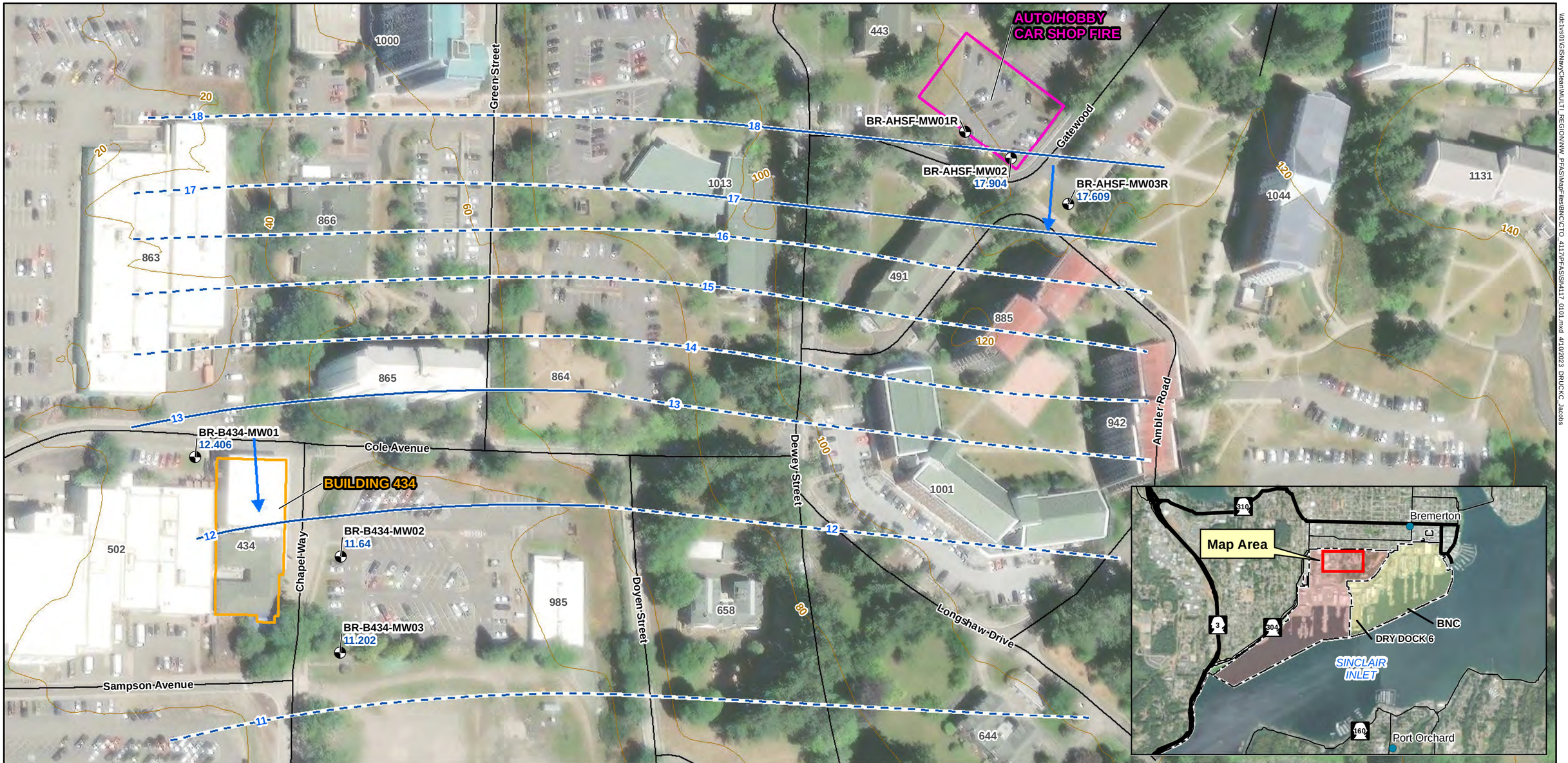

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (dashed where inferred) (drydock 6 flooded)
- Local Connecting Road
- 20' Topographic Contours
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 62.5 125
1 inch = 125 feet

N

Figure 4-15
Potentiometric Map: North NBK Bremerton
Site Inspection for PFAS
BNC, Bremerton, Washington

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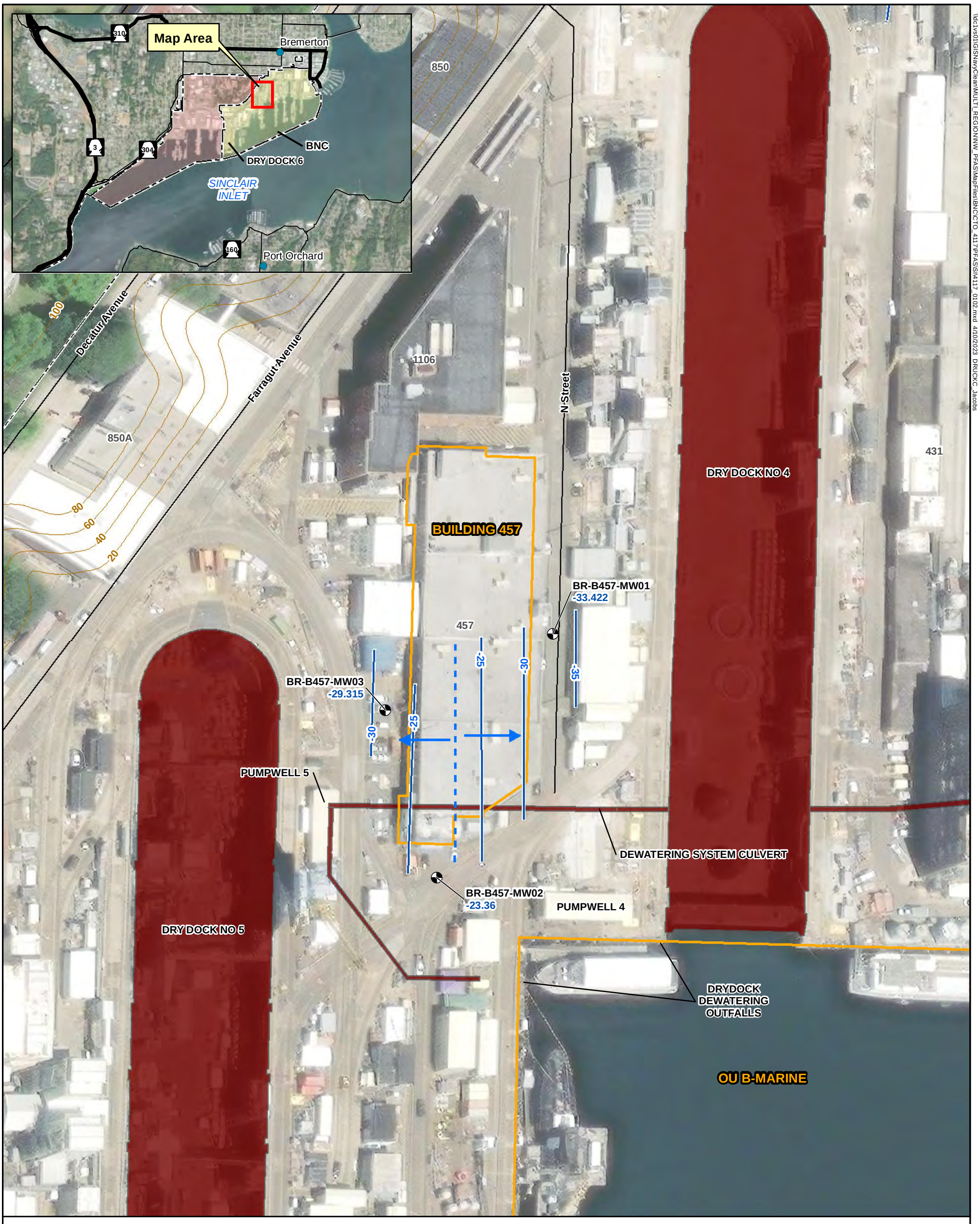

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (drydock 6 flooded)
- Groundwater Divide (drydock 6 flooded)
- 20' Topographic Contours
- Local Connecting Road
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 50 100
1 inch = 100 feet
N

Figure 4-16
Potentiometric Map: Building 457
Site Inspection for PFAS
BNC, Bremerton, Washington

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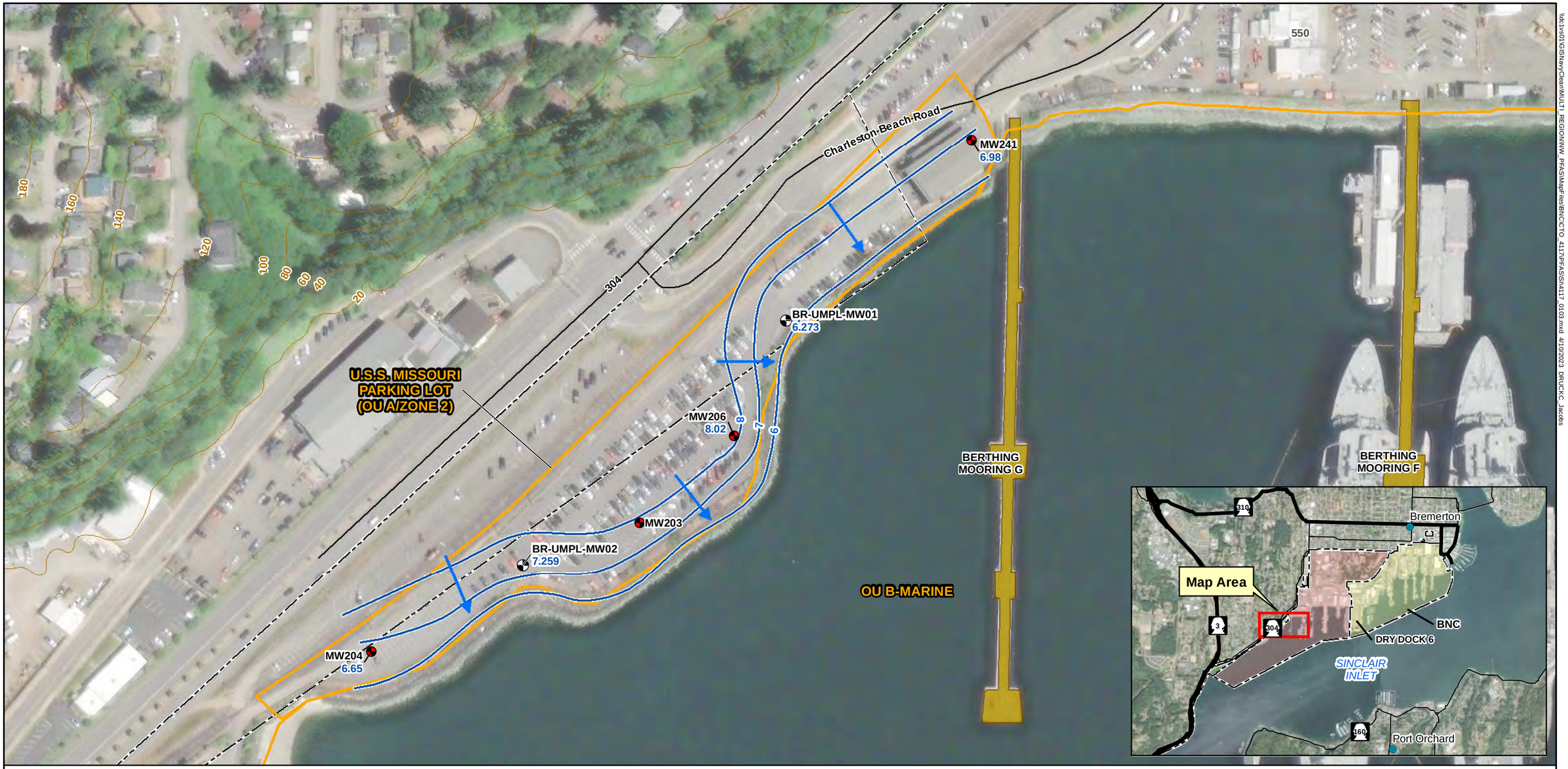

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (drydock 6 flooded)
- Local Connecting Road
- 20' Topographic Contours
- Potential PFAS Release Area
- Dock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

Figure 4-17
Potentiometric Map: USS Missouri Parking Lot
Site Inspection for PFAS
BNC, Bremerton, Washington

0 75 150
1 inch = 150 feet
N

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LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (dashed where inferred) (drydock 6 flooded)
- Groundwater Divide (drydock 6 flooded)
- 20' Topographic Contours
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

Figure 4-18a
Potentiometric Map (Drydock 6 Flooded): South PSNS
Site Inspection for PFAS
BNC, Bremerton, Washington

0 87.5 175
1 inch = 175 feet
N



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (all drydocks empty)
- Groundwater Elevation Contour (dashed where inferred) (all drydocks empty)
- Groundwater Divide (all drydocks empty)
- 20' Topographic Contours
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
12.083 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

Figure 4-18b
Potentiometric Map (All Drydocks Empty): South PSNS
Site Inspection for PFAS
BNC, Bremerton, Washington

0 87.5 175
1 inch = 175 feet
N

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LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Elevation Contour (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

BR-B513-MW01 = well ID
9.803 = groundwater elevation (drydock 6 flooded) - ft amsl

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 50 100
1 inch = 100 feet
N

Figure 4-19
Potentiometric Map: OU D
Site Inspection for PFAS
BNC, Bremerton, Washington

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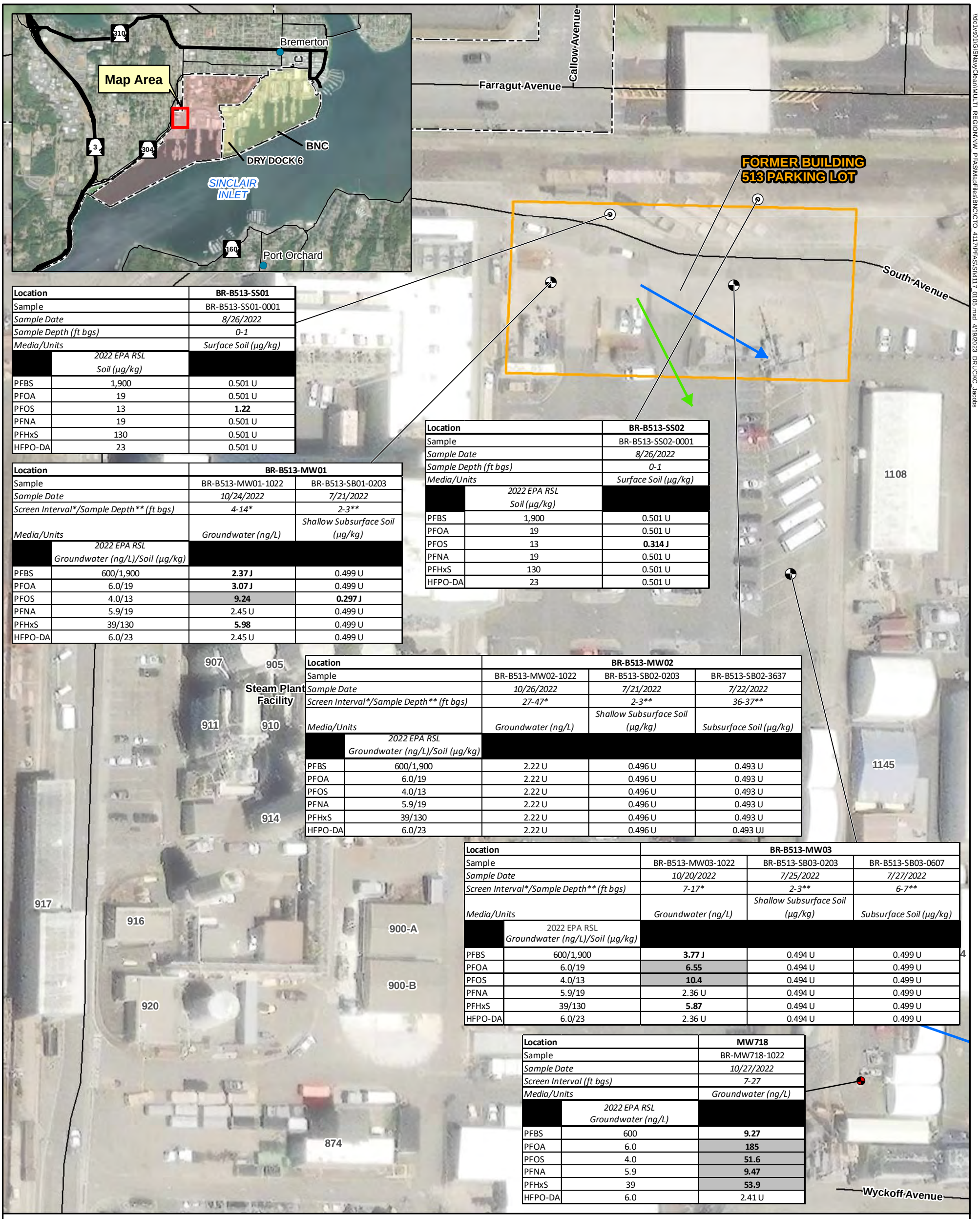

Location	BR-B513-SS01
Sample	BR-B513-SS01-0001
Sample Date	*8/26/2022*
Sample Depth (ft bgs)	*0-1*
Media/Units	*Surface Soil (µg/kg)*
2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.501 U
PFOA	19	0.501 U
PFOS	13	**1.22**
PFNA	19	0.501 U
PFHxS	130	0.501 U
HFPO-DA	23	0.501 U

Location	BR-B513-SS02
Sample	BR-B513-SS02-0001
Sample Date	*8/26/2022*
Sample Depth (ft bgs)	*0-1*
Media/Units	*Surface Soil (µg/kg)*
2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.501 U
PFOA	19	0.501 U
PFOS	13	**0.314 J**
PFNA	19	0.501 U
PFHxS	130	0.501 U
HFPO-DA	23	0.501 U

Location	BR-B513-MW01	
Sample	BR-B513-MW01-1022	BR-B513-SB01-0203
Sample Date	*10/24/2022*	*7/21/2022*
Screen Interval/Sample Depth** (ft bgs)*	*4-14**	*2-3***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)		
PFBS	600/1,900	**2.37 J**	0.499 U
PFOA	6.0/19	**3.07 J**	0.499 U
PFOS	4.0/13	**9.24**	**0.297 J**
PFNA	5.9/19	2.45 U	0.499 U
PFHxS	39/130	**5.98**	0.499 U
HFPO-DA	6.0/23	2.45 U	0.499 U

Location	BR-B513-MW02		
Sample	BR-B513-MW02-1022	BR-B513-SB02-0203	BR-B513-SB02-3637
Sample Date	*10/26/2022*	*7/21/2022*	*7/22/2022*
Screen Interval/Sample Depth** (ft bgs)*	*27-47**	*2-3***	*36-37***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	2.22 U	0.496 U	0.493 U
PFOA	6.0/19	2.22 U	0.496 U	0.493 U
PFOS	4.0/13	2.22 U	0.496 U	0.493 U
PFNA	5.9/19	2.22 U	0.496 U	0.493 U
PFHxS	39/130	2.22 U	0.496 U	0.493 U
HFPO-DA	6.0/23	2.22 U	0.496 U	0.493 UJ

Location	BR-B513-MW03		
Sample	BR-B513-MW03-1022	BR-B513-SB03-0203	BR-B513-SB03-0607
Sample Date	*10/20/2022*	*7/25/2022*	*7/27/2022*
Screen Interval/Sample Depth** (ft bgs)*	*7-17**	*2-3***	*6-7***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**3.77 J**	0.494 U	0.499 U
PFOA	6.0/19	**6.55**	0.494 U	0.499 U
PFOS	4.0/13	**10.4**	0.494 U	0.499 U
PFNA	5.9/19	2.36 U	0.494 U	0.499 U
PFHxS	39/130	**5.87**	0.494 U	0.499 U
HFPO-DA	6.0/23	2.36 U	0.494 U	0.499 U

Location	MW718
Sample	BR-MW718-1022
Sample Date	*10/27/2022*
Screen Interval (ft bgs)	*7-27*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**9.27**
PFOA	6.0	**185**
PFOS	4.0	**51.6**
PFNA	5.9	**9.47**
PFHxS	39	**53.9**
HFPO-DA	6.0	2.41 U

LEGEND

- Monitoring Well Installation/ Groundwater Sampling/Soil Sampling Location
- Shallow Subsurface Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Potential PFAS Release Area
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 30 60
1 inch = 75 feet

N

Figure 4-20
PFAS Results: Former Building 513 Parking Lot
Site Inspection for PFAS
BNC, Bremerton, Washington

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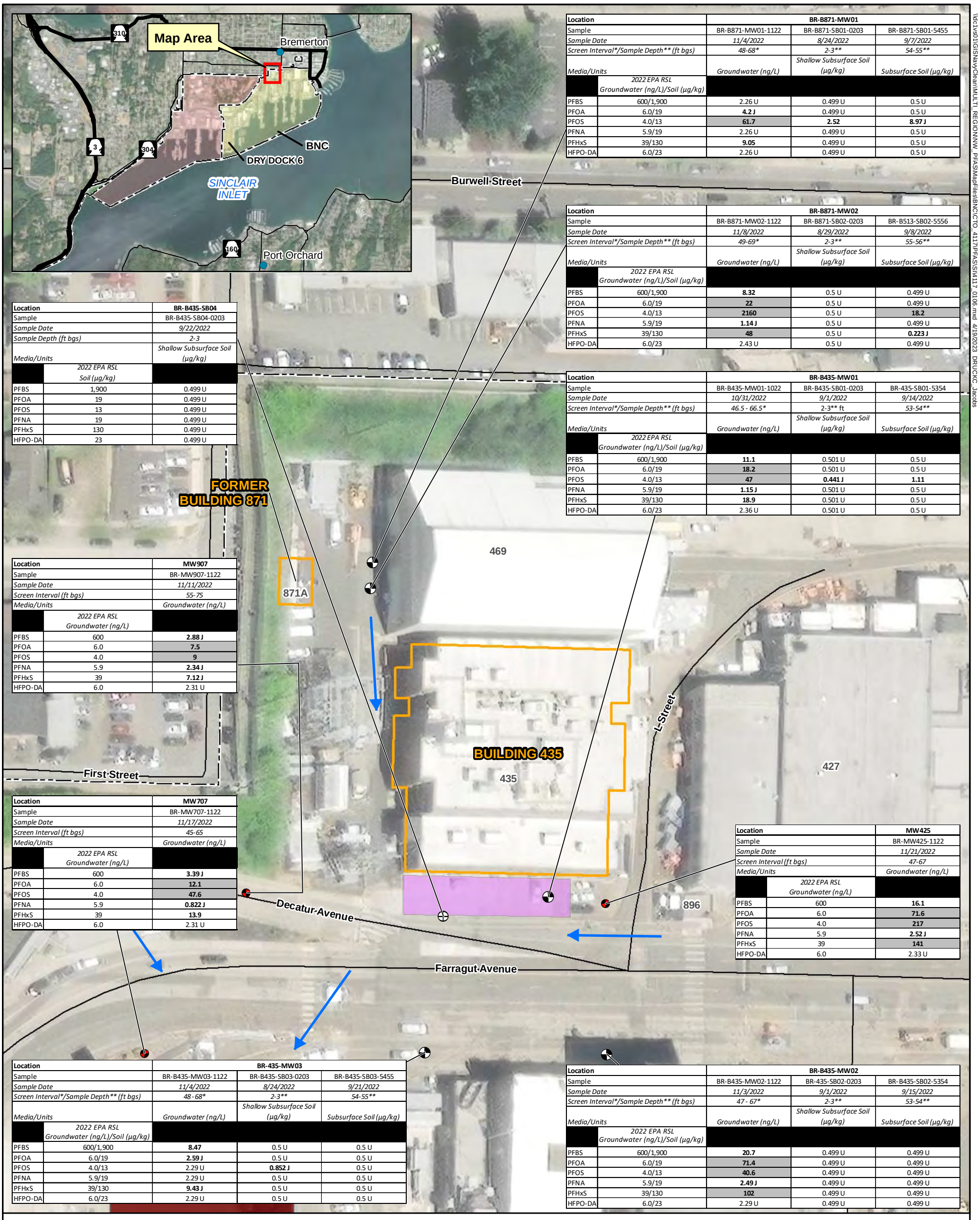

Location	BR-B435-SB04
Sample	BR-B435-SB04-0203
Sample Date	*9/22/2022*
Sample Depth (ft bgs)	*2-3*
Media/Units	*Shallow Subsurface Soil (µg/kg)*
2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.499 U
PFOA	19	0.499 U
PFOS	13	0.499 U
PFNA	19	0.499 U
PFHxS	130	0.499 U
HFPO-DA	23	0.499 U

Location	MW907
Sample	BR-MW907-1122
Sample Date	*11/11/2022*
Screen Interval (ft bgs)	*55-75*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**2.88 J**
PFOA	6.0	**7.5**
PFOS	4.0	**9**
PFNA	5.9	**2.34 J**
PFHxS	39	**7.12 J**
HFPO-DA	6.0	2.31 U

Location	MW707
Sample	BR-MW707-1122
Sample Date	*11/17/2022*
Screen Interval (ft bgs)	*45-65*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**3.39 J**
PFOA	6.0	**12.1**
PFOS	4.0	**47.6**
PFNA	5.9	**0.822 J**
PFHxS	39	**13.9**
HFPO-DA	6.0	2.31 U

Location	BR-B435-MW03		
Sample	BR-B435-MW03-1122	BR-B435-SB03-0203	BR-B435-SB03-5455
Sample Date	*11/4/2022*	*8/24/2022*	*9/21/2022*
Screen Interval/Sample Depth** (ft bgs)*	*48 - 68**	*2-3***	*54-55***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**8.47**	0.5 U	0.5 U
PFOA	6.0/19	**2.59 J**	0.5 U	0.5 U
PFOS	4.0/13	2.29 U	**0.852 J**	0.5 U
PFNA	5.9/19	2.29 U	0.5 U	0.5 U
PFHxS	39/130	**9.43 J**	0.5 U	0.5 U
HFPO-DA	6.0/23	2.29 U	0.5 U	0.5 U

Location	BR-B871-MW01		
Sample	BR-B871-MW01-1122	BR-B871-SB01-0203	BR-B871-SB01-5455
Sample Date	*11/4/2022*	*8/24/2022*	*9/7/2022*
Screen Interval/Sample Depth** (ft bgs)*	*48-68**	*2-3***	*54-55***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	2.26 U	0.499 U	0.5 U
PFOA	6.0/19	**4.2 J**	0.499 U	0.5 U
PFOS	4.0/13	**61.7**	**2.52**	**8.97 J**
PFNA	5.9/19	2.26 U	0.499 U	0.5 U
PFHxS	39/130	**9.05**	0.499 U	0.5 U
HFPO-DA	6.0/23	2.26 U	0.499 U	0.5 U

Location	BR-B871-MW02		
Sample	BR-B871-MW02-1122	BR-B871-SB02-0203	BR-B513-SB02-5556
Sample Date	*11/8/2022*	*8/29/2022*	*9/8/2022*
Screen Interval/Sample Depth** (ft bgs)*	*49-69**	*2-3***	*55-56***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**8.32**	0.5 U	0.499 U
PFOA	6.0/19	**22**	0.5 U	0.499 U
PFOS	4.0/13	**2160**	0.5 U	**18.2**
PFNA	5.9/19	**1.14 J**	0.5 U	0.499 U
PFHxS	39/130	**48**	0.5 U	**0.223 J**
HFPO-DA	6.0/23	2.43 U	0.5 U	0.499 U

Location	BR-B435-MW01		
Sample	BR-B435-MW01-1022	BR-B435-SB01-0203	BR-435-SB01-5354
Sample Date	*10/31/2022*	*9/1/2022*	*9/14/2022*
Screen Interval/Sample Depth** (ft bgs)*	*46.5 - 66.5**	2-3** ft	*53-54***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**11.1**	0.501 U	0.5 U
PFOA	6.0/19	**18.2**	0.501 U	0.5 U
PFOS	4.0/13	**47**	**0.441 J**	**1.11**
PFNA	5.9/19	**1.15 J**	0.501 U	0.5 U
PFHxS	39/130	**18.9**	0.501 U	0.5 U
HFPO-DA	6.0/23	2.36 U	0.501 U	0.5 U

Location	MW425
Sample	BR-MW425-1122
Sample Date	*11/21/2022*
Screen Interval (ft bgs)	*47-67*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**16.1**
PFOA	6.0	**71.6**
PFOS	4.0	**217**
PFNA	5.9	**2.52 J**
PFHxS	39	**141**
HFPO-DA	6.0	2.33 U

Location	BR-B435-MW02		
Sample	BR-B435-MW02-1122	BR-435-SB02-0203	BR-B435-SB02-5354
Sample Date	*11/3/2022*	*9/1/2022*	*9/15/2022*
Screen Interval/Sample Depth** (ft bgs)*	*47 - 67**	*2-3***	*53-54***
Media/Units	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**20.7**	0.499 U	0.499 U
PFOA	6.0/19	**71.4**	0.499 U	0.499 U
PFOS	4.0/13	**40.6**	0.499 U	0.499 U
PFNA	5.9/19	**2.49 J**	0.499 U	0.499 U
PFHxS	39/130	**102**	0.499 U	0.499 U
HFPO-DA	6.0/23	2.29 U	0.499 U	0.499 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Shallow Subsurface Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Fire Truck Ramp
- Local Connecting Road
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
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PFAS = Per- and Polyfluoroalkyl Substances
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PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-21
PFAS Results: Building 435 and Former Building 871
Site Inspection for PFAS
BNC, Bremerton, Washington

0 37.5 75
1 inch = 75 feet
N

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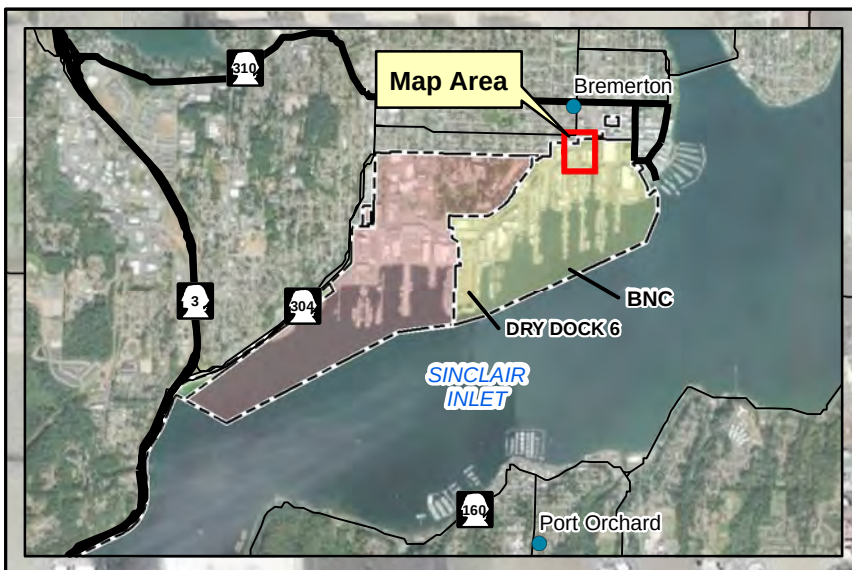

Location		BR-FB99-MW01		
Sample		BR-FB99-MW01-1122	BR-FB99-SB01-0203	BR-FB99-SB01-26H27H
Sample Date		*11/15/2022*	*9/27/2022*	*10/4/2022*
Screen Interval/Sample Depth** (ft bgs)*		*20-40**	*2-3***	*26.5-27.5***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**2.71 J**	0.499 U	0.5 U
PFOA	6.0/19	**21.1**	0.499 U	0.5 U
PFOS	4.0/13	**15.5**	**0.213 J**	0.5 U
PFNA	5.9/19	2.19 U	0.499 U	0.5 U
PFHxS	39/130	**19.3**	0.499 U	0.5 U
HFPO-DA	6.0/23	2.19 U	0.499 U	0.5 U

Location	MW904
Sample	BR-MW904-1122
Sample Date	*11/9/2022*
Screen Interval (ft bgs)	*7-27*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	**6.23**
PFOA 6.0	**3.42 J**
PFOS 4.0	**3.87 J**
PFNA 5.9	2.24 U
PFHxS 39	**3.22 J**
HFPO-DA 6.0	2.24 U

Location	BR-FB99-SB04
Sample	BR-B99-SB04-0203
Sample Date	*9/22/2022*
Sample Depth (ft bgs)	*2-3*
Media/Units	*Shallow Subsurface Soil (µg/kg)*
2022 EPA RSL Soil (µg/kg)	
PFBS 1,900	0.499 U
PFOA 19	0.499 U
PFOS 13	**0.628 J**
PFNA 19	0.499 U
PFHxS 130	**0.368 J**
HFPO-DA 23	0.499 U

Location	MW433
Sample	BR-MW433-1122
Sample Date	*11/11/2022*
Screen Interval (ft bgs)	*48-63*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	**2.64 J**
PFOA 6.0	**3.46 J**
PFOS 4.0	**2.87 J**
PFNA 5.9	**2.14 J**
PFHxS 39	2.37 U
HFPO-DA 6.0	2.37 U

Location	MW432
Sample	BR-MW432-1122
Sample Date	*11/15/2022*
Screen Interval (ft bgs)	*30-50*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	**3.14 J**
PFOA 6.0	**6.3**
PFOS 4.0	**26.4**
PFNA 5.9	2.28 U
PFHxS 39	**4.61**
HFPO-DA 6.0	2.28 U

Location		BR-FB99-MW02		
Sample		BR-FB99-MW02-1122	BR-FB99-SB02-0203	BR-FB99-SB02-2425
Sample Date		*11/18/2022*	*9/27/2022*	*10/3/2022*
Screen Interval/Sample Depth** (ft bgs)*		*17-37**	*2-3***	*24-25***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL Groundwater (ng/L)/Soil (µg/kg)			
PFBS	600/1,900	**2.24 J**	0.5 U	0.5 U
PFOA	6.0/19	**5.2**	0.5 U	0.5 U
PFOS	4.0/13	**7.01**	0.5 U	0.5 U
PFNA	5.9/19	2.33 U	0.5 U	0.5 U
PFHxS	39/130	**6.26**	0.5 U	0.5 U
HFPO-DA	6.0/23	2.33 U	0.5 U	0.5 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Shallow Subsurface Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Divde (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

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NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

0 37.5 75
1 inch = 75 feet
N

Figure 4-22
PFAS Results: Former Building 99
Site Inspection for PFAS
BNC, Bremerton, Washington

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Location		BR-B503-SS02
Sample		BR-B503-SS02-0001
Sample Date		*8/4/2022*
Sample Depth (ft bgs)		*0-1*
Media/Units		*Subsurface Soil (µg/kg)*
	2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.502 U
PFOA	19	**0.38 J**
PFOS	13	**12.8**
PFNA	19	**0.162 J**
PFHxS	130	**0.392 J**
HFPO-DA	23	0.502 U

Location		BR-B503-MW02		
Sample		BR-B503-MW02-1022	BR-B503-SB02-0203	BR-B503-SB02-1213*
Sample Date		*10/25/2022*	*8/2/2022*	*8/9/2022*
Screen Interval/Sample Depth** (ft bgs)		*15-25**	*2-3***	*12-13***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**4.39 J**	0.499 U	0.501 U
PFOA	6.0/19	**193**	0.499 U	0.501 U
PFOS	4.0/13	**29.6**	0.499 U	**4.08**
PFNA	5.9/19	2.3 U	0.499 U	0.501 U
PFHxS	39/130	**31.1**	0.499 U	**0.184 J**
HFPO-DA	6.0/23	2.3 U	0.499 U	0.501 U

Location		BR-B503-MW01		
Sample		BR-B503-MW01-1122	BR-B503-SB01-0203	BR-B503-SB01-1011
Sample Date		*11/1/2022*	*8/3/2022*	*8/5/2022*
Screen Interval/Sample Depth** (ft bgs)		*11-31**	*2-3***	*10-11***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**3.74 J**	0.547 U	0.617 U
PFOA	6.0/19	**208**	0.547 U	**0.422 J**
PFOS	4.0/13	**16.8**	**1.96**	**0.237 J**
PFNA	5.9/19	**1.53 J**	0.547 U	0.617 U
PFHxS	39/130	**23.7**	**0.355 J**	**0.272 J**
HFPO-DA	6.0/23	2.42 U	0.547 U	0.617 U

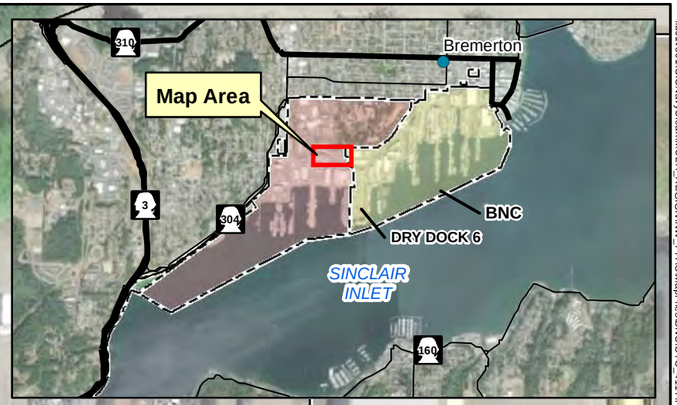
Location		BR-B503-SS01
Sample		BR-B503-SS01-0001
Sample Date		*8/4/2022*
Sample Depth (ft bgs)		*0-1*
Media/Units		*Surface Soil (µg/kg)*
	2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.501 U
PFOA	19	0.501 U
PFOS	13	**1.79**
PFNA	19	0.501 U
PFHxS	130	0.501 U
HFPO-DA	23	0.501 U

Location		BR-B503-MW03		
Sample		BR-B503-MW03-1022	BR-B503-SB03-0203	BR-B503-SB03-1920
Sample Date		*10/31/2022*	*8/3/2022*	*8/8/2022*
Screen Interval/Sample Depth** (ft bgs)		*20-30**	*2-3***	*19-20***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**4.5 J**	0.591 U	0.62 U
PFOA	6.0/19	**36.5**	0.591 U	0.62 U
PFOS	4.0/13	**25.1 J**	**2.16**	0.62 U
PFNA	5.9/19	**1.12 J**	0.591 U	0.62 U
PFHxS	39/130	**31.8**	0.591 U	0.62 U
HFPO-DA	6.0/23	2.29 U	0.591 U	0.62 U

Location		BR-B494-MW03	
Sample		BR-B494-MW03-1122	BR-B494-SB03-1415
Sample Date		*11/2/2022*	*8/15/2022*
Screen Interval/Sample Depth** (ft bgs)		*48-68**	*14-15***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**3.31 J**	0.498 U
PFOA	6.0/19	**25.7**	0.498 U
PFOS	4.0/13	**471**	**0.704 J**
PFNA	5.9/19	**3.1 J**	0.498 U
PFHxS	39/130	**124**	0.498 U
HFPO-DA	6.0/23	2.49 U	0.498 U

Location		BR-B494-MW01		
Sample		BR-B494-MW01-1122	BR-B494-SB01-0203	BR-B494-SB01-1415
Sample Date		*11/2/2022*	*8/2/2022*	*8/3/2022*
Screen Interval/Sample Depth** (ft bgs)		*15-35**	*2-3***	*14-15***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**1.83 J**	0.5 U	0.576 U
PFOA	6.0/19	**11.6**	0.5 U	0.576 U
PFOS	4.0/13	**62.7**	**1.45**	**0.335 J**
PFNA	5.9/19	**1.31 J**	0.5 U	0.576 U
PFHxS	39/130	**24.7**	0.5 U	0.576 U
HFPO-DA	6.0/23	2.41 U	0.5 U	0.576 U

Location		BR-B494-MW02		
Sample		BR-B494-MW02-1122	BR-B494-SB02-0203	BR-B494-SB02-1617
Sample Date		*11/2/2022*	*8/2/2022*	*8/4/2022*
Screen Interval/Sample Depth** (ft bgs)		*17-37**	*2-3***	*16-17***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**1.68 J**	0.501 U	0.562 U
PFOA	6.0/19	**41.7**	**0.251 J**	0.562 U
PFOS	4.0/13	**56.4**	**0.32 J**	0.562 U
PFNA	5.9/19	**2.36 J**	0.501 U	0.562 U
PFHxS	39/130	**28.8**	0.501 U	0.562 U
HFPO-DA	6.0/23	2.26 U	0.501 U	0.562 U



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Fire Truck Ramp
- Potential PFAS Release Area
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
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EPA = United States Environmental Protection Agency
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NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-23
PFAS Results: Building 503 and Building 494
Site Inspection for PFAS
BNC, Bremerton, Washington

0 37.5 75
1 inch = 75 feet
N

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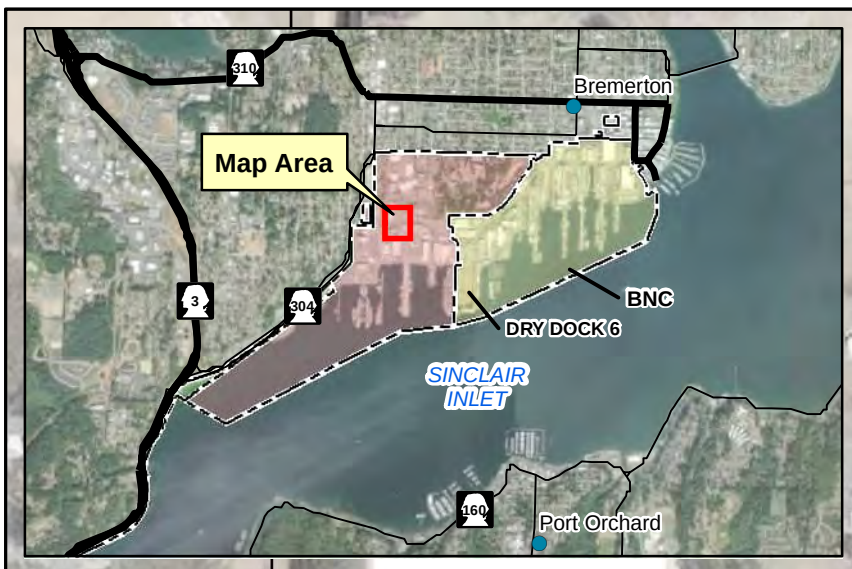

Location		BR-FBCC-MW01		
Sample		BR-FBCC-MW01-1122	BR-FBCC-SB01-0203	BR-FBCC-SB01-0607
Sample Date		*11/16/2022*	*10/10/2022*	*10/10/2022*
Screen Interval/Sample Depth** (ft bgs)*		*7-17**	*2-3***	*6-7***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**0.935 J**	0.5 U	0.501 U
PFOA	6.0/19	**8.98**	0.5 U	0.501 U
PFOS	4.0/13	**21.7**	0.5 U	0.501 U
PFNA	5.9/19	**1.71 J**	0.5 U	0.501 U
PFHxS	39/130	**7.49**	0.5 U	0.501 U
HFPO-DA	6.0/23	2.25 U	0.5 U	0.501 U

Location		BR-FBCC-MW02		
Sample		BR-FBCC-MW02-1022	BR-FBCC-SB02-0203	BR-FBCC-SB02-1112
Sample Date		*10/20/2022*	*8/12/2022*	*8/15/2022*
Screen Interval/Sample Depth** (ft bgs)*		*10-20**	*2-3***	*11-12***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**7.31**	0.502 U	0.501 U
PFOA	6.0/19	**29.6**	0.502 U	0.501 U
PFOS	4.0/13	**30.3**	0.502 U	0.501 U
PFNA	5.9/19	2.35 U	0.502 U	0.501 U
PFHxS	39/130	**10.6**	0.502 U	0.501 U
HFPO-DA	6.0/23	2.35 U	0.502 U	0.501 UJ

Location		BR-FBCC-MW03	
Sample		BR-FBCC-MW03-1022	BR-FBCC-SB03-0809
Sample Date		*10/20/2022*	*8/16/2022*
Screen Interval/Sample Depth** (ft bgs)*		*10-20**	*8-9***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**4.24 J**	0.499 U
PFOA	6.0/19	**19**	0.499 U
PFOS	4.0/13	**3.3 J**	**0.23 J**
PFNA	5.9/19	2.38 U	0.499 U
PFHxS	39/130	**5.68**	0.499 U
HFPO-DA	6.0/23	2.38 U	0.499 U

Location		BR-B432-MW01		
Sample		BR-B432-MW01-1022	BR-B432-SB01-0203	BR-B432-SB01-0405
Sample Date		*10/31/2022*	*8/5/2022*	*8/10/2022*
Screen Interval/Sample Depth** (ft bgs)*		*7-17**	*2-3***	*4-5***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**16.8**	0.502 U	0.498 U
PFOA	6.0/19	**603**	**0.447 J**	0.498 U
PFOS	4.0/13	**2040**	**14.2**	**1.45**
PFNA	5.9/19	**17.9**	0.502 U	0.498 U
PFHxS	39/130	**448**	**3.43**	**0.192 J**
HFPO-DA	6.0/23	2.52 U	0.502 U	0.498 U

Location		BR-B432-MW02		
Sample		BR-B432-MW02-1122	BR-B432-SB02-0203	BR-B432-SB02-1213
Sample Date		*11/4/2022*	*8/5/2022*	*8/10/2022*
Screen Interval/Sample Depth** (ft bgs)*		*17-27**	*2-3***	*12-13***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.41 U	0.501 U	0.5 U
PFOA	6.0/19	**56.6**	0.501 U	0.5 U
PFOS	4.0/13	**47.5**	0.501 U	**0.344 J**
PFNA	5.9/19	**1.01 J**	0.501 U	0.5 U
PFHxS	39/130	**17.3**	0.501 U	0.5 U
HFPO-DA	6.0/23	2.41 U	0.501 U	0.5 UJ

Location		BR-B432-MW03	
Sample		BR-B432-MW03-1022	BR-B432-SB03-1415
Sample Date		*10/21/2022*	*8/16/2022*
Screen Interval/Sample Depth** (ft bgs)*		*16-26**	*14-15***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**4.86**	0.5 U
PFOA	6.0/19	**14.8**	0.5 U
PFOS	4.0/13	**50.5**	0.5 U
PFNA	5.9/19	2.31 U	0.5 U
PFHxS	39/130	**20.9**	0.5 U
HFPO-DA	6.0/23	2.31 U	0.5 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

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PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-24
PFAS Results: Former Building 432 and Farragut Ave/Barclay Rd Car Crashes
Site Inspection for PFAS
BNC, Bremerton, Washington

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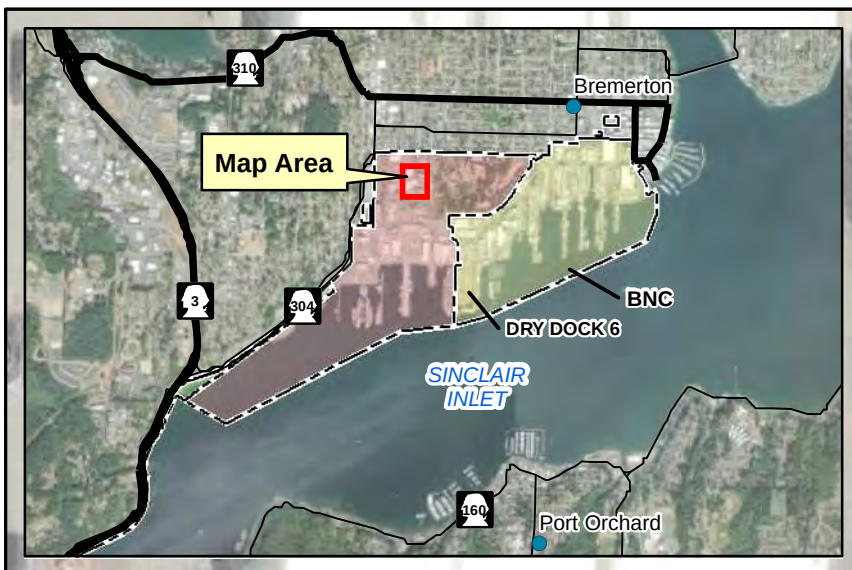

Location		BR-B434-MW01		
Sample		BR-B434-MW01-1122	BR-B434-SB01-0203	BR-B434-SB01-1011
Sample Date		*11/1/2022*	*7/22/2022*	*7/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*10-20**	*2-3***	*10-11***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**99.1**	0.503 U	0.501 UJ
PFOA	6.0/19	**344**	**1.18**	**16.1**
PFOS	4.0/13	**3.62 J**	**2.98**	0.501 U
PFNA	5.9/19	2.32 U	0.503 U	0.501 U
PFHxS	39/130	**89.3**	**0.288 J**	**3.57**
HFPO-DA	6.0/23	2.32 U	0.503 U	0.501 U

Location		BR-B434-MW02		
Sample		BR-B434-MW02-1122	BR-B434-SB02-0203	BR-B434-SB02-2727H
Sample Date		*11/1/2022*	*7/22/2022*	*7/27/2022*
Screen Interval/Sample Depth** (ft bgs)*		*27-37**	*2-3***	*27-27.5***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**5.17**	0.501 U	0.499 UJ
PFOA	6.0/19	**322**	0.501 U	0.499 U
PFOS	4.0/13	2.39 U	**0.718 J**	0.499 U
PFNA	5.9/19	2.39 U	0.501 U	0.499 U
PFHxS	39/130	**12.5**	0.501 U	0.499 U
HFPO-DA	6.0/23	2.39 U	0.501 U	0.499 U

Location	BR-B434-SS01
Sample	BR-B434-SS01-0001
Sample Date	*8/4/2022*
Sample Depth (ft bgs)	*0-1*
Media/Units	*Surface Soil (µg/kg)*
2022 EPA RSL Soil (µg/kg)	
PFBS 1,900	0.502 U
PFOA 19	**0.357 J**
PFOS 13	**0.453 J**
PFNA 19	0.502 U
PFHxS 130	0.502 U
HFPO-DA 23	0.502 U

Location		BR-B434-MW03		
Sample		BR-B434-MW03-1122	BR-B434-SB03-0203	BR-B434-SB03-26H27
Sample Date		*11/1/2022*	*7/22/2022*	*7/26/2022*
Screen Interval/Sample Depth** (ft bgs)*		*28.5-38.5**	*2-3***	*26.5-27***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL Groundwater(ng/L)/Soil(µg/kg)			
PFBS	600/1,900	**8.25**	0.496 U	0.5 U
PFOA	6.0/19	**423**	**0.419 J**	0.5 U
PFOS	4.0/13	**7.56 J**	**1.2**	0.5 U
PFNA	5.9/19	**1.06 J**	0.496 U	0.5 U
PFHxS	39/130	**33**	0.496 U	0.5 U
HFPO-DA	6.0/23	2.24 U	0.496 UJ	0.5 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Potential PFAS Release Area
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTES:
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PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-25
PFAS Results: Building 434
Site Inspection for PFAS
BNC, Bremerton, Washington

0 30 60
1 inch = 60 feet
N

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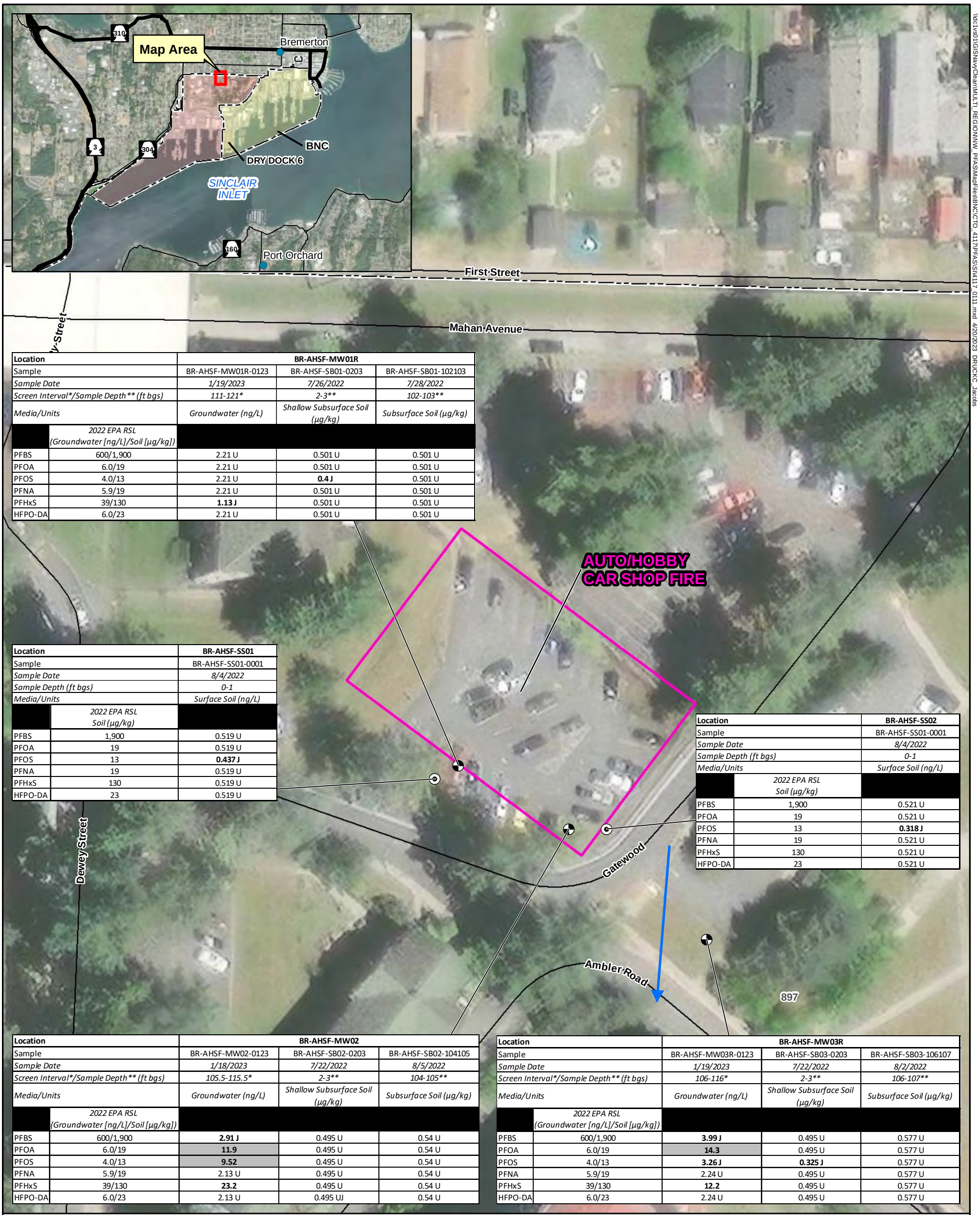

Location		BR-AHSF-MW01R		
Sample		BR-AHSF-MW01R-0123	BR-AHSF-SB01-0203	BR-AHSF-SB01-102103
Sample Date		*1/19/2023*	*7/26/2022*	*7/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*111-121**	*2-3***	*102-103***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.21 U	0.501 U	0.501 U
PFOA	6.0/19	2.21 U	0.501 U	0.501 U
PFOS	4.0/13	2.21 U	**0.4 J**	0.501 U
PFNA	5.9/19	2.21 U	0.501 U	0.501 U
PFHxS	39/130	**1.13 J**	0.501 U	0.501 U
HFPO-DA	6.0/23	2.21 U	0.501 U	0.501 U

Location		BR-AHSF-SS01
Sample		BR-AHSF-SS01-0001
Sample Date		*8/4/2022*
Sample Depth (ft bgs)		*0-1*
Media/Units		*Surface Soil (ng/L)*
	2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.519 U
PFOA	19	0.519 U
PFOS	13	**0.437 J**
PFNA	19	0.519 U
PFHxS	130	0.519 U
HFPO-DA	23	0.519 U

Location		BR-AHSF-SS02
Sample		BR-AHSF-SS01-0001
Sample Date		*8/4/2022*
Sample Depth (ft bgs)		*0-1*
Media/Units		*Surface Soil (ng/L)*
	2022 EPA RSL Soil (µg/kg)	
PFBS	1,900	0.521 U
PFOA	19	0.521 U
PFOS	13	**0.318 J**
PFNA	19	0.521 U
PFHxS	130	0.521 U
HFPO-DA	23	0.521 U

Location		BR-AHSF-MW02		
Sample		BR-AHSF-MW02-0123	BR-AHSF-SB02-0203	BR-AHSF-SB02-104105
Sample Date		*1/18/2023*	*7/22/2022*	*8/5/2022*
Screen Interval/Sample Depth** (ft bgs)*		*105.5-115.5**	*2-3***	*104-105***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**2.91 J**	0.495 U	0.54 U
PFOA	6.0/19	**11.9**	0.495 U	0.54 U
PFOS	4.0/13	**9.52**	0.495 U	0.54 U
PFNA	5.9/19	2.13 U	0.495 U	0.54 U
PFHxS	39/130	**23.2**	0.495 U	0.54 U
HFPO-DA	6.0/23	2.13 U	0.495 UJ	0.54 U

Location		BR-AHSF-MW03R		
Sample		BR-AHSF-MW03R-0123	BR-AHSF-SB03-0203	BR-AHSF-SB03-106107
Sample Date		*1/19/2023*	*7/22/2022*	*8/2/2022*
Screen Interval/Sample Depth** (ft bgs)*		*106-116**	*2-3***	*106-107***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**3.99 J**	0.495 U	0.577 U
PFOA	6.0/19	**14.3**	0.495 U	0.577 U
PFOS	4.0/13	**3.26 J**	**0.325 J**	0.577 U
PFNA	5.9/19	2.24 U	0.495 U	0.577 U
PFHxS	39/130	**12.2**	0.495 U	0.577 U
HFPO-DA	6.0/23	2.24 U	0.495 U	0.577 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Surface Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Confirmed PFAS Release Area
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 25 50
1 inch = 50 feet
N

Figure 4-26
PFAS Results: Auto/Hobby Car Shop Fire
Site Inspection for PFAS
BNC, Bremerton, Washington

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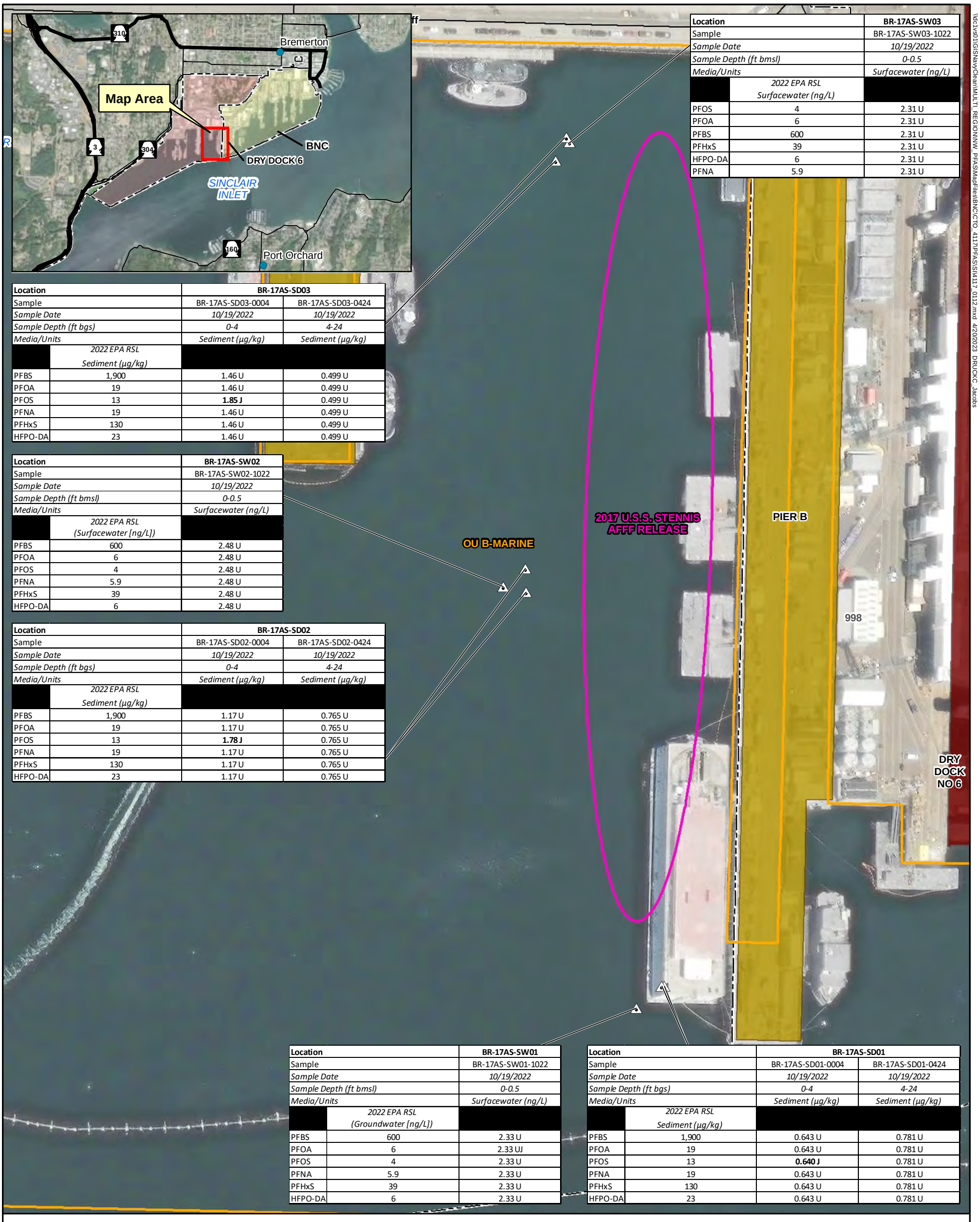

Location	BR-17AS-SW03
Sample	BR-17AS-SW03-1022
Sample Date	*10/19/2022*
Sample Depth (ft bmsl)	*0-0.5*
Media/Units	*Surfacewater (ng/L)*
	2022 EPA RSL Surfacewater (ng/L)	
PFOS	4	2.31 U
PFOA	6	2.31 U
PFBS	600	2.31 U
PFHxS	39	2.31 U
HFPO-DA	6	2.31 U
PFNA	5.9	2.31 U

Location	BR-17AS-SD03	
Sample	BR-17AS-SD03-0004	BR-17AS-SD03-0424
Sample Date	*10/19/2022*	*10/19/2022*
Sample Depth (ft bgs)	*0-4*	*4-24*
Media/Units	*Sediment (µg/kg)*	*Sediment (µg/kg)*
	2022 EPA RSL Sediment (µg/kg)		
PFBS	1,900	1.46 U	0.499 U
PFOA	19	1.46 U	0.499 U
PFOS	13	**1.85 J**	0.499 U
PFNA	19	1.46 U	0.499 U
PFHxS	130	1.46 U	0.499 U
HFPO-DA	23	1.46 U	0.499 U

Location	BR-17AS-SW02
Sample	BR-17AS-SW02-1022
Sample Date	*10/19/2022*
Sample Depth (ft bmsl)	*0-0.5*
Media/Units	*Surfacewater (ng/L)*
	2022 EPA RSL (Surfacewater [ng/L])	
PFBS	600	2.48 U
PFOA	6	2.48 U
PFOS	4	2.48 U
PFNA	5.9	2.48 U
PFHxS	39	2.48 U
HFPO-DA	6	2.48 U

Location	BR-17AS-SD02	
Sample	BR-17AS-SD02-0004	BR-17AS-SD02-0424
Sample Date	*10/19/2022*	*10/19/2022*
Sample Depth (ft bgs)	*0-4*	*4-24*
Media/Units	*Sediment (µg/kg)*	*Sediment (µg/kg)*
	2022 EPA RSL Sediment (µg/kg)		
PFBS	1,900	1.17 U	0.765 U
PFOA	19	1.17 U	0.765 U
PFOS	13	**1.78 J**	0.765 U
PFNA	19	1.17 U	0.765 U
PFHxS	130	1.17 U	0.765 U
HFPO-DA	23	1.17 U	0.765 U

Location	BR-17AS-SW01
Sample	BR-17AS-SW01-1022
Sample Date	*10/19/2022*
Sample Depth (ft bmsl)	*0-0.5*
Media/Units	*Surfacewater (ng/L)*
	2022 EPA RSL (Groundwater [ng/L])	
PFBS	600	2.33 U
PFOA	6	2.33 UJ
PFOS	4	2.33 U
PFNA	5.9	2.33 U
PFHxS	39	2.33 U
HFPO-DA	6	2.33 U

Location	BR-17AS-SD01	
Sample	BR-17AS-SD01-0004	BR-17AS-SD01-0424
Sample Date	*10/19/2022*	*10/19/2022*
Sample Depth (ft bgs)	*0-4*	*4-24*
Media/Units	*Sediment (µg/kg)*	*Sediment (µg/kg)*
	2022 EPA RSL Sediment (µg/kg)		
PFBS	1,900	0.643 U	0.781 U
PFOA	19	0.643 U	0.781 U
PFOS	13	**0.640 J**	0.781 U
PFNA	19	0.643 U	0.781 U
PFHxS	130	0.643 U	0.781 U
HFPO-DA	23	0.643 U	0.781 U

LEGEND

- Sediment and Surface Water Sampling Location
- Local Connecting Road
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

NOTES:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

0 62.5 125
1 inch = 125 feet
N

Figure 4-27
PFAS Results: 2017 U.S.S. Stennis AFFF Release
Site Inspection for PFAS
BNC, Bremerton, Washington

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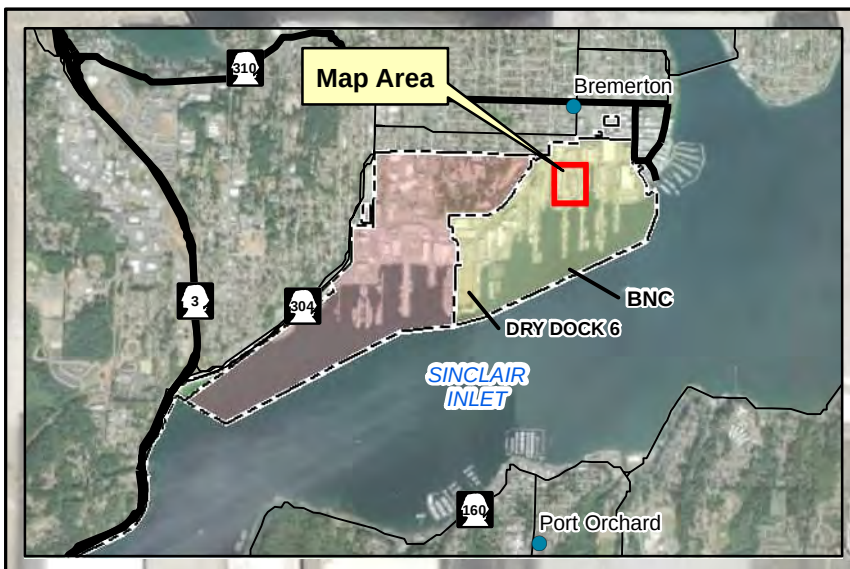
Location		BR-18AS-MW01		
Sample		BR-18AS-MW01-1122	BR-18AS-SB01-0203	BR-18AS-SB01-3233
Sample Date		*11/16/2022*	*8/24/2022*	*9/23/2022*
Screen Interval/Sample Depth** (ft bgs)*		*26-46**	*2-3***	*32-33***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**5.04 J**	0.502 U	0.499 U
PFOA	6.0/19	**6.93**	0.502 U	0.499 U
PFOS	4.0/13	**30.7**	**0.635 J**	0.499 U
PFNA	5.9/19	2.28 U	0.502 U	0.499 U
PFHxS	39/130	**2.64 J**	0.502 U	0.499 U
HFPO-DA	6.0/23	2.28 U	0.502 U	0.499 U



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Potential PFAS Release Area
- Confirmed PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-28
PFAS Results: 2018 AFFF Spill
Site Inspection for PFAS
BNC, Bremerton, Washington

0 37.5 75
1 inch = 75 feet
N

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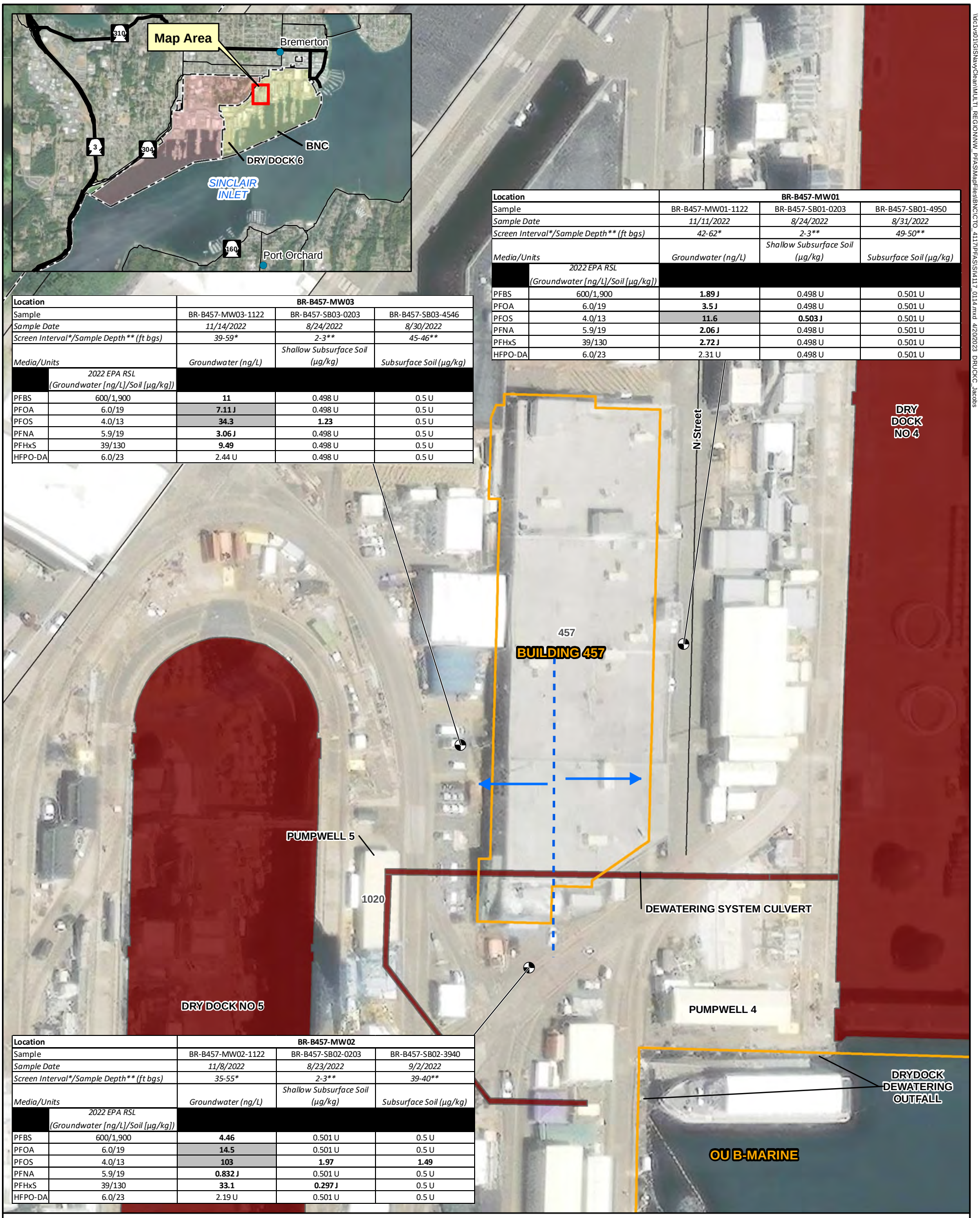

Location		BR-B457-MW03		
Sample		BR-B457-MW03-1122	BR-B457-SB03-0203	BR-B457-SB03-4546
Sample Date		*11/14/2022*	*8/24/2022*	*8/30/2022*
Screen Interval/Sample Depth** (ft bgs)*		*39-59**	*2-3***	*45-46***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**11**	0.498 U	0.5 U
PFOA	6.0/19	**7.11 J**	0.498 U	0.5 U
PFOS	4.0/13	**34.3**	**1.23**	0.5 U
PFNA	5.9/19	**3.06 J**	0.498 U	0.5 U
PFHxS	39/130	**9.49**	0.498 U	0.5 U
HFPO-DA	6.0/23	2.44 U	0.498 U	0.5 U

Location		BR-B457-MW01		
Sample		BR-B457-MW01-1122	BR-B457-SB01-0203	BR-B457-SB01-4950
Sample Date		*11/11/2022*	*8/24/2022*	*8/31/2022*
Screen Interval/Sample Depth** (ft bgs)*		*42-62**	*2-3***	*49-50***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**1.89 J**	0.498 U	0.501 U
PFOA	6.0/19	**3.5 J**	0.498 U	0.501 U
PFOS	4.0/13	**11.6**	**0.503 J**	0.501 U
PFNA	5.9/19	**2.06 J**	0.498 U	0.501 U
PFHxS	39/130	**2.72 J**	0.498 U	0.501 U
HFPO-DA	6.0/23	2.31 U	0.498 U	0.501 U

Location		BR-B457-MW02		
Sample		BR-B457-MW02-1122	BR-B457-SB02-0203	BR-B457-SB02-3940
Sample Date		*11/8/2022*	*8/23/2022*	*9/2/2022*
Screen Interval/Sample Depth** (ft bgs)*		*35-55**	*2-3***	*39-40***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**4.46**	0.501 U	0.5 U
PFOA	6.0/19	**14.5**	0.501 U	0.5 U
PFOS	4.0/13	**103**	**1.97**	**1.49**
PFNA	5.9/19	**0.832 J**	0.501 U	0.5 U
PFHxS	39/130	**33.1**	**0.297 J**	0.5 U
HFPO-DA	6.0/23	2.19 U	0.501 U	0.5 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Divde (drydock 6 flooded)
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- Local Connecting Road
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

0 37.5 75
1 inch = 75 feet
N

Figure 4-29
PFAS Results: Building 457
Site Inspection for PFAS
BNC, Bremerton, Washington

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Location		MW203
Sample		BR-MW203-1022
Sample Date		*10/28/2022*
Screen Interval (ft bgs)		*7-16.5*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**1.38 J**
PFOA	6.0	**5.14**
PFOS	4.0	**27.3**
PFNA	5.9	2.3 U
PFHxS	39	**11.7**
HFPO-DA	6.0	2.3 U

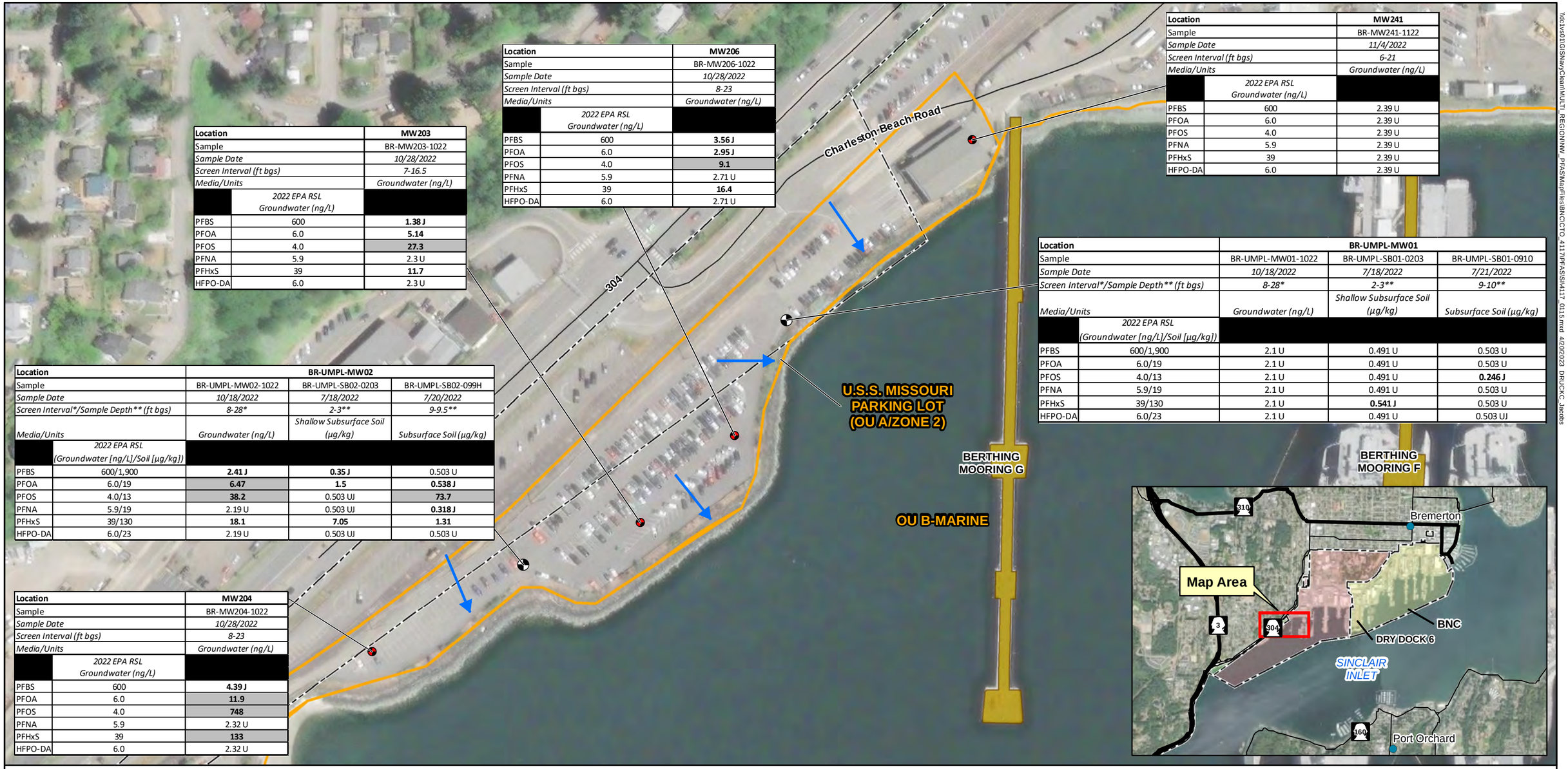
Location		MW206
Sample		BR-MW206-1022
Sample Date		*10/28/2022*
Screen Interval (ft bgs)		*8-23*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**3.56 J**
PFOA	6.0	**2.95 J**
PFOS	4.0	**9.1**
PFNA	5.9	2.71 U
PFHxS	39	**16.4**
HFPO-DA	6.0	2.71 U

Location		MW241
Sample		BR-MW241-1122
Sample Date		*11/4/2022*
Screen Interval (ft bgs)		*6-21*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	2.39 U
PFOA	6.0	2.39 U
PFOS	4.0	2.39 U
PFNA	5.9	2.39 U
PFHxS	39	2.39 U
HFPO-DA	6.0	2.39 U

Location		BR-UMPL-MW01		
Sample		BR-UMPL-MW01-1022	BR-UMPL-SB01-0203	BR-UMPL-SB01-0910
Sample Date		*10/18/2022*	*7/18/2022*	*7/21/2022*
Screen Interval/Sample Depth*** (ft bgs)*		*8-28**	*2-3***	*9-10***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.1 U	0.491 U	0.503 U
PFOA	6.0/19	2.1 U	0.491 U	0.503 U
PFOS	4.0/13	2.1 U	0.491 U	**0.246 J**
PFNA	5.9/19	2.1 U	0.491 U	0.503 U
PFHxS	39/130	2.1 U	**0.541 J**	0.503 U
HFPO-DA	6.0/23	2.1 U	0.491 U	0.503 UJ

Location		BR-UMPL-MW02		
Sample		BR-UMPL-MW02-1022	BR-UMPL-SB02-0203	BR-UMPL-SB02-099H
Sample Date		*10/18/2022*	*7/18/2022*	*7/20/2022*
Screen Interval/Sample Depth*** (ft bgs)*		*8-28**	*2-3***	*9-9.5***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**2.41 J**	**0.35 J**	0.503 U
PFOA	6.0/19	**6.47**	**1.5**	**0.538 J**
PFOS	4.0/13	**38.2**	0.503 UJ	**73.7**
PFNA	5.9/19	2.19 U	0.503 UJ	**0.318 J**
PFHxS	39/130	**18.1**	**7.05**	**1.31**
HFPO-DA	6.0/23	2.19 U	0.503 UJ	0.503 U

Location		MW204
Sample		BR-MW204-1022
Sample Date		*10/28/2022*
Screen Interval (ft bgs)		*8-23*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**4.39 J**
PFOA	6.0	**11.9**
PFOS	4.0	**748**
PFNA	5.9	2.32 U
PFHxS	39	**133**
HFPO-DA	6.0	2.32 U



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-30
PFAS Results: U.S.S. Missouri Parking Lot
Site Inspection for PFAS
BNC, Bremerton, Washington

0 75 150
1 inch = 150 feet
N

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Location		BR-MAD5-MW02		
Sample		BR-MAD5-MW02-1122	BR-MAD5-SB02-0203	BR-MAD5-SB02-1011
Sample Date		*11/8/2022*	*8/19/2022*	*8/23/2022*
Screen Interval/Sample Depth** (ft bgs)*		*12-22**	*2-3***	*10-11***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.26 U	0.499 U	0.501 U
PFOA	6.0/19	2.26 UJ	**0.439 J**	0.501 U
PFOS	4.0/13	2.26 U	**1.42**	**0.541 J**
PFNA	5.9/19	2.26 UJ	0.499 U	0.501 U
PFHxS	39/130	2.26 U	0.499 U	0.501 U
HFPO-DA	6.0/23	2.26 UJ	0.499 U	0.501 U

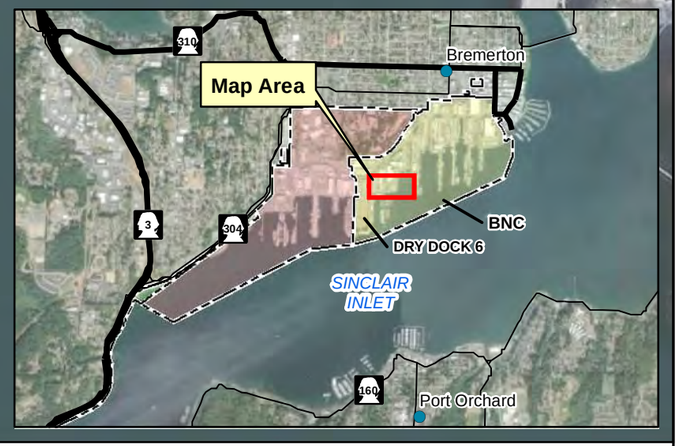
Location		BR-LS3-MW01		
Sample		BR-LS3-MW01-1122	BR-LS3-SB01-0203	BR-LS3-SB01-1314
Sample Date		*11/7/2022*	*8/23/2022*	*8/24/2022*
Screen Interval/Sample Depth** (ft bgs)*		*14-24**	*2-3***	*13-14***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.25 U	0.499 U	0.5 U
PFOA	6.0/19	**10.6**	0.499 U	0.5 U
PFOS	4.0/13	**170**	**1.55**	0.5 U
PFNA	5.9/19	2.25 U	0.499 U	0.5 U
PFHxS	39/130	**60.4**	**0.236 J**	0.5 U
HFPO-DA	6.0/23	2.25 U	0.499 U	0.5 U

Location		BR-MAD5-MW01		
Sample		BR-MAD5-MW01-1122	BR-MAD5-SB01-0203	BR-MAD5-SB01-1213
Sample Date		*11/8/2022*	*8/19/2022*	*8/24/2022*
Screen Interval/Sample Depth** (ft bgs)*		*15-25**	*2-3***	*12-13***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**12**	0.501 U	0.5 U
PFOA	6.0/19	**136**	0.501 U	**0.594 J**
PFOS	4.0/13	**163**	**0.58 J**	**0.227 J**
PFNA	5.9/19	2.42 U	0.501 U	0.5 U
PFHxS	39/130	**55.8**	0.501 U	**0.173 J**
HFPO-DA	6.0/23	2.42 U	0.501 U	0.5 U

Location	MW709
Sample	BR-MW709-1122
Sample Date	*11/8/2022*
Screen Interval (ft bgs)	*8-28*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	**2.74 J**
PFOA 6.0	**292**
PFOS 4.0	**43**
PFNA 5.9	2.22 U
PFHxS 39	**19.2**
HFPO-DA 6.0	2.22 U

Location	MW412
Sample	BR-MW412-1122
Sample Date	*11/7/2022*
Screen Interval (ft bgs)	*14.5-24*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	**71.5**
PFOA 6	**28.6**
PFOS 4	**67.8**
PFNA 5.9	2.19 U
PFHxS 39	**940**
HFPO-DA 6	2.3 U

Location	MW713
Sample	BR-MW713-1122
Sample Date	*11/7/2022*
Screen Interval (ft bgs)	*8-28*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFBS 600	2.28 U
PFOA 6.0	2.28 U
PFOS 4.0	2.28 U
PFNA 5.9	2.28 U
PFHxS 39	2.28 U
HFPO-DA 6.0	2.28 U



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Groundwater Divde (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-31
PFAS Results: Mooring A and Drydock 5 Fill Area and Lift Station 3
Site Inspection for PFAS
BNC, Bremerton, Washington

0 45 90
1 inch = 90 feet
N

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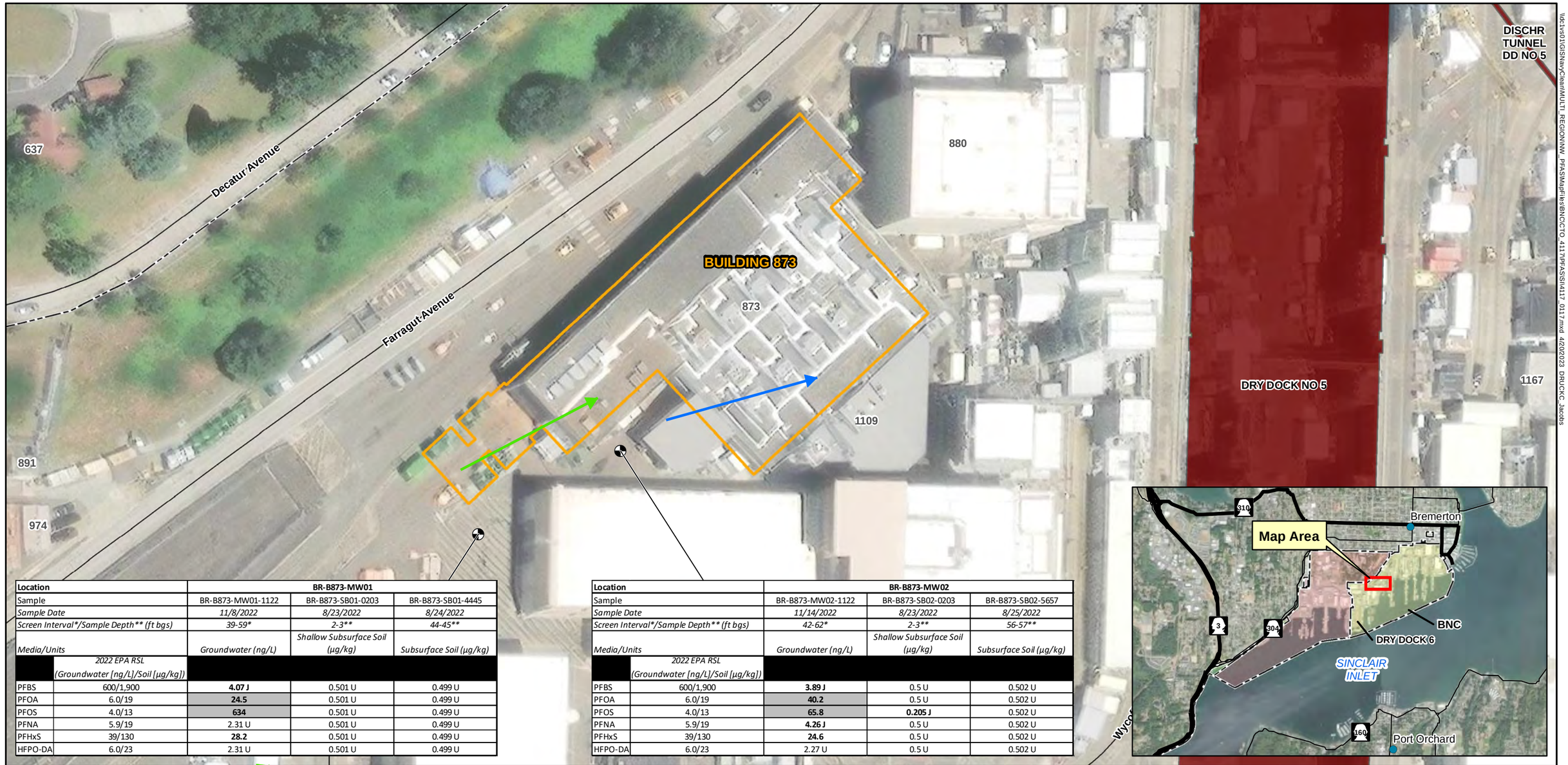

Location		BR-B873-MW01		
Sample		BR-B873-MW01-1122	BR-B873-SB01-0203	BR-B873-SB01-4445
Sample Date		*11/8/2022*	*8/23/2022*	*8/24/2022*
Screen Interval/Sample Depth** (ft bgs)*		*39-59**	*2-3***	*44-45***
Media/Units	*2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])*	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
PFBS	600/1,900	**4.07 J**	0.501 U	0.499 U
PFOA	6.0/19	**24.5**	0.501 U	0.499 U
PFOS	4.0/13	**634**	0.501 U	0.499 U
PFNA	5.9/19	2.31 U	0.501 U	0.499 U
PFHxS	39/130	**28.2**	0.501 U	0.499 U
HFPO-DA	6.0/23	2.31 U	0.501 U	0.499 U

Location		BR-B873-MW02		
Sample		BR-B873-MW02-1122	BR-B873-SB02-0203	BR-B873-SB02-5657
Sample Date		*11/14/2022*	*8/23/2022*	*8/25/2022*
Screen Interval/Sample Depth** (ft bgs)*		*42-62**	*2-3***	*56-57***
Media/Units	*2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])*	*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
PFBS	600/1,900	**3.89 J**	0.5 U	0.502 U
PFOA	6.0/19	**40.2**	0.5 U	0.502 U
PFOS	4.0/13	**65.8**	**0.205 J**	0.502 U
PFNA	5.9/19	**4.26 J**	0.5 U	0.502 U
PFHxS	39/130	**24.6**	0.5 U	0.502 U
HFPO-DA	6.0/23	2.27 U	0.5 U	0.502 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

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NAVSTA = Naval Station
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PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-32
PFAS Results: Building 873
Site Inspection for PFAS
BNC, Bremerton, Washington

0 37.5 75
1 inch = 75 feet
N

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Location		BR-DRMO-MW01		
Sample		BR-DRMO-MW01-1022	BR-DRMO-SB01-0203	BR-DRMO-SB01-1415
Sample Date		*10/21/2022*	*7/25/2022*	*7/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*15.5-25.5**	*2-3***	*14-15***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**10.7**	0.499 U	0.501 UJ
PFOA	6.0/19	**30.4**	**0.29 J**	0.501 U
PFOS	4.0/13	**113**	**3.94**	**1.23**
PFNA	5.9/19	2.4 U	0.499 U	0.501 U
PFHxS	39/130	**103**	**0.826 J**	0.501 U
HFPO-DA	6.0/23	2.4 U	0.499 U	0.501 U

Location		BR-DRMO-MW02		
Sample		BR-DRMO-MW02-1122	BR-DRMO-SB02-0203	BR-DRMO-SB02-1213
Sample Date		*11/15/2022*	*7/26/2022*	*8/2/2022*
Screen Interval/Sample Depth** (ft bgs)*		*14-24**	*2-3***	*12-13***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.3 U	0.501 U	0.561 U
PFOA	6.0/19	**8.51**	0.501 U	0.561 U
PFOS	4.0/13	**64.1**	**1.15**	**0.831 J**
PFNA	5.9/19	2.3 U	0.501 U	0.561 U
PFHxS	39/130	**29.6**	0.501 U	0.561 U
HFPO-DA	6.0/23	2.3 U	0.501 U	0.561 U

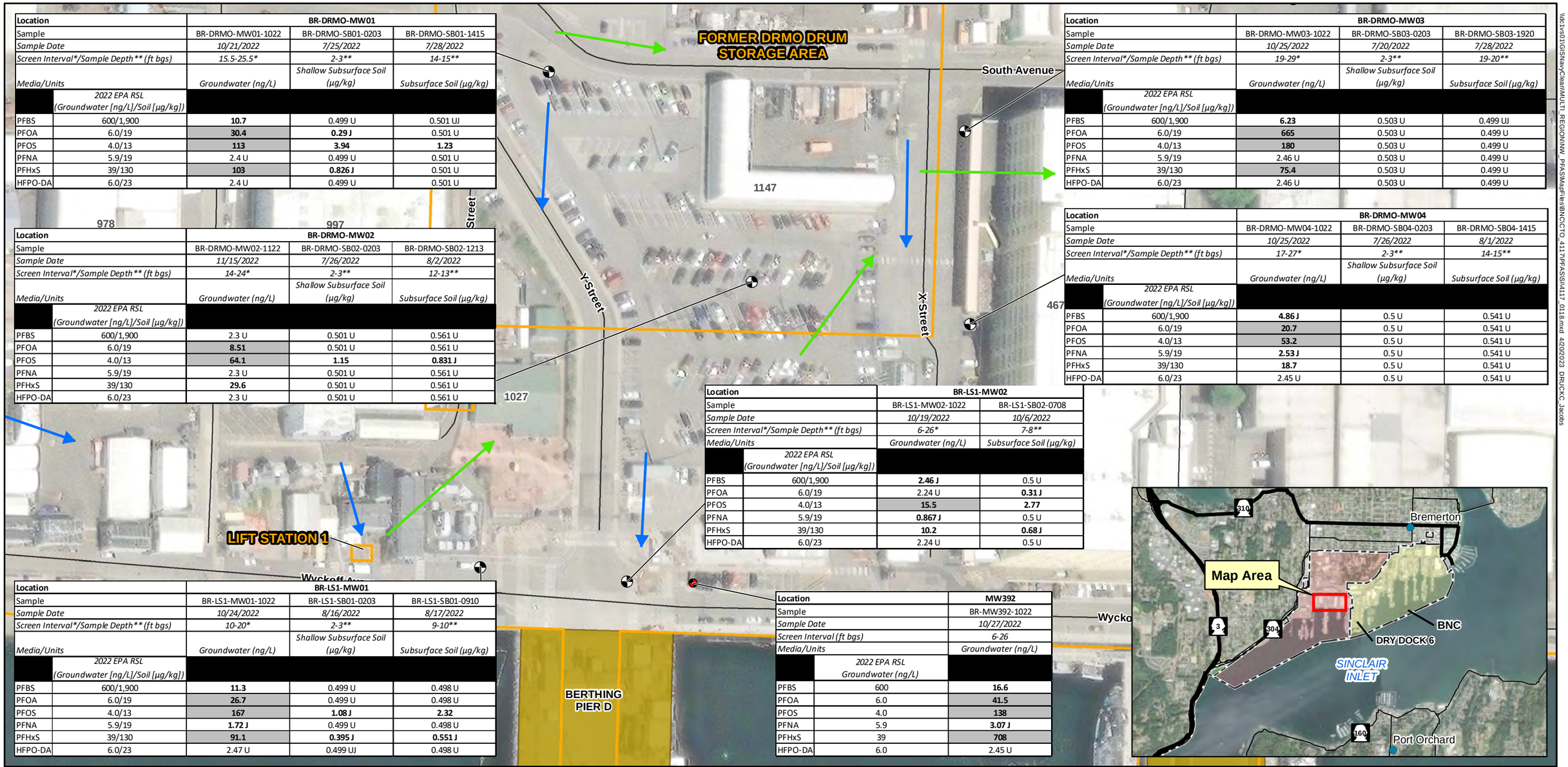
Location		BR-LS1-MW01		
Sample		BR-LS1-MW01-1022	BR-LS1-SB01-0203	BR-LS1-SB01-0910
Sample Date		*10/24/2022*	*8/16/2022*	*8/17/2022*
Screen Interval/Sample Depth** (ft bgs)*		*10-20**	*2-3***	*9-10***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**11.3**	0.499 U	0.498 U
PFOA	6.0/19	**26.7**	0.499 U	0.498 U
PFOS	4.0/13	**167**	**1.08 J**	**2.32**
PFNA	5.9/19	**1.72 J**	0.499 U	0.498 U
PFHxS	39/130	**91.1**	**0.395 J**	**0.551 J**
HFPO-DA	6.0/23	2.47 U	0.499 UJ	0.498 U

Location		BR-LS1-MW02	
Sample		BR-LS1-MW02-1022	BR-LS1-SB02-0708
Sample Date		*10/19/2022*	*10/6/2022*
Screen Interval/Sample Depth** (ft bgs)*		*6-26**	*7-8***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**2.46 J**	0.5 U
PFOA	6.0/19	2.24 U	**0.31 J**
PFOS	4.0/13	**15.5**	**2.77**
PFNA	5.9/19	**0.867 J**	0.5 U
PFHxS	39/130	**10.2**	**0.68 J**
HFPO-DA	6.0/23	2.24 U	0.5 U

Location		MW392
Sample		BR-MW392-1022
Sample Date		*10/27/2022*
Screen Interval (ft bgs)		*6-26*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**16.6**
PFOA	6.0	**41.5**
PFOS	4.0	**138**
PFNA	5.9	**3.07 J**
PFHxS	39	**708**
HFPO-DA	6.0	2.45 U

Location		BR-DRMO-MW03		
Sample		BR-DRMO-MW03-1022	BR-DRMO-SB03-0203	BR-DRMO-SB03-1920
Sample Date		*10/25/2022*	*7/20/2022*	*7/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*19-29**	*2-3***	*19-20***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**6.23**	0.503 U	0.499 UJ
PFOA	6.0/19	**665**	0.503 U	0.499 U
PFOS	4.0/13	**180**	0.503 U	0.499 U
PFNA	5.9/19	2.46 U	0.503 U	0.499 U
PFHxS	39/130	**75.4**	0.503 U	0.499 U
HFPO-DA	6.0/23	2.46 U	0.503 U	0.499 U

Location		BR-DRMO-MW04		
Sample		BR-DRMO-MW04-1022	BR-DRMO-SB04-0203	BR-DRMO-SB04-1415
Sample Date		*10/25/2022*	*7/26/2022*	*8/1/2022*
Screen Interval/Sample Depth** (ft bgs)*		*17-27**	*2-3***	*14-15***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**4.86 J**	0.5 U	0.541 U
PFOA	6.0/19	**20.7**	0.5 U	0.541 U
PFOS	4.0/13	**53.2**	0.5 U	0.541 U
PFNA	5.9/19	**2.53 J**	0.5 U	0.541 U
PFHxS	39/130	**18.7**	0.5 U	0.541 U
HFPO-DA	6.0/23	2.45 U	0.5 U	0.541 U



LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
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PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
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PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-33
PFAS Results: Former DRMO Drum Storage Area and Lift Station 1
Site Inspection for PFAS
BNC, Bremerton, Washington

0 50 100
1 inch = 100 feet
N

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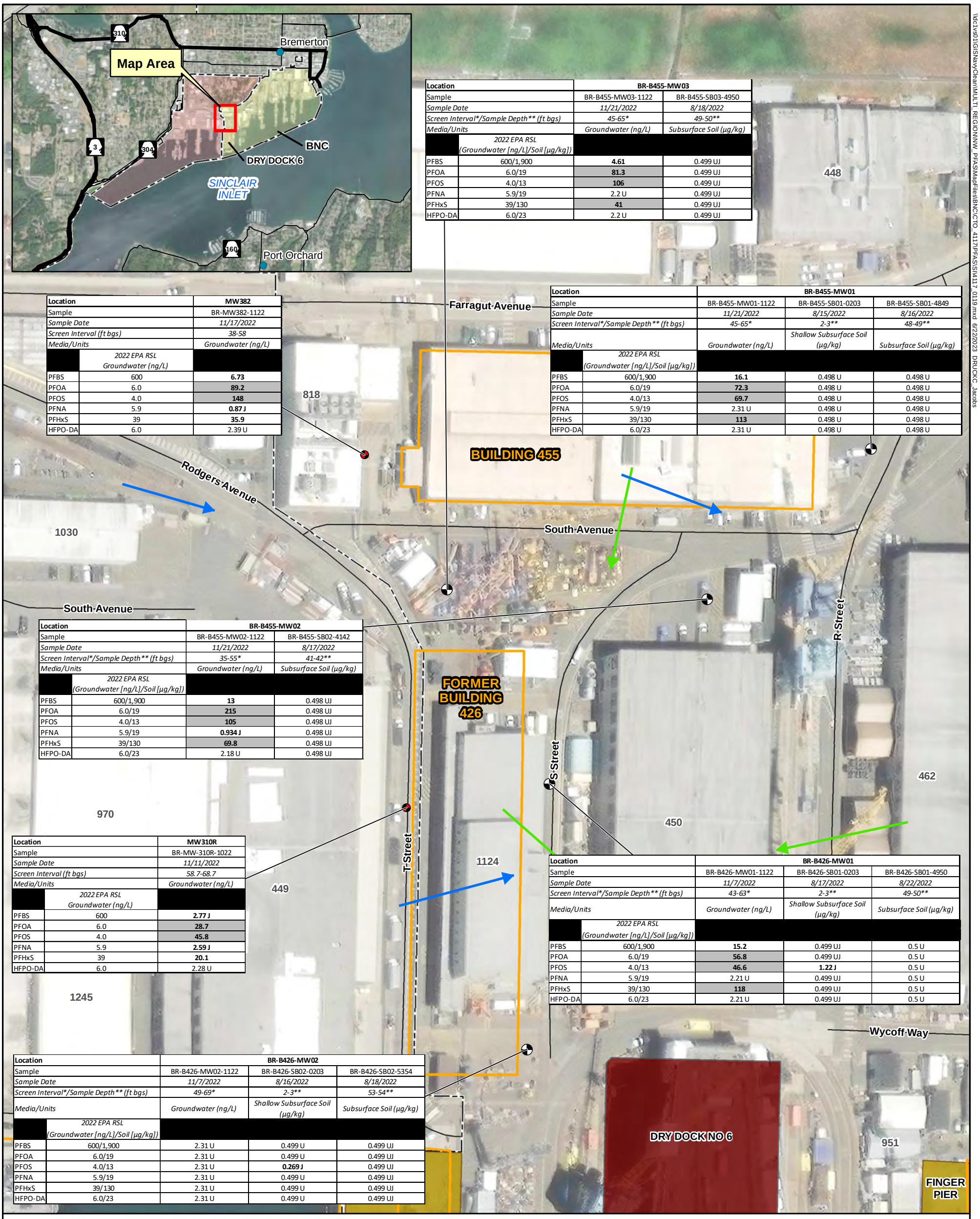

Location		MW382
Sample		BR-MW382-1122
Sample Date		*11/17/2022*
Screen Interval (ft bgs)		*38-58*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**6.73**
PFOA	6.0	**89.2**
PFOS	4.0	**148**
PFNA	5.9	**0.87 J**
PFHxS	39	**35.9**
HFPO-DA	6.0	2.39 U

Location		BR-B455-MW03	
Sample		BR-B455-MW03-1122	BR-B455-SB03-4950
Sample Date		*11/21/2022*	*8/18/2022*
Screen Interval/Sample Depth** (ft bgs)*		*45-65**	*49-50***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**4.61**	0.499 UJ
PFOA	6.0/19	**81.3**	0.499 UJ
PFOS	4.0/13	**106**	0.499 UJ
PFNA	5.9/19	2.2 U	0.499 UJ
PFHxS	39/130	**41**	0.499 UJ
HFPO-DA	6.0/23	2.2 U	0.499 UJ

Location		BR-B455-MW01		
Sample		BR-B455-MW01-1122	BR-B455-SB01-0203	BR-B455-SB01-4849
Sample Date		*11/21/2022*	*8/15/2022*	*8/16/2022*
Screen Interval/Sample Depth** (ft bgs)*		*45-65**	*2-3***	*48-49***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**16.1**	0.498 U	0.498 U
PFOA	6.0/19	**72.3**	0.498 U	0.498 U
PFOS	4.0/13	**69.7**	0.498 U	0.498 U
PFNA	5.9/19	2.31 U	0.498 U	0.498 U
PFHxS	39/130	**113**	0.498 U	0.498 U
HFPO-DA	6.0/23	2.31 U	0.498 U	0.498 U

Location		BR-B455-MW02	
Sample		BR-B455-MW02-1122	BR-B455-SB02-4142
Sample Date		*11/21/2022*	*8/17/2022*
Screen Interval/Sample Depth** (ft bgs)*		*35-55**	*41-42***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**13**	0.498 UJ
PFOA	6.0/19	**215**	0.498 UJ
PFOS	4.0/13	**105**	0.498 UJ
PFNA	5.9/19	**0.934 J**	0.498 UJ
PFHxS	39/130	**69.8**	0.498 UJ
HFPO-DA	6.0/23	2.18 U	0.498 UJ

Location		MW310R
Sample		BR-MW-310R-1022
Sample Date		*11/11/2022*
Screen Interval (ft bgs)		*58.7-68.7*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**2.77 J**
PFOA	6.0	**28.7**
PFOS	4.0	**45.8**
PFNA	5.9	**2.59 J**
PFHxS	39	**20.1**
HFPO-DA	6.0	2.28 U

Location		BR-B426-MW01		
Sample		BR-B426-MW01-1122	BR-B426-SB01-0203	BR-B426-SB01-4950
Sample Date		*11/7/2022*	*8/17/2022*	*8/22/2022*
Screen Interval/Sample Depth** (ft bgs)*		*43-63**	*2-3***	*49-50***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**15.2**	0.499 UJ	0.5 U
PFOA	6.0/19	**56.8**	0.499 UJ	0.5 U
PFOS	4.0/13	**46.6**	**1.22 J**	0.5 U
PFNA	5.9/19	2.21 U	0.499 UJ	0.5 U
PFHxS	39/130	**118**	0.499 UJ	0.5 U
HFPO-DA	6.0/23	2.21 U	0.499 UJ	0.5 U

Location		BR-B426-MW02		
Sample		BR-B426-MW02-1122	BR-B426-SB02-0203	BR-B426-SB02-5354
Sample Date		*11/7/2022*	*8/16/2022*	*8/18/2022*
Screen Interval/Sample Depth** (ft bgs)*		*49-69**	*2-3***	*53-54***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	2.31 U	0.499 U	0.499 UJ
PFOA	6.0/19	2.31 U	0.499 U	0.499 UJ
PFOS	4.0/13	2.31 U	**0.269 J**	0.499 UJ
PFNA	5.9/19	2.31 U	0.499 U	0.499 UJ
PFHxS	39/130	2.31 U	0.499 U	0.499 UJ
HFPO-DA	6.0/23	2.31 U	0.499 U	0.499 UJ

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Flow Direction (all drydocks empty)
- Local Connecting Road
- Potential PFAS Release Area
- Dock
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

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PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

Figure 4-34
PFAS Results: Former Building 426 and Building 455
Site Inspection for PFAS
BNC, Bremerton, Washington

0 50 100
1 inch = 100 feet
N

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IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

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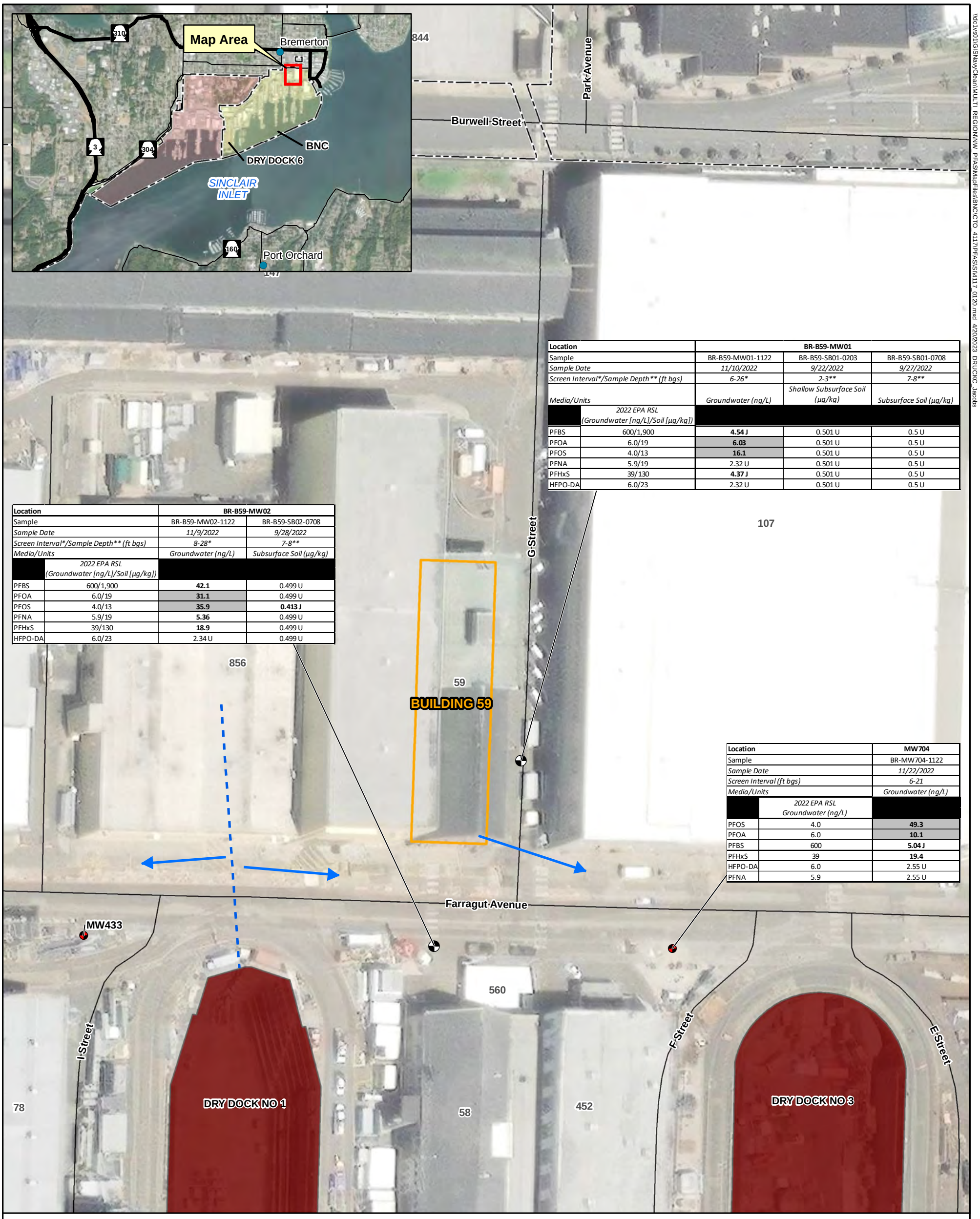

Location		BR-B59-MW01		
Sample		BR-B59-MW01-1122	BR-B59-SB01-0203	BR-B59-SB01-0708
Sample Date		*11/10/2022*	*9/22/2022*	*9/27/2022*
Screen Interval/Sample Depth** (ft bgs)*		*6-26**	*2-3***	*7-8***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**4.54 J**	0.501 U	0.5 U
PFOA	6.0/19	**6.03**	0.501 U	0.5 U
PFOS	4.0/13	**16.1**	0.501 U	0.5 U
PFNA	5.9/19	2.32 U	0.501 U	0.5 U
PFHxS	39/130	**4.37 J**	0.501 U	0.5 U
HFPO-DA	6.0/23	2.32 U	0.501 U	0.5 U

Location		BR-B59-MW02	
Sample		BR-B59-MW02-1122	BR-B59-SB02-0708
Sample Date		*11/9/2022*	*9/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*8-28**	*7-8***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**42.1**	0.499 U
PFOA	6.0/19	**31.1**	0.499 U
PFOS	4.0/13	**35.9**	**0.413 J**
PFNA	5.9/19	**5.36**	0.499 U
PFHxS	39/130	**18.9**	0.499 U
HFPO-DA	6.0/23	2.34 U	0.499 U

Location	MW704
Sample	BR-MW704-1122
Sample Date	*11/22/2022*
Screen Interval (ft bgs)	*6-21*
Media/Units	*Groundwater (ng/L)*
2022 EPA RSL Groundwater (ng/L)	
PFOS	4.0	**49.3**
PFOA	6.0	**10.1**
PFBS	600	**5.04 J**
PFHxS	39	**19.4**
HFPO-DA	6.0	2.55 U
PFNA	5.9	2.55 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Groundwater Divde (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Drydock
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

0 37.5 75
1 inch = 75 feet
N

Figure 4-35
PFAS Results: Building 59
Site Inspection for PFAS
BNC, Bremerton, Washington

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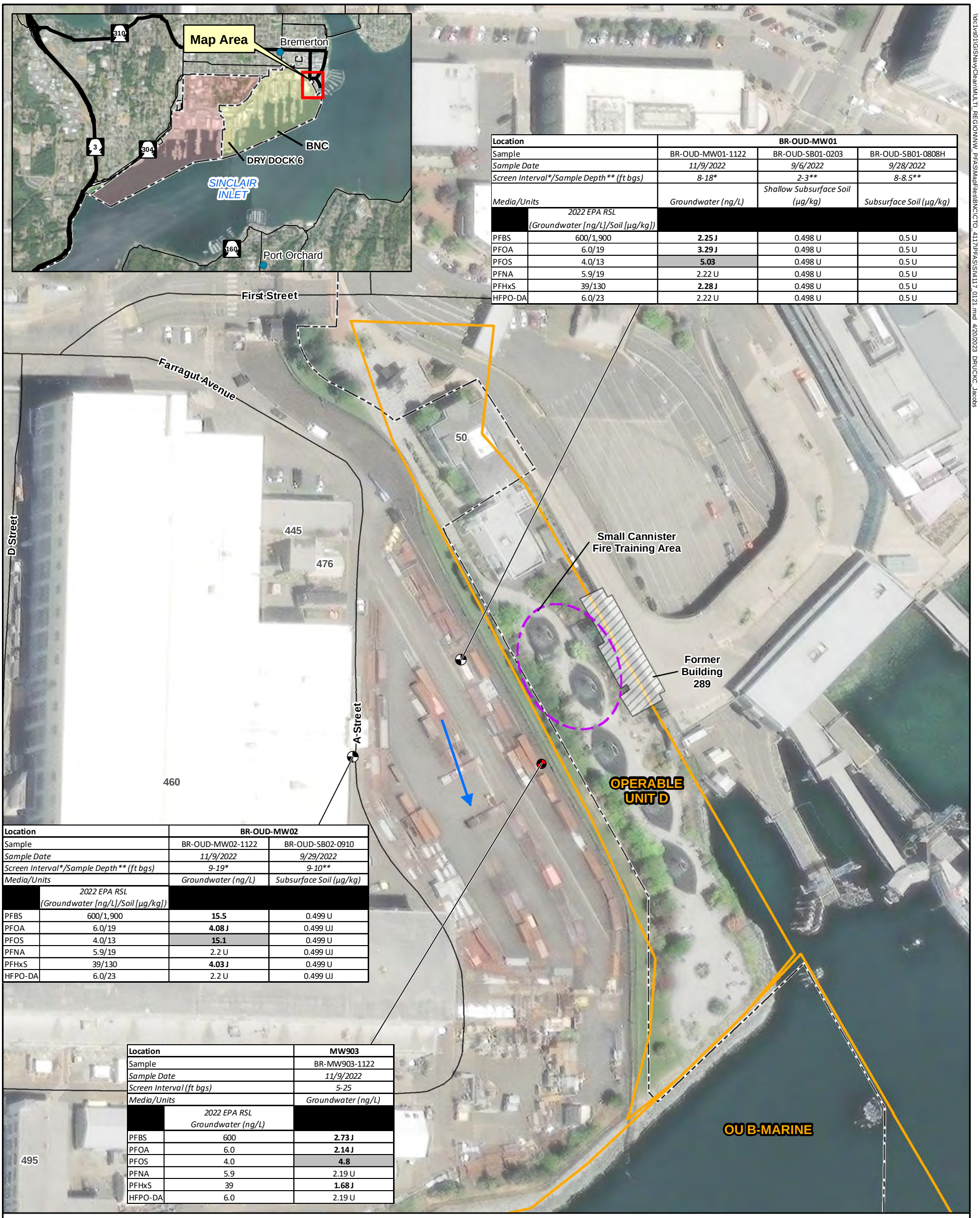

Location		BR-OUD-MW01		
Sample		BR-OUD-MW01-1122	BR-OUD-SB01-0203	BR-OUD-SB01-0808H
Sample Date		*11/9/2022*	*9/6/2022*	*9/28/2022*
Screen Interval/Sample Depth** (ft bgs)*		*8-18**	*2-3***	*8-8.5***
Media/Units		*Groundwater (ng/L)*	*Shallow Subsurface Soil (µg/kg)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])			
PFBS	600/1,900	**2.25 J**	0.498 U	0.5 U
PFOA	6.0/19	**3.29 J**	0.498 U	0.5 U
PFOS	4.0/13	**5.03**	0.498 U	0.5 U
PFNA	5.9/19	2.22 U	0.498 U	0.5 U
PFHxS	39/130	**2.28 J**	0.498 U	0.5 U
HFPO-DA	6.0/23	2.22 U	0.498 U	0.5 U

Location		BR-OUD-MW02	
Sample		BR-OUD-MW02-1122	BR-OUD-SB02-0910
Sample Date		*11/9/2022*	*9/29/2022*
Screen Interval/Sample Depth** (ft bgs)*		*9-19**	*9-10***
Media/Units		*Groundwater (ng/L)*	*Subsurface Soil (µg/kg)*
	2022 EPA RSL (Groundwater [ng/L]/Soil [µg/kg])		
PFBS	600/1,900	**15.5**	0.499 U
PFOA	6.0/19	**4.08 J**	0.499 UJ
PFOS	4.0/13	**15.1**	0.499 U
PFNA	5.9/19	2.2 U	0.499 UJ
PFHxS	39/130	**4.03 J**	0.499 U
HFPO-DA	6.0/23	2.2 U	0.499 UJ

Location		MW903
Sample		BR-MW903-1122
Sample Date		*11/9/2022*
Screen Interval (ft bgs)		*5-25*
Media/Units		*Groundwater (ng/L)*
	2022 EPA RSL Groundwater (ng/L)	
PFBS	600	**2.73 J**
PFOA	6.0	**2.14 J**
PFOS	4.0	**4.8**
PFNA	5.9	2.19 U
PFHxS	39	**1.68 J**
HFPO-DA	6.0	2.19 U

LEGEND

- Monitoring Well Installation/Groundwater Sampling/Soil Sampling Location
- Existing Monitoring Well Groundwater Sampling Location
- Groundwater Flow Direction (drydock 6 flooded)
- Local Connecting Road
- Potential PFAS Release Area
- Approximate Small Cannister Fire Training Area Boundary
- Installation Boundary
- NBK Bremerton
- Puget Sound Naval Shipyard
- Navy Railroad

NOTE:
BNC = Bremerton Naval Complex
PFAS = Per- and Polyfluoroalkyl Substances

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service, World Imagery, 2022

SAMPLE NOTES:
Bolded text indicates detection
Bolded and gray-highlighted text indicates an exceedance of the SL
EPA = United States Environmental Protection Agency
ft bgs = feet below ground surface
HFPO-DA = Hexafluoropropylene oxide dimer acid
J = Analyte present, value may or may not be accurate or precise
NAVSTA = Naval Station
ng/L = nanograms per liter
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
PFHxS = Perfluorohexane sulfonate
PFNA = Perfluorononanoic acid
PFOA = perfluorooctanoic acid
PFOS = perfluorooctane sulfonate
RSL = regional screening level
T = Hold time exceeded.
U = The material was analyzed for, but not detected
µg/kg = micrograms per kilogram

0 50 100
1 inch = 100 feet
N

Figure 4-36
PFAS Results: OU D
Site Inspection for PFAS
BNC, Bremerton, Washington

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SECTION 5

Conclusions and Recommendations

Of the 23 potential PFAS release areas identified for SI activities in the PA, 17 are recommended for further investigation in the form of an RI and 6 are recommended for no further investigation at this time (**Figure 5-1**). Four combined RIs are recommended for release areas located in close proximity to one another that warrant further investigation as part of an RI and have similar CSMs. The conclusions and recommendations from the SI are summarized in **Table 5-1**:

Table 5-1. Site Inspection Summary and Recommendations

Potential/Confirmed PFAS Release Area	Rationale	Recommendation
Former Building 513 Parking Lot	• PFOA, PFOS, PFNA, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SL in three monitoring wells. PFOA concentrations exceed the SL in two monitoring wells. PFNA and PFHxS concentrations exceed the SLs in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA, PFOS, and PFNA as potential COPCs in groundwater.	• Initiate combined RI with Building 503, Former Building 432, Building 494, Former DRMO Drum Storage Area, and Lift Station 1.
Building 435	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in three monitoring wells. PFHxS concentrations exceed the SL in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 871.
Former Building 871	• PFOS subsurface soil concentrations exceed the SL at one location. • PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SL in four monitoring wells. PFOA concentrations exceed the SL in three monitoring wells. PFHxS exceeds the SLs in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOS as a potential COPC in groundwater.	• Initiate combined RI with Building 435.
Former Building 99	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SL in three monitoring wells. PFOA concentrations exceed the SL in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS did not identify potentially unacceptable human health risk or COPCs in soil or groundwater.	• No further investigation at this time.
Building 503	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SL in three monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 513 Parking Lot, Former Building 432, Building 494, Former DRMO Drum Storage Area, and Lift Station 1.

Table 5-1. Site Inspection Summary and Recommendations

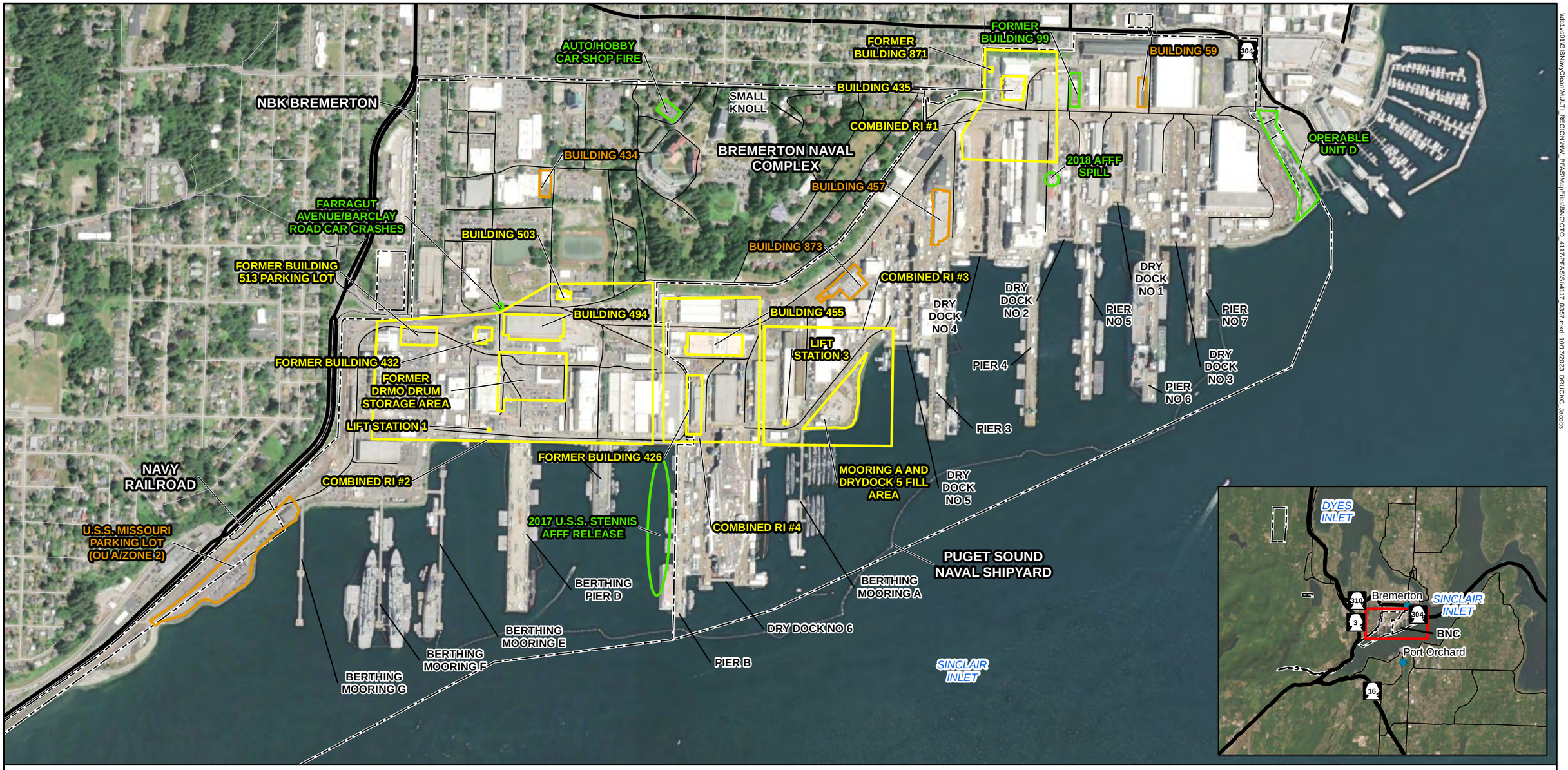
Potential/Confirmed PFAS Release Area	Rationale	Recommendation
Building 494	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SL in three monitoring wells. PFHxS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 513 Parking Lot, Building 503, Former Building 432, Former DRMO Drum Storage Area, and Lift Station 1.
Former Building 432	• PFOS subsurface soil concentrations exceed the SL at one location. • PFOA, PFOS, PFNA, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in three monitoring wells. PFNA and PFHxS concentrations exceed the SLs in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 513 Parking Lot, Building 503, Building 494, Former DRMO Drum Storage Area, and Lift Station 1.
Farragut Ave/Barclay Rd Car Crashes	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA concentrations exceed the SL in three monitoring wells. PFOS concentrations exceed the SL in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS did not identify potentially unacceptable human health risk or COPCs in soil or groundwater.	• No further investigation at this time.
Building 434	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA concentrations exceed the SL in three monitoring wells. PFOS and PFHxS concentrations exceed the SLs in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA as a potential COPC in groundwater.	• Initiate RI.
Auto/Hobby Shop Fire	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA concentrations exceed the SL in two monitoring wells. PFOS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS did not identify potentially unacceptable human health risk or COPCs in soil or groundwater.	• No further investigation at this time.
2017 USS Stennis AFFF Release	• There were no PFAS exceedances in sediment and surface water. • HHRS did not identify potentially unacceptable human health risk or COPCs in surface water or sediment.	• No further investigation at this time.
2018 AFFF Spill	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS did not identify potentially unacceptable human health risk or COPCs in soil or groundwater.	• No further investigation at this time.

Table 5-1. Site Inspection Summary and Recommendations

Potential/Confirmed PFAS Release Area	Rationale	Recommendation
Building 457	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SL in three monitoring wells. PFOA concentrations exceed the SL in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate RI.
USS Missouri Parking Lot	• PFOS subsurface soil concentrations exceed the SL at one location. • PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SLs in four monitoring wells. PFOA concentrations exceed the SL in two monitoring wells. PFHxS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOS as a potential COPC in groundwater.	• Initiate RI.
Mooring A and Drydock 5 Fill Area	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in two monitoring wells. PFHxS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Lift Station 3.
Lift Station 3	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA, PFOS, and PFHxS concentrations exceed the SLs in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA, PFOS, and PFHxS as potential COPCs in groundwater.	• Initiate combined RI with Mooring A and Drydock 5 Fill Area.
Building 873	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate RI.
Former DRMO Drum Storage Area	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in four monitoring wells. PFHxS concentrations exceed the SL in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 513 Parking Lot, Building 503, Former Building 432, Building 494, and Lift Station 1.
Lift Station 1	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOS concentrations exceed the SL in three monitoring wells. PFOA and PFHxS concentrations exceed the SLs in two monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA, PFOS, and PFHxS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 513 Parking Lot, Building 503, Former Building 432, Building 494, and Former DRMO Drum Storage Area.

Table 5-1. Site Inspection Summary and Recommendations

Potential/Confirmed PFAS Release Area	Rationale	Recommendation
Former Building 426	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in two monitoring wells. PFHxS concentrations exceed the SL in one monitoring well. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Building 455.
Building 455	• PFOA, PFOS, and PFHxS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in four monitoring wells. PFHxS concentrations exceed the SL in three monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate combined RI with Former Building 426.
Building 59	• PFOA and PFOS are present in groundwater at concentrations in exceedance of the SLs. PFOA and PFOS concentrations exceed the SLs in three monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS identified PFOA and PFOS as potential COPCs in groundwater.	• Initiate RI.
OU D	• PFOS is present in groundwater at concentrations in exceedance of the SL. PFOS concentrations exceed the SL in three monitoring wells. The extent of PFAS exceedances in groundwater is not delineated. • HHRS did not identify potentially unacceptable human health risk or COPCs in soil or groundwater.	• No further investigation at this time.



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LEGEND

- State Route
- Important Local Road
- No Further Action at this Time
- RI
- Combined RI Sites
- Installation Boundary

NOTES:
BNC = Bremerton Naval Complex
NBK = Naval Base Kitsap
PFAS = Per- and Polyfluoroalkyl Substances
RI = Remedial Investigation
SI = Site Inspection

Combined RI boundaries are preliminary.

IMAGERY SOURCE:
ESRI ArcGIS Online Web Service,
World Imagery, Maxar, 2022

Figure 5-1
SI Recommendations Summary
Site Inspection for PFAS
BNC, Bremerton, Washington

0 375 750
1 inch = 750 feet

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SECTION 6

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