Northwest
Silverdale, Washington

Final

Preliminary Assessment for Per- and Polyfluoroalkyl Substances (PFAS) Outlying Landing Field Coupeville

Naval Air Station Whidbey Island
Oak Harbor, Washington

November 2018

Northwest
Silverdale, Washington

Final

Preliminary Assessment for Per- and Polyfluoroalkyl Substances (PFAS) Outlying Landing Field Coupeville

Naval Air Station Whidbey Island
Oak Harbor, Washington

November 2018

Prepared for NAVFAC Northwest
by CH2M HILL, Inc.
Bellevue, Washington
Contract N62470-16-D-9000
CTO 4041

Contents

Tables

Figures

Appendixes

Acronyms and Abbreviations

AFFF	aqueous film forming foam
bgs	below ground surface
CH2M	CH2M HILL, Inc.
DoD	Department of Defense
FTA	fire training area
LHA	lifetime health advisory
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NIRIS	Naval Installation Restoration Information Solution
OLF	Outlying Landing Field
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonate
PFOA	perfluorooctanoic acid
ppt	parts per trillion
RPM	Remedial Project Manager
RSL	Regional Screening Level
USEPA	United States Environmental Protection Agency
VSI	visual site inspection

SECTION 1

Introduction

The Department of the Navy (Navy) Environmental Restoration Program at Naval Air Station (NAS) Whidbey Island, which is within the Naval Facilities Engineering Command (NAVFAC) Northwest Division, contracted with CH2M HILL, Inc. (CH2M) to perform preliminary assessment (PA) activities at all NAS Whidbey Island installations (Ault Field, Outlying Landing Field (OLF) Coupeville, and the Seaplane Base) to determine probable environmental release of per- and polyfluoroalkyl substances (PFAS). This document specifically applies to possible PFAS release areas at OLF Coupeville. The document provides an initial assessment of these possible release areas, migration pathways, and potential receptors of contamination. Separate PA documents are being developed for Ault Field and Seaplane Base. This work is being performed under Comprehensive Long-term Environmental Action—Navy (CLEAN) 9000 Contract N62470-16-D-9000, Contract Task Order 4041.

CH2M visited OLF Coupeville on multiple occasions between October through December 2017. OLF Coupeville is an active Navy installation near the Town of Coupeville, Washington. The location of the NAS Whidbey Island installations including OLF Coupeville are shown on **Figure 1-1** and the potential PFAS release locations identified at OLF Coupeville during this PA are shown on **Figure 1-2**.

1.1 Background

PFAS have been identified in a variety of commercial and industrial sources and have been widely used since the 1970s. PFAS are a component of aqueous film forming foam (AFFF), which was utilized by the Navy for fire training exercises, fire suppression systems, and suppressing aircraft fires or other fires. The Military Specification for AFFF (MIL-F-24385) was formally issued on November 21, 1969. AFFF suppresses combustion by coating the fuel source of the fire and preventing oxygen from entering. Areas located at OLF Coupeville may have used, stored, or disposed of AFFF during historical operations. Currently, fire trucks with AFFF tanks are parked at OLF Coupeville.

PFAS have been identified by the United States Environmental Protection Agency (USEPA) as emerging contaminants. The Department of Defense (DoD) has identified these chemicals as contaminants that have a reasonably possible pathway to enter the environment, present a potential unacceptable human health or environment risk, and lack or have evolving published regulatory standards (Navy, 2017a). As detailed in the NAVFAC Interim PFAS Site Guidance, currently there are no Safe Drinking Water Act (SDWA) federal regulations or Clean Water Act Ambient Water Quality Human Health Criteria for any PFAS. For contaminants not subject to national primary drinking water regulation, the SDWA authorizes the USEPA to publish nonregulatory lifetime health advisories (LHAs) or take other appropriate actions. These LHAs are created to assist state and local officials in evaluating risks from these contaminants in drinking water. In May of 2016, the USEPA issued an LHA for two PFASs, specifically perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Each LHA was established as 70 parts per trillion (ppt) or 0.07 micrograms per liter. An additional LHA of 70 ppt was established for the total concentration of PFOA and PFOS combined when both PFOA and PFOS have been detected. Additionally, a risk-based Regional Screening Level (RSL) has been set for one other PFAS compound, perfluorobutane sulfonate (PFBS). As of June 2017, this level is 400 micrograms per liter (400,000 ppt) for tap water.

PFAS are chemically and biologically stable and are able to resist natural degradation processes; therefore, they persist in the environment. Recognized sources of PFAS in groundwater and soil include (NGWA, 2017):

- Storage, transfer, and use of AFFF for firefighting and fire training
- Disposal and land application of biosolids (treated solid waste)

- Discharge of effluent from municipal wastewater treatment systems
- Release from landfill leachate
- Release from commercial and industrial sources

1.2 Purpose and Objectives

The purpose of this PA report is to assess potential PFAS releases into the environment at OLF Coupeville. Specific objectives are to:

- Identify locations related to the potential use, storage, and disposal of AFFF
- Provide initial overview of potential contaminant migration pathways from areas where AFFF was potentially used and identify potential receptors that may be exposed
- Provide recommendations for areas requiring further investigation

This PA Report identifies and documents known fire training areas (FTAs), as well as non-fire-training locations where PFAS may have been released into the environment (**Table 1-1**). No historical or current FTAs were identified at OLF Coupeville.

Table 1-1. Fire Training Areas and Non-Fire Training Areas Identified for Potential PFAS Releases
OLF Coupeville, NAS Whidbey Island, Washington

Fire Training Areas
(No FTAs were identified)
Non-Fire Training Areas
Fire Station
Building 2709 (Crash Truck Shelter)
Emergency Response
1982 EA-6B Accident Location (Off-Base)
Other
Facility 1, Facility 2, and Facility 11 (Control Tower, Airfield Operations Building, and Potable Water Well Pump House)
Building 2807 (OLF Electronic Warfare Signal Emitter Building)

1.3 Preliminary Assessment Methods

This PA was conducted in accordance with the USEPA's *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991) with additional guidance from the Navy's *Interim Per-and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/ September 2017 Update* (Navy, 2017a). The following activities were completed as part of this PA:

- Existing site documentation was reviewed to identify and characterize potential PFAS storage, use, and disposal activities.
- Relevant site personnel were interviewed to identify and characterize potential PFAS storage, use, and disposal activities.

- A visual site inspection (VSI) was conducted to identify evidence of PFAS storage, use, and disposal, to fill data gaps identified in the preliminary review. Physical characteristics (e.g., surface flow, drainage conditions) were documented for those areas identified during the preliminary review and interviews.
- Environmental data records were reviewed to identify nearby populations, drinking water sources, and environmental sensitive areas.

The activities above, as well as conclusions and recommendations for each potential PFAS release area are summarized in this report. Potential PFAS exposure routes were also evaluated, with consideration of current and potential future land and groundwater use.

1.4 Report Organization

This PA contains the following sections:

- **Section 1 – Introduction,** describes the background, purpose, and organization of the report.
- **Section 2 – Background,** describes facility and relevant history.
- **Section 3 – Archive Sources,** identifies the sources of information used to identify and assess potential PFAS release areas.
- **Section 4 – Identification and Assessment of Potential PFAS Release Areas,** presents each potential release area along with a description and operational history; PFAS storage, use, or release; and a pathway and environmental hazard assessment.
- **Section 5 – Conclusions and Recommendations,** summarizes the findings of this PA and makes recommendations regarding future actions.

SECTION 2

Background

This section presents background information on OLF Coupeville relevant to this PA, including descriptions of the facility and its history and the environmental setting. This section also presents summaries of previous PFAS sampling at and near the Base.

2.1 Facility Description and Background

OLF Coupeville occupies 677 acres and is located approximately 2 miles southeast of Coupeville, Washington in Island County, 7 miles south of Seaplane Base, and 10 miles south of Ault Field (**Figure 1-1**). OLF Coupeville became active in 1943 as an auxiliary field for Naval Station Seattle (Navy, 2017b). It was originally used for emergency and practice landings until 1946 (Navy, 2016) and remained an active landing strip through 1963 at which point the Navy made plans to sell the facility (Navy, 2017b). In 1967, however, the Navy reactivated OLF Coupeville for use in field carrier landing practice (Navy, 2016; Navy, 2017b). Such operations allow aviators to practice touch-and-go activities, which simulate carrier landings and take offs. The Navy considers OLF Coupeville as an ideal airfield for this type of carrier training because of its remote location and low ambient lighting, which allow pilots and crew to have an optimum experience that replicates landing aboard an aircraft carrier. OLF Coupeville has been continuously used for this purpose since 1967 (Navy, 2016). The airfield has one 5,400-foot runway, Runway 14-32.

2.2 Environmental Setting

OLF Coupeville is situated on a broad plateau in central Whidbey Island at an elevation of approximately 195 feet above mean sea level. The paved runway is bordered by maintained grass (Navy, 1994). A runway safety area extends approximately 3,300 feet north and south of the runway footprint and is bordered by trees and residential parcels (**Figure 1-2**). Washington State Route 20 runs north-south along or near the eastern Base boundary and east-west near the northern boundary; Keystone Hill Road runs north-south along a portion of the western boundary (**Figure 1-2**). Portions of the airfield are within and are bordered by Ebey's Landing National Historical Reserve. The southernmost potion of the airfield is wooded and slopes steeply downward (**Figure 1-2)** toward Admiralty Bay (**Figure 1-1**).

2.2.1 Geologic Setting

Whidbey Island lies within the Puget Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range. The geology of the area is heavily influenced by glacial advances and retreats. The geologic units of Whidbey Island consist of a sequence of Quaternary-age (less than 2 million years old) glacial and interglacial deposits that may be over 3,000 feet thick (USGS, 1985). The near-surface deposits are mostly glacial sediment of the most recent Fraser glaciation (20,000 to 10,000 years old).

The glacial and post-glacial sediments make up most of the surface and near-surface soil underlying the base. In general, these stratigraphic units consist of relatively impermeable clay, silt, and silty fine sand and gravels (Everson glaciomarine drift and Vashon till), with interbedded layers of sands and gravels. Interbedded sands and gravels were deposited by retreating glaciers. Along the coastline these sediments have been reworked into sandy beach deposits. Low-permeability Cretaceous or Tertiary bedrock (older than 30 million years) underlies the unconsolidated Quaternary deposits (USGS, 1988a).

Surficial geology at OLF Coupeville consists of the Partridge Gravel, which was deposited by glacial meltwaters and is composed of sand, gravel, and sand-gravel mixtures with minor inter-layered silt

and silty sand (Polenz et al., 2005). Based on borings completed in 2017, the Partridge Gravel generally extends to depths of 180 to 200 feet below ground surface (bgs) and is characterized by fine to medium sand with intermittent occurrences of gravel and laterally discontinuous layers of silt and clay (NAVFAC, 2017). Pleistocene deposits, including Vashon till, lie beneath the Partridge Gravel and consist predominantly of silt and clay.

2.2.2 Hydrogeologic Setting

The hydrogeologic setting at OLF Coupeville was initially described in the *Draft Technical Memorandum: Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater Outlying Landing Field Coupeville* (NAVFAC, 2017) and further refined in the *Draft Aquifer Test Groundwater Sampling and Groundwater Modeling Report, Per- and Polyfluoroalkyl Substances (PFAS) Outlying Landing Field Coupeville* (NAVFAC, 2018). The results of these evaluations are summarized here. The results are based on testing of a network of 31 monitoring wells (27 installed November 2016 and February 2017 and 4 installed in December 2017). All wells are shown on **Figure 2-1**. For purposes of understanding groundwater flow directions, these wells have been assigned to shallow, intermediate, and deep elevation intervals (NAVFAC, 2018)[1]. These elevation intervals do not indicate three discrete aquifers or water-bearing zones. With the exception of some shallow wells possibly screened within localized areas of perched groundwater, all of the wells were screened within a single aquifer system and are in hydraulic connection with one another. The terms shallow, intermediate, and deep are used to convey depth information within the aquifer system at the site for the purposes of discussing variability in flow directions, PFAS presence or absence, or other characteristics that may vary with depth.

The first encountered groundwater in the northern portion of the site is between 90 and 130 feet bgs. Selected shallow wells may represent localized perched groundwater, but the available data do not confirm this. A discontinuous clay and silt layer is present at some well cluster locations but pinches out in the southern portion of the site. The underlying intermediate elevation interval is likely semiconfined, with confined conditions in some areas of the northern portion of the site and unconfined conditions in the southern portion, near wells WI-CV-MW10M and WI-CV-MW12S/D. The potentiometric surface for the intermediate elevation interval is at approximately 60 to 85 feet NAVD88, or 120 to 130 feet bgs. A heterogeneous clay, claystone, and silt confining layer underlies the intermediate elevation interval and is interpreted to define the bottom of the Partridge Gravel. Organic material (for example, plant material and peat) was frequently observed in this interval. Transmissive sand zones are present within and beneath the organic silt and clay unit. Borings completed at the site were typically terminated in the organic clay zone or sand zones within or beneath it. For this assessment, these sand zones are considered part of the deep elevation interval.

Groundwater contour maps have been generated for both the intermediate and deep elevation intervals based on groundwater level data collected on January 8, 2018 and included as **Figures 2-1** and **2-2,** respectively. **Figure 2-1** indicates the presence of a groundwater mound in the intermediate elevation interval located in the northeast portion of the site, with groundwater flowing radially outward from the center of the mound. In the deeper elevation interval (**Figure 2-2**), the groundwater flow directions are similar to the intermediate interval; however, the available monitoring well infrastructure can only define flow directions to the south and east of the site.

2.2.3 Hydrologic Setting

No surface water bodies are present at OLF Coupeville. The Base is generally level (elevations ranging from about 180 to 200 feet above mean sea level with higher elevations on the eastern side of the installation. As a result, surface drainage is directed to the southwest (Landau Associates, 1984). Surface

[1] Note that the naming convention of the wells in this report ("-S", "-M", "-D") is based on depth bgs, not elevation, and does not necessarily correspond to the shallow, intermediate, and deep elevation intervals discussed herein.

water on-Base drains via infiltration into soil or runoff in shallow ditches immediately after precipitation events. Surface topography for OLF Coupeville and the surrounding area is depicted on **Figure 1-2**. The nearest major surface water bodies are Admiralty Bay (0.7 mile to the south), Crockett Lake (1 mile to the southwest), and Saratoga Passage (1 mile to the east) (**Figure 1-1**).

OLF Coupeville is not within the 100- or 500-year floodplains (FEMA, 2017).

2.2.4 Ecological Receptors

The occurrence of ecological receptors in the study area's surrounding area, including Ault Field, Seaplane Base, and OLF Coupeville are presented in the *Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Volume 1* (Navy, 2016). The findings are summarized in the following subsections.

Federally Threatened and Endangered Species

There are nine federally listed terrestrial species that could potentially occur at OLF Coupeville and the surrounding area (Navy, 2016). These are:

- Golden paintbrush (plant, threatened)
- Taylor's checkerspot butterfly (invertebrate, endangered)
- Island marble butterfly (invertebrate, candidate)
- Oregon spotted frog (amphibian, threatened)
- Marbled murrelet (bird, threatened)
- Northern spotted owl (bird, threatened)
- Streaked horned lark (bird, threatened)
- Yellow-billed cuckoo (bird, threatened)
- North American wolverine (mammal, proposed threatened)

The marbled murrelet is known to occur year-round in the marine waters surrounding Whidbey Island (near OLF Coupeville).

Other Fish and Wildlife Species

Reptile and amphibian species potentially occurring in the study area encompassing Ault Field, Seaplane Base, OLF Coupeville, and the surrounding areas include several species of lizards, snakes, salamanders, and frogs. Birds occurring in the study area include about 230 migratory bird species protected under the Migratory Bird Treaty Act. Six common year-round bird species may also occur, including the ring-necked pheasant (*Phasianus colchicus*), rock pigeon (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), European starling, house sparrow (*Passer domesticus*), and the California quail (*Callipepla californica*). Thirty-six species of terrestrial mammals were identified as potentially occurring in the study area. Large mammals that regularly occur are the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and the coyote (*Canis latrans*), which occur in the mixed forest, alder forest, and freshwater marsh habitat types, as well as in grasslands. The eastern cottontail (*Sylvilagus floridanus*), European rabbit (*Oryctolagus cuniculus*), river otter (*Lontra canadensis*), mink (*Mustella vison*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), Townsend's vole (*Microtus townsendii*), masked shrew (*Sorex cinereus*), and deer mouse (*Peromyscus maniculatus*) also are among the most commonly occurring mammals within the study area. Bat species are also commonly occurring. Many fish and marine mammals may potentially occur in the marine areas that surround Whidbey Island. (Navy, 2016)

2.2.5 Water Usage

Two potable drinking water supply wells are present at OLF Coupeville: one at Building 11 and one at Building 2807.

The Town of Coupeville operates a community drinking water well, the Keystone Hill Well, just west of OLF Coupeville (off-Base, shown on **Figure 1-2**). The Keystone Hill Well is currently used as a potable water source for the Town of Coupeville and it is currently operating at an extraction rate of approximately 150 gallons per minute for 21 to 23 hours per day (CH2M, 2017a). The Town of Coupeville also obtains water from the Fort Casey Well Field, which is located 0.4 mile southwest of OLF Coupeville (off-Base, **Figure 1-2**). This well field consists of 6 operational wells: 4 that produce between 10 and 27 gallons per minute and 2 that produce between 40 and 45 gallons per minute (Coupeville, 2009). Admiral Cove Water District also operates drinking water wells south of OLF Coupeville (approximately 0.5 mile) (Navy, 2017c). Several smaller public and private drinking water wells are located near OLF Coupeville (WSDOH, 2017).

2.3 Previous and Current PFAS Investigations

In September 2016, the Navy conducted on-Base drinking water sampling at OLF Coupeville. PFOA was detected in one of two on-Base drinking water wells (at Building 2807, shown on **Figure 1-2**) below the USEPA LHA of 70 ppt along with PFBS (CH2M, 2017a, 2017b). The PFAS detections prompted initiation of groundwater and drinking water investigations at OLF Coupeville and the surrounding area.

2.3.1 Groundwater Investigations

Following the detection of PFAS in the Building 2807 supply well, an evaluation was conducted to refine the understanding of groundwater flow at OLF Coupeville and to confirm the presence of PFAS in groundwater and characterize their nature, if present. The results of this evaluation are reported in the *Draft Technical Memorandum: Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater Outlying Landing Field Coupeville* (NAVFAC, 2017). Twenty-seven groundwater monitoring wells were installed between November 28, 2016 and February 14, 2017, ranging in depth from 106 feet bgs to 237 feet bgs.

The April 2017 groundwater elevation study indicated groundwater elevation fluctuations during a 48-hour monitoring period ranged up to 0.6 foot. Deep-screened wells (MW01-D, MW03-D, MW10-D, and MW12-D) showed a clear semidiurnal tidal influence. Two intermediate-screened wells (MW06-M and MW08-M) showed a weaker semidiurnal tidal influence (NAVFAC, 2017). MW14-M appeared to show a response to nearby pumping, likely related to operation of the Town of Coupeville's Keystone Hill Well (all wells are shown on **Figure 1-2**).

In addition to the groundwater elevation data, twenty-seven groundwater samples were collected between February 20 and March 4, 2017. Validated PFAS results from the 2017 event are shown on **Figure 2-3** and summarized as follows:

- **PFBS** – PFBS was detected in seven samples. No PFBS detections exceeded the RSL (USEPA, 2017) of 400,000 ppt (based on a hazard quotient of 1.0).
- **PFOS** – PFOS was detected in five samples. No PFOS detections exceeded the USEPA LHA of 70 ppt.
- **PFOA** – PFOA was detected in five samples. PFOA detections exceeded the USEPA LHA of 70 ppt in three monitoring wells: MW02-S (571 ppt), MW05-M (1,190 ppt), and MW14-M (166 ppt).
- **PFOS + PFOA** – PFOS + PFOA detections exceeded the USEPA combined LHA of 70 ppt in three monitoring wells: MW02-S (625.7 ppt), MW05-M (1,190 ppt), and MW14-M (167 ppt).

From the groundwater sampling results, PFAS contamination appears to be most widespread in the intermediate elevations within the aquifer compared to the shallow/perched and deeper elevations. The only exception is the LHA exceedance detected in Well MW02-S (a shallow-screened well south of Building 2709). The only detection in the deeper elevation of the aquifer occurred in MW03-D, where an estimated PFOS concentration of 0.914 J ppt was detected.

A focused groundwater study was conducted from December 2017 to January 2018. During this event, four new wells were installed and sampled (MW15-S, MW15-M, MW16-S, NS MW16-M) along with seven existing monitoring wells (MW02-S, MW04-S, MW04-M, MW05-M, MW07-S, MW07-M, and MW14-M). Validated results from the late 2017/early 2018 sampling event are shown on **Figure 2-3** and summarized as follows.

- **PFBS** – PFBS was detected in six samples. No PFBS detections exceeded the RSL (USEPA, 2017) of 400,000 ppt (based on a hazard quotient of 1.0).
- **PFOS** – PFOS was detected in six samples. PFOS exceeded the USEPA LHA of 70 ppt in monitoring well MW02-S (87.8 ppt).
- **PFOA** – PFOA was detected in six samples. PFOA detections exceeded the USEPA LHA of 70 ppt in the following monitoring wells: MW02-S (1010 ppt), MW05M (1220 ppt), MW15S (253 ppt), MW16S (297 ppt), and MW16M (373 ppt).
- **PFOS + PFOA** – PFOS + PFOA detections exceeded the USEPA combined LHA of 70 ppt in the following monitoring wells: MW02-S (1098 ppt), MW05M (1223 ppt), MW15S (253 ppt), MW16S (300 ppt), and MW16M (376 ppt).

All wells with LHA exceedances, except for MW02-S (a shallow-screened well), were completed in the intermediate elevation range of the aquifer.

During the groundwater study, an aquifer test was conducted. Groundwater levels observed near the Keystone Hill Well during aquifer testing indicated that several locations in the surrounding aquifer are hydraulically impacted by pumping at the Keystone Hill Well (NAVFAC, 2018). Groundwater level fluctuations in response to Keystone Hill Well pumping at MW14M (approximately 500 feet away) were approximately 0.5 foot or less. Larger responses were observed at wells MW15M/S and MW16M/S (approximately 370 and 190 feet from the KHW, respectively) where drawdown in response to pumping was 1 to 1.5 feet. The aquifer test results were used to develop a groundwater model that analyzes flow patterns in the vicinity of OLF Coupeville. Specific detail on the model is included in the *Draft Aquifer Study Report* (NAVFAC, 2018).

2.3.2 Drinking Water Well Investigation

From November 2016 to June 2017, off-Base drinking water wells were sampled under a voluntary sampling program. Due to the uncertainty of groundwater flow direction at the time, the Navy used Building 2807 as the center point to draw a 1-mile radius to initiate the Phase 1 off-Base drinking water sampling, which included more than 397 properties. The Phase 1 results indicate that PFOS and/or PFOA are above the USEPA LHA in seven off-Base drinking water wells located south of the OLF Coupeville runway (CH2M, 2017b; Navy, 2017c). The Town of Coupeville's primary water supply well contained PFOA and PFOS below the USEPA LHA. PFOS and PFOA were not detected in the other Fort Casey Well Field supply wells (Navy, 2017c). Based on the Phase 1 results, the Navy expanded the drinking water investigation a half-mile downgradient. This additional area is referred to as the Phase 2 sampling area. There were no exceedances of the USEPA LHA for PFOS/PFOA or the USEPA RSL for PFBS in the Phase 2 area. During Phase 2 sampling, PFOS and PFOA were not detected in the Admiral's Cove Water District wells downgradient of OLF Coupeville (Navy, 2017c). Based on the Phase 2 results, the Navy did not expand the drinking water sampling area near OLF Coupeville beyond the Phase 2 area.

In October 2017, the Navy conducted an additional drinking water sampling event, which included resampling of drinking water wells where PFOS and/or PFOA were previously detected and additional drinking water wells at properties adjacent to wells with USEPA LHA exceedances. The results of the October 2017 resampling confirmed USEPA LHA exceedances in seven previously-sampled off-base drinking water wells and in one of two newly sampled locations south of OLF Coupeville (Navy, 2018).

SECTION 3

Archive Sources

This section summarizes the sources of information used to perform the PA.

3.1 Preliminary Review

Information was gathered and evaluated during the preliminary review to identify and characterize locations of potential PFAS storage, use, or disposal, and to focus the activities to be conducted during the VSI. The information was obtained from existing documents and interviews conducted with relevant individuals. A summary of information reviewed is provided as **Appendix A**.

3.1.1 Document Review

The following document types were evaluated during the preliminary review.

Internet Records

Internet search engines were utilized to find historical information on crashes, fires, use of AFFF, and spills at OLF Coupeville. Additionally, the National Archives Catalog was queried to obtain relevant historical documents. The Washington Department of Ecology website (WDOE, 2017) was searched for records of groundwater supply wells located near OLF Coupeville.

Facility Operations Records

Navy staff provided inventory lists for AFFF, including installed storage in trucks, trailers, or dispensing tanks, and uninstalled storage in manufacturers' shipping containers (cans, pails, drums, or totes). A building inventory list was obtained from the Naval Installation Restoration Information Solution (NIRIS) geographic information system records and was used to identify the names buildings and facilities.

Environmental Restoration Program Records

Environmental Restoration Program reports from the Administrative Record were searched for key terms to identify potential PFAS release areas and to obtain information on physical investigations and identification of potential pathways and receptors at those areas.

Aircraft Incident Reports

A summary of NAS Whidbey Island aircraft incidents that occurred near OLF Coupeville during flight operations from 1975 to approximately May 2005 was obtained from an Air Installation Compatible Use Zones report for NAS Whidbey Island (Onyx, 2005) and supplemented with findings from internet searches and interviews. Aircraft incident reports were requested but were not received in time for inclusion in this report.

3.1.2 Interviews

CH2M conducted interviews with current and former NAS Whidbey Island personnel to gather pertinent information regarding the history and operations at NAS Whidbey Island, including OLF Coupeville. The goal of these interviews was to validate and verify data collected during document and record reviews, and to identify other information related to PFAS not previously found in historical documents. Interviews with specific information related to OLF Coupeville are referenced in **Section 4.**

The interviews were conducted in person, by telephone, or via email. Each interview session was logged using a Communication Record Sheet. Completed record sheets are provided in **Appendix B**. The

information from the interviews was also used to confirm and select additional locations to observe during site visits. This information is referenced throughout **Section 4**.

The following personnel were interviewed (additional interviewee details are presented in **Appendix A**):

- Fire Chief, Navy Region NW Fire and Emergency Services; 2006 to present. Fire Chief, NAS Whidbey Island; 1999 to 2006.
- Fire Chief, NAS Whidbey Island; 2006 to present.
- Hazardous Waste Manager, NAVFAC Northwest Public Works
- Regional Hazardous Waste Program Manager, NAVFAC Northwest Public Works; 2011 to present
- Public Works Commander, NAVFAC Northwest
- Aviation Emergency Medical Technician (AEMT)/Firefighter, NAS Whidbey Island; 1997 to present
- Civil Engineer, NAVFAC Northwest Urban Environmental Management
- Director of Research, Principal Investigator, International Arrow, and Goal Technologies
- Lead Engineering Technician, NAS Whidbey Island Facility Engineering & Acquisition Division
- Crash Captain, NAS Whidbey Island; 1985 to 2001
- Device Manager, Building 2807 (1999 to present)

3.2 Visual Site Inspection

A preliminary VSI was completed on October 26, 2017 with a second VSI completed on November 30, 2017. During the VSIs, accessible areas were visited to inspect for signs of potential releases, such as surficial debris, stained soil, stressed vegetation, locations and distances from release to potential receptors, significant Base features, and the drainage pattern and overland flow route to surface water. Each location identified in the preliminary review was visited if it was identified as a potential AFFF storage, use, or disposal area. Information gathered during the VSIs is summarized in **Section 4** and a photograph log from the VSIs is provided in **Appendix C**.

SECTION 4

Identification and Assessment of Potential PFAS Release Areas

This section summarizes the characteristics of each area identified for the VSI; the potential for PFAS to have been stored, used, or released at each area; and assesses the migration pathways and potential exposures that could result from a PFAS release. If no PFAS storage, use, or release was identified at an area, the potential migration pathways and exposures were considered incomplete and were not evaluated.

A complete exposure pathway typically includes the following components: a source of contamination (an environmental medium contaminated at the source or a release mechanism by which chemicals are released from a source medium and transported), an exposure medium by which a receptor comes into contact, and a route of intake for the contaminant into the receptor's body. If any of these elements are missing, the pathway is incomplete. Other release mechanisms resulting in exposure media for receptors may include the uptake of soil contaminants by plants and animals and the emission of soil contaminants into the air in association with dust particles (USEPA, 1989).

Database research shows 625 parcels within 4 miles of OLF Coupeville including 2 schools, 4 daycare facilities, 1 nursing home, and 1 hospital (all located north of the Base). The Town of Coupeville is approximately 2 miles north. Thirty-three parcels are within 200 feet of the Base boundary (no schools or daycares were identified within 200 feet of the boundary).

Specific VSI areas are discussed in the following sections.

4.1 Fire Training Areas

No current or former fire training areas were identified at OLF Coupeville.

4.2 Hangars

No current or former hangars were identified at OLF Coupeville.

4.3 Fire Stations

One fire station was identified at OLF Coupeville. It consists of two separate buildings: a two-story house referred to in this document as the Fireman's Quarters (not identified for VSI) and Building 2709 (Crash Truck Shelter).

4.3.1 Building 2709 (Crash Truck Shelter)

Description and Operational History

Building 2709 (Crash Truck Shelter) is located east of Runway 14-32 just south of an access road that serves the facility (**Figure 4-1**). The geographic coordinates are 48°11'24.50" N and 122°37'44.00" W. It is approximately 2,600 square feet and is surrounded by pavement to the east and west, and by grass to the north and south. Across the access road to the north is a two-story house used by the fire department. This house was referred to during the VSI as the "Fireman's Quarters". West of Building 2709 is a cluster of airfield operation buildings. Building 2709 serves as a fire truck parking structure. The structure has three west-facing bay doors and two east-facing bay doors that are accessed from paved

driveways that lead to each side. A small gravel wash pad is located on the west side of the building at the northwest corner. A photo log from the VSI is provided in **Appendix C**.

PFAS Storage, Use, or Release

AFFF inventory records indicate that 9 fire trucks serving NAS Whidbey Island are equipped with AFFF tanks. The inventory associates two of these fire trucks (Whidbey 36 and Whidbey 38) with OLF Coupeville; however, during the VSIs, Whidbey 30 and Whidbey 35 were parked in Building 2709. Uninstalled ready reserve AFFF is currently stored at Ault Field at the current fire station (Station 71, Building 2897). In the past, AFFF was stored inside Building 2709 in the northeast corner (Director of Research, Principal Investigator, International Arrow, and Goal Technologies, 12/13/2017, pers. comm.). Although the fire trucks that currently serve OLF Coupeville include built-in AFFF tanks, older models (MB-5 crash trucks) did not. Personnel interviews indicate that during the 1970s, 5-gallon buckets of AFFF concentrate were kept on top of the MB-5 crash trucks and added to the water tank as needed. One or two of that type of truck was present at OLF Coupeville in the past (Crash Captain, 2017, pers. comm.; **Appendix B**). No historical records were identified that indicate whether additional AFFF was or was not stored at Building 2709 in the past. Based on interviews with current fire department personnel, truck washing occurs just outside the building (Fire Chief, Navy Region NW Fire and Emergency Services, 2017, pers. comm.; **Appendix B**). During the VSIs, a water spigot and hose were identified on the west side of the building near the small gravel wash pad. AFFF may have been rinsed off the trucks during washing activities.

Pathway and Environmental Hazard Assessment

The pathway and environmental hazard assessment includes analyses of groundwater, surface water, sediment, soil and air pathways and targets. These analyses are included in the following subsections.

Groundwater Pathway and Targets

AFFF that may have been rinsed off the fire trucks could have infiltrated the gravel wash pad or soil in the grassy areas adjacent to the west driveway, especially on the south side, and migrated to underlying shallow groundwater. Groundwater flow near Building 2709 varies due to the presence of a groundwater mound in the intermediate elevation interval located in the northeast portion of the site, with groundwater flowing radially outward from the center of the mound. Flow direction near Building 2709 is generally to the southwest in intermediate-screened wells and to the south in deep-screened wells (**Figure 4-1**). In March 2017 groundwater samples were collected from MW02-S and MW02-M, which are located approximately 200 feet downgradient of Building 2709 (**Figure 4-1**). PFOS and PFOA were detected in MW02-S at a combined concentration of 625.7 ppt (PFOS: 54.7 ppt; PFOA: 571 ppt). PFOS and PFOA were not detected above the laboratory reporting limits in MW02-M. Groundwater at MW02-S was resampled in January 2018. At that time PFOS and PFOA were detected at a combined concentration of 1098 ppt (PFOS: 87.8 ppt; PFOA: 1010 ppt).

A potable water supply well associated with Facility 11 (WI-CV-WL01) is located about 370 feet cross gradient. PFAS were not detected in this well during a routine monitoring that occurred in September 2016. The influence of this well on local groundwater gradients is unknown. The other on-Base, potable water supply well (WI-CV-WL02) is located 0.5 mile downgradient. PFOA was detected in September 2016 at an estimated concentration of 17.5 J ppt, below the USEPA LHA. The Keystone Hill Well (a community drinking water supply well) is located about 0.5-mile cross gradient (**Figure 2-1**). PFOA was also detected in the Keystone Hill Well (in December 2016) at a concentration of 61 ppt, below the USEPA LHA (**Figure 2-2**). The influence of the Keystone Hill Well on local groundwater gradients is currently under investigation (CH2M, 2017a, NAVFAC, 2018).

Washington Department of Ecology and Washington Department of Health records identified 632 wells within 4 miles of OLF Coupeville. PFAS compounds have been detected in samples collected from some private drinking water wells south of OLF Coupeville (downgradient of Building 2709) and a subset of

these detections have exceeded the USEPA LHA. The closest off-Base drinking water well to Building 2709 is a private well 1,081 feet downgradient.

Surface Water and Sediment Pathways and Targets

Surface water drainage is limited because of a relatively flat topography, and rainfall is expected to infiltrate the grassy areas surrounding Building 2709 and the adjacent paved driveways. In the vicinity of Building 2709, the ground surface slopes slightly downward from the road located to the north to the grass on the south side of the building with the grassy area to the south being the lowest point in the immediate vicinity. A shallow ditch is located south of Building 2709. The next lowest point is the east driveway, which appears slightly lower than the west driveway. Surface water drainage is assumed to flow toward the south or southeast of the building (**Figure 4-1**). During the VSIs, a stormwater inlet was noted near the northeast corner of the building. No surface water bodies are present near Building 2709. The nearest major surface water bodies are Saratoga Passage (1.3 miles east), Crockett Lake (1.7 miles southwest), and Admiralty Bay (1.9 miles south) (**Figure 1-1**).

Soil and Air Pathways and Targets

As previously discussed, AFFF that may have been rinsed off the fire trucks could have infiltrated the gravel wash pad or soil in the grassy areas adjacent to the west driveway, especially on the south side. No distressed vegetation was noted during the VSIs. Workers, but not residents, are present within 200 feet and could potentially be exposed to contaminated soil in the area during excavations. The potential of exposure for burrowing animals may also be present. Because the area consists primarily of paved or grassy areas, fugitive dust emissions and potential exposure should be minimal. Construction or other ground-disturbing activities could result in potential worker exposure to dust.

4.4 Emergency Response

One documented emergency response location was identified near OLF Coupeville. Other emergency response locations may exist, but their existence, location, and likelihood of AFFF use could not be confirmed.

4.4.1 1982 EA-6B Accident Location

Description and Operational History

An accident involving a Northrop Grumman EA-6B Prowler aircraft occurred near OLF Coupeville in December 1982 during Field Carrier Landing Practice (Onyx, 2005). The accident occurred off-Base approximately 0.2 mile west of the Base boundary. The approximate location of the accident is shown on **Figure 4-2** (precise geographic coordinates are not known).

PFAS Storage, Use, or Release

Anecdotal reports on whether AFFF was applied during emergency response at this location are mixed (Director of Research, Principal Investigator, International Arrow, and Goal Technologies, 2017, pers. comm. [**Appendix B**]; Stensland, 2016). No official documentation that AFFF was or was not used was identified or available.

Pathway and Environmental Hazard Assessment

The pathway and environmental hazard assessment includes analyses of groundwater, surface water, sediment, soil and air pathways and targets. These analyses are included in the following subsections.

Groundwater Pathway and Targets

If AFFF was applied during an emergency response at the 1982 EA-6B accident location, then it is highly likely it infiltrated into the ground and could have migrated to underlying groundwater. Groundwater

flow direction near the 1982 EA-6B accident location is not well-characterized, but can be inferred from the regional groundwater flow direction. Outside the west side of the Base boundary near the accident location, groundwater flow may be to the west, southwest, or south (Island County, 2005; USGS, 1988).

The Keystone Hill Well is located approximately 0.3 mile from the approximate crash location (likely upgradient). PFOA was detected in the Keystone Hill Well in December 2016 at a concentration below the USEPA LHA (**Figure 2-2**). The influence of the Keystone Hill Well on local groundwater gradients is currently under investigation (CH2M, 2017a, NAVFAC, 2018). WI-CV-WL01, an on-Base potable water supply well associated with Facility 11, is 0.5 mile east-northeast (potentially upgradient or cross gradient). PFAS were not detected at this well during sampling in September 2016. WI-CV-WL02, an on-Base potable water supply well associated with Building 2708, is located 0.4 mile southeast (potentially downgradient). PFOA was detected in this well in September 2016 at a concentration below the USEPA LHA.

Washington Department of Ecology and Washington Department of Health records identified 632 wells within 4 miles of OLF Coupeville. PFAS compounds have been detected in samples collected from some private drinking water wells south of OLF Coupeville (downgradient of Building 2709) and a subset of these detections have exceeded the USEPA LHA. The closest off-Base drinking water well to the approximate accident location is a private well approximately 670 feet away (potentially downgradient).

Surface Water and Sediment Pathways and Targets

The 1982 EA-6B accident location is off-Base in a wooded area. The site was not accessible at the time of the VSIs, so the presence of small surface water features and local surface drainage patterns are unknown. Due to the wooded surroundings and overall flat topography (**Figure 1-2**), rainfall is expected to primarily infiltrate into the surrounding vegetated area. No surface water bodies are present near the crash site based on review of aerial imagery. The nearest major surface water bodies are Crockett Lake (1.3 miles southwest), Admiralty Bay (1.6 miles south), and Saratoga Passage (1.9 miles east) (**Figure 1-1**).

Soil and Air Pathways and Targets

As previously discussed, if AFFF was applied during an emergency response at the 1982 EA-6B accident location, then it is likely it infiltrated into the ground. Because the precise location of the crash was not available at the time of the PA, the risk of exposure to potential receptors is inferred. The accident location is on private property in a wooded area with few residences. Two residential parcels are located within 400 feet of the location shown on **Figure 4-2**; one is to the north (assumed to be upgradient) and one is to the south (assumed to be downgradient). At least one of these parcels (the parcel to the south) contains a dwelling. The potential of exposure for burrowing animals may also be present. A road leading from Keystone Hill Road west towards the approximate crash location with a “No Trespassing” sign was observed during the VSI. It is an unpaved, dirt access road and may represent a potential source of contaminated dust. Minor vegetation has reclaimed some of the road surface.

4.5 AFFF Spray Test Areas

No current or former AFFF spray test areas were identified at OLF Coupeville. Third-party refractory testing (spray testing) was adopted in 2008. AFFF spray testing may or may not have occurred prior to the tenure of the employees interviewed (1999 to present).

4.6 Wastewater Treatment Plants

No current or former wastewater treatment plants were identified at OLF Coupeville.

4.7 Landfills

No current or former landfills were identified at OLF Coupeville. The Coupeville Solid Waste Complex, which is operated by the Island County Public Works Solid Waste Division and serves Island County residents, is located about 0.15-mile northwest of the OLF Coupeville Base boundary at 20018 Washington State Route 20. This facility accepts municipal solid waste, yard waste, construction/ demo/bulky waste, and hard-to-handle waste, as well as appliances and tires (Island County, 2017). The facility also offers recycling (e.g., aluminum, batteries, mixed paper, motor oil) (Island County, 2017). A Moderate Risk Waste Facility at the Coupeville Solid Waste Complex accepts household and business hazardous waste (Island County, 2017). The Coupeville Solid Waste Complex is not located within the Base boundary and is not affiliated with NAS Whidbey Island.

4.8 Other Locations

Two other locations were identified as potential PFAS storage, use, or discharge locations: a cluster of small airfield operations facilities located east of the Runway 14-32 and Building 2807 (OLF Electronic Warfare Signal Emitter Building).

4.8.1 Facility 1, Facility 2, and Facility 11 (Control Tower, Airfield Operations Building, and Potable Water Well Pump House)

Facility 1, Facility 2, and Facility 11 are a cluster of small buildings bordering a paved vehicle parking area east of Runway 14-32 (**Figure 4-1**). The geographic coordinates are 48°11’25.67” N and 122°37’50.64” W, 48°11’25.23” N and 122°37’49.99” W, and 48°11’25.07” N and 122°37’49.77” W, respectively. Facility 1 (Control Tower, also known as the A/C Operations Tower Building) is approximately 580 square feet and is located on the northwest corner of the vehicle parking area. Facility 2 (Airfield Operations Building, also known as the Equipment Storage Building) is approximately 300 square feet and is located just southwest of the vehicle parking area. Both buildings date back to World War II (Navy, 2016). Facility 11 (Potable Water Well Pump House) is approximately 96 square feet and is located just south of Facility 2 and is adjacent to the main OLF Coupeville access road. An aboveground storage tank (FP Tank 11) is located on the roof of Facility 11 (shown on **Figure 4-1** and on pages 17 through 20 of **Appendix C**). A conduit extends from the tank to a chute located over the adjacent access road.

PFAS Storage, Use, or Release

Base records do not list current storage of AFFF at Facilities 1 (Control Tower), Facility 2 (Airfield operations Building), or Facility 11 (Potable Water Well Pump House), but no historical records were available regarding past AFFF storage and no anecdotal evidence was available to prove or disprove historical storage or use. No record of the type of equipment or materials stored in Facility 2 was available during PA preparation and the buildings were not accessible at the time of the VSI. Interviews indicate that FP Tank 11, which is located on the roof of Facility 11, is used to rapidly fill crash trucks with water (AEMT/Firefighter, 2017, pers. comm.**; Appendix B**). There is no identified record or interviewee knowledge of AFFF being added to FP Tank 11; in past and current operations, AFFF concentrate is mixed with water onboard the crash trucks (AEMT/Firefighter, 2017, pers. comm.**; Appendix B**). Other than the information listed here and the facility names from NIRIS, no documented information or anecdotal evidence is available to prove or disprove historical storage, use, or release of PFAS at Facilities 1, 2, and 11.

Pathway and Environmental Hazard Assessment

The pathway and environmental hazard assessment includes analyses of groundwater, surface water, sediment, soil and air pathways and targets. These analyses are included in the following subsections.

Groundwater Pathway and Targets

If AFFF was released near Facilities 1, 2, and 11, it likely would have infiltrated the grassy areas surrounding the buildings and paved areas and could have migrated to underlying groundwater. As discussed in **Section 2.2.2**, groundwater flow near Facilities 1, 2, and 11 is generally to the southwest (**Figure 2-1**) with flow to the southeast in deep-screened wells (**Figure 2-2**). A potable water supply well associated with Facility 11 (WI-CV-WL01) is located at this location. PFAS were not detected in this well during a routine monitoring in September 2016. The influence of this well on local groundwater gradients is unknown.

In February 2017, PFOA, PFOS, and PFBS were detected in monitoring well MW-05-M, located approximately 0.23 mile (1,200 feet) downgradient of these facilities (**Figure 4-1**). PFOA was detected above the USEPA LHA at a concentration of 1,190 ppt. PFOA and PFBS were also detected in MW-05-S, but at concentrations below the LHA and RSL, respectively. PFOA was detected in WI-CV-MW02, an on-Base potable water supply well 0.5 mile downgradient, in September 2016 at a concentration below the LHA.

The Keystone Hill Well is located 0.38-mile cross gradient of Facilities 1, 2, and 11. PFOA was detected in the Keystone Hill Well in December 2016 at a concentration below the USEPA LHA (**Figure 2-3**). The influence of the Keystone Hill Well on local groundwater gradients is currently under investigation (CH2M, 2017a, NAVFAC, 2018).

Washington Department of Ecology and Washington Department of Health records identified 632 wells within 4 miles of OLF Coupeville. PFAS compounds have been detected in samples collected from some private drinking water wells south of OLF Coupeville (downgradient of Building 2709) and a subset of these detections have exceeded the USEPA LHA. The closest off-Base drinking water well to Facilities 1, 2, and 11 is a private well 1,400 feet downgradient.

Surface Water and Sediment Pathways and Targets

Surface water drainage in the area is expected to primarily infiltrate the grassy areas surrounding Facilities 1, 2, and 11 and the adjacent vehicle parking area and roads. The local ground surface is highest along the road southeast of Facility 11 and lowest off the northwest corner of the facility cluster, just north-northwest of Facility 1 (Control Tower). The ground surface continues to slope down to Facility 10 (Runway Lighting Vault), which is located to the northwest (**Figure 4-1**). A raised berm is present west of the vehicle parking area outside the asphalt drive that encircles the facility cluster. A trench running parallel to Runway 14-32 on the northeast side of the taxiway is approximately 270 feet to the west. No surface water bodies are present near Facilities 1, 2, and 11. The nearest major surface water bodies are Saratoga Passage (1.3 miles northeast), Crockett Lake (1.7 miles southwest), and Admiralty Bay (1.9 miles south) (**Figure 1-1**).

Soil and Air Pathways and Targets

If AFFF was released near Facilities 1, 2, and 11, it likely would have infiltrated the grassy areas surrounding the buildings and paved areas. No distressed vegetation was noted during the VSIs. Workers, but not residents, are present within 200 feet and could potentially be exposed to contaminated soil in the area during excavations. The potential of exposure for burrowing animals may also be present. Because the area consists primarily of paved or grassy areas, fugitive dust emissions and potential exposure should be minimal. Construction or other ground-disturbing activities could result in potential worker exposure to dust.

4.8.2 Building 2807 (OLF Electronic Warfare Signal Emitter Building)

Description and Operational History

Building 2807 (OLF Electronic Warfare Signal Emitter Building) is located southwest of Runway 14-32 (**Figure 4-3**). The geographic coordinates are 48°11’03.51” N and 122°38’10.06” W. It is approximately 2,500 square feet and surrounded by gravel and/or grass. Personnel interviews indicate that the building was constructed in 1999 and that the building is used for electronic warfare signal emission (Device Manager, Building 2807, 2017, pers. comm.; **Appendix B**). The building houses electronic equipment and is equipped with a Halon fire suppression system.

PFAS Storage, Use, or Release

No storage of AFFF is associated with this location currently or is known to have occurred historically based on the current AFFF inventory and personnel interviews. The building has always been equipped with a Halon fire suppression system rather than an AFFF system (Device Manager, Building 2807, 2017, pers. comm.; **Appendix B**), which is consistent with the storage and use of electronic equipment in the building. One employee interviewed has worked at the building since its construction in 1999.

Pathway and Environmental Hazard Assessment

Not applicable.

SECTION 5

Conclusions and Recommendations

This PA Report identified four areas (Building 2709 [Crash Truck Shelter], 1982 EA-6B Accident Location, Facilities 1, 2, and 11 [Control Tower, Airfield Operations Building, and Potable Water Well Pump House], and Building 2807 [OLF Electronic Warfare Signal Emitter Building]) that were evaluated for potential PFAS releases. Each of these areas is located near or (potentially) upgradient of community and private drinking water supply wells and may pose an immediate risk to human health and the environment. PFAS compounds have been detected in one on-Base supply well, nine on-Base monitoring wells, and in the nearby Keystone Hill Well (the Town of Coupeville's primary water supply well) (**Figure 2-2**). PFAS have also been detected in several private drinking water wells located immediately south of OLF Coupeville (CH2M, 2017b).

In accordance with DoD Instruction 4715.18, *Emerging Contaminants* (June 2009, certified through June 2016), DoD policy requires that "Risks to people, the environment, and DoD missions, programs, and resources shall be assessed and, when appropriate, actions shall be taken to reduce risks related to ECs [emerging contaminants] development, use, or release." Additionally, Navy *Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/September 2017 Update* (Navy, 2017a) recommends:

"RPMs should consider investigating [Environmental Restoration] sites for PFAS when the conceptual site model indicates:

a. Historical release or use of aqueous film forming foam (AFFF), or

b. Historical use of an area for other industrial activities (e.g., plating operations) that may have released PFAS.

Based on recent Navy experience, sites at Naval and Marine Corps Air Stations (NAS and MCAS respectively), including outlying or auxiliary landing fields, or other applicable installations with potential repeated (e.g., former firefighting training areas) or significant (e.g., crashes) AFFF releases should be prioritized for investigation."

This PA report has identified locations that meet the first criterion, triggering the need for further investigation to determine whether a release to the environment occurred resulting in impacts to soil, sediment, surface water, or groundwater at levels that warrant remedial actions.

Three locations are recommended for site inspections based on the potential for AFFF to have been stored, used, or released during Navy operations. One location is recommended for no further action as there is no evidence that AFFF was stored, used, or released at that location. The recommended path forward and rationale for each location are provided in **Table 5-1**.

Table 5-1. Preliminary Assessment Report Summary and Findings

Areas Investigated	Rationale	Recommendation
Building 2709 (Crash Truck Shelter)	• Fire trucks containing AFFF are and have been stored at this location. Additional off-truck AFFF was stored at this location in the past. • Truck washing occurs and has occurred outside the building. A gravel wash pad is present adjacent to the building. • Refilling of the AFFF tank on fire trucks typically occurs at Ault Field into dedicated AFFF tanks, but in in the past 5-gallon containers of AFFF were stored on former fire trucks and added to the water tank when needed.	Initiate site inspection

Table 5-1. Preliminary Assessment Report Summary and Findings

Areas Investigated	Rationale	Recommendation
	• No documentation or Base personnel recollection of AFFF use or release. • The building was not available for entry during the VSIs. • No visual signs of a release. • PFAS have been detected in one groundwater monitoring well located approximately 0.04 mile (200 feet) downgradient (MW02-S, which is screened at a relatively shallow depth). PFOS and PFOA were detected at a combined concentration of 625.7 ppt. • Groundwater downgradient is used as a potable water source. • Ecological and worker exposure to soil and dust could occur.	
1982 EA-6B Accident Location	• The crash occurred during the period of time when AFFF was in use. • AFFF may or may not have been applied during the emergency response. Anecdotal reports regarding AFFF application are mixed and no official documentation regarding the emergency response was identified or available. • The accident location is off-Base on private property and was not accessible for VSI. Residential exposure to potentially contaminated soil may represent a route of exposure. • The direction of groundwater flow near the accident location is not well-understood. • Groundwater downgradient is used as a potable water source. • Ecological and residential exposure to soil and dust could occur.	Initiate site inspection
Facility 1, Facility 2, and Facility 11 (Control Tower, Airfield Operations Building, and Potable Water Well Pump House)	• Facility 1 and Facility 2 both “date back to World War II.” Construction dates for these facilities and Facility 11 were not identified in available records. • Both historical and current available information regarding these facilities, including potential PFAS storage, use, or release, was very limited during the PA. • PFAS have been detected in two groundwater monitoring wells located approximately 0.2 mile (1,000 feet) downgradient (MW02-S, which is screened at a relatively shallow depth). PFOS and PFOA were detected at a combined concentration of 625.7 ppt. • Groundwater downgradient is used as a potable water source. • Ecological and worker exposure to soil and dust could occur.	Initiate site inspection
Building 2807 (OLF Electronic Warfare Signal Emitter Building)	• Building 2807 was constructed in 1999. • The building is currently and has always been equipped with a halon fire suppression system. • No known releases of AFFF have occurred based on the recollection of personnel who have worked at the building since its construction.	No Further Action

Though the 1982 EA-6B Accident location is located outside of the OLF property boundary, a site inspection is recommended because it is a known crash site. Access issues, including possible legal procedures must be resolved with the property owner before the inspection is conducted at this site.

SECTION 6

References

Board of Island County Commissioners (Island County). 2005. *Island County Water Resource Management Plan, 2415 Watershed Planning*. June.

Island County. 2017. *Coupeville Solid Waste Complex*. https://www.islandcountywa.gov/PublicWorks/solidwaste/Pages/Coupeville.aspx. Accessed on November 27, 2017.

CH2M HILL, Inc. (CH2M). 2017a. *Sampling and Analysis Plan, Aquifer Testing, Drinking Water and Groundwater Sampling Keystone Hill Well, Outlying Landing Field Coupeville Naval Air Station Whidbey Island, Coupeville, Washington*. November.

CH2M. 2017b. *Sampling and Analysis Plan, Investigation of Per- and Polyfluoroalkyl Substances in Drinking Water, Ault Field and Outlying Landing Field Coupeville, Naval Air Station Whidbey Island, Oak Harbor and Coupeville, Washington*. October.

Department of the Navy (Navy). 1994. *Final Remedial Investigation Report for Operable Unit 3, Naval Air Station Whidbey Island*. Prepared for Engineering Field Activity Northwest, Naval Facilities Engineering Command by URS Consultants Under Contract No. N62474-89-D-9295, CTO 0074. January.

Navy. 2016. Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex. Vol. 1 and 2. November.

Navy 2017a. Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Manages (RPMS)/September 2017 Update. 5090 Ser EV/006. September.

Navy 2017b. Naval Air Station Whidbey Island Air Field Operations. https://cnic.navy.mil/content/dam/cnic/cnrnw/pdfs/NASWIfactsheets/Air%20Operations%20Fact%20Sheet.pdf. Accessed on October 26, 2017.

Navy. 2017c. *PFAS Groundwater and Drinking Water Investigation*. https://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/northwest/about_us/northwest_documents/environmental-restoration/pfas-groundwater-and-drinking-water-investigation.html. Accessed December 20, 2017.

Navy. 2018. *Naval Air Station Whidbey Island OLF Coupeville, Drinking Water Investigation*. February.

Federal Emergency Management Agency (FEMA). 2017. *National Flood Insurance Program Flood Insurance Rate Map. Map Number 53029C0210F*. Version 2.3.2.1. Revised March 7.

National Groundwater Association (NGWA). 2017. Groundwater and PFAS: State of Knowledge and Practice, Draft.

Naval Facilities Engineering Command (NAVFAC). 2017. Draft Technical Memorandum: Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater Outlying Landing Field Coupeville Naval Air Station Whidbey Island Coupeville, Washington. Prepared by CH2M. July.

NAVFAC. 2018. Draft Aquifer Test, Groundwater Sampling and Groundwater Modeling Report Per- and Polyfluoroalkyl Substances (PFAS) Outlying Landing Field Coupeville Naval Air Station Whidbey Island Coupeville, Washington. Prepared by CH2M. April.

The Onyx Group (Onyx). 2005. AICUZ Study Update for Naval Air Station Whidbey Island's Ault Field and Outlying Landing Field Coupeville, Washington. May.

Polenz, M., S. Slaughter, and G. Thorsen. 2005. *Geologic Map of the Coupeville and Part of the Port Townsend North 7.5-minute Quadrangles, Island County, Washington*. June.

Stensland, Jessie. 2016. Navy confirms wells near Ault Field, OLF Coupeville contain chemicals. *South Whidbey Record*. December 16. Accessed at http://www.southwhidbeyrecord.com/news/navy-confirms-wells-near-ault-field-olf-coupeville-contain-chemicals/.

Town of Coupeville (Coupeville). 2009. 2009 to 2014 Water System Plan. September.

United States Environmental Protection Agency (USEPA). 1989. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A).* Interim Final. USEPA/540/1-89/002. Office of Emergency and Remedial Response. December.

USEPA. 1991. *Guidance for Performing Preliminary Assessments Under CERCLA*. Office of Emergency and Remedial Response. September.

United States Geological Survey (USGS). 1982. *Preliminary Survey of Ground-water Resources for Island County, Washington*.

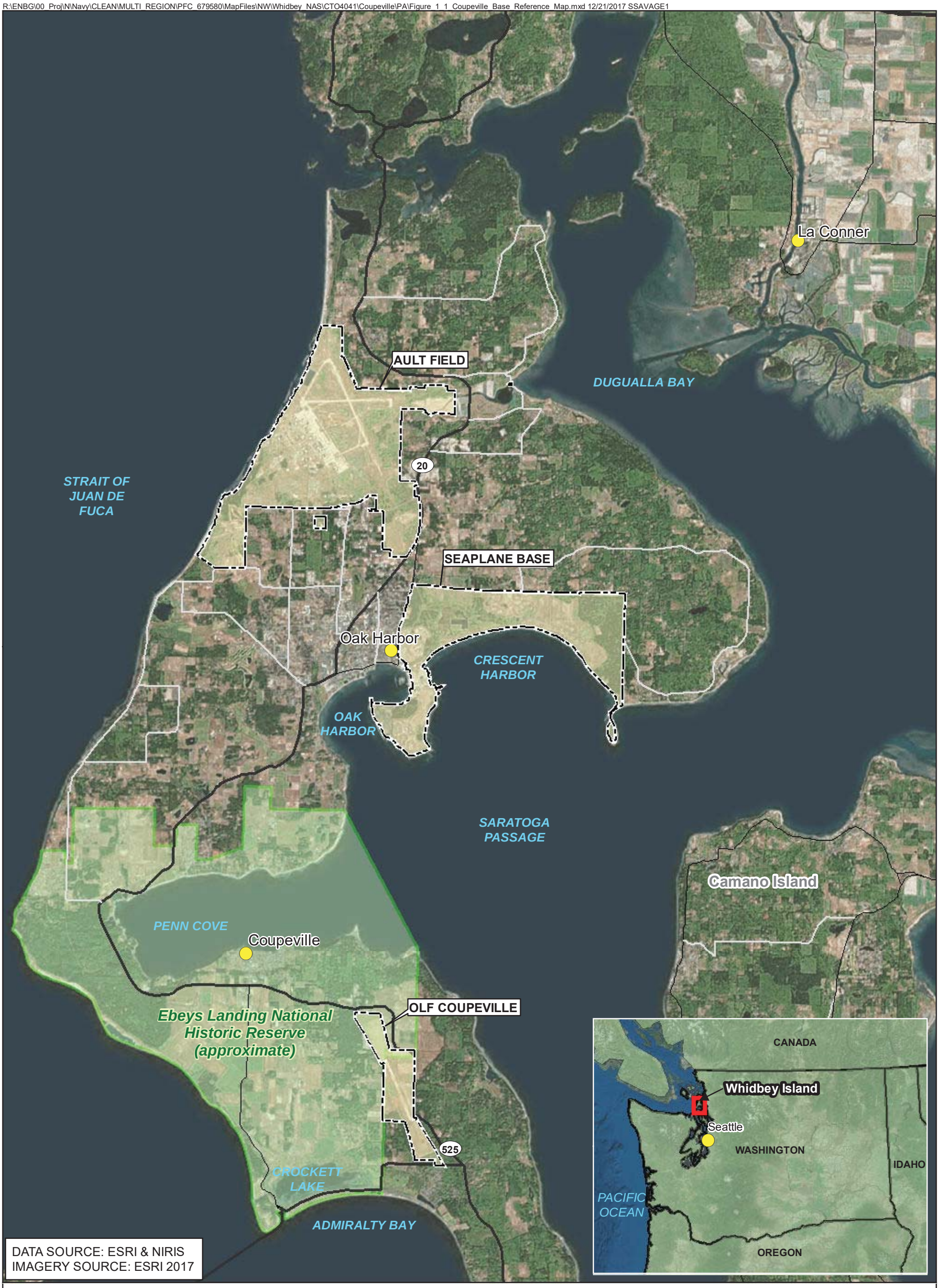
USGS. 1988. *Ground-water Resources and Simulations of Flow in Aquifers Containing Freshwater and Seawater, Island County, Washington*.

Washington Department of Ecology (WDOE). 2017. *Well Reports.* https://fortress.wa.gov/ecy/waterresources/map/WCLSWebMap/WellConstructionMapSearch.aspx

Washington State Department of Health, Office of Drinking Water (WSDOH). 2017. https://fortress.wa.gov/doh/eh/portal/odw/si/FindWaterSystem.aspx. Accessed December 20, 2017.

Figures

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_1_1_Coupeville_Base_Reference_Map.mxd 12/21/2017 SSAVAGE1



Legend

- City
- Secondary Road
- Local Connecting Road
- Important Local Road
- Base Boundary
- Ebey's Landing National Historic Reserve (Approximate)

N

0 0.75 1.5 3 Miles

1 inch = 1.5 miles

Figure 1-1
Base Location Map
Outlying Landing Field Coupeville
Naval Air Station Whidbey Island
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_1_2_Site_Layout.mxd 8/2/2018 SSAVAGE1

Legend

- OLF Coupeville Supply Well
- Groundwater Well Location
- Community Drinking Water Well
- Emergency Response Location
- Elevation Contour (25 ft Interval)
- Wetlands
- Ebey's Landing National Historic Reserve (Approximate)
- Building Location
- Structure Location
- Potential PFAS Release Area
- Base Boundary

N

0 0.1 0.2 Miles

1 inch = 0.2 mile

Imagery Source: Esri

Figure 1-2
OLF Coupeville Overview Map
Outlying Landing Field Coupeville
Naval Air Station Whidbey Island
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_2_1_Intermediate_Screened_GW_Contour_Map.mxd 8/2/2018 SSAVAGE1

Legend

- Groundwater Well Location
- OLF Coupeville Supply Well
- Community Drinking Water Well
- Emergency Response Location
- 5-foot Contour Interval (dashed where inferred)
- Direction of Intermediate-Screened Interval Groundwater Flow
- Building Location
- Structure Location
- Potential PFAS Release Area
- Base Boundary

Notes:
Intermediate-screened wells were typically screened between approximately 0 and 50 feet above msl (NAVFAC, 2017).
Groundwater elevations shown in feet above msl.
Groundwater level measurements used to generate this contour map were collected 3/3/2017 and 3/18/2017.

N

0 0.1 0.2 Miles

1 inch = 0.2 mile

Imagery Source: Esri

Figure 2-1
Intermediate-Screened Interval Groundwater Contours
Outlying Landing Field Coupeville
Naval Air Station Whidbey Island
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_2_2_Deep_Screened_GW_Contour_Map.mxd 8/2/2018 SSAVAGE1

Legend

- Monitoring Well Location
- OLF Coupeville Supply Well
- Community Drinking Water Well
- Emergency Response Location
- 5-foot Contour Interval (dashed where inferred)
- Direction of Deep-Screened Interval Groundwater Flow
- Building Location
- Potential PFAS Release Area
- Base Boundary

Notes:
1. NAVD88 = North American Vertical Datum of 1988
2. Intermediate elevation interval wells are typically screened between approximately 10 and 60 feet NAVD88.
3. Groundwater elevations shown in feet NAVD88
4. Groundwater level measurements used to generate this contour map were collected on 1/8/2018.
5. Data from well MW03D was not used in the contouring.
6. Full well names include "WI-CV-" preceding the well number; however names have been abbreviated for figure presentation.

N

0 0.1 0.2 Miles

1 inch = 0.2 mile

Imagery Source: Esri

Figure 2-2
Deep Elevation Interval Groundwater Contours
Outlying Landing Field Coupeville
Naval Air Station Whidbey Island
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_2_3_Summary_of_PFAS_in_GW.mxd 8/2/2018 SSAVAGE1

Well ID	MW11-S	MW11-M
Screened Interval (ft bgs)	130 - 140	155 - 165
Sample Date	2/26/2017	2/26/2017
PFBS	3.91 U	7.66 U
PFOS	**1 J**	1.72 U
PFOA	1.95 U	3.83 U
PFOS + PFOA	**1 J**	ND

Well ID	MW04-S		MW04-M	
Screened Interval (ft bgs)	112 - 122		149 - 159	
Sample Date	3/1/2017	1/4/2018	2/28/2017	1/2/2018
PFBS	3.91 U	5.3 U	4.03 U	5.3 U
PFOS	0.879 U	5.3 U	0.907 U	**1.25 J**
PFOA	1.95 U	5.3 U	2.02 U	5.3 U
PFOS + PFOA	ND	ND	ND	**1.25 J**

Well ID	WI-CV-WL01
Well Depth (ft bgs)	162
Sample Date	9/19/2016
PFBS	10 U
PFOS	10 U
PFOA	3 U
PFOS + PFOA	ND

Well ID	MW07-S		MW07-M	
Screened Interval (ft bgs)	130 - 140		183 - 193	
Sample Date	3/4/2017	1/4/2018	3/4/2017	1/4/2018
PFBS	4.39 U	5.17 U	3.91 U	5.34 U
PFOS	0.987 U	5.17 U	**0.844 J**	5.34 U
PFOA	2.19 U	5.17 U	1.95 U	5.34 U
PFOS + PFOA	ND	ND	**0.844 J**	ND

Well ID	MW08-S	MW08-M
Screened Interval (ft bgs)	121 - 131	150 - 160
Sample Date	3/2/2017	3/4/2017
PFBS	3.85 U	3.91 U
PFOS	0.865 U	0.879 U
PFOA	1.92 U	1.95 U
PFOS + PFOA	ND	ND

Well ID	MW15-S	MW15-M
Screened Interval (ft bgs)	132-142	164-174
Sample Date	12/30/2017	12/30/2017
PFBS	**15.8**	5.25 U
PFOS	5.21 U	5.25 U
PFOA	**253**	5.25 U
PFOS + PFOA	**253**	ND

Well ID	MW01-M	MW01-D
Screened Interval (ft bgs)	148 - 158	202 - 212
Sample Date	2/28/2017	2/28/2017
PFBS	3.94 U	4 U
PFOS	0.886 U	0.9 U
PFOA	1.97 U	2 U
PFOS + PFOA	ND	ND

Well ID	MW16-S	MW16-M
Screened Interval (ft bgs)	130-140	165-175
Sample Date	12/29/2017	12/29/2017
PFBS	**36.6**	**34.8**
PFOS	**3.47 J**	**2.63 J**
PFOA	**297**	**373**
PFOS + PFOA	**300**	**376**

Well ID	MW02-S		MW02-M
Screened Interval (ft bgs)	92 - 102		153 - 163
Sample Date	3/1/2017	1/3/2018	3/1/2017
PFBS	**332**	**390**	3.88 U
PFOS	**54.7**	**87.8**	0.872 U
PFOA	**571**	**1010**	1.94 U
PFOS + PFOA	**626**	**1098**	ND

Well ID	Keystone Hill Well	
Well Depth (ft bgs)	190	
Sample Date	12/6/2016	12/30/2017
PFBS	99 U	12.9
PFOS	43 U	4.7 U
PFOA	**61**	**54.1 J**
PFOS + PFOA	**61**	**54.1 J**

Well ID	MW05-S	MW05-M	
Screened Interval (ft bgs)	114 - 124	160 - 170	
Sample Date	2/24/2017	2/23/2017	1/5/2018
PFBS	**12.9**	**473**	**533**
PFOS	0.922 U	**3.26 J**	**2.84 J**
PFOA	**9.87**	**1,190**	**1,220**
PFOS + PFOA	**9.87**	**1,193**	**1,223**

Well ID	MW14-M	
Screened Interval (ft bgs)	161 - 171	
Sample Date	3/4/2017	1/5/2018
PFBS	**111**	**10**
PFOS	**0.898 J**	**1.24 J**
PFOA	**166**	**8.86**
PFOS + PFOA	**167**	**10.10**

Well ID	MW06-S	MW06-M
Screened Interval (ft bgs)	130 - 140	174 - 184
Sample Date	2/22/2017	2/21/2017
PFBS	3.97 U	3.91 U
PFOS	0.893 U	0.879 U
PFOA	1.98 U	1.95 U
PFOS + PFOA	ND	ND

Well ID	MW03-M	MW03-D
Screened Interval (ft bgs)	145 - 155	222 - 232
Sample Date	2/27/2017	2/27/2017
PFBS	3.88 U	3.91 U
PFOS	0.872 U	**0.914 J**
PFOA	1.94 U	1.95 U
PFOS + PFOA	ND	**0.914 J**

Well ID	MW10-M	MW10-D
Screened Interval (ft bgs)	144 - 154	191 - 201
Sample Date	2/22/2017	2/20/2017
PFBS	**3.07 J**	3.85 U
PFOS	0.938 U	0.865 U
PFOA	2.08 U	1.92 U
PFOS + PFOA	ND	ND

Well ID	MW13-S	MW13-M
Screened Interval (ft bgs)	105 - 115	173 - 183
Sample Date	3/3/2017	2/22/2017
PFBS	4.07 U	**139**
PFOS	0.915 U	0.872 U
PFOA	2.03 U	**20.4**
PFOS + PFOA	ND	**20.4**

Well ID	MW12-S	MW12-D
Screened Interval (ft bgs)	92 - 107	183 - 193
Sample Date	NA	3/1/2017
PFBS	NS	3.97 U
PFOS	NS	0.893 U
PFOA	NS	1.98 U
PFOS + PFOA	NS	ND

Well ID	MW09-S	MW09-M
Screened Interval (ft bgs)	96 - 106	182 - 192
Sample Date	NA	2/23/2017
PFBS	NS	**11.2**
PFOS	NS	0.915 U
PFOA	NS	2.03 U
PFOS + PFOA	NS	ND

1982 EA-6B Accident Location

Well ID	WI-CV-WL02
Well Depth (ft bgs)	178
Sample Date	9/19/2016
PFBS	**110**
PFOS	10 U
PFOA	**17.5 J**
PFOS + PFOA	**17.5 J**

Notes
PFBS - perfluorobutanesulfonic acid
PFOS - perfluorooctane sulfonate
PFOA - perfluorooctanoic acid
units - parts per trillion (ppt)
J - analyte detected, concentration is estimated
U - not detected
NA - not applicable
ND - not detected
NS - not sampled
Bold indicates detection
Shading indicates exceedance of USEPA Lifetime Health Advisory (70 ppt)
Where applicable, the higher concentration between the primary and field duplicate samples is shown.
Samples were not collected from MW09-S and MW12-S because the wells were dry at the time of sampling.

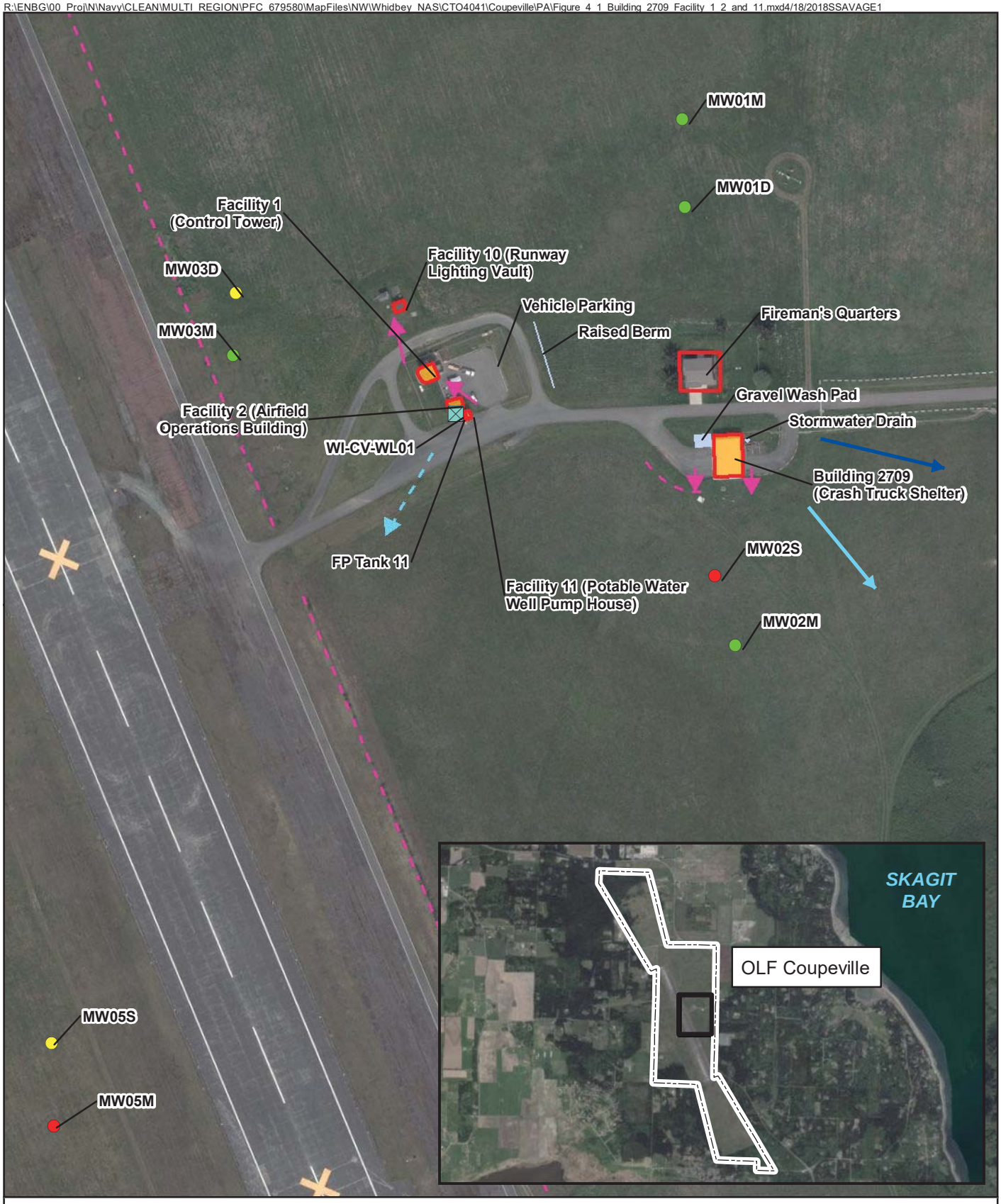
Legend
- OLF Coupeville Supply Well
- Monitoring Well with no exceedance of LHA
- Monitoring Well with LHA exceedance
- No detections of PFAS
- Not Sampled
- Community Drinking Water Well
- Emergency Response Location
- Direction of Intermediate Interval Groundwater Flow
- Direction of Deep Interval Groundwater Flow
- Base Boundary

N
0 0.1 0.2 Miles
1 inch = 0.2 mile
Imagery Source: Esri

Figure 2-3
Summary of Groundwater PFAS Concentrations
Outlying Landing Field Coupeville
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_4_1_Building_2709_Facility_1_2_and_11.mxd4/18/2018SSAVAGE1



Legend

- OLF Coupeville Supply Well
- Monitoring well with no exceedance of LHA
- Monitoring well with LHA exceedance
- No detections of PFAS
- Intermediate-screened interval groundwater flow direction (dashed where inferred)
- Deep-screened interval groundwater flow direction
- Anticipated surface water flow
- Drainage ditch
- Base additional features
- Building Location
- Potential PFAS Release Area
- Base Boundary

1 inch = 200 feet
Imagery Source: Esri

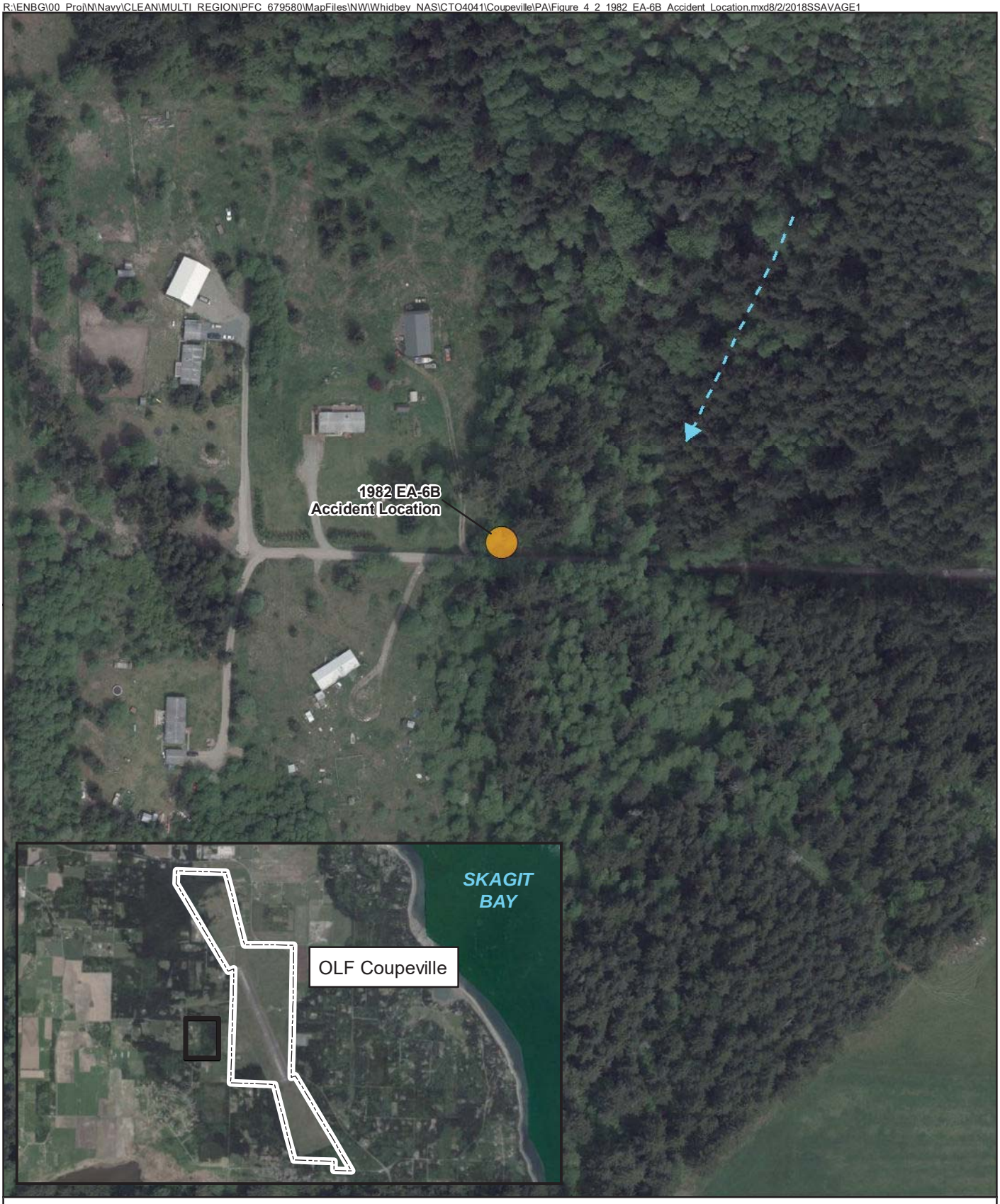
N

0 75 150
Feet

Figure 4-1
Building 2709, Facility 1, 2 and 11
Potential PFAS Release Areas
Outlying Field Coupeville
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_4_2_1982_EA-6B_Accident_Location.mxd8/2/2018SSAVAGE1



Legend
- Inferred Groundwater Flow Direction
- PFAS Release Area
- Base Boundary

N

0 75 150

Feet

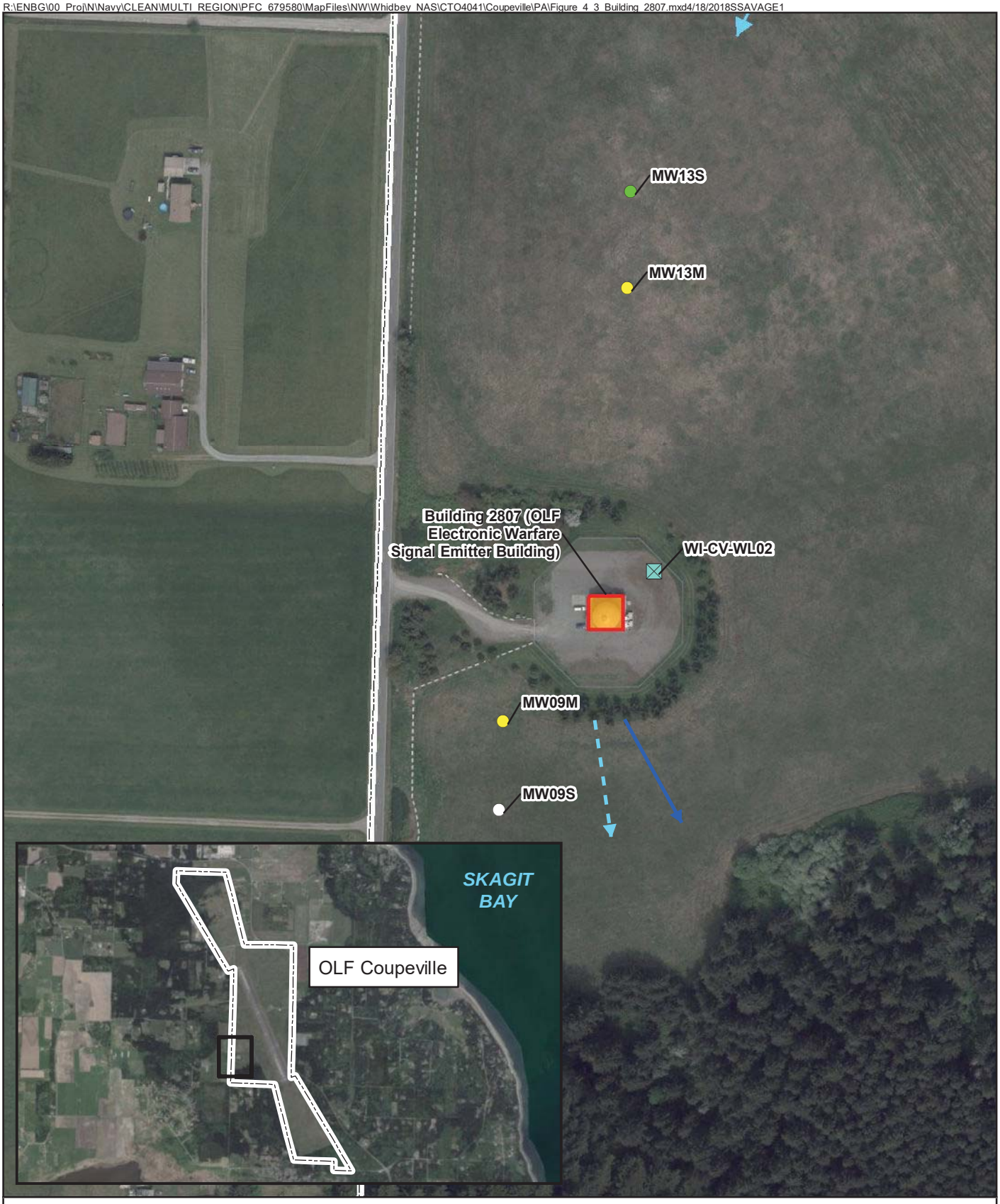
1 inch = 200 feet

Imagery Source: Esri

Figure 4-2
1982 EA-6B Accident Location
Potential PFAS Release Areas
Outlying Field Coupeville
Coupeville, Washington

For Official Use Only

R:\ENBG\00_Proj\N\Navy\CLEAN\MULTI_REGION\PFC_679580\MapFiles\NW\Whidbey_NAS\CTO4041\Coupeville\PA\Figure_4_3_Building_2807.mxd4/18/2018SSAVAGE1



Legend

- OLF Coupeville Supply Well
- Monitoring Well with no exceedance of LHA
- No detections of PFAS
- Not Sampled
- Intermediate-screened interval groundwater flow direction (dashed where inferred)
- Deep-screened interval groundwater flow direction
- Building Location
- Potential PFAS Release Area
- Base Boundary

N

0 75 150 Feet

1 inch = 200 feet

Imagery Source: Esri

Figure 4-3
Building 2807
Potential PFAS Release Areas
Outlying Field Coupeville
Coupeville, Washington

For Official Use Only

Appendix A
Summary of Records Reviewed

Summary of Records Reviewed

Documents Reviewed from the Administrative Record

Department of the Navy. 1994. *Final Remedial Investigation Report for Operable Unit 3, Naval Air Station Whidbey Island*. Prepared for Engineering Field Activity Northwest, Naval Facilities Engineering Command by URS Consultants Under Contract No. N62474-89-D-9295, CTO 0074. January.

Landau Associates. 1984. *Navy Assessment and Control of Installation Pollutants: Initial Assessment Summary of UIC: N00620*. September.

Other Documents

CH2M HILL, Inc. 2017a. *Draft Sampling and Analysis Plan, Aquifer Testing, Drinking Water and Groundwater Sampling Keystone Hill Well, Outlying Landing Field Coupeville Naval Air Station Whidbey Island, Coupeville, Washington*. November.

CH2M HILL, Inc. 2017b. *Sampling and Analysis Plan, Investigation of Per- and Polyfluoroalkyl Substances in Drinking Water, Ault Field and Outlying Landing Field Coupeville, Naval Air Station Whidbey Island, Oak Harbor and Coupeville, Washington*. October.

Department of the Navy. 2016. Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex. Vol. 1 and 2. November.

Federal Emergency Management Agency (FEMA). 2017. *National Flood Insurance Program Flood Insurance Rate Map. Map Number 53029C0210F*. Version 2.3.2.1. Revised March 7.

Naval Facilities Engineering Command (NAVFAC). 2017. Draft Technical Memorandum: Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater Outlying Landing Field Coupeville Naval Air Station Whidbey Island Coupeville, Washington. Prepared by CH2M. July.

The Onyx Group (Onyx). 2005. AICUZ Study Update for Naval Air Station Whidbey Island's Ault Field and Outlying Landing Field Coupeville, Washington. May.

Polenz, M., S. Slaughter, and G. Thorsen. 2005. *Geologic Map of the Coupeville and Part of the Port Townsend North 7.5-minute Quadrangles, Island County, Washington*. June.

Robinson and Noble. 2008. Town of Coupeville Keystone Hill Well Construction and Testing Report. Tacoma, Washington. April 2008.

Town of Coupeville (Coupeville). 2009. 2009 to 2014 Water System Plan. September.

United States Geological Survey (USGS). 1982. *Preliminary Survey of Ground-water Resources for Island County, Washington*.

USGS. 1988. Ground-water Resources and Simulations of Flow in Aquifers Containing Freshwater and Seawater, Island County, Washington.

Internet Records

Associated Press. 1982. AROUND THE NATION; Three Navy Fliers Die In Crash of Practice Jet. *The New York Times*. http://www.nytimes.com/1982/12/29/us/around-the-nation-three-navy-fliers-die-in-crash-of-practice-jet.html. Accessed December 8, 2017.

Flight Safety Foundation. Aviation Safety Network. aviation-safety.net. Accessed November 2017.

Island County. 2017. *Coupeville Solid Waste Complex*. https://www.islandcountywa.gov/PublicWorks/solidwaste/Pages/Coupeville.aspx. Accessed on November 27, 2017.

Island County. 2017. *Island County Groundwater Publications*. https://www.islandcountywa.gov/Health/EH/Hydrogeology/Pages/Groundwater-Information.aspx. Accessed on December 6, 2017.

Navy 2017. Naval Air Station Whidbey Island Air Field Operations. https://cnic.navy.mil/content/dam/cnic/cnrnw/pdfs/NASWIfactsheets/Air%20Operations%20Fact%20Sheet.pdf. Accessed on October 26, 2017.

Navy. 2017. PFAS Groundwater and Drinking Water Investigation. https://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/northwest/about_us/northwest_documents/environmental-restoration/pfas-groundwater-and-drinking-water-investigation.html. Accessed December 20, 2017.

Navy. 2018. *Naval Air Station Whidbey Island OLF Coupeville, Drinking Water Investigation*. February.

Stensland, Jessie. 2016. Navy confirms wells near Ault Field, OLF Coupeville contain chemicals. *South Whidbey Record*. December 16. Accessed at http://www.southwhidbeyrecord.com/news/navy-confirms-wells-near-ault-field-olf-coupeville-contain-chemicals/.

Washington State Department of Health, Office of Drinking Water (WSDOH). 2017. https://fortress.wa.gov/doh/eh/portal/odw/si/FindWaterSystem.aspx. Accessed December 20, 2017.

Interviews

Brooks, John, International Arrow, and Goal Technologies, Retired Director of Research, Principal Investigator. Personal communication (meeting). November 2.

Crain, Allison, NAVFAC Northwest, Regional Hazardous Waste Program Manager. Personal communication (meeting). November 2.

Hardy, Blaine, NAVFAC Northwest Public Works, Hazardous Waste Manager. Personal communication (meeting and email). November 2; December 6.

Hornsby, John, NAS Whidbey Island, Crash Captain, 1985 to 2001. Personal communication (meeting). November 8.

Long, Doug, Device Manageer, Building 2807, 1999 to present. Personal communication (meeting). October 24.

Merrill, Sean, NAS Whidbey Island, Fire Chief, 2008 to present. Personal communication (phone meeting). October 17.

Potter, Lloyd, NAVFAC Northwest Facility Engineering & Acquisition Division, Lead Engineering Technician. Personal communication (meeting). November 2.

Prince, Tom, NAS Whidbey Island Aviation Emergency Medical Technician /Firefighter, 1997 to present. Personal communication (meeting). November 8.

Waeschle, Kurt, Navy Northwest Region, Fire Chief, 2006 to present; NAS Whidbey Island, Fire Chief, 1999-2006. Personal communication (meeting and email). October 17; December 4; and December 8.

Willey, Allan, CDR, USN, NAVFAC Northwest Public Works Commander. Personal communication (meeting). November 2.

Email Communication

Firefighting Foam Inventory List

Appendix B
Interview Record

Communication Record[1]	
Date 10-17-17	Time 1210-1400
Name of Base, State: Keyport, WA – regarding Ault Field/OLF Coupeville /Seaplane Base	
Interviewer: J. Horton, J. Hauser	
Organization: CH2M HILL	Phone: (360) 556-0621
Position/role on this project: Task Managers	Email: Janice.horton@ch2m.com
Interviewee: Kurt Waeschle (Sean Merrill via phone)	
Organization: Navy Regional NW Fire and Emergency Services	Phone: (360) 340-1342
Position/Job Title: Fire Chief	Email: kurt.waeschle@navy.mil
How long in this position? 2008 to present	
How long in current and previous positions? Naval Air Station Whidbey Island (NASWI) Fire Chief 1999 to 2006	
Have you held similar positions at other Bases? - N/A	
Which Base?N/A	
How long? N/A	
General Discussion Notes and Information:	
Assumed responsibility for fire and emergency at Outlying Landing Field (OLF) Coupeville in March/April 2012. NASWI AirOps had responsibility for OLF Coupeville prior to March 2012.	
Two documented events exist for OLF Coupeville – neither utilized foam, and both are recorded in the Navy Installation Restoration Information System (NIRIS).	
One event was a hard landing for a helicopter; the other was a light civil event that occurred within the last 2 years. There is no information prior to October 1, 2012.	
See Bill MacMillan[2] from NASWI AirOps for further information.	
Mr. Waeschle provided a list of names of key firefighting personnel to legal department dating back to 1972.	
A barn fire is reported to have occurred at OLF Coupeville some years ago. The Navy responded with “buckets of chemical,” according to statements from onlookers. Navy	

[1] This interview record contains information relevant to Ault Field, Seaplane Base, and OLF Coupeville. Information not directly relevant to OLF Coupeville has been shaded in gray.

[2] Bill MacMillan was contacted via email on 10/30/2017. In a response sent on 10/31/2017 he said that he had “no knowledge of storage or use of AFFF at NASWI.”

personnel involved were “contacted” and stated that no aqueous film forming foam (AFFF) was used.
* Mr. Waeschle stated that emails are part of the litigation hold. All emails sent to Mr. Waeschle from this team will be included in the litigation hold.
In the 1970s, protein foam containing Ox blood was used. NASWI Hangar 7 used protein foam until a couple of years ago.
At Ault Field, all foam storage and crash truck reservicing was done at Building 121 before it was demolished and turned into a parking lot. The new fire station is known as Building 2687. During the normal AFFF truck-filling procedure, the foam would bubble over the top of the truck and may have dripped onto the ground. Five-gallon buckets of foam were poured into the truck, then hoses were used to fill the remainder of the truck with water. After filling the trucks, the garden hoses were usually put in 5-gallon buckets that people would “take home.” This was done from 1999 to 2006. This filling method has not been practiced since 2008. The new filling procedure is not prone to leaks or releases, as the hose fills the tank from the bottom via piping, rather than pouring from the top.
For filling, each truck has approximately 130 gallons of foam. At times, trucks would lose foam on the fire station floor from leaking tanks. Crash response trucks also leaked foam when parked near Area 31 at the Hardstand parking. Trucks were parked for approximately 4-hour intervals.
Naval Air Systems Command (NAVAIR) 80-R-14 has a specification direction for AFFF.
Refractory testing to check the viscosity of foam was not conducted as part of normal procedure. It was conducted once in 1999 on the taxiway at the airfield drains.
Operational testing at the NASWI waste treatment plant may have been done but not when Mr. Merrill was on duty. It was proposed to NAVFAC Northwest Environmental, but to either Fire Chief’s knowledge, it wasn’t actually performed.
JP-8 jet fuel was burned at the NASWI fire school (500 gallon-per-minute [gpm] nozzles). The agent selector knob on the fire truck was operated as right applied more water, left applied more foam; one to two times per year someone would pull it too far left and release foam into the pit, which required reservicing of the truck. Overfoaming created water/foam separator issues from too much foam in the pit (at current fire training school). This has been at the same location during Mr. Waeschle’s time. He suggests looking at that pit as there may be JP-8 issues there in addition to foam-related issues. Eventually the JP-8 tanks were replaced with propane tanks.
In Mr. Waeschle’s career, he has never directed the use of foam due to any event at NASWI or elsewhere. During 2006-2007, foam was used on an F-18 crash (note, Mr. Waeschle and Mr. Merrill were not Fire Chiefs during this time). Mr. Waeschle stated that the biggest instance of foam deployment that he has observed, is due to training and accidental releases. Most training and actual firefighting is done using water, due to the low flash point of JP-8. Firefighters are trained to know that foam is only to be used in actual emergencies.
Currently, all foam is stored at NASWI Building 2687 (at Ault Field).

Firefighters would train for crashes, but rarely would use foam. On structure fires, it was generally not used, and the higher likelihood of use was on car fires.
Mr. Waeschle has previously provided an inventory of all foam to NAVFAC Northwest Environmental. Currently, he has two trucks that have foam that failed third-party refractory testing (adopted in 2008). He is unsure of the chemical composition of the foam in each truck, his primary concern is viscosity.
At NASWI, trucks have also been washed at the P3 washrack. Foam was rinsed into the grass when the trucks were being washed there.
At OLF Coupeville, from an operational perspective, there was no reason for trucks to deploy foam at Building 2807. In 2009, there was an agreement with AirOps where the NASWI Fire Department was to provide OLF Coupeville personal protective equipment and apparatus (fire trucks), but AirOps would provide staffing.
During 2004-2005, the Navy responded to a smoking dump truck at the waste transfer facility approximately ½ mile away from OLF Coupeville. (The transfer facility was owned by OLF Coupeville.) Foam may or may not have been used at that event.
For major fuel spills, foam was not deployed because JP-8 generally doesn't burn due to the weather conditions here. The preferred spill response method was to dike, divert, and dam. Mr. Waeschle recommends looking at the Area 16 drainage system available on NIRIS.
Other than at hangars, no known large-scale AFFF was deployed by the Fire Department during Mr. Waeschle's time.
At Seaplane Base, foam loading occurred at Building 19 and at the washrack. Truck washing also occurred at the washrack (recalling that foam during reservicing or leaking tank trucks would have AFFF residue on the outer portion of the truck). Additionally, Building 12 behind the fire station may have had foam used.
At OLF Coupeville, truck washing occurs just outside the fire station.
Mr. Waeschle has no knowledge of high-expansion foam being used at NASWI.
Mr. Waeschle also suggested speaking to the assistant fire chiefs for more information.[3]

[3] Contact information was obtained for Scott Style (assistant fire chief in 2007). Attempts made to contact Mr. Style were unsuccessful (he was out of the country at the time).

Communication Record[1]	
Date: 11-02-2017	Time: 1430
Name of Base, State: Naval Air Station Whidbey Island (NASWI)	
Interviewer: Janice Horton, Eric Cutler	
Organization: CH2M HILL	Phone: (360) 556-0621
Position/role on this project: Task Manager	Email: Janice.Horton@CH2M.com
Interviewee: John Brooks	
Organization: Retired Navy and Former Lab Research Manager in charge of AFFF specification, verification, and fire research/testing.	Phone: (360) 941-2358
Position/Job Title: N/A	Email: JBrooks@PYROGEN.COM
How long in this position? N/A	
How long in current and previous positions? Stationed at NASWI late 1960s to late 1970s.	
Have you held similar positions at other Bases? Yes	
Which Base? NASWI and Former Naval Air Facility Adak during active duty	
How long? N/A	
General Discussion Notes and Information: Charles (Charlie) Escola, NAVFAC NW Naval Technical Representative (NTR) was also in attendance during the interview.	
Mr. Brooks stated that perfluorooctane sulfonate (PFOS) was first invented in 1968 and its manufacture was discontinued around 2000 (including as a component in aqueous film forming foam [AFFF]). In the spring of 2000, 3M (the only PFOS manufacturer at the time) ceased production of PFOS-based AFFF due to a toxicity issue. Up until 2001, AFFF was said to only have 5-year shelf life. In 2002, perfluorooctanoic acid (PFOA)-based AFFF was produced and all PFOS production had ended.	
Mr. Brooks stated that from the late 1960s, when he was stationed at NASWI, during fire training activities at Area 31, only the last half of Friday was designated for foam usage during training. The first day of fire training was in-class and the second through fourth days were live fire training at Area 31 where only water was used to extinguish the 500 gallons of JP-5 jet fuel lit on fire on the 50-foot by 50-foot concrete burn pad. There was approximately ¼ inch of water on top of the jet fuel-covered concrete when only water was used. On the last day of training, typically the fifth day, AFFF would be sprayed to put out the fire. AFFF was only used on the last day because AFFF coated the burn pad and would prevent fires	

[1] This interview record contains information relevant to Ault Field, Seaplane Base, and OLF Coupeville. Information not directly relevant to OLF Coupeville has been shaded in gray.

from being able to be started for subsequent training days. When water was used to extinguish the fire, it took several minutes to put the fire out. When the AFFF was used, it took about 30 seconds to extinguish the fire. Mr. Brooks recalled the Area 31 burn pad drained to a tank and there may have been some minor spillage from the pad to ground surfaces. After the Area 31 fire training area was shut down, fire training activities were moved to the state facility in Enumclaw where training occurred for a couple of years before being moved back to the current fire training area. Mr. Brooks recalled the current fire training area used propane and water to start and extinguish fires. He is not aware of any AFFF used at the current fire training area during his time stationed at NASWI.
Mr. Brooks recalled that municipalities likely did not use AFFF foam until the mid-1970s due to the price. He stated that AFFF also would likely not be used on non-petroleum based fires (Class A fires) such as building fires and wildfires because it is not as effective as water.
Mr. Brooks recalled an agricultural lease program up until 8 to 10 years ago, specifically at OLF Coupeville, and a local farmer cutting hay from the fields within the OLF property boundary. Mr. Brooks recalled that during his research days he was aware of the use of PFOS as a surfactant in agricultural use (herbicides, insecticides, etc.). He also stated the Naval Research Laboratory (NRL) did a worldwide inventory of AFFF in the 2000 to 2001 timeframe and quarterly, and annual reports of that data may be available.
Mr. Brooks stated that PFOA releases likely occurred from refueling activities at the former fire station and parking area near Area 31.
Mr. Brooks recalled a golf course crash in approximately 1972, and an A-6 runway crash in the late 1980s. Mr. Brooks stated Chief Hadder was Ault Field Fire Chief in 1979 while Mr. Brooks was stationed in Adak, Alaska, and may have more information on crashes.
At OLF Coupeville, Mr. Brooks recalled a crash west of the OLF Coupeville flight lines in 1982 and suspects AFFF was used.

Communication Record[1]	
Date: 11-08-2017	Time: 1200
Name of Base, State: Naval Air Station Whidbey Island (NASWI)	
Interviewer: Janice Horton, Eric Cutler	
Organization: CH2M HILL	Phone: (360) 556-0621
Position/role on this project: Task Manager	Email: Janice.Horton@CH2M.com
Interviewee: John Hornsby	
Organization: Retired	Phone: (360) 675-6139
Position/Job Title: Former Crash Captain (1985 to 2001)	Email: jnahornsby@comcast.net
How long in this position? Retired in 2001	
How long in current and previous positions?	
Have you held similar positions at other Bases?	
Which Base?	
How long?	
General Discussion Notes and Information: Also in attendance Charles (Charlie) Escola, NAVFAC NW Naval Technical Representative (NTR).	
Mr. Hornsby volunteers at the Oak Harbor Fire Department.	
Mr. Hornsby came to NASWI in 1977 from Kingsville, Texas. He was promoted to Crash Captain in 1985 and remained in that position until retiring in 2001. The role of the Crash Captain was to take control of all flight operations when a pilot called in for an incident (crash landing). Mr. Hornsby would station three crash trucks along the length of the runway, one at the approach, one at the roll out, and one mid-field.	
Mr. Hornsby recalled that the P3A crash occurred farther north at Runway 13-31 than what was presented on the figure (location #15 on **Figure 1**).	
Mr. Hornsby stated the Fire Department logbooks could be a source for crash information, which may include Aircraft Incident Reports. Mr. Hornsby said Allen Sprouse[2], the Fire Inspector at the Fire Station, has access to the logbooks. Those records could be available from Aviation Safety or AirOps, and may include the volume of aqueous film forming foam (AFFF) used when the crashes occurred.	

[1] This interview record contains information relevant to Ault Field, Seaplane Base, and OLF Coupeville. Information not directly relevant to OLF Coupeville has been shaded in gray.

[2] Attempts to identify contact information for Allen Sprouse were unsuccessful.

Mr. Hornsby recalled an EA-6B crash to the east part of runway 07-25 in the mid-1990s. A gear stuck and caused a wheel fire. The crash truck used AFFF to put out the fire. Mr. Hornsby stated this was the only incident he could recall where AFFF was used. *Note: Mr. Hornsby circled the approximate location of this incident on the map and the location will be included on applicable figures.*
Mr. Hornsby recalled an A6 crash occurring sometime after 1990. The crash was caused by a pin being put in backward in the tail section. This crash occurred at the east end of the 07-25 runway.
Mr. Hornsby stated the Fire Chief would fill out the reports for crashes. Joe Hader[3] was the Fire Chief from the mid-1970s until his retirement prior to Mr. Hornsby's retirement. Mr. Hornsby does not recall Fire Chief Kurt Waeschle.
Mr. Hornsby recalled a fire set by an employee in the Chapel Building, but to his knowledge AFFF was not used to extinguish the fire.
Mr. Hornsby stated that pre-foaming of the runway was performed with protein foam, but this procedure ceased in the mid-1990s because it was determined to be ineffective. Pilots declined foaming the runways, so to Mr. Hornsby's knowledge no AFFF was used to pre-foam the runways.
Mr. Hornsby stated that in Hangar 7, protein foam in the system was replaced by AFFF. The only known use of AFFF during his time was when the sprinkler system was accepted and the AFFF was deluged.
Mr. Hornsby recalled that the hangar fire suppression systems were tested when they were newly installed or when work was performed on them, including AFFF systems. Drip pans were positioned under discharge sprinklers to capture discharged AFFF, and the percentage of foam was measured.
Mr. Hornsby stated that any planes with AFFF, crash parts, and other potentially contaminated materials were taken to the wash rack between Hangars 7 and 9. The wash rack was installed in the mid-1980s. Mr. Hornsby recalled that the wash rack was installed prior to the eruption of Mt. St. Helens. He recalled the timeline because newly purchased trucks were traveling to Ault Field from eastern Washington and were covered in ash, so when they arrived at Ault Field they went through the wash rack. At the wash rack there is an oil-water separator and "once the valve was thrown to get AFFF out of the o/w separator, the pump needed to be cleaned out as well." Mr. Hornsby said the cleaning records could be obtained from the Base Operating Support Contract (BOSC).
Mr. Hornsby recalled there was/is a stormwater weir at the eastern extent of the runway drainage ditches.
Mr. Hornsby stated that it is common practice to put out hay fires with AFFF foam since the foam is effective at penetrating hay bales, but to his knowledge nothing like this occurred at Ault Field.

[3] Attempts to contact Joe Hader were unsuccessful. The information gathered suggested that Mr. Hader was deceased at the time of the Preliminary Assessment information search.

Mr. Hornsby stated that at the hardstand area near Area 31, the trucks did not leak foam "frequently." He did recall that in the 1970s 5-gallon buckets of AFFF were kept on top of the MB-5 crash trucks because those trucks did not have an AFFF tank. Mr. Hornsby stated OLF Coupeville had one or two of those trucks during his timeframe.
Mr. Hornsby recalled that during his time as Crash Captain, his crew performed 32 in a 9-hour period, which is the record for arrestments. When each arrestment was made, the cable would have to be respooled around the drums by hand. The new arrestment system uses hydraulics to brake and control the planes.
Mr. Hornsby recalled at Seaplane Base there was a fuel transfer tank overflow. He does not recall whether a fire occurred, nor the timeframe for that tank overflow.
Mr. Hornsby stated that Oak Harbor Fire Department (Dist. 2) has used AFFF. Contact names provided are: Mike Bugston (Battalion Chief), Ray Merrill, and Craig Anderson (Training Officer).[4]

[4] The named Oak Harbor Fire Department personnel were not contacted, as this was outside of the scope of this Preliminary Assessment.

Figure 1
Ault Field

Communication Record[1]	
Date: 11-02-2017	Time: 1300
Name of Base, State: Naval Air Station Whidbey Island (NASWI)	
Interviewer: Janice Horton, Eric Cutler	
Organization: CH2M HILL	Phone: (360) 556-0621
Position/role on this project: Task Manager	Email: Janice.Horton@CH2M.com
Interviewees: Blaine Hardy (Public Works, Environmental, Hazardous Waste Manager), Allison Crain (NAVFAC NW), Officer Allen Willey (Public Works Officer), Lloyd Potter (FEAD, Lead Engineering Tech)	
Organization: NAVFAC, Public Works	Phone:
Position/Job Title:	Email:
How long in this position?	
How long in current and previous positions?	
Have you held similar positions at other Bases?	
Which Base?	
How long?	
General Discussion Notes and Information: The format of the interview was an open discussion on what the group recalls from storage/use/disposal of AFFF. Charles (Charlie) Escola, NAVFAC NW Naval Technical Representative was also in attendance during the interview.	
Mrs. Crain was Environmental Manager/Hazardous Waste Manager from 2011 to 2015, preceding Mr. Hardy. Mr. Potter was stationed at NASWI from 1984 to 1987, and has been at NASWI since 1993.	
Mr. Hardy stated the transition to AFFF from protein foam was not instantaneous. After 1970, protein foam was used up before AFFF was put into circulation. The date when protein foam ceased being used is unknown.	
Mr. Potter stated the crash response to the 1986 EA-6B crash was large and AFFF was likely used.	
Hangar 7 AFFF Release – AFFF was released during an accidental triggering of the Hangar 7 fire suppression system in Sept 2016. The AFFF/water was captured in the Hangar 7	

[1] This interview record contains information relevant to Ault Field, Seaplane Base, and OLF Coupeville. Information not directly relevant to OLF Coupeville has been shaded in gray.

containment (concrete) tank. The AFFF/water was transferred to Building 420 via pump truck, as approved by Officer Willey. The transfer trucks were triple-rinsed, with all AFFF/water and rinsate going into the concrete tank at Building 420. Within a couple of days of the Hangar 7 tank being emptied, it was observed to be full of water again. Upon further investigation, it was determined the tank was cracked and had filled back up with water surcharged around the tank. The tank was sealed within the last 3 to 6 months, and presently there is approximately 3 to 6 inches of water in the tank. The tank is configured with a 10-inch-diameter inlet on the wall, and is buried approximately 4 to 5 feet below ground surface. Mr. Potter recalled that during construction, coffer dams were built around the tank to keep water out of the excavation because the groundwater in the area was so shallow. The AFFF/water mixture is still in the concrete tanks, and will be stored there until a granular activated carbon (GAC) filtration system is funded. The resultant carbon from the GAC filters is to be incinerated as per a 2016 Navy mandate.

Mrs. Crain stated that as of 2016 a Navy mandate requires all AFFF materials to undergo either incineration or solidification. She can provide a copy of that policy.

Mrs. Crain stated that, in general, most stormwater drains lead to the oil/water separator north of the hangars, then to the Strait of Juan de Fuca. Officer Willey stated the storm utility GIS data is currently being updated as it does not accurately reflect what ground truthing shows. Mr. Hardy stated that there have been no known direct discharges of storm to sanitary sewer or vice-versa and it is believed that none of the stormwater drains that could have contained AFFF are connected to the sewer system, since AFFF causes issues with the sanitary sewer treatment. Dye tests are tentatively planned for stormwater lines from and in the vicinity of the hangars.

Mr. Hardy stated AFFF previously had been disposed of by spray disposal or it was sent to the sanitary sewer. Mr. Hardy said he could provide emails from the former Program Manager with requests to dispose of AFFF by spraying on the wastewater treatment plant (WWTP) lagoons. Sending the AFFF through the sewer system was corrosive to piping. Spray disposal from the fire trucks was metered. It was stated by the interviewees that in the last 10 years, small amounts of AFFF have been sent to the current WWTP as a means of viable disposal.

Mr. Hardy stated that AFFF was sprayed on the former WWTP lagoons directly south of the current WWTP during the 2005-2009 timeframe. The lagoons were closed 12 to 14 years ago. Olivia Sumaway (Environmental) conducted the sampling of those lagoons.

The interviewees have no knowledge of any official record of AFFF discharges in the hangars other than the confirmed discharge at Hangar 7 within the last year.

Mr. Potter stated that sometime between 1984 and 1987, there was a house fire south of the old security buildings where AFFF could potentially have been sprayed.

Mrs. Crain confirmed chrome plating was performed at Building 2547. The closure date of the chrome plating building is unknown.

Mr. Hardy stated there is a component of per- and polyfluroalkyl substances (PFAS) in Glycol. The 2016 Superfund Amendments and Reauthorization Act (SARA) report includes the Glycol quantity stored at the site.

Mr. Hardy stated that Building 2713 (now Building 2757) is used for waste handling; however, there have been no documented releases of AFFF. Mrs. Crain stated if there were any releases due to spills, a Maximo work request could be obtained from the Base Operating Support Contract (BOSC). The BOSC should have spill reports dating back to the 1980s. Environmental records of spills may not be available prior to Mrs. Crain's time.
Mr. Hardy stated that every 45 to 90 days, another container of AFFF is found from various locations across the Base. In May 2017, AFFF drums were found in storage at Hangar 14.
The approximate location of the accident is shown on ***Figure 4-2*** *(precise geographic coordinates are not known)* Officer Willey stated all hangar fire suppression systems are tested annually as part of the Preventative Maintenance (PM) Program and that these PMs would be included on the Maximo list. In general, testing goes to collection drains. Some collection drains go to stormwater. Officer Willey stated a big culprit could be hangars and storm drain outfalls from hangars.
Mr. Hardy stated he did not recall any biosolids being taken to the golf course. To his knowledge, biosolids are now composted and disposed of at Area 6 (adjacent to the wood chipper), and are often given away for construction, campgrounds, or beautification projects on-Base, or are land-applied at Area 6 and at Seaplane Base east of the munitions storage areas. This occurred in 2015 and 2017.
Mrs. Crain stated that information on hotpits could be obtained from Karen Campbell (NAVFAC SE). Karen was the CERCLA Tank Manager. Mr. Potter stated there were aboveground storage tanks at the temporary hotpits, which were refueling locations in service for a couple of years. The interviewees stated there are no known spills or application of AFFF at the temporary hotpits.
Mr. Potter stated that at one time Ault Field held land leases with farmers.
Seaplane Base had primarily industrial operations. There were four fuel farms on Seaplane Base, all of which were shut down during the 1990s. Mr. Potter was part of the shutdown project. Wells were installed with analytical testing done on the wells and tanks. the tanks were decommissioned as part of the shutdown project.
Potential interviewees for additional information:
Karen Campbell[2] (NAVFAC SE) (317) 491-2929
Rolando Ferris[3] (Environmental, Fleet Readiness Center (FRC) contact for information on the chrome plating facility) (360) 257-8646
Rick Dutton[4] (Supply Manager at Fleet Logistics Center [FLC]) Richard.dutton@navy.mil for information on AFFF managed as waste at Building 2757

[2] Karen Campbell was contacted as part of the Preliminary Assessments at NASWI. She stated that she did not have any records relevant to this investigation.

[3] Attempts made to contact Rolando Ferris were unsuccessful.

[4] Rick Dutton was not contacted as part of the Preliminary Assessments at NASWI as the information he may have provided was obtained from Navy environmental personnel.

Dave Krause[5] (Public Works, retired), Allison may have his contact information
Bobbi Holly[6] (for issues at Fuel Farms) (360) 672-1204 Don Hill[7] (for issues at Fuel Farms) currently works in Mr. Potter's department

[5] Contact information was not obtained for Rick Dutton and no attempts were made to contact him. Multiple other staff from Public Works were interviewed.

[6] Bobbi Holly was not contacted as part of the Preliminary Assessments at NASWI as it was determined that only water was used for fire suppression at the fuel farms.

[7] Don Hill was not contacted as part of the Preliminary Assessments at NASWI as it was determined that only water was used for fire suppression at the fuel farms.

Communication Record[1]	
Date: 11-08-2017	Time: 1000
Name of Base, State: Naval Air Station Whidbey Island (NASWI)	
Interviewer: Janice Horton, Eric Cutler	
Organization: CH2M HILL	Phone: (360) 556-0621
Position/role on this project: Task Manager	Email: Janice.Horton@CH2M.com
Interviewee: Tom Prince	
Organization: Navy Fire and Emergency Services	Phone: (360) 257-2532
Position/Job Title: Advanced Emergency Medical Technician (AEMT)/Firefighter	Email: thomas.prince@navy.mil
How long in this position? Since December 1997	
How long in current and previous positions? N/A	
Have you held similar positions at other Bases? N/A	
Which Base? N/A	
How long? N/A	
General Discussion Notes and Information: Charles (Charlie) Escola, NAVFAC NW Navy Technical Representative (NTR) was also present during the interview.	
When Mr. Prince was stationed at the hardstand area, which was the crash truck parking location during refueling at the hotpits. He did not see any AFFF leaking from the crash truck tanks; however, he stated it was possible leaks could have occurred. The trucks stationed at the hardstand were there for 8 hours in rotation as the hardstand was manned all day during refueling.	
Mr. Prince confirmed the locations of the two hotpits, but during his time as a firefighter, he said that, to his knowledge, no foam was used at either location.	
Mr. Prince provided a photo of an F-18 plane crash and the approximate location (**Figures 1 and 2**) at the north end of Runway 13-31 at approximately the 2,000-foot marker on 30 April 2006. Mr. Prince was the firefighter who responded, and applied AFFF to three portions of the F-18, over the nose of the F-18, the tail, and on a burning fuel hose. He recalled that each of the three applications of AFFF lasted approximately 3 to 5 seconds. The quantity of AFFF used to put out the fire was unknown, but Mr. Prince recalls that 80 to 90 percent of the water was left in the truck tank. Mr. Prince stated that runoff of AFFF was controlled with	

[1] This interview record contains information relevant to Ault Field, Seaplane Base, and OLF Coupeville. Information not directly relevant to OLF Coupeville has been shaded in gray.

dikes and spill containment and runoff of AFFF into ditches was unlikely. He stated the cleanup was performed by NAVFAC Environmental.
Mr. Prince stated fires on the runway ramp are put out using halon extinguishers, not AFFF. Wheel-unit halon extinguishers are typically spaced out on runway aprons at designed intervals and would be used prior to the fire truck arrival. Therefore, the fires would have already been extinguished so no AFFF would be used.
Mr. Prince stated that foam is not intentionally used at the current Fire Training Area (FTA), but every once in a while, someone may accidentally release foam. If this occurs, the foam shutoff would be immediate. The foam would have to overflow the containment tank in order to escape the closed loop system. The water used to fight training fires at the current FTA comes from the containment tank onsite, and is not used offsite because of the JP-5 jet fuel and propane in the water. The system is an enclosed loop and closed pit system.
Mr. Prince is only aware of the current FTA, which has been in use since 1997 when Mr. Prince began.
Mr. Prince stated protein foam is used at Hangar 7 and suggested obtaining the BOSC Preventative Maintenance (PM) records for the changeover date. **Note: the 2016 Hangar 7 discharge has been documented as an AFFF release.*
Mr. Prince stated AFFF is stored in 55-gallon drums at the current fire station at Ault Field. A pump is used to transfer the AFFF from the drums into the truck. Any spills, even small amounts of AFFF, would be noticed immediately because AFFF leaves a sticky white residue on anything it touches, which is difficult to clean off and eats away at the material it touches.
Mr. Prince stated truck leaks could have occurred if personnel were not careful during reservicing at the former fire station, although leaks were unlikely due to the filling box being of sufficient size to accommodate the entire contents of the 5-gallon bucket without spillage. Again, he stated that personnel pouring AFFF into the filling box would be immediately aware of any spills, and that the difficulty of cleaning up AFFF would likely ensure personnel being careful during truck reservicing.
Mr. Prince stated that presently there is AFFF stored in the caged area at the current Fire Station at Ault Field.
Mr. Prince verified that the current Ault Field Fire Station (Building 2897) is built on the same footprint as the former Fire Station. The demolition and new construction of the Fire Station took 2 to 3 years to complete, and a portion of the former Fire Station concrete slab still exists at the new Fire Station.
Mr. Prince stated that all fire training activities for Ault Field, Seaplane Base, and OLF Coupeville have occurred at Ault Field at either the Runway Fire School (Area 31), or the current FTA.
Mr. Prince confirmed that the Fire Station and adjacent maintenance facility at Seaplane Base have been in the same locations since World War II. Mr. Prince circled the location of both (**Figure 3**).
Mr. Prince stated the only AFFF stored at Seaplane Base is in the fire trucks.

Mr. Prince stated that at OLF Coupeville, the FP Tank 11 (aboveground water tank on top of a well head building) was used to refill the fire trucks with water faster. The process of filling the truck with water this way should not have created any spillage of AFFF because the water filling box on top of the truck is separate from the AFFF filling box. The water and AFFF are in separate tanks on the truck and the water/AFFF mixing does not occur in the tanks, but at a valve on the truck only during foam spraying.
Mr. Prince verified the house fire (previously discussed by Mr. Potter during the interview on November 2, 2017) occurred at a residence in the southern part of Ault Field. Mr. Prince verified the fire was put out with water only and recalled it was Ladder 71 that responded. Mr. Prince also stated that typically all house fire training exercises are done with water, and during an actual housefire, firefighters would naturally react as they would from the training, which is to just use water.
Mr. Prince said AFFF was not used on car fires during his time at Ault Field.
Mr. Prince suggested accessing the NAVFAC Enterprise Safety Applications Management System (ESAMS) for any firefighting records. ESAMS records should show National Fire Incident Reporting System entries. Mr. Escola stated he can request those records for CH2M as he has access to ESAMS.[2]

Figure 1
Ault Field

[2] This information was requested several times during this Preliminary Assessment, but was not obtained.

Figure 2
Ault Field

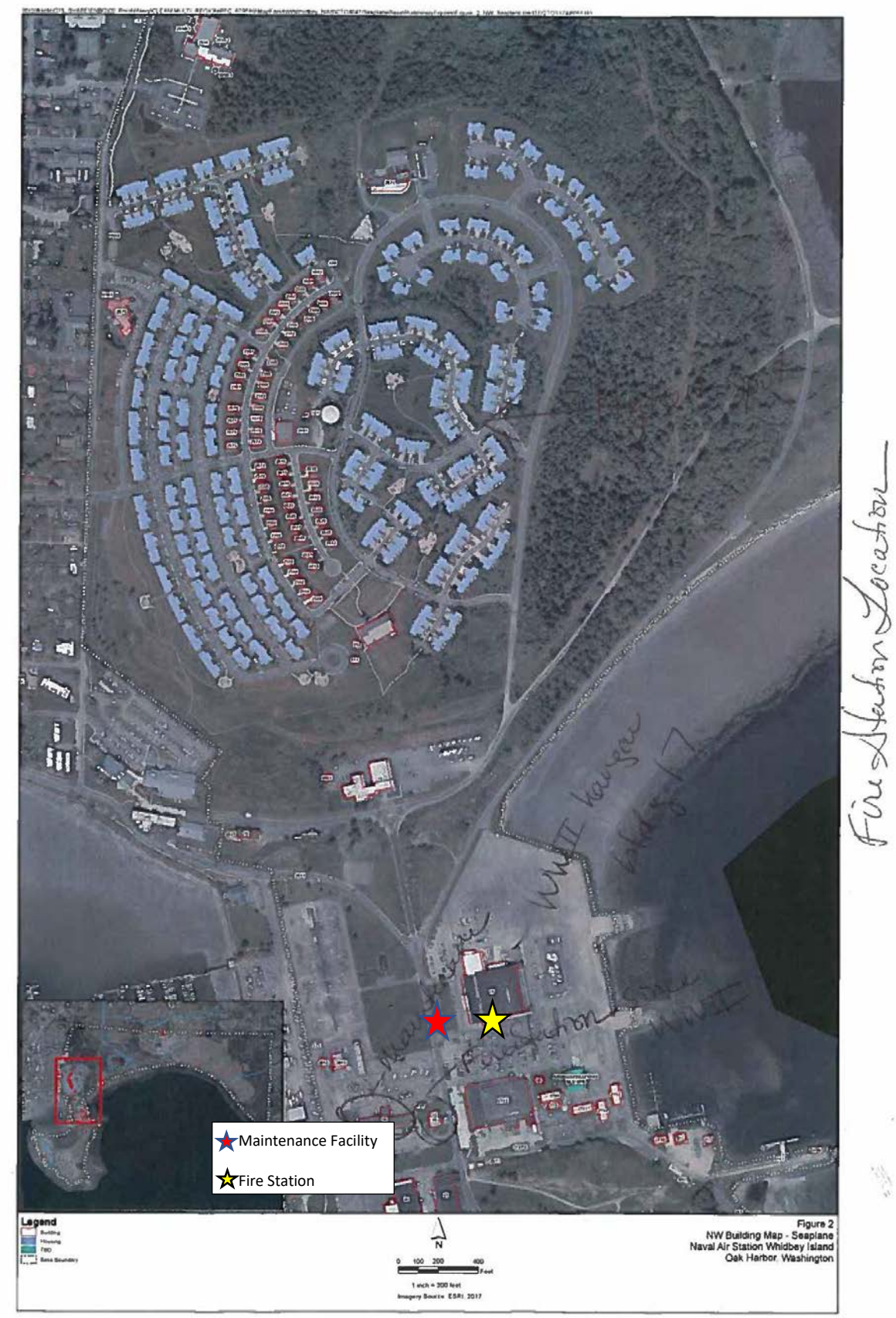


Figure 3
Seaplane Base

Communication Record[1]	
Date 10/24/17	Time 10:00
Name of Base, State: NASWI, OLF, Washington	
Interviewer: Joe Hauser and Alexandra Salter-Blanc	
Organization: CH2M	Phone: 425-233-3108
Position/role on this project: Task Manager	Email: Joe.Hauser@ch2m.com
Interviewee: Dave Bunch (Doug Long also present)	
Organization:	Phone:
Position/Job Title: Device Manager, Building 2807	Email:
How long in this position? 1999 to present at Building 2807	
How long in current and previous positions? Since 1978	
Have you held similar positions at other Bases?	
Which Base?	
How long?	
General Discussion Notes and Information:	
-Informal interview (ran into outside of Building 2807 during initial VSI)	
-Building 2708 is used for electronic warfare signal emission	
-Building built in 1999	
-Building fire suppression system: Halon	
-No recollection of crashes/emergency response at OLF or surrounding area	

[1] All information in this interview record is applicable to OLF Coupeville.

Appendix C
Photo Documentation

Building 2807 (OLF Electronic Warfare Signal Emitter Building) (facing east)

Halon fire suppression system in Building 2807

Halon fire suppression system in Building 2807

Halon fire suppression system in Building 2807

Halon fire suppression system in Building 2807

Halon fire suppression system in Building 2807

Halon fire suppression system in Building 2807

Building 2709 with west-facing bay doors and gravel wash pad (facing south)

Building 2709 (facing southeast)

Building 2709 (facing northeast)

Water spigot and hose on the west-side of Building 2709

Gravel area (presumably wash pad) at the northwest corner of Building 2709

View of Fireman's Quarters from the driveway west of Building 2709

Low-lying area (shallow ditch) south of Building 2709

Low-lying area (shallow ditch) south of Building 2709

Metal plate in grass southwest of Building 2709

Metal plate in grass southwest of Building 2709

Stormwater inlet near the northeast corner of Building 2709

View of Building 2709 from the front (south side) of the Fireman's Quarters

View of Fireman's Quarters (facing east)

View of apparent storage shed, Facility 11, Facility 2, Facility 1, and Facility 10 (facing west)

View from main access road west of Building 2709(facing north)

View of Facility 11, Facility 2, Facility 1, and Facility 10 (facing south)

Facility 10 (Runway Lighting Vault)

Facility 10 (Runway Lighting Vault)

Facility 1 (Control Tower)

Facility 11 (Potable Water Well Pump House) with PF Tank 11 on roof

Facility 2 (Airfield Operations Building) (left) and Facility 11 (Potable Water Well Pump House) with PF Tank 11 on roof (right)

Facility 2 (Airfield Operations Building) (left) and Facility 11 (Potable Water Well Pump House) with PF Tank 11 on roof (right)

Wellhead protection area sign on Facility 11

Wellhead protection area sign on Facility 11

Conduit from FP Tank 11

Ditch east of taxiway running parallel to runway

Ditch east of taxiway running parallel to runway

View of Fireman's Quarters and Building 2709 facing east.

Possible old runway surface between current runway and taxiway

Possible old runway surface between current runway and taxiway

Possible old runway surface between current runway and taxiway

Distressed vegetation north of runway. Appears to be scotch broom and/or holly weed control.

Distressed vegetation north of runway. Appears to be scotch broom and/or holly weed control.

Vault at the north end of the runway next to the optical landing system utility connection

Vault at the north end of the runway next to the optical landing system utility connection

Vault at the north end of the runway next to the optical landing system utility connection

Optical landing system utility connection, north end of runway

South end of runway (facing southwest)

South end of runway (facing southwest)