



Former Fort Ord Monterey County California

Per- and Polyfluoroalkyl Substances (PFAS)

February 2023

Derek S. Lieberman, P.E.

Ahtna

Definitions

AFFF – Aqueous Film-Forming Foam

Aquifer – a body of rock or soil that is sufficiently permeable for groundwater to flow and serve as a water source.

DoD – Department of Defense

FAAF – Fritzsche Army Airfield

FTA – fire training area

Groundwater – all water under the ground, not water on the surface (rivers, lakes, etc.).

OU – Operable Unit, discrete portion of remedial response that manages migration, or eliminates or mitigates a pathway of exposure.

PA – Preliminary Assessment

PFAS – per- and polyfluoroalkyl substances

PFOS – perfluorooctane sulfonate

PFOA – perfluorooctanoic acid

SI – Site Inspection

STP – sewage treatment plant

USEPA – U.S. Environmental Protection Agency



PFAS Background

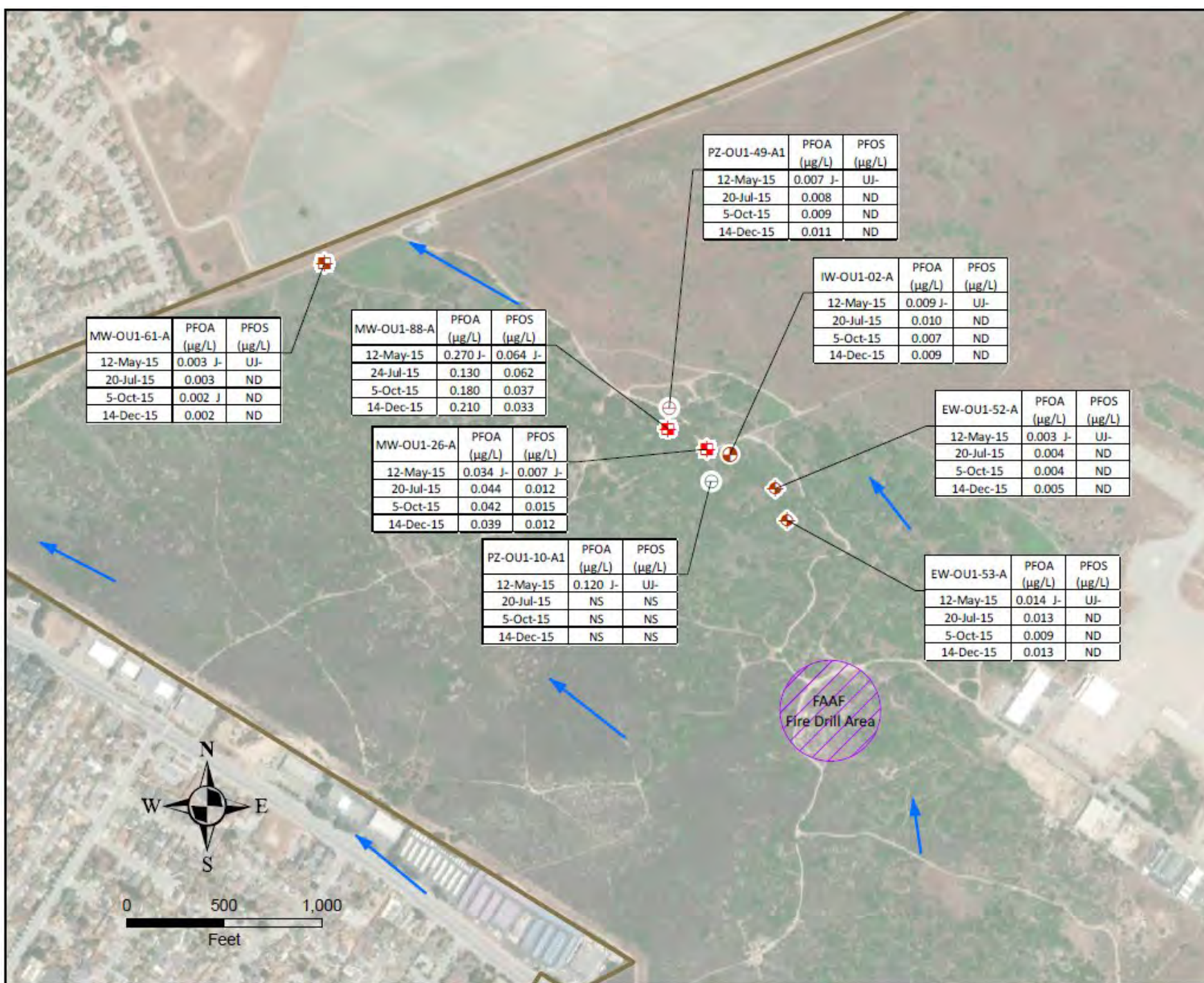
- Resistant to heat, water, and oil originally developed in the 1930s.
- Included in many consumer and industrial products by the 1950s
- 1970s – DoD began using Aqueous Film-Forming Foam (AFFF) that contained PFAS because it quickly extinguishes petroleum-based fires.
- Found in people, the environment, and wildlife and do not break down easily.
- Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) – historically the most widely-used throughout the United States.
- 2022 – DoD and USEPA established screening levels for six PFAS, including PFOA and PFOS, in drinking water and soil
<https://www.epa.gov/newsreleases/epa-adds-five-pfas-chemicals-list-regional-screening-and-removal-management-levels>.



Army PFAS Investigations at the former Fort Ord

The Army conducted investigations to assess for the presence of PFOA and PFOS in groundwater at Operable Unit 1 (OU1) and Operable Unit 2 (OU2).

- OU1 includes former Fritzsche Army Airfield (FAAF) Fire Drill Area operated from the 1960s to the 1980s where AFFF was used by the fire department during training exercises.
 - Four groundwater monitoring events for PFOA/PFOS completed in 2015 at eight wells.
 - Concentrations of PFOA and PFOS exceeded screening levels at two of the eight wells sampled.
- OU2 includes a landfill operated from the 1950s to the 1980s and may have received waste materials containing PFAS.
 - One groundwater monitoring event for PFOA/PFOS completed in 2019 at twelve wells.
 - Concentrations of PFOA and PFOS exceeded screening levels at one of the twelve wells sampled.



EXPLANATION

- Secondary Assessment Sites
- General Groundwater Flow Direction, A-Aquifer*
- Former Fort Ord Boundary
- Well type & detected concentrations in µg/L of PFOA or PFOS**
- Monitoring Well: Concentration above USEPA regional screening level (RSL) and DoD screening level
- Piezometer: Concentration above USEPA RSL and DoD screening level
- Concentrations below USEPA RSL and DoD screening level**
- Monitoring Well
- Extraction Well
- Injection Well
- Piezometer

NOTES:
*Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)
PFOA (perfluorooctanoic acid)
PFOS (Perfluorooctane sulfonate)
The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022). DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).

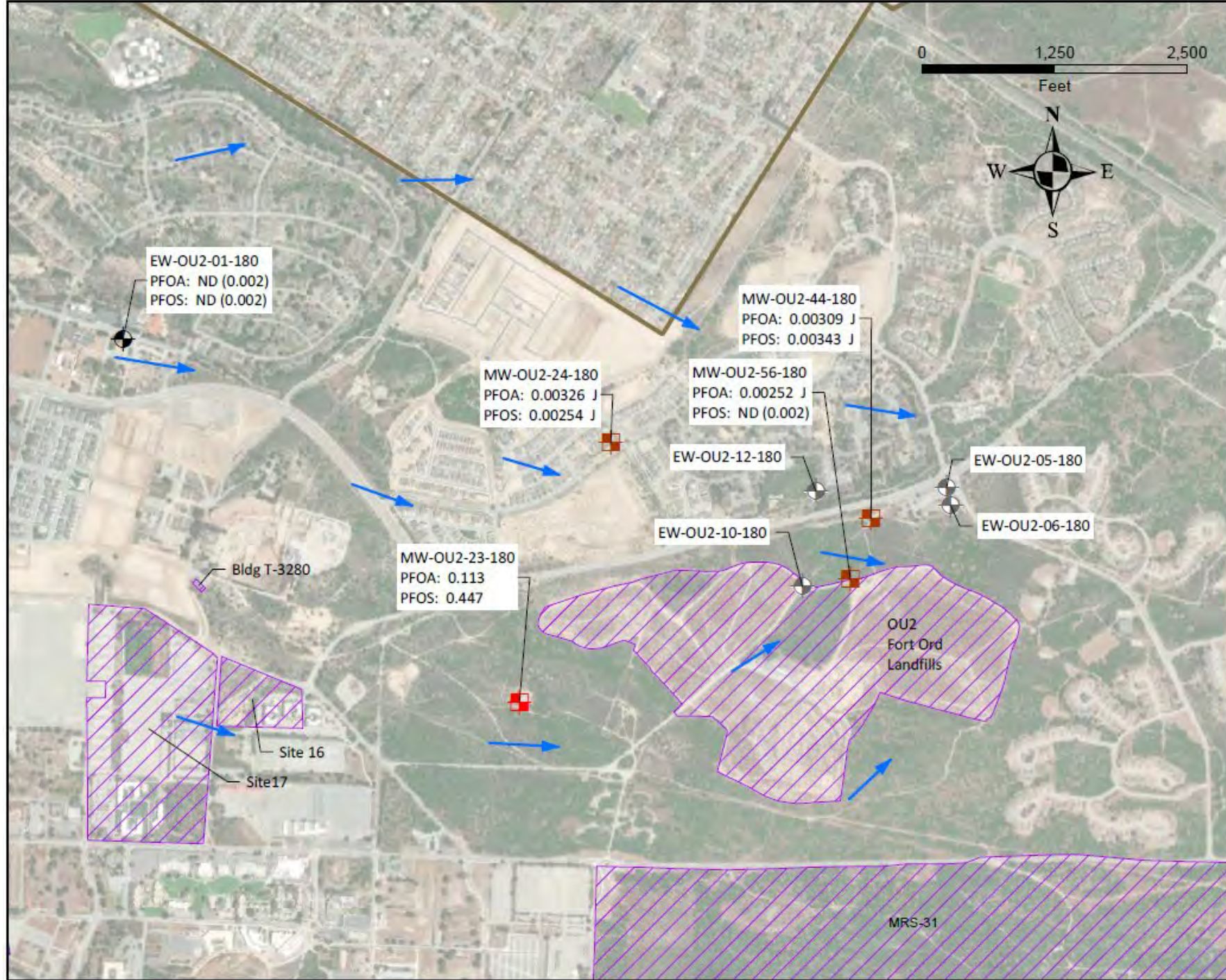


GROUNDWATER MONITORING ANALYTICAL
RESULTS AT OU1
A-AQUIFER, 2015
PFAS PA Narrative Report
Former Fort Ord, California

Ahtna

Date: 7/11/2022

Figure: 19



EXPLANATION

- Secondary Assessment Sites
- General Groundwater Flow Direction, Upper 180-Foot Aquifer*
- Former Fort Ord Boundary

Well Type and PFOA/PFOS results in µg/L

- Monitoring Well - detected concentrations of PFOA or PFOS are above USEPA regional screening level (RSL) and DoD screening level
- Monitoring Well - detected concentrations of PFOA or PFOS are below USEPA RSL and DoD screening
- Extraction Well - PFOA and PFOS not detected
- Extraction Well - PFOA and PFOS not sampled

NOTES:

*Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)

PFOA (perfluorooctanoic acid)

PFOS (Perfluorooctane sulfonate)

The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022).

DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).

Date: 7/11/2022

GROUNDWATER MONITORING ANALYTICAL RESULTS AT OU2 UPPER 180-FOOT AQUIFER, 2019

PFAS PA Narrative Report

Former Fort Ord, California

Ahtna

Date: 7/11/2022

Figure: 22

PFAS Preliminary Assessment/Site Inspection (PA/SI) at the former Fort Ord

The Army follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or “Superfund”) process to fully investigate releases, prioritize responses, and determine appropriate cleanup actions based on risk.



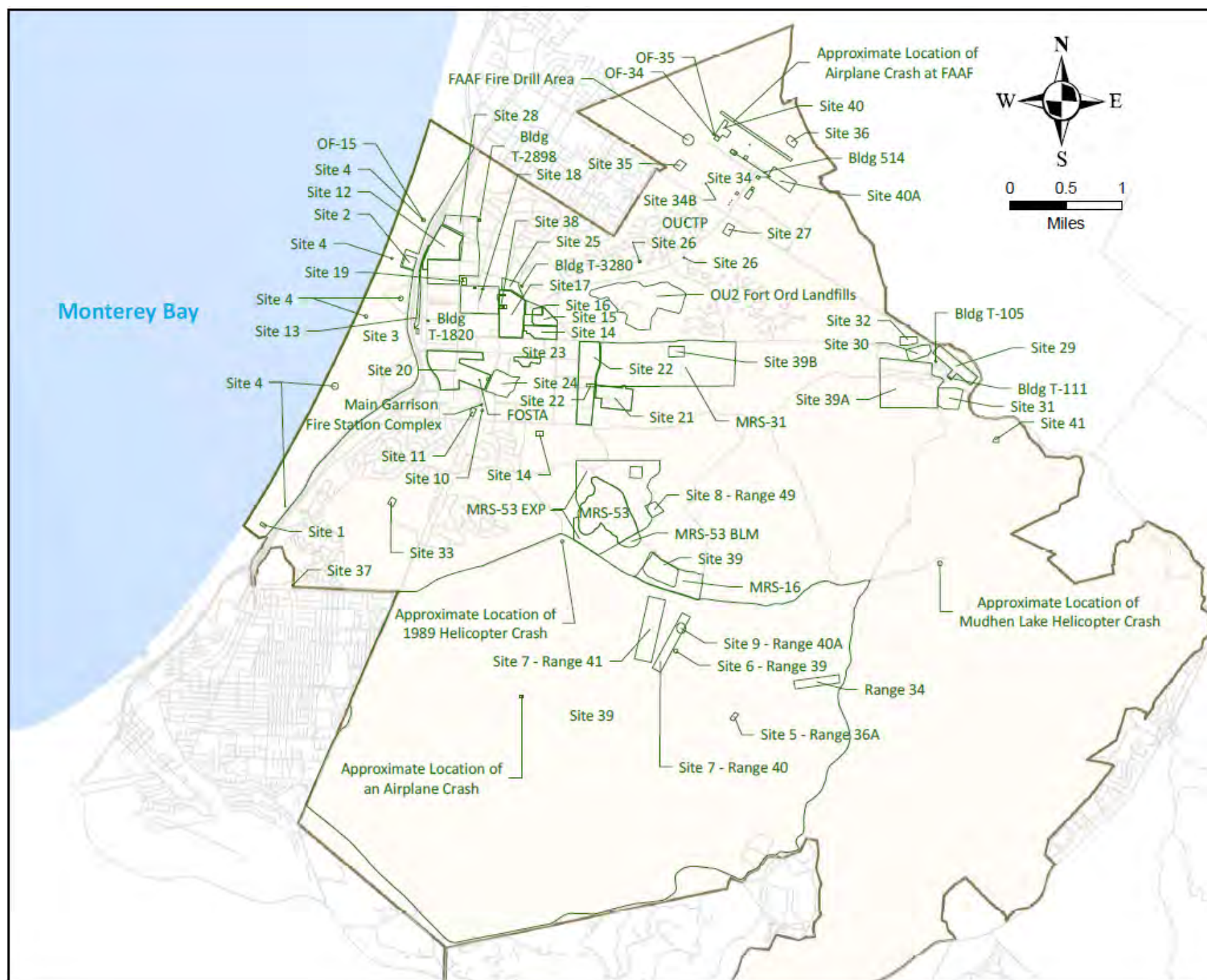
- In 2022, the Army reviewed historical activities at former Fort Ord sites for potential releases of PFAS in a PA.
- PA Narrative Report available at https://docs.fortordcleanup.com/ar_pdfs/AR-BW-2904B//BW-2904B.pdf.
- Results indicate limited historical use of PFAS-containing material.
- Further investigation is being conducted in an SI.

PFAS PA Site Assessment Process

PA Primary Assessment: review of historical records to determine if uses listed below occurred while Fort Ord was still an active Army facility; 103 sites were evaluated.

- Fire training areas (FTAs)
- AFFF storage locations (e.g., fire stations)
- Aircraft crash sites where AFFF may have been applied for fire control
- Aviation hangars and other buildings or fuel storage areas where AFFF was used in the fire suppression system and where a release may have occurred
- Other aviation assets (runways, fuel farms, defueling areas) where fuel- or petroleum-based fires may have occurred and AFFF may have been applied
- Landfills and waste disposal areas where PFAS-containing materials may have been disposed
- Wastewater treatment plants that may have received liquid effluents from facilities that used or disposed of PFAS
- AFFF firefighting equipment testing and washout discharge locations





EXPLANATION

- Primary Assessment Site
- Former Fort Ord boundary
- Roads

NOTE:
 FAAF = former Fritzche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2
 OUCTP = Operable Unit Carbon Tetrachloride Plume
 FOSTA = Fort Ord Soil Treatment Area
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403



PRIMARY ASSESSMENT SITES
 PFAS PA Narrative Report
 Former Fort Ord, California

PFAS PA/SI at the former Fort Ord

Secondary Assessment:

- 42 sites advanced to secondary assessment.
- Secondary records review.
- Site reconnaissance.
- Interviews with personnel either currently or formerly employed at Fort Ord.
- Evaluated to determine if a release of PFAS at the site was probable.



PFAS PA/SI at the former Fort Ord

PA Tertiary Assessment:

Ten sites advanced to tertiary assessment to determine:

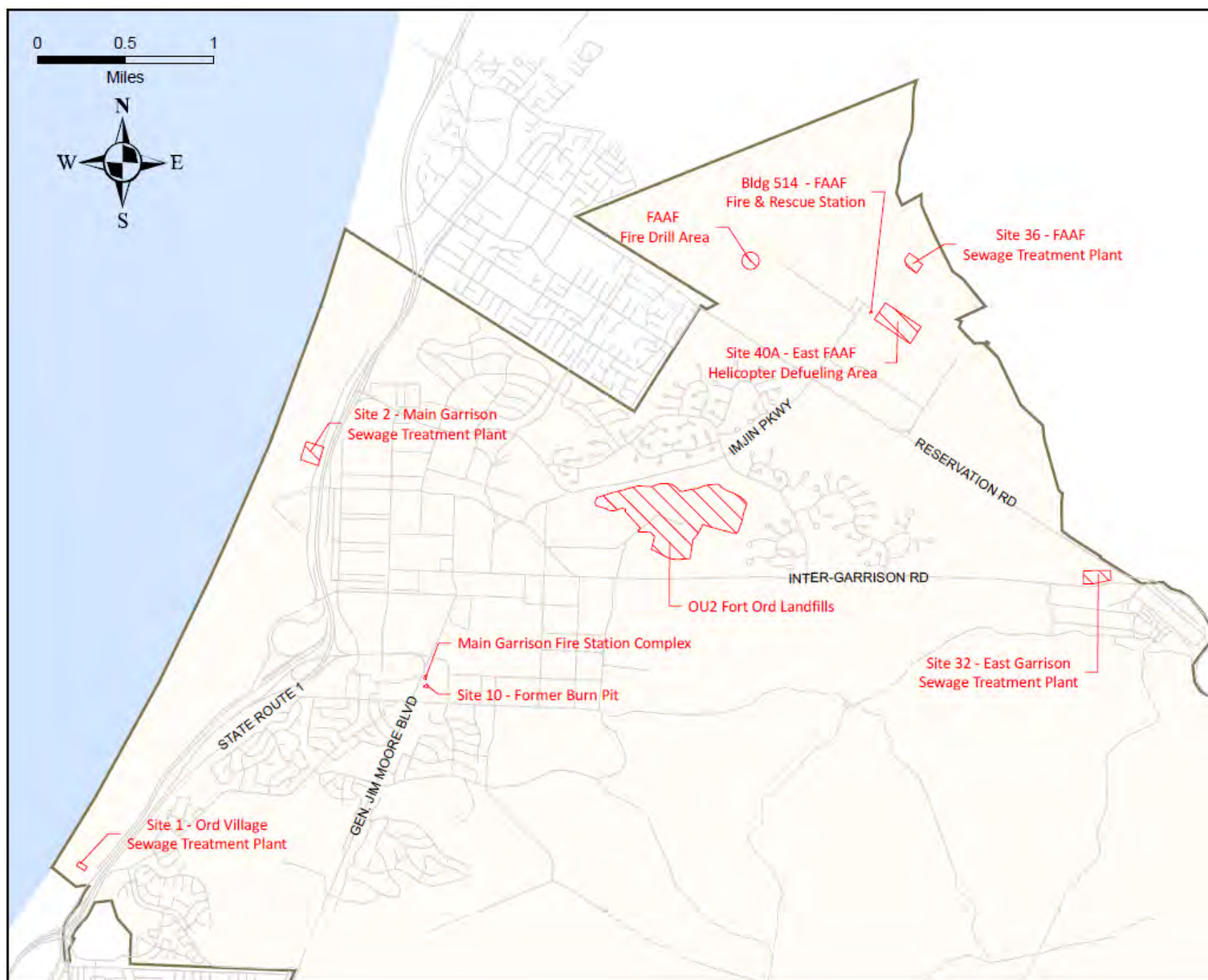
- Geology, hydrogeology, hydrology, and soil settings at each site
- Residential, commercial, and industrial populations on or near each site
- Private and municipal drinking water wells on or near each site
- Groundwater use on or near each site
- Fisheries and sensitive environments downstream of each site

Information used to develop a pathway and target assessment for each site.

- Pathway: the environmental medium through which a hazardous substance may threaten targets.
- Target: a physical or environmental receptor that is within the target distance limit for a particular pathway.

Marina Coast Water District supplies drinking water to the former Fort Ord and tests regularly – drinking water meets all state and federal requirements. Consumer confidence reports are available at:

https://www.mcwd.org/docs/ccr/2021/mcwd_ccr_2021_english.pdf



EXPLANATION

- Tertiary Assessment Site
- Former Fort Ord Boundary
- Roads

NOTE:

OU2 = Operable Unit 2

FAAF = Fritzsche Army Airfield (Marina Municipal Airport)

Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403



TERTIARY ASSESSMENT SITES
PFAS PA Narrative Report
Former Fort Ord, California

Ahtna

Date: 7/5/2022

Figure: 24

PFAS PA/SI at the former Fort Ord

SI Investigation:

Seven sites identified in the PA Narrative Report as warranting further investigation advanced to the SI:

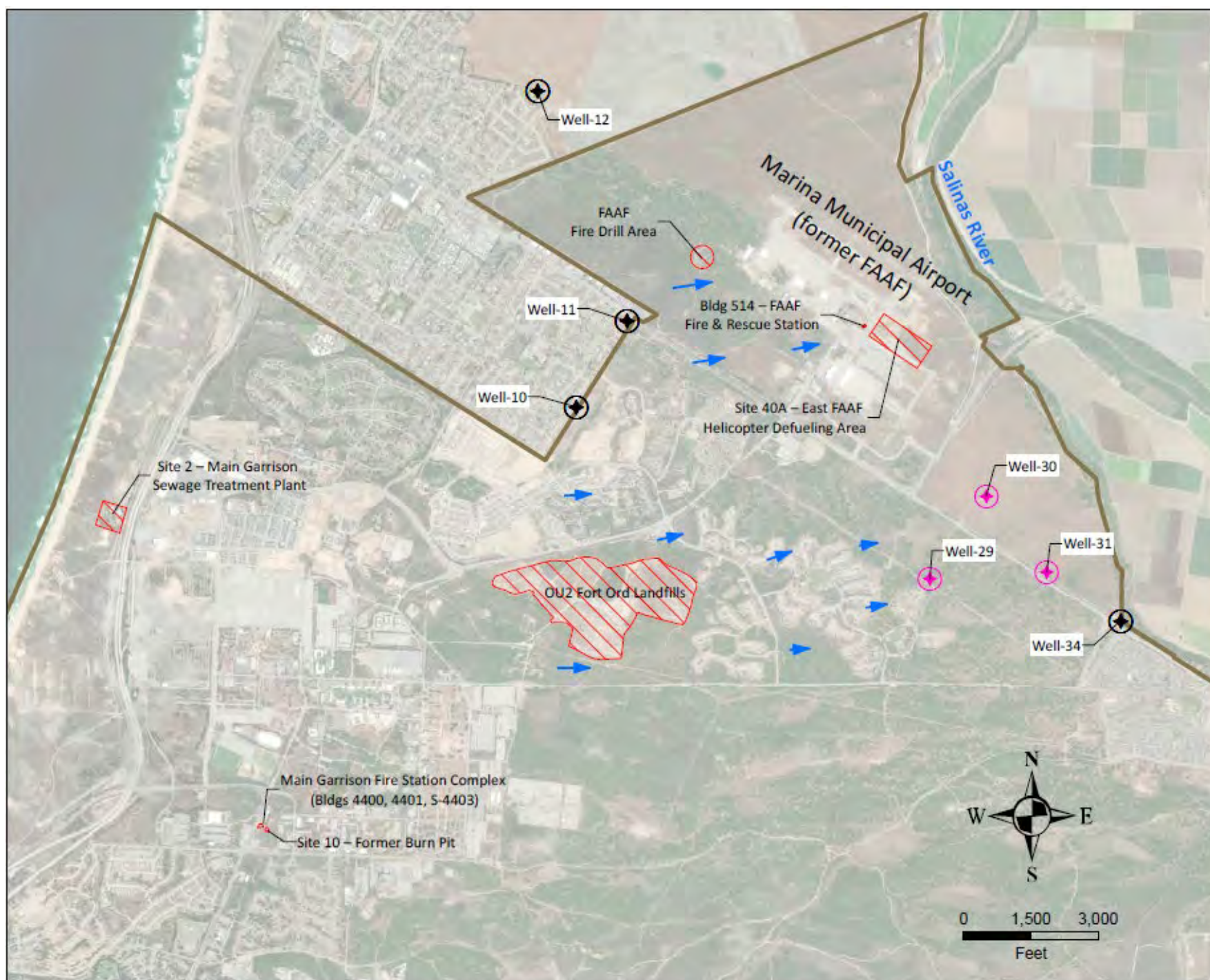
- Site 2: Main Garrison Sewage Treatment Plant (STP)
- Site 10: Former Burn Pit
- Site 40A: East FAAF Helicopter Defueling Area
- FAAF Fire & Rescue Station
- Main Garrison Fire Station
- FAAF Fire Drill Area
- OU2: Fort Ord Landfills

The SI:

- Determines whether PFAS are present in soil and groundwater by collecting data from sites where probable PFAS releases occurred.
- Is not a study of the full extent of contamination at a site or a risk assessment.

If SI indicates a release occurred, additional investigation may be conducted to quantify the nature and extent of contamination.





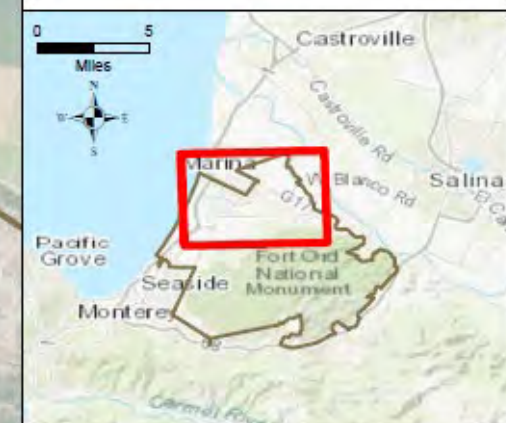
EXPLANATION

- Suspected PFAS Release Sites
- General Lower 180-Foot/400-Foot Aquifer Groundwater Flow Direction*
- Former Fort Ord Boundary
- ⊕ Well screened in the Lower 180-Foot/400-Foot Aquifer
- ⊕ Well screened in the 900-Foot Aquifer

NOTES:

*Operable Unit Carbon Tetrachloride Plume Fourth Quarter 2019 - Third Quarter 2020 Groundwater Monitoring Report (Ahtna, 2021)

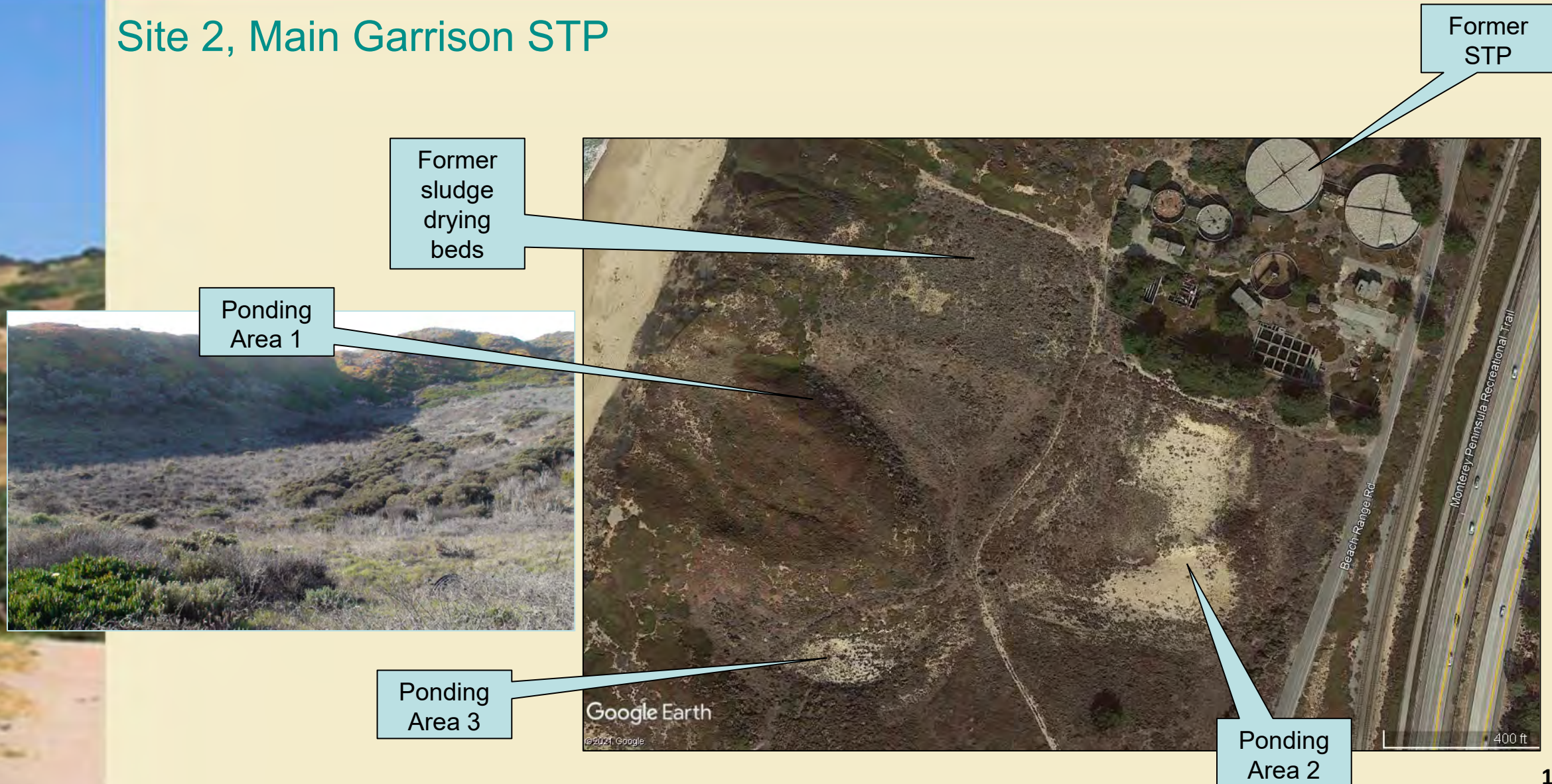
FAAF = Fritzsche Army Airfield
OU2 = Operable Unit 2 (Fort Ord Landfills)



SUSPECTED PFAS RELEASE SITES AND
NEARBY DRINKING WATER SUPPLY WELLS
PFAS SI Work Plan/QAPP
Former Fort Ord, California

PFAS SI Investigation

Site 2, Main Garrison STP



PFAS SI Investigation

Main Garrison Fire Station and Site 10, Former Burn Pit



Main
Garrison
Fire Station



AFFF
discharge
area



Former
burn pit
area



PFAS SI Investigation

FAAF Fire & Rescue Station and Site 40A, East FAAF Helicopter Defueling Area

Fire & Rescue
Station



Drainage
channel north
of Site 40A

AFFF discharge
area south of Fire
& Rescue Station

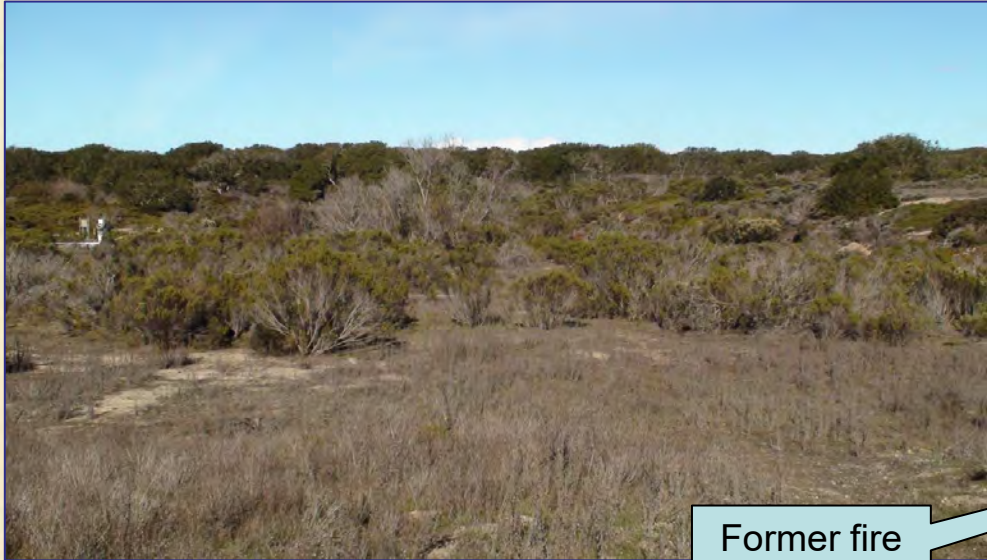


Suspected
helicopter
defueling area



PFAS SI Investigation

FAAF Fire Drill Area



Former fire
drill area



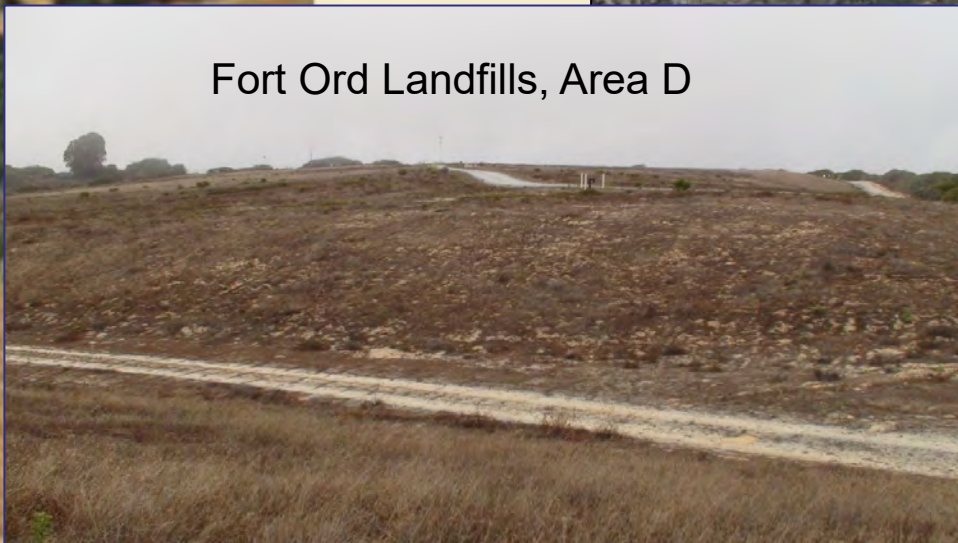
Former drum
unloading area

PFAS SI Investigation

Operable Unit 2, Fort Ord Landfills



Fort Ord Landfills, Area D



For Additional Information

Visit the Army's website at:
www.fortordcleanup.com

Visit the Fort Ord Administrative Record at:
Building 4463 Gigling Road, Room 101
Ord Military Community
Seaside CA 93955
(831) 393-9693
adminrecord@fortordcleanup.com

Visit the MCWD website at:
www.mcwd.org

2021 Consumer Confidence Report is available at:
https://www.mcwd.org/docs/ccr/2021/mcwd_ccr_2021_english.pdf

