



FINAL PRELIMINARY ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES V2

Presidio of Monterey and Ord Military Community, California

Prepared For:
U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, Maryland 21201

February 2022

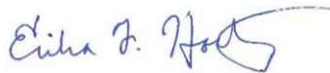
PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA and ORD
MILITARY COMMUNITY, CALIFORNIA



Wendy McClellan, P.G.
Preliminary Assessment Project Manager



Rhonda Stone, PMP
Project Manager



Erika Houtz, PhD, P.E.
Environmental Engineer / Technical Expert

Preliminary Assessment of Per- and Polyfluoroalkyl Substances V2

Presidio of Monterey, California
Ord Military Community, California

Prepared for:

U.S. Army Corps of Engineers

Contract No.: W912DR-13-D-0019

Delivery Order No.: W912DR17F0396

Prepared by:

Arcadis U.S., Inc.

7550 Teague Road

Suite 210

Hanover

Maryland 21076

Arcadis Ref.:

30001994

Date:

February 2022

CONTENTS

Executive Summary.....	ES-1
1 Introduction.....	1
1.1 Project Background.....	1
1.2 PA Objectives	2
1.3 PA Process Description	2
1.3.1 Pre-Site Visit.....	2
1.3.2 Preliminary Assessment Site Visit.....	3
1.3.3 Post-Site Visit	3
2 Installation Overview	4
2.1 Site Location	4
2.2 Mission and Brief Site History.....	4
2.3 Current and Projected Land Use	4
2.4 Climate.....	5
2.5 Topography.....	5
2.6 Geology.....	5
2.7 Hydrogeology.....	5
2.8 Surface Water Hydrology.....	6
2.9 Relevant Utility Infrastructure.....	6
2.10 Potable Water Supply and Drinking Water Receptors.....	6
2.11 Ecological Receptors	6
2.12 Previous PFAS Investigations	7
3 Summary of PA Activities.....	8
3.1 Records Review.....	8
3.2 Personnel Interviews	8
3.3 Site Reconnaissance	8
4 Potential PFAS Use, Storage, and/or Disposal Areas.....	10
4.1 AFFF Use, Storage, and Disposal Areas	10
4.2 Other Potential PFAS Use, Storage, and Disposal Areas.....	10
4.3 Readily Identifiable Off-Post PFAS Sources	11

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

5 Summary and Discussion of PA Results 13
5.1 Areas Not Retained for Further Investigation 13
6 Conclusions and Recommendations 15
7 References 16

Table 5-1 Installation Areas Not Retained for Further Investigation (in-text)

FIGURES

- Figure 2-1 Presidio of Monterey Site Location
- Figure 2-2 Ord Military Community Site Location
- Figure 2-3 Presidio of Monterey Site Layout
- Figure 2-4 Ord Military Community Site Layout
- Figure 2-5 Presidio of Monterey Topographic Map
- Figure 2-6 Ord Military Community Topographic Map
- Figure 2-7 Presidio of Monterey Off-Post Potable Wells
- Figure 2-8 Ord Military Community Off-Post Potable Wells
- Figure 2-9 Presidio of Monterey UCMR3 Data
- Figure 2-10 Ord Military Community UCMR3 Data
- Figure 5-1 AOPI Decision Flowchart (in text)

APPENDICES

- Appendix A Office of the Secretary of Defense. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September 15.
- Appendix B Preliminary Assessment Quality Control Checklist
- Appendix C Antiterrorism/Operations Security Review Cover Sheet
- Appendix D Not used
- Appendix E Installation EDR Survey Reports
- Appendix F Research Log
- Appendix G Compiled Interview Logs
- Appendix H Compiled Site Reconnaissance Logs

EXECUTIVE SUMMARY

The United States Army (Army) is performing preliminary assessments (PAs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS), at Army installations (installations) nationwide. The PA identifies areas of potential interest where PFAS-containing materials were used, stored, and/or disposed, or areas where known or suspected releases to the environment occurred. This Presidio of Monterey (POM) and Ord Military Community (OMC) PA was completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, The National Oil and Hazardous Substances Pollution Contingency Plan, and Army/Department of Defense policy and guidance.

The POM and OMC are located in northern Monterey County, California along the coast of the Pacific Ocean, approximately 120 miles south of San Francisco. POM covers approximately 392 acres, and the largest tenant of the installation is the Defense Language Institute Foreign Language Center, which is the largest foreign language training facility in the U.S. The primary mission of Defense Language Institute Foreign Language Center is to provide culturally based foreign language education and training for Department of Defense personnel, to ensure success of the Defense Language Program, and to enhance national security. OMC consists of 859 acres within the boundaries of the former Fort Ord, which was inactivated in 1994, and is adjacent to the cities of Seaside, Sand City, Monterey, and Del Rey Oaks to the south and Marina to the north. OMC consists of neighborhoods providing housing for military and civilian residents.

Based on the results of the PA for both installations, no areas of potential interest were identified. Therefore, further investigation for PFAS at POM or OMC is not warranted at this time.

1 INTRODUCTION

The United States (U.S.) Army (Army) is performing preliminary assessments (PAs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS), with a focus on perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS), at Army installations (installations) nationwide. The Army is the lead agency under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Executive Order 12580, and is conducting the PA consistent with its authority under CERCLA, 42 United States Code §§ 9600, et seq. (as amended), and the Defense Environmental Restoration Program, 10 United States Code §§ 2701, et seq. The purpose of this PA is to identify locations that are areas of potential interest (AOPIs) at Presidio of Monterey (POM) and Ord Military Community (OMC) based on the use, storage, and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances (Army 2018). This report provides the PA for POM and OMC and was completed in accordance with CERCLA and The National Oil and Hazardous Substances Pollution Contingency Plan.

1.1 Project Background

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

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

1.2 PA Objectives

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

1.3 PA Process Description

For POM and OMC, PA development followed a similar process as described in **Sections 1.3.1** through **1.3.3** below. **Section 3** provides a summary of the PA activities completed at POM and OMC. The PA processes are documented in the PA Quality Control Checklist included as **Appendix B**. The Army PA operations security requirements package, which includes the antiterrorism/operations security review cover sheet is included as **Appendix C**.

1.3.1 Pre-Site Visit

An installation kickoff teleconference was held between applicable points of contact (POCs) from United States Army Environmental Command (USAEC), United States Army Corps of Engineers (USACE), POM, OMC, and Arcadis U.S., Inc. (Arcadis). The kickoff call occurred on 23 October 2018, prior to the site visit to discuss the goals and scope of the PA, project scheduling, installation access, timeline for the site visit, access to installation-specific databases, and to request available records.

Records review was conducted before the site visit to obtain electronically available documents from the installation and external sources for review. The purpose of the records review was to identify any area on the installation that may have been a location where PFAS-containing materials were used, stored, and/or disposed, as well as gather information on the physical setting and site history at POM and OMC.

A read-ahead package was prepared and submitted to the appropriate POCs 2 weeks before the site visit. The read-ahead package contains the following information:

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

1.3.2 Preliminary Assessment Site Visit

The site visit was conducted on 13 December 2018. An in-brief meeting was held to provide installation staff with the objectives of the site visit and team introductions. **Section 3** includes information regarding personnel interviewed.

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

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

An exit briefing was offered to installation personnel at the conclusion of the site visit to raise any items identified during the site visit, discuss any follow-up items, and review the schedule for submitting deliverables. The exit briefing was conducted on 13 December 2018 with the installation, USAEC, and USACE to discuss preliminary findings of the PA site visit.

1.3.3 Post-Site Visit

Information collected before, during, and after the PA site visit was reviewed and corroborated by cross-referencing records and reviewing interview details and observations noted during site visit reconnaissance. A site visit trip report was completed and provided to the installation POC, applicable USAEC POCs, and USACE regional POCs following the site visit.

2 INSTALLATION OVERVIEW

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

2.1 Site Location

POM covers approximately 392 acres in northern Monterey County, California along the coast of the Pacific Ocean, approximately 120 miles south of San Francisco. The largest tenant of the installation is the Defense Language Institute Foreign Language Center, which is the largest foreign language training facility in the U.S. The location and layout of POM are shown on **Figure 2-1** and **Figure 2-3**, respectively (Army, Brown and Caldwell 2011).

OMC, previously part of the former Fort Ord, is a non-contiguous portion of POM and is located approximately 117 miles south of San Francisco, California and approximately 4.5 miles northeast of POM. The installation is approximately 859 acres and is largely occupied by housing for active military and civilian personnel. The location and layout of OMC are shown on **Figure 2-2** and **Figure 2-4**, respectively (Army, Brown and Caldwell 2011).

2.2 Mission and Brief Site History

The mission of POM is to provide professional base support services that facilitate mission readiness and promote well-being. Defense Language Institute Foreign Language Center, the primary tenant, provides culturally based foreign language education, training, evaluation, and sustainment for DoD personnel to ensure the success of the Defense Foreign Language Program and enhance national security. In June 1946, the school was designated as the Army Language School and was renamed the Defense Language Institute in 1963 (Presidio of Monterey 2013).

In 1770, Monterey became one of five presidios, or forts, built by the Spanish government in what is now the western U.S. American control of the area began in 1846, during the war with Mexico, when Commodore John D. Sloat, commander of the U.S. Navy's Pacific Squadron, landed a small force unopposed in Monterey and claimed the territory and the Presidio for the U.S. (Presidio of Monterey 2013).

OMC is within the boundaries of the former Fort Ord, deactivated in 1994, and consists of residential neighborhoods providing housing for military and civilian residents (Army, Brown and Caldwell 2011).

2.3 Current and Projected Land Use

Both POM and OMC are comprised mostly of residential areas used for military housing, such as training and temporary personnel barracks, and enlisted and officer housing. POM also includes community spaces and professional and institutional buildings, including Defense Language Institute Foreign Language Center facilities. There are currently no plans for different land use in the future, apart from increasing the number of buildings on each post (Brown and Caldwell 2011).

2.4 Climate

POM and OMC are within 5 miles of each other, located within the Monterey Bay area, which has a relatively temperate coastal climate, characterized by cool, dry summers and wet winters. The warmest months are July through October, and the rainiest are November and April, averaging approximately 21 inches of rainfall a year. Summer months often can be foggy, especially early and late in the day, due to the chilly and unchanging water temperatures of the Pacific Ocean with temperatures ranging from 70 degrees Fahrenheit to 40 degrees Fahrenheit (The Ultimate U.S. Military Base Resource 2019).

2.5 Topography

The topography at POM is characterized by a series of gently dipping marine terrace platforms cut into a bedrock hill comprised of ancient sand dunes, steepening toward the peak of the hill in the southwestern portion of POM (Army, Brown and Caldwell 2011). Elevations range from approximately 30 to 770 feet above mean sea level.

The topography at OMC is characterized by low hills of stabilized sand dunes, ranging in elevation from approximately 0 to 450 feet above mean sea level. In the western and northern portions of OMC, the ground surface slopes gently west and northwest, toward Monterey Bay. The southern portions of OMC are characterized by moderate to steeply sloping canyons which drain to the east, into Salinas Valley (Army, Brown and Caldwell 2011). **Figure 2-5** and **Figure 2-6** present topographic information for POM and OMC, respectively.

2.6 Geology

POM and OMC are near the boundary of the North American and Pacific plates, along the western margin of the Coast Ranges physiographic province. The province contains many elongated ranges and narrow valleys that generally parallel the coast. POM and OMC are located on the Monterey Formation, which has a uniquely siliceous composition and complex diagenesis, and is an important source and reservoir of oil in California (Behl 1999). The formation is largely siliceous shales interbedded with diatomite and chert that represent deposition in low-energy, quiet-water settings in which clay particles and microfossils slowly settled out of the water column to accumulate on the ancient sea floor. Though the formation is characterized by highly siliceous rocks, it includes large amounts of interbedded clastic shale, mudstone, and sandstone (Bramlette 1946).

POM overlies a geologically complex subsurface consisting primarily of variously weathered granites and marine terrace deposits, and ancient sand dunes. The bedrock is weathered to varying degrees depending on rock type and location relative to drainage features, fractures, and joints. Stabilized sand dunes dominate the uppermost units at OMC (Army, Brown and Caldwell 2011).

2.7 Hydrogeology

Groundwater flows generally east to northeast toward Monterey Bay from POM. Information about specific depths to groundwater at POM is unavailable, although localized perched groundwater has been encountered at less than 30 feet below ground surface (bgs) in two locations at POM. A 2007 study of the

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

feasibility of installing a production well at POM noted the likely required depth of the well would be 400 to 700 feet bgs (Army, Brown and Caldwell 2011).

Groundwater at OMC flows generally west to southwest toward the bay. Depth to groundwater ranges from 60 to 100 feet bgs (Army, Brown and Caldwell 2011).

2.8 Surface Water Hydrology

No surface water bodies are present on POM or OMC. Surface runoff flows generally east to northeast toward Monterey Bay from POM. At OMC, surface runoff flows generally west to southwest toward Monterey Bay, except in the southern portions, where moderately to steeply sloping canyons drain eastward toward Salinas Valley (Army, Brown and Caldwell 2011).

2.9 Relevant Utility Infrastructure

Information regarding the utility infrastructures that may influence the fate and transport of PFAS at POM and OMC was not specifically researched due to the lack of AOPIs identified. However, the following information regarding a historical sewer system at OMC was found during pre-site visit research: the OMC Main Garrison Sewage Treatment Plant was the primary sewage treatment facility for OMC and served the majority of housing areas and the main industrial area until it was decommissioned in 1990. This area included 10 asphalt-lined drying beds and treated effluent was sent to a storm drain that emptied onto Indianhead Beach during low tide and to Monterey Bay during high tide (USACE Sacramento District 2002).

2.10 Potable Water Supply and Drinking Water Receptors

An Environmental Data Resources, Inc. (EDR) report includes search results from a variety of environmental, state, city, and other publicly available databases for a referenced property. An EDR report was generated for POM and OMC which identified no potable wells on either POM or OMC; however, the EDR report shows potable wells within a 5-mile radius upgradient of POM and side- to downgradient of OMC. The City of Seaside, a small municipal water source with one active well, California-American Water District, and Marina Coast Water District provide potable water to POM and OMC. Additional water supplies are noted on **Figures 2-7** and **2-8**. The EDR reports providing well search results provided as **Appendix E**.

2.11 Ecological Receptors

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

Monterey Bay National Marine Sanctuary is the largest area containing ecological receptors in the area and is downgradient of both POM and OMC. This sanctuary is home to a wide variety of sea life and is renowned for its complex seafloor habitat, deep submarine canyons, strong seasonal upwelling, an abundance of forage species, a wide range of physical and biogenic habitats and several different fish

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

assemblages (Oceana 2012). Monterey Harbor is listed as an impaired water body by the State of California (California State Water Resources Control Board 2017).

2.12 Previous PFAS Investigations

In response to the third Unregulated Contaminant Monitoring Rule (UCMR3) and IMCOM Operations Order 16-088, Army installations began initial PFAS sampling in 2016 at water supply wells.

Sampling conducted under UCMR3 near POM (privatized water supplied by California-American Water District) and OMC (Marina Coast Water District) determined all results were below detection limits for six PFAS compounds (including PFOS and PFOA at 40 ng/L and 20 ng/L, respectively) analyzed for in April and October 2014 (Army 2018) (**Figures 2-9 and 2-10**).

3 SUMMARY OF PA ACTIVITIES

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

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

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

3.1 Records Review

The records reviewed for this PA included, but were not limited to, various Installation Restoration Program administrative record documents, compliance documents, POM and OMC fire department documents, POM and OMC Directorate of Public Works documents, and GIS files. Internet searches were also conducted to identify publicly available and other relevant information. A list of the specific documents reviewed for POM and OMC is provided in **Appendix F**.

3.2 Personnel Interviews

Interviews were conducted during the PA site visit. If a previously identified interviewee was not available during the site visit, attempts were made to complete the interview via telephone before or following the site visit or by contacting an alternate interviewee identified by the installation POC.

The list of roles for the installation personnel interviewed during the PA process for POM and OMC is presented below (affiliation is with POM and OMC unless otherwise noted).

- Administrative Officer
- Environmental Support Manager
- Environmental Protection Specialist
- Fire Chief
- Assistant Fire Chief
- Installation Pest Management Coordinator
- Environmental Specialist

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

3.3 Site Reconnaissance

Site reconnaissance and visual surveys were conducted at the preliminary locations identified at POM and OMC during the records review process, the installation in-brief meeting, and/or during the installation personnel interviews. The site reconnaissance logs are provided in **Appendix H**.

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD
MILITARY COMMUNITY, CALIFORNIA

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

A summary of the observations made, and data collected through records reviews (**Appendix F**), installation personnel interviews (**Appendix G**), and site reconnaissance logs (**Appendix H**) during the PA process for POM and OMC is presented in **Section 4**.

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

POM and OMC were evaluated for all potential current and historical use, storage, and/or disposal of PFAS-containing materials. There are a variety of PFAS-containing materials used in relation to current and historical Army operations. However, the use, storage, and/or disposal of aqueous film-forming foam (AFFF) is the most prevalent potential source of PFAS chemicals at DoD facilities. As such, this section is organized to summarize the AFFF-related uses first, and all remaining potential PFAS-containing materials in the subsequent section.

4.1 AFFF Use, Storage, and Disposal Areas

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

No AFFF use, storage, or disposal was identified within the current installation boundaries of POM or OMC during this PA. During interviews, fire department personnel stated that all AFFF use, storage, and/or disposal associated with POM and OMC activities had occurred on properties that have been transferred and are no longer part of POM or OMC. These activities and locations are discussed in **Section 4.3**.

4.2 Other Potential PFAS Use, Storage, and Disposal Areas

Following document research, personnel interviews, and site reconnaissance at POM and OMC, other potential PFAS source types, such as metal plating operations, photo processing facilities, and wastewater treatment plants, were either not identified at the installation or did not prompt further research or constitute categorization as AOPs.

One waste disposal area was identified at POM based on personnel interviews and site reconnaissance. POM-05 Historic Landfill (Installation Restoration Program Site 10) operated until the 1940s and received animal remains and other items not likely to contain PFAS materials.

Potential PFAS use associated with metal plating activities may also be relevant to Army installations. During metal plating operations, a metal surface may be treated with a layer of electrochemically deposited metals in an acid bath. PFAS, specifically PFOS, have been used in metal plating operations as surface tension-reducing wetting agents to mitigate the release of aerosolized chemicals into a

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

working environment. Hard chromium plating is one type of metal plating operation where PFAS-containing mist suppressants were commonly used. Historically, it was common for spent plating baths from metal plating operations to be disposed of in a lined or unlined pit or into a sanitary or storm sewer. Therefore, PFAS present in mist suppressants during the metal plating process could be released to the environment. Review of data collected from installation personnel interviews indicated that there have been no chromium plating operations at POM or OMC (**Appendix G**).

It was noted during a discussion with a USAEC Pest Management Consultant that the larger group of pesticides are generally not of PFAS concern. Specifically, products containing Sulfluramid (i.e., associated with insecticides) may have contained PFAS and were phased out in 1996. The USAEC Pest Management Consultant has records of pesticides used and stored at IMCOM installations, including POM and ORD, and did not identify POM or ORD as installations having used or stored PFAS-containing pesticides/insecticides. Additionally, the PA team reviewed available pesticide use inventory documentation provided by the installation and did not identify PFAS-containing pesticides use, storage, or disposal.

Further discussion of areas not retained for further investigation is presented in **Section 5.1**.

4.3 Readily Identifiable Off-Post PFAS Sources

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

Two off-post potential PFAS source areas identified during interviews with installation fire department personnel are properties that were historically within OMC installation boundaries but have since been transferred to the City of Seaside: a former nozzle testing area and the OMC Fire Station Building 4400 and adjacent former burn pit.

OMC fire department personnel conducted training, fire hose and tank flushing, and nozzle testing in a paved area near the Chartwell School on Numa Watson Road until the 1990s, before the property was transferred to the City of Seaside. Fire department personnel were trained to perform nozzle testing with AFFF to ensure optimal flow and release of the AFFF mixture. Nozzle testing involved spraying AFFF through fire equipment. Fire equipment training also included arc training to maximize the arc, reach, and distance covered by AFFF in an emergency response. Training took place about once a month for at least 10 years, releasing approximately 30 gallons of AFFF concentrate during each event. The nozzle testing area was a large asphalt parking area with storm drains that lead to channels that discharge into Monterey Bay.

The OMC Ord Fire Station Building 4400 and former burn pit are immediately adjacent to the northern OMC boundary. The property has been transferred to the City of Seaside and is leased to OMC for ongoing use by the OMC Fire Department. Nozzle testing with AFFF, as well as filling and flushing of AFFF tanks, gasket testing, and truck washing were conducted on pavement with a drain and sand filtration system, which discharges to subsurface soil upgradient of Monterey Bay. Periodic cleanout of the sand filtration system consisted of flushing the drain with clean water. The former burn pit was located approximately 160 feet south of OMC fire station building. The site was an unlined, rectangular pit (approximately 45 feet long, 25 feet wide, and 2 feet deep) into which flammable liquids were placed,

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

ignited, and subsequently extinguished using AFFF. A 2-inch diameter pipe was used to regulate fluid levels in the pit, and a narrow drainage ditch exited the pit to the south (Army, Brown and Caldwell 2011). Interviewed firefighters estimated that such training at the fire station burn pit took place about once a month for at least 10 years, releasing approximately 30 gallons of AFFF concentrate during each event. A soil excavation was performed in 1996 as part of a remedial action, and the former pit is now a vegetated area. The southern portion of the 2-inch-diameter pipe may remain buried within shallow soils (Army, Brown and Caldwell 2011). The site is currently undergoing a site inspection for PFOS, PFOA, and PFBS under Base Realignment and Closure.

There are also numerous non-Army fire stations within a 5-mile radius of POM and OMC. Any training activities conducted at these stations which involve the use of AFFF are not known. The closest non-Army fire station to POM is the Monterey Fire Department Station No. 1, which is within 0.5 mile to the south. The Pacific Grove Fire Department is approximately 1-mile northwest of POM. The closest non-Army fire station to OMC is the Seaside Fire Department, which is within 2 miles of the installation. Four of the fire stations are part of the Monterey Fire District. All fire stations are either side gradient or upgradient from POM and OMC.

Additionally, Monterey Regional Airport is located between the two installations, within 5 miles of POM and OMC. Airports are identified as potential PFAS source areas due to the possibility of firefighter training activities and historical crashes that may have required the use of AFFF.

5 SUMMARY AND DISCUSSION OF PA RESULTS

The areas evaluated for potential use, storage, and/or disposal of PFAS-containing materials at POM and OMC, were further refined during the PA process and identified either as an area not retained for further investigation or as an AOPI. In accordance with the established process for the PA, no areas have been identified as AOPIs. The process used for refining these areas is presented on **Figure 5-1**, below.

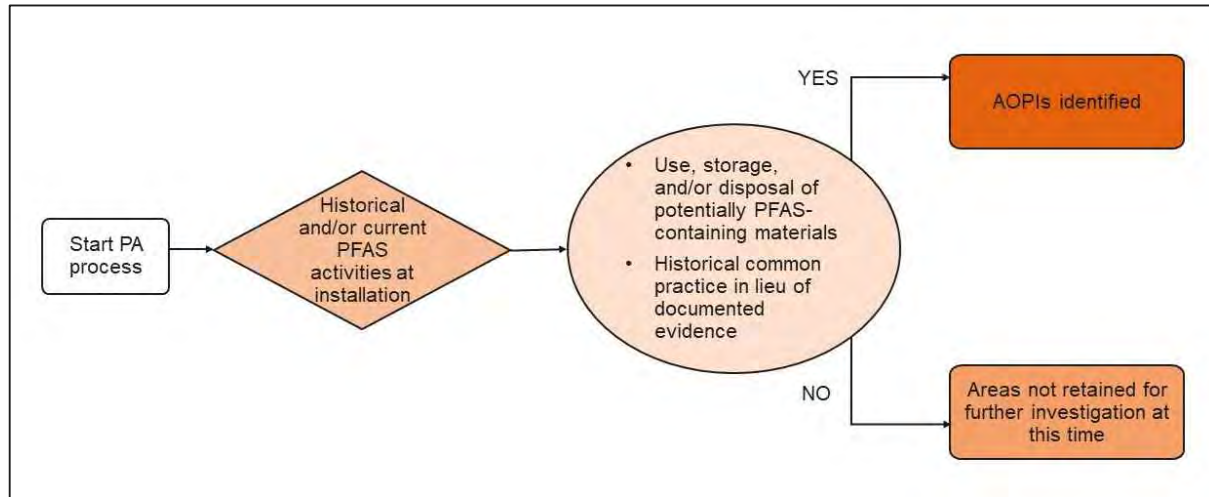


Figure 5-1: AOPI Decision Flowchart

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

Data limitations for this PA at POM and OMC are presented in **Section 6**.

5.1 Areas Not Retained for Further Investigation

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

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

PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

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

Area Description	Dates of Operation	Relevant Site History	Rationale
POM-05 Historic Landfill (Site 10)	Unknown through 1940s	Interviewees stated that it accepted animal remains and items not likely to contain PFAS materials through the 1940s (Appendix G). The landfill has been closed, capped, and maintained.	No evidence of historical use, storage, and/or disposal of PFAS-containing materials

6 CONCLUSIONS AND RECOMMENDATIONS

The PFAS PA identified AOPIs at POM and OMC based on the use, storage, and/or disposal of PFAS-containing materials, in accordance with the 2018 Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances (Army 2018).

A combination of document review, internet searches, interviews with installation personnel, and an installation site visit were used to identify specific areas of suspected PFOS, PFOA, and PFBS use, storage, and/or disposal at POM and OMC. Following the evaluation, no AOPIs were identified.

Data collected during the PA (**Sections 3 through 5**) were sufficient to draw the conclusions and to make the recommendations summarized above. The data limitations relevant to the development of this PA for PFOS, PFOA, and PFBS at POM and OMC are discussed below.

Records gathered for the use, storage and/or disposal of PFAS-containing materials were reviewed during the PA process. Documentation specific to AFFF may have been limited (e.g., each AFFF use; procurement records, documentation of AFFF used during crash responses or fire training activities) due to lack of recordkeeping requirements for the full timeline of common AFFF practices. Anecdotal accounts of AFFF use (and therefore likely PFOS, PFOA, and PFBS use) were limited to available installation personnel, whose knowledge of AFFF use may have been restricted by their time spent at the installation or previous roles held that limited their relevant knowledge of potential AFFF (or other PFAS-containing material) use.

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

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

Further investigation of PFAS is not recommended at POM and OMC at this time.

7 REFERENCES

- Army. 2018. Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances. September 4. Available online at: <https://www.fedcenter.gov/admin/itemattachment.cfm?attachmentid=1150>.
- Army, Brown and Caldwell. 2011. Draft Environmental Impact Statement Presidio of Monterey Real Property Master Plan. February 2011.
- Behl, Richard J. 1999. Since Bramlette (1946): The Miocene Monterey Formation of California revisited. 1999.
- Bramlette, Milton Nunn. 1946. The Monterey Formation of California and the origin of its siliceous rocks. Vol. 212. 1946.
- California State Water Resources Control Board. 2017. Category 5. 2014 and 2016 California 303(d) List of Water Quality Limited Segments. Available online at https://www.waterboards.ca.gov/water_issues/programs/tmdl/2014_16state_ir_reports/category5_report.shtml
- Interstate Technology Regulatory Council. 2017. History and Use of Per-and Polyfluoroalkyl Substances (PFAS). November. Available online at: https://pfas-1.itrcweb.org/wp-content/uploads/2017/11/pfas_fact_sheet_history_and_use_11_13_17.pdf.
- Interstate Technology Regulatory Council. 2020. Section 3.1 Firefighting Foams. Updated April 14. Available online at: https://pfas-1.itrcweb.org/3-firefighting-foams/#3_1
- Oceana. 2012. Important Ecological Areas in Monterey Bay. September. Available online at: https://usa.oceana.org/sites/default/files/reports/Monterey_Bay_Report.pdf
- Office of the Secretary of Defense (OSD). 2019. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. October.
- OSD. 2021. Memorandum: Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program. September.
- Presidio of Monterey. 2013. Installation Action Plan FY2012. January 2013.
- The Ultimate U.S. Military Base Resource. 2019. Weather & Climate at Presidio of Monterey Army Base in Monterey, CA. Accessed 19 July 2019. <https://www.milbases.com/california/presidio-of-monterey-army-base/weather>
- United States Army Corps of Engineers (USACE), Sacramento District. 2002. Draft Final Five-Year Review Report First Five-Year Review Report for Fort Ord Superfund Site Monterey, California. August 2002
- United States Environmental Protection Agency (USEPA). 2016. Lifetime Health Advisories and Health Effects Support Documents for Perfluorooctanoic Acid and Perfluorooctane Sulfonate. EPA-HQ-OW-2014-0138; FRL-9946-91-OW. Federal Register/ Vol. 81. No. 101. May 25. Available online at: <https://www.govinfo.gov/content/pkg/FR-2016-05-25/pdf/2016-12361.pdf>.
- USEPA. 2021. Human Health Toxicity Values for Perfluorobutane Sulfonic Acid (CASRN 375-73-5) and Related Compound Potassium Perfluorobutane Sulfonate (CASRN 29420-49-3). EPA/600/R-20/345F. Center for Public Health and Environmental Assessment, Office of Research and Development, Washington DC. April.

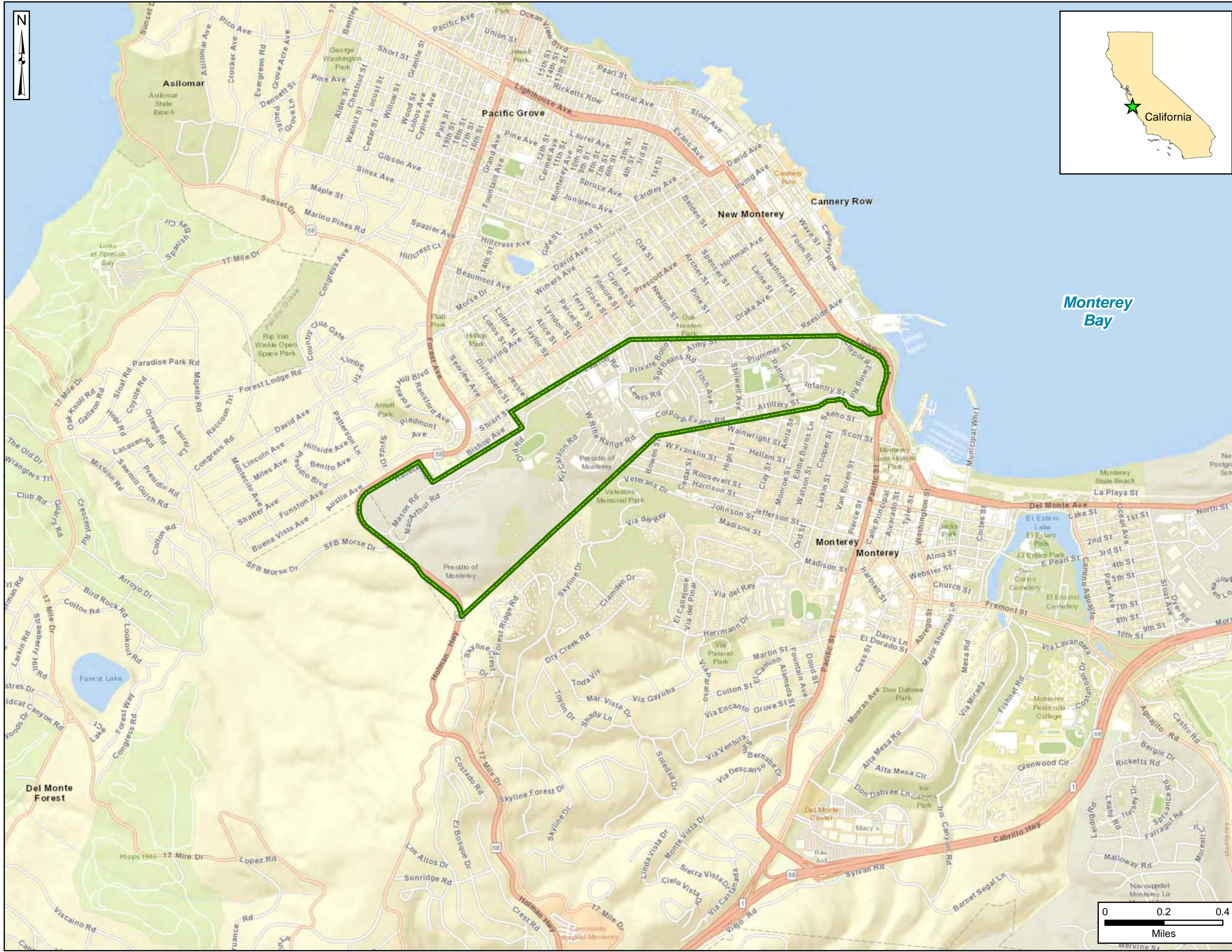
PRELIMINARY ASSESSMENT OF PFAS AT PRESIDIO OF MONTEREY, CALIFORNIA AND ORD MILITARY COMMUNITY, CALIFORNIA

ACRONYMS

%	percent
AFFF	aqueous film-forming foam
AOPI	area of potential interest
Arcadis	Arcadis U.S., Inc.
Army	United States Army
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DoD	Department of Defense
EDR	Environmental Data Resources, Inc.
GIS	geographic information system
IMCOM	Installation Management Command
installation	United States Army or Reserve installation
ng/L	nanograms per liter (parts per trillion)
OMC	Ord Military Community
OSD	Office of the Secretary of Defense
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POC	point of contact
POM	Presidio of Monterey
RSL	regional screening level
UCMR3	Third Unregulated Contaminant Monitoring Rule
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USEPA	United States Environmental Protection Agency

FIGURES





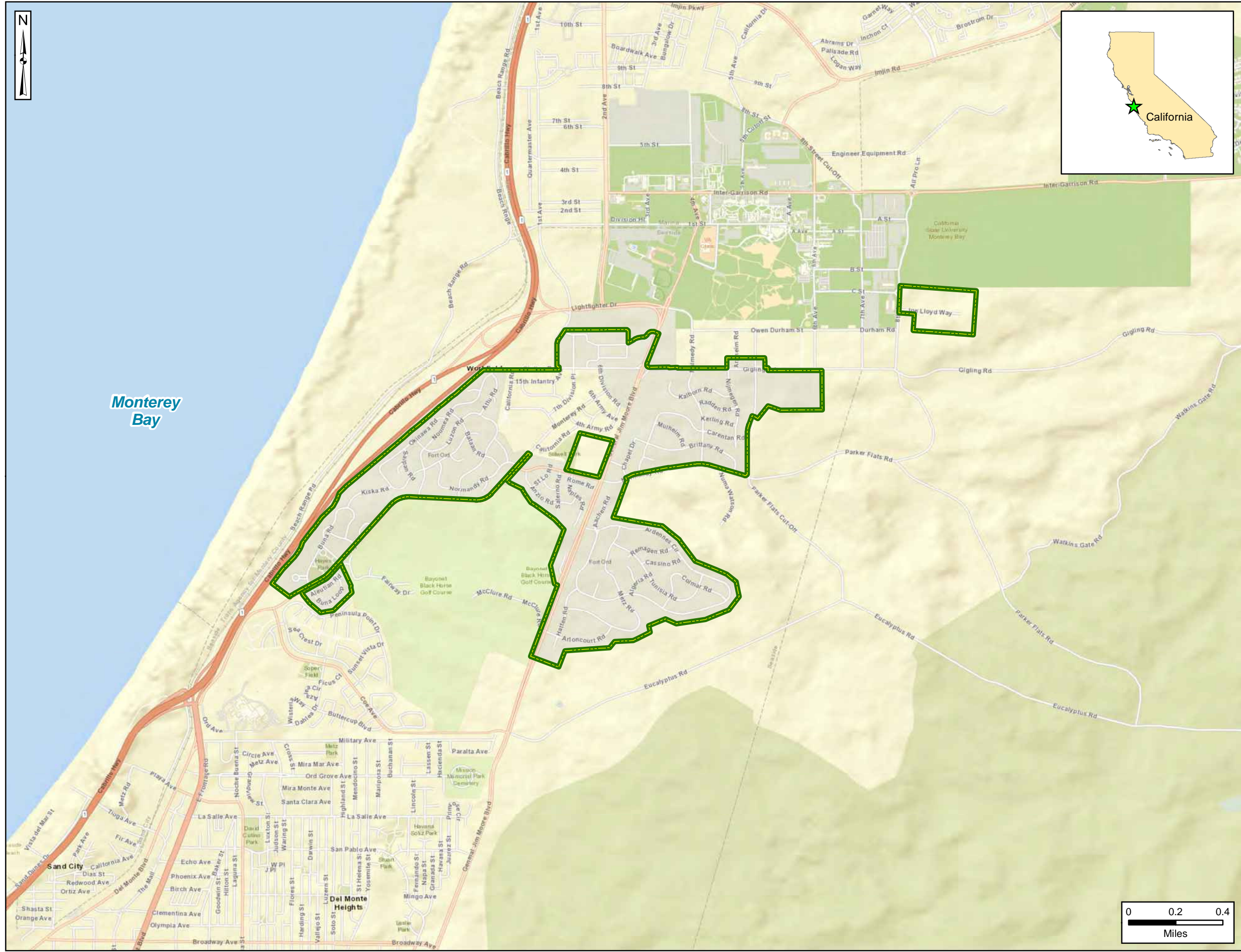
**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



**Figure 2-1
Presidio of Monterey
Site Location**

Legend
 Installation Boundary

Data Sources:
 Presidio of Monterey, GIS Data, 2019
 ESRI ArcGIS Online, StreetMap Data
 Coordinate System:
 WGS 1984, UTM Zone 10 North




**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**

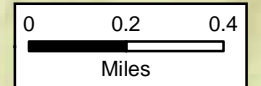


**Figure 2-2
Ord Military Community
Site Location**

Legend

 Installation Boundary

**Monterey
Bay**



Data Sources:
Presidio of Monterey, GIS Data, 2019
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 10 North




USAEC PFAS
 Preliminary Assessment
 Presidio of Monterey &
 Ord Military Community, CA



ARCADIS

Figure 2-3
 Presidio of Monterey
 Site Layout

Legend

-  Installation Boundary
-  Stream (Intermittent)
-  Water Body



Data Sources:
 Presidio of Monterey, GIS Data, 2019
 ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
 WGS 1984, UTM Zone 10 North




USAEC PFAS
 Preliminary Assessment
 Presidio of Monterey &
 Ord Military Community, CA



Figure 2-4
 Ord Military Community
 Site Layout

Legend

 Installation Boundary

Data Sources:
 Presidio of Monterey, GIS Data, 2019
 ESRI ArcGIS Online, Aerial Imagery

Coordinate System:
 WGS 1984, UTM Zone 10 North

USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA



ARCADIS

Figure 2-5
Presidio of Monterey
Topographic Map

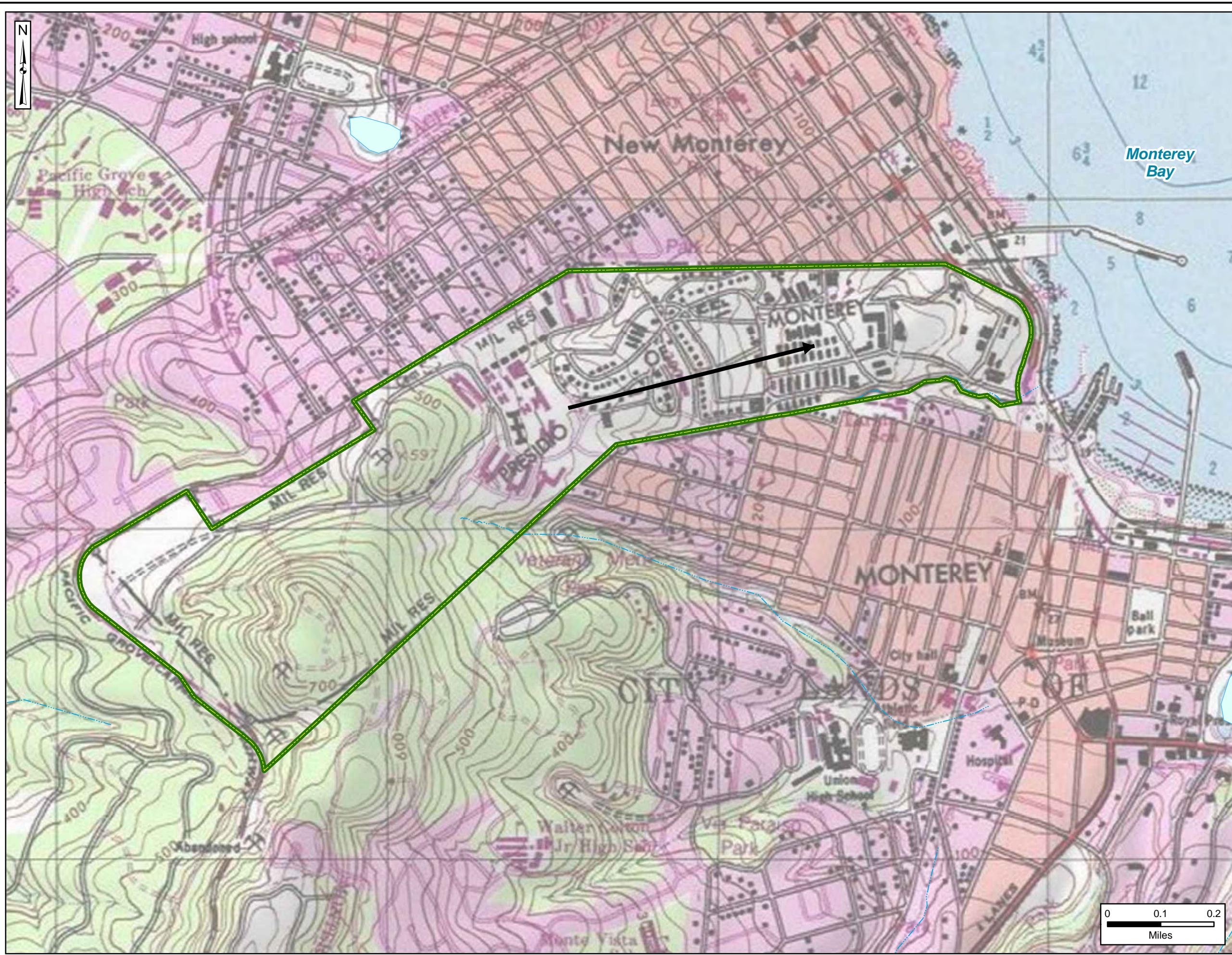
Legend

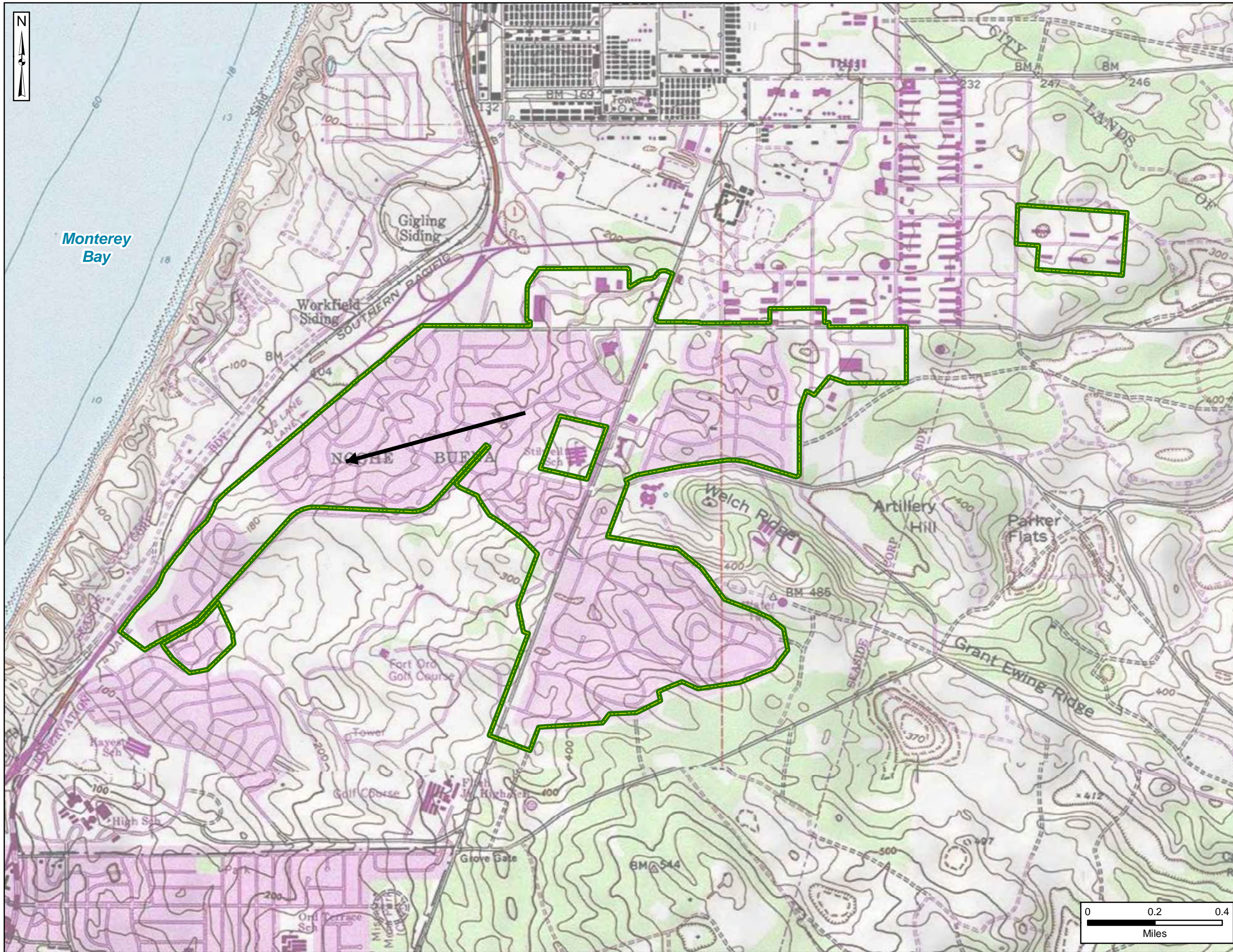
- Installation Boundary
- Stream (Intermittent)
- Assumed Groundwater Flow Direction

Note: Elevation contour labels
(20-foot intervals) are in feet.

Data Sources:
Presidio of Monterey, GIS Data, 2019
ESRI ArcGIS Online, USA Topo Maps

Coordinate System:
WGS 1984, UTM Zone 10 North







**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



ARCADIS

**Figure 2-6
Ord Military Community
Topographic Map**

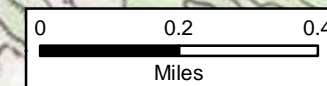
Legend

-  Installation Boundary
-  Assumed Groundwater Flow Direction

Note: Elevation contour labels (20-foot intervals) are in feet.

Data Sources:
Presidio of Monterey, GIS Data, 2019
ESRI ArcGIS Online, USA Topo Maps

Coordinate System:
WGS 1984, UTM Zone 10 North



**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



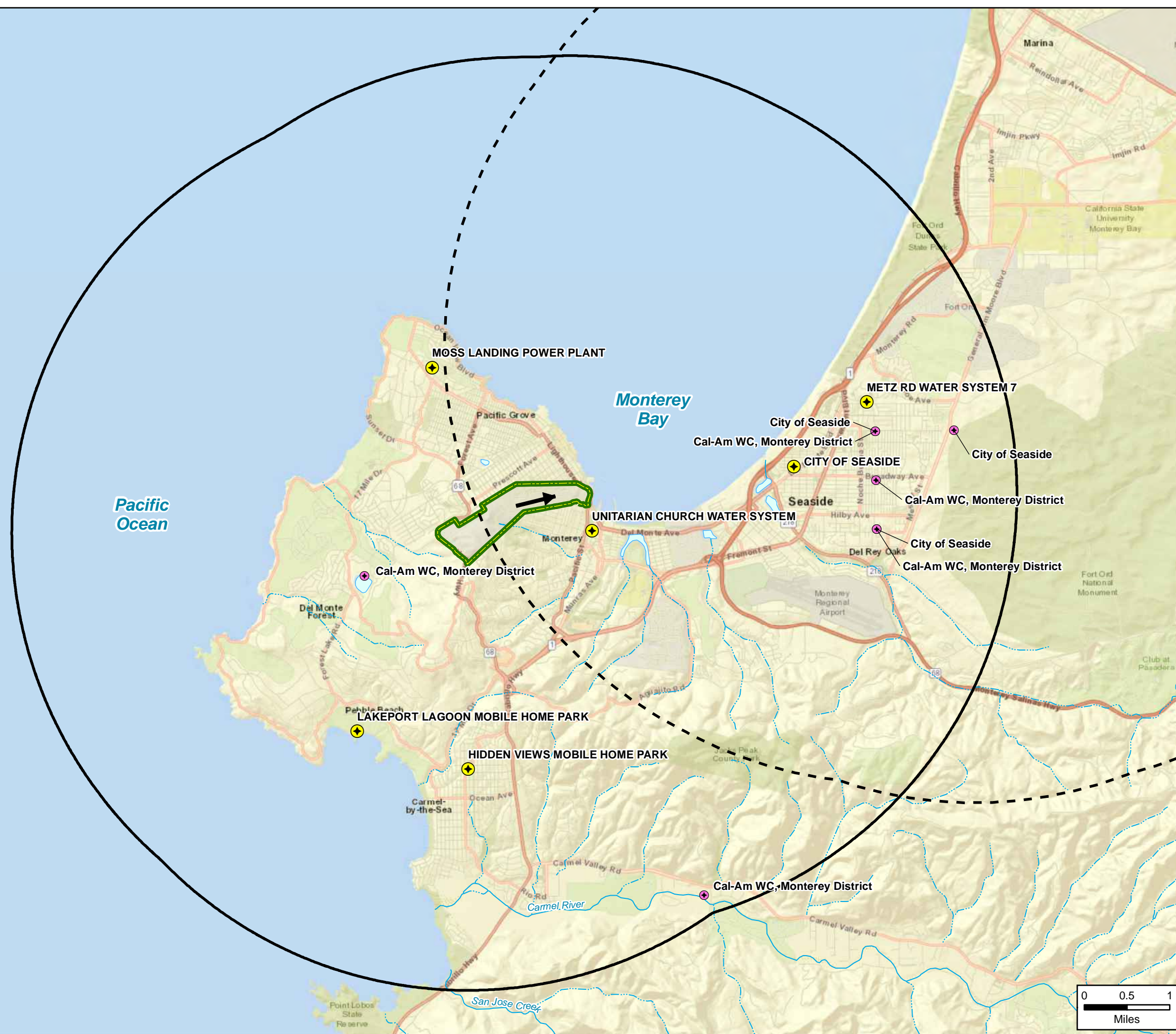
ARCADIS

**Figure 2-7
Presidio of Monterey
Off-Post Potable Wells**

Legend

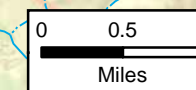
- Installation Boundary
- 5-Mile Radius of Presidio of Monterey
- 5-Mile Radius of Ord Military Community
- River/Stream (Perennial)
- Stream (Intermittent)
- Assumed Groundwater Flow Direction
- Public Water System Supply Well
- State Water Well *

* State water well locations are approximate.



Data Sources:
Presidio of Monterey, GIS Data, 2019
EDR, Well Data, 2018
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 10 North



**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



ARCADIS

**Figure 2-8
Ord Military Community
Off-Post Potable Wells**

Legend

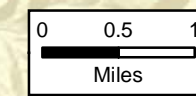
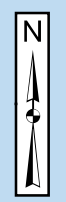
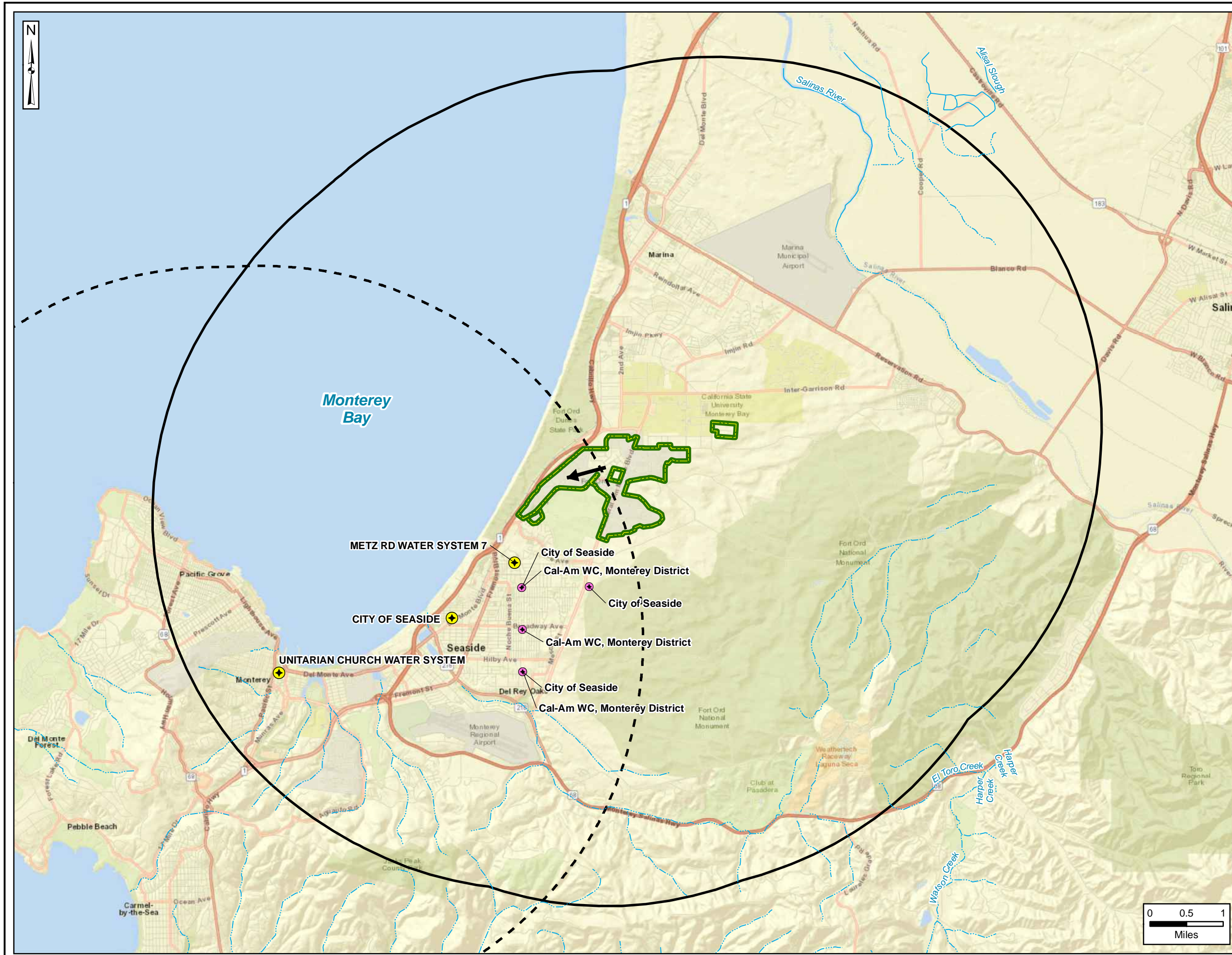
- Installation Boundary
- 5-Mile Radius of Ord Military Community
- 5-Mile Radius of Presidio of Monterey
- River/Stream (Perennial)
- Stream (Intermittent)
- Assumed Groundwater Flow Direction
- Public Water System Supply Well
- State Water Well *

* State water well locations are approximate.

Note: Only wells within 5 miles of Presidio of Monterey were provided and shown.

Data Sources:
Presidio of Monterey, GIS Data, 2019
EDR, Well Data, 2018
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 10 North



**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



**Figure 2-9
Presidio of Monterey
UCMR3 Data**

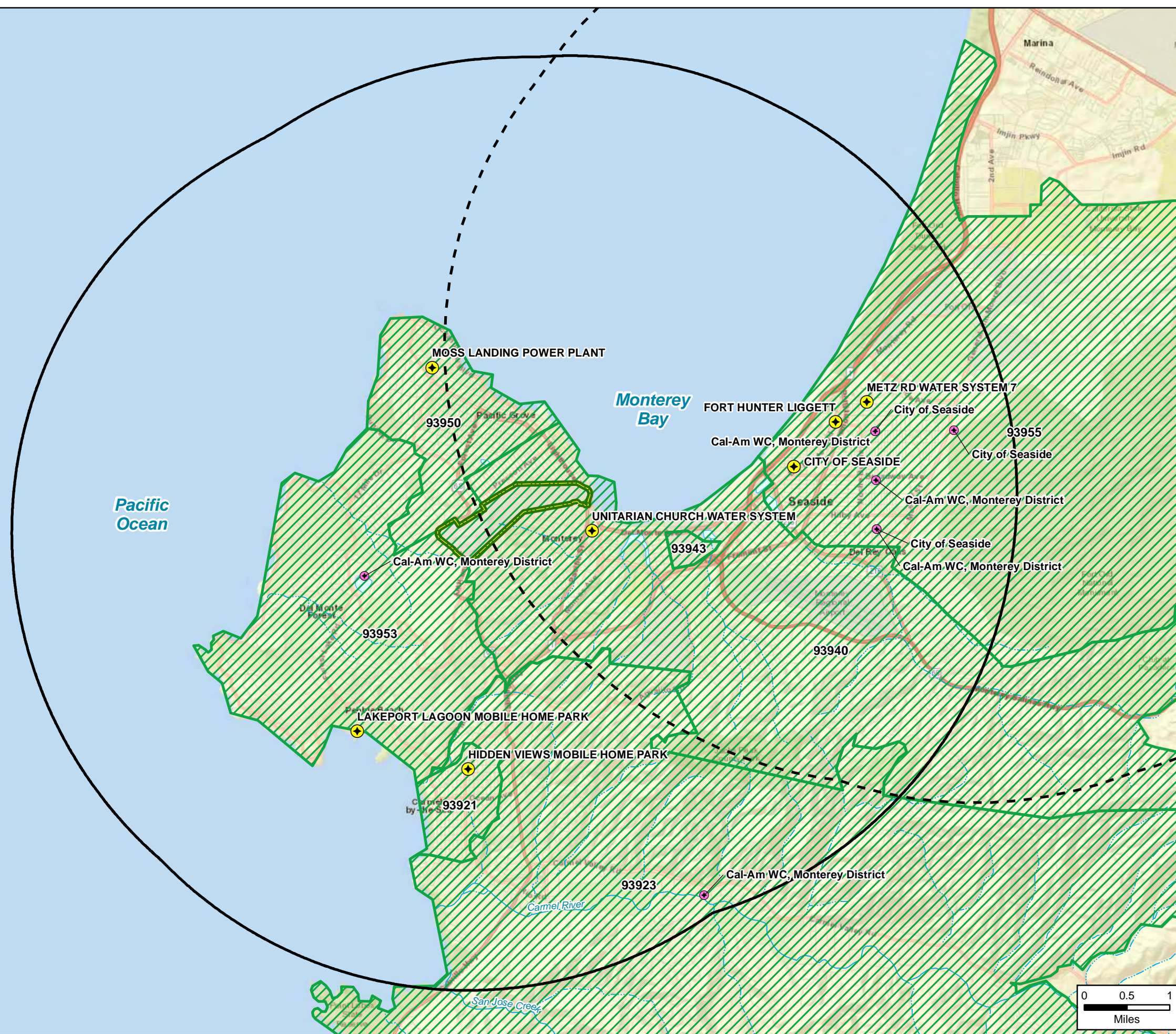
Legend

- Installation Boundary
- 5-Mile Radius of Presidio of Monterey
- 5-Mile Radius of Ord Military Community
- River/Stream (Perennial)
- Stream (Intermittent)
- Public Water System Supply Well
- State Water Well *
- Zip Code Boundary - PFAS Analysis**
- Non-Detect

* State water well locations are approximate.

Data Sources:
Presidio of Monterey, GIS Data, 2019
EDR, Well Data, 2018
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 10 North



**USAEC PFAS
Preliminary Assessment
Presidio of Monterey &
Ord Military Community, CA**



**Figure 2-10
Ord Military Community
UCMR3 Data**

Legend

- Installation Boundary
- 5-Mile Radius of Ord Military Community
- 5-Mile Radius of Presidio of Monterey
- River/Stream (Perennial)
- Stream (Intermittent)
- Public Water System Supply Well
- State Water Well *
- Zip Code Boundary - PFAS Analysis**
- Non-Detect

* State water well locations are approximate.

Note: Only wells within 5 miles of both Ord Military Community and Presidio of Monterey are shown.

Data Sources:
Presidio of Monterey, GIS Data, 2019
EDR, Well Data, 2018
ESRI ArcGIS Online, StreetMap Data

Coordinate System:
WGS 1984, UTM Zone 10 North

