

APPENDIX D

Del Rey Oaks / Monterey MRA Conceptual Site Model

11.0 DRO/MONTEREY MRA CONCEPTUAL SITE MODEL

The Del Rey Oaks/Monterey (DRO/Monterey) MRA CSM profiles are based on existing information and data provided by the Army and contained in the Fort Ord Administrative Record. Tables and figures associated with the DRO/Monterey MRA are located at the end of Section 11.0.

11.1 DRO/Monterey MRA Facility Profile

The facility profile provides information on location, physical boundaries, roadways and access, structures and utilities, historical military use, and administrative controls associated with the MRA.

11.1.1 Boundaries and Access

The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord, along South Boundary Road (Figure 11.1-1). The DRO/Monterey MRA is contained within the jurisdictional boundaries of the City of Del Rey Oaks and the City of Monterey.

The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way. The DRO/Monterey MRA contains the following four USACE property transfer parcels: E29.1, L6.2, L20.13.1.2, and L20.13.3.1 (Table 11.1-1 and Figure 11.1-1).

The DRO/Monterey MRA is partially restricted by four-strand barbed-wire fencing, which is not complete around the entire MRA, allowing access to the MRA. South Boundary Road is an active roadway with vehicle traffic on a daily basis. This is a major roadway of the FORA transportation network and is scheduled for upgrade and improvement in the FORA Capital Improvement Program. A number of unpaved roadway and dirt trails are located throughout the MRA (Figure 11.1-1). Detailed information on roadways and access is provided in Table 11.1-2.

11.1.2 Structure and Utilities

There are no existing buildings or structures within the DRO/Monterey MRA. There are several large buildings located to the southwest of the MRA. The MRA is not currently served by any major utilities.

11.1.3 Historical Military Use

Initial use of the DRO/Monterey MRA began in approximately 1917 when the U.S. government purchased more than 15,000 acres of land and designated it as an artillery range. Although no training maps from this time period have been found, pre-World War II-era military munitions were removed during previous Army response actions within the DRO/Monterey MRA.

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Figure 11.1-2 shows the locations of known firing ranges and training areas within the MRA. Table 11.1-3 summarizes the historical military uses of these areas within the DRO/Monterey MRA. To facilitate previous MEC investigations and removal activities, the area was divided into MRSs. The MRSs were identified through a review of Fort Ord records completed for the Revised Fort Ord Archive Search Report (USACE 1997a). The MRA is comprised of two non-contiguous portions of MRS-43 and a portion of the South Boundary Road, which is located within the boundaries of MRS-15 DRO.1 (Figure 11.1-3). The boundaries of the two non-contiguous portions of MRS-43 include a large portion of Parcel L6.2 and all of Parcel E29.1 for a combined area of approximately 29 acres. The South Boundary Road portion of the DRO/Monterey MRA includes Parcels L20.13.1.2 and L20.13.3.1 for a total area of approximately 5 acres (Table 11.1-1).

Based on an interview, the 1997 Revised Archive Search Report identified portions of the ridge in the area of MRS-43 were used as a backstop for rifle grenades and shoulder launched projectiles from 1942 to 1944. Firing positions were excavated along South Boundary Road, and firing was from the southeast to the northwest at a diagonal to the hill. Impact occurred just north of a large stand of trees and continued up to the next to last large fire break. The firing positions were buried when the use was discontinued. The area was control burned in the 1940s to support this training (USACE 1997a).

Based on the results of previous investigations and removal actions, it was anticipated that weapons capable of firing 37 mm projectiles had been fired from the east of the DRO/Monterey MRA toward the hillside in MRS-43 at some time up through the 1940s (Shaw/MACTEC 2007a).

MRS-15 DRO-1 is not being evaluated in this CSM. This information is included because it was adjacent to the portion of South Boundary Road that lies within this DRO/Monterey MRA. There were several known ranges in MRS-15 DRO-1, all with firing points positioned such that they fired into the former impact area, away from MRS-43 (Shaw/MACTEC 2007).

11.1.4 Administrative Controls

A number of administrative controls have been and will be imposed on the DRO/Monterey MRA, including land use covenants, city ordinances, FORA resolutions, an MOA between FORA and the DTSC, habitat-related requirements, and BOs. The applicable administrative controls are described in more detail in Table 11.1-4. These administrative controls are enforceable and place constraints on field-related activities and future development activities until such time that remediation has been completed and the regulatory agencies have made a determination as to the closure status of the MRA.

11.2 DRO/Monterey MRA Physical Profile

The physical profile provides information on topography, geology, vegetation, surface water, and groundwater associated with the MRA that may affect the location, movement, detectability, and recovery of military munitions.

11.2.1 Topography and Geology

The terrain of the DRO/Monterey MRA is hilly and sloping from the southwest to the northeast, while relatively flat along the roadway. The elevation ranges from approximately 150 to 260 feet msl with 0 to 30 percent slopes (Figure 11.2-1). The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil types present in the DRO/Monterey MRA are Baywood Sand and Arnold-Santa Ynez Complex. Soil conditions at the survey sites are predominantly weathered dune sand (Figures 11.2-1), which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

11.2.2 Vegetation

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (Table 11.2-2 and Figure 11.2-2; USACE/Jones & Stokes 1992). The area south of South Boundary Road consists of dense brush. The area along South Boundary Road transitions from sparse vegetation adjacent to the roadway to more dense vegetation to the south. A number of sampling and removal actions have been performed at MRS-43 that required vegetation removal. Vegetation removal was performed with both manual and mechanical methods. Past field activities have noted the presence of poison oak in the area.

11.2.3 Surface Water and Groundwater

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the DRO/Monterey MRA. The MRA overlies the Seaside Groundwater Basin, which is structurally complex and divided into several sub-basins. Groundwater is generally encountered at a depth of more than 100 feet bgs; however, layers of perched groundwater may be present. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities.

Storm-water drainage from the MRA flows overland to a drainage swale, which runs parallel to South Boundary Road and ultimately flows to the southwest through park district property. The surface water from the Site is ultimately discharged to Laguna del Rey. There are no delineated wetlands reported to be present on the DRO/Monterey MRA. There are two aquatic features (i.e., vernal pools, ponds) located within approximately 100 feet of the MRA (Figure 12.2-2).

11.3 DRO/Monterey MRA Release Profile

The release profile provides information on the MRA with respect to investigation and removal history, location and extent of military munitions, such as MEC, MPPEH, and MD, and history and conditions of HTW.

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11.3.1 Investigation and Removal History

Numerous investigation and removal operations were performed by the Army in the DRO/Monterey MRA (MRS-43), which included:

- SS/GS Investigation at 19 100-foot by 200-foot grids in 1998 (USA 2001j)
- 100 percent Grid Sampling at 11 100-foot by 100-foot grids in December 1999 and March 2000 (Parsons 2001)
- 4-foot Removal Action with Schonstedt GA-52/Cx instrumentation
- Geophysical Investigation with G-858 digital magnetometer at 23 100-foot by 100-foot grids and partial grids (approximately 5.5 acres) (Parsons 2001)
- Geophysical Investigation with EM61 instrument at 164 100-foot by 100-foot grids and partial grids (Parsons 2001)
- Geophysical Investigation with EM-61HH instrument at 20 100-foot by 100-foot grids (Parsons 2001)

Investigations and removal actions conducted by the Army at the adjacent property to the northeast (MRS-15 DRO-1) are summarized in the “Track 2 Munitions Response, Remedial Investigation/Feasibility Study, Del Rey Oaks Munitions Response Area, Former Fort Ord, California” (Shaw/MACTEC 2007).

These investigations and removal actions are summarized in Table 11.3-1. During the removal actions, no burial pits containing MEC were encountered in the MRA. The results of these investigations and removal actions with respect to the types of MEC recovered are summarized in Table 11.3-2, and MEC and MD are shown on Figures 11.3-1, 11.3-2, and 11.3-3.

11.3.2 Types of MEC Recovered and Hazard Classification

Table 11.3-3 includes a summary of MEC recovered from the DRO/Monterey MRA and associated hazard classification scores. All MEC removed from the MRA were identified and assigned a hazard classification. Hazard classification scores range from 0 to 3 according to the following descriptions:

Hazard Classification Score	Description
0	Inert MEC that will cause no injury
1	MEC that will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities
2	MEC that will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities
3	MEC that will kill an individual if detonated by an individual's activities

The hazard classification provides a qualitative assessment of risk for MEC. These classifications will be used as inputs in future risk assessments for the DRO/Monterey MRA. It should be noted that SAA is not considered in the risk assessment because SAA poses no explosive risk.

11.3.3 Location of MEC and MD

Figures 11.3-1, 11.3-2, and 11.3-3 show the distribution of MEC and MD within the DRO/Monterey MRA. A summary of the MEC and MD encountered during previous investigations and removal actions in the DRO/Monterey MRA is provided in Table 11.3-3 and included:

- 3 UXO items
- 3 DMM items
- 1,012 pounds of MD (includes MD-E and MD-F items if weights were documented)

The MMRP database indicates that MEC were encountered in the northwestern portion of MRS-43 (Parcel L6.2) and along the northeastern side of South Boundary Road (Figure 11.3-2). Most of the investigated grids within the central portion of MRS-43 did not contain any MD. Grids in the remaining portions of MRS-43 contained up to 10 pounds of MD with a few grids containing 10 to 100 pounds of MD. The MD identified on Figures 11.3-1 and 11.3-3 includes SAS but not SAA.

All of the MEC removed from the MRA was located within 0 to 6 inches bgs. Figure 11.3-4 shows the distribution of MEC recovered at specified depth intervals.

11.3.4 HTW History and Conditions

A BRA was conducted by the Army to evaluate the potential presence of COCs related to HTW at known or suspected small arms ranges and military munitions training sites within the former Fort Ord (Shaw/MACTEC 2006). The areas are identified as HAs. The objectives of the BRA investigation activities were to identify which HAs could be eliminated from consideration for potential remediation related to COCs, and to identify areas that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs.

Table 11.3-5 summarizes the findings of the BRA with respect to HTW for each MRS. As stated in the FOSET, based on the BRA, no further action has been recommended for HAs within this MRA (Army 2007).

11.3.5 Regulatory Status

Work completed to date has been documented in after action reports, which have received regulatory reviews; however, the regulatory agencies have identified the following outstanding issue:

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- The CERCLA process must be completed for the DRO/Monterey MRA, including development of an RI/FS, development of a Proposed Plan, and completion of a ROD.

11.4 DRO/Monterey MRA Land Use and Exposure Profile

The land use and exposure profile provides information on the MRA with respect to cultural resources, the current and reasonably foreseeable future uses of the land, and the potential human receptors that may be exposed to military munitions.

11.4.1 Cultural Resources

According to archaeological records, the greater Monterey Peninsula was occupied by Native American groups, including the Ohlone (Costanoan) Indians (EA 1991). Monterey County has designated the southeastern margin of the former Fort Ord as an archaeologically sensitive zone based on two known archaeological sites (EA 1991). The remaining portions of the former Fort Ord have been designated as having low or no archaeological sensitivity. The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord in an area designated as having no archaeological sensitivity.

Actions to be taken at the DRO/Monterey MRA will be in compliance with the Programmatic Agreement Among the Department of the Army, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer Regarding the Base Closure and Realignment Actions at Fort Ord, California.

11.4.2 Current Land Use

It has been reported that the northwestern portion of the MRA (Parcel L6.2) is accessed by day recreation including hikers and mountain bikers. There is also evidence of trespasser activity and illegal dumping.

11.4.3 Reasonably Foreseeable Future Land Use

Table 11.4-1 and Figure 11.4-1 identify the proposed uses of the MRA by parcel. As indicated in the Base Reuse Plan, this area is planned for development and habitat reuse. It is important to note that general development land use category encompasses infrastructure activities such as roadway and utility construction as well as commercial/retail, parks, and borderland activities. Roadway expansion and utility construction will constitute the major development along a portion of South Boundary Road.

11.4.4 Potential Receptors

A number of potential human receptors that could come in contact with residual MEC have been identified for current and future land use scenarios. The potential human receptors include:

- Construction Workers (persons conducting surface and subsurface construction activities) – current/future
- Utility Workers (persons installing and maintaining surface and subsurface utilities) - current/future
- Trespassers (persons not authorized to enter or use an area) – current/future
- Firefighters (may require installation of fire breaks) – current/future
- Emergency Response Workers (police and emergency medical technicians conducting surface activities) – current/future
- Ancillary Workers (biologist, archaeologists) – current/future
- Recreational Users (persons biking and on foot) – future

11.5 DRO/Monterey MRA Ecological Profile

The ecological profile provides information on the MRA with respect to biological resources, plant communities and habitats, threatened and endangered species, and habitat management. This information is discussed below and provided in Table 11.5-1.

As discussed in Section 11.3.4, COCs related to HTW have been previously addressed and no further action was recommended. Therefore, potential exposure of ecological receptors to the primary risk factors has been mitigated to an acceptable level and ecological receptor exposure is not considered further in this CSM.

The HMP identifies the DRO/Monterey MRA as development and habitat reserve (Figure 11.5-1). Habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

FORA will implement the mitigation requirements identified in the HMP for MEC activities in accordance with the BOs developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas, these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b).

11.5.1 Major Plant Communities and Ecological Habitats

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (Figure 11.2-2; USACE/Jones & Stokes 1992). The area south of South Boundary Road consists of dense brush. The area along South Boundary Road transitions from sparse vegetation adjacent to the roadway to more dense vegetation to the south.

11.5.2 Threatened and Endangered Species

Special-status biological resources are those resources, including plant, wildlife, and native biological communities, that receive various levels of protection under local, state, or federal laws, regulations, or policies. The closure and disposal of former Fort Ord is considered a

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major federal action that could affect several species proposed for listing or listed as threatened or endangered under the federal ESA.

The HMP for former Fort Ord complies with the USFWS BOs and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival (USACE 1997b). The HMP incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. Since April 1997, three additional BOs have been issued that are relevant to MEC removal activities (USFWS 1999, 2002, and 2005). Future MEC remediation is required to be consistent with the applicable conservation measures.

The Monterey spineflower is a threatened plant species and has been identified as having possible occurrence in the DRO/Monterey MRA.

In 2004, the CTS was identified as a threatened species. CTS may be found as far as 2 km from aquatic breeding habitats. As shown on Figure 11.5-1, it is possible the CTS may be found in the DRO/Monterey MRA as the MRA is within 500 meters of aquatic features that may provide breeding habitat for the CTS.

11.5.3 Other Communities and Species of Concern

As identified in the HMP, a number of species could be found on the DRO/Monterey MRA, which have been identified in Table 11.5-2 by parcel. The following species are identified in the HMP as having possible occurrence in the DRO/Monterey MRA: Seaside bird's beak, Sandmat manzanita, Monterey ceanothus, Eastwood's ericameria.

11.6 DRO/Monterey MRA Pathway Analysis

As discussed in Sections 11.3.4 and 11.5, potential exposure of human and ecological receptors to COCs related to the HTW program has been evaluated by the Army. Based on the Army's evaluation in the FOSET, no further action relative to the COCs is required under the ESCA RP. Therefore, no further discussion of potential exposure to human or ecological receptors to COCs relative to the HTW program is presented in this pathway analysis. The primary focus of the exposure pathway analysis is for human health risk from MEC that are potentially present.

11.6.1 Exposure Pathways

An exposure pathway analysis was conducted for the DRO/Monterey MRA using the information gathered in the CSM profiles. Exposure pathways include a source, access, receptor, and activity. The likelihood of exposure, however, has been significantly reduced as a result of previous removal actions by the Army. Exposure pathways for the DRO/Monterey MRA are presented on Figure 11.6-1 and discussed below.

Source

The majority of the source areas within the DRO/Monterey MRA were addressed during the Army's previous removal actions and included MRS-43. The historical source area within the DRO/Monterey MRA consists of MRS-43 as shown on Figure 11.1-3, and recovered MEC and MD from the MRA are shown on Figures 11.3-1, 11.3-2, and 11.3-3. MRS-15 DRO-1 was given consideration in this CSM because it is adjacent to South Boundary Road. The source areas in MRS-15DRO.1 include target areas and range safety fans from military weapons training and troop transit for troop training activities, all of which were well north of South Boundary Road.

Figure 11.6-2 illustrates the most likely release mechanisms for MEC being found in the DRO/Monterey, which included:

- Mishandling/Loss, Abandonment, and Burial (Military Weapons Training)
- Indirect and Direct Firing and Thrown (Military Weapons Training)
- Firing, Mishandling/Loss, Abandonment, and Burial (Troop Training and Maneuvers)

Access

Access is not restricted to MRS-43.

Receptor / Activity

Table 11.6-1 identifies the potential human receptors and exposure media as Ground Surface or Below Grade.

11.6.2 Exposure Pathway Analysis

As discussed above, Figure 11.6-1 graphically presents the exposure pathways analysis for the DRO/Monterey MRA. The graphic shows the current and future potentially complete pathways for activities in the DRO/Monterey MRA immediately adjacent to South Boundary Road.

11.7 DRO/Monterey MRA Conclusions and Recommendations

Potential exposure of human and ecological receptors to COCs related to the HTW program has been evaluated by the Army. Based on the Army's evaluation in the FOSET, no further action relative to the COCs is required under the ESCA Remediation Program. The CSM has identified a potential for human health risk associated with residual (or potentially present) MEC in the DRO/Monterey MRA.

As required by the AOC, the SEDR provides conclusions and recommendations for each MRA. Generally, the SEDR recommendations identify that a particular MRA falls into one or more of the following categories:

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- No response action or no further response action is appropriate
- Response action is necessary
- Additional data are required to fill data gaps
- Proceed to RI

The MEC encountered within the DRO/Monterey MRA are consistent with the historical use as a weapons and troop training area. Army has conducted removal actions over the majority of the MRA. Therefore, the DRO/Monterey MRA falls into the category of proceed to RI. Based on the information presented in the CSM for DRO/Monterey MRA, the recommendation is:

- Proceed with Documentation – Prepare RI/FS and subsequent ROD.

The proposed pathway to regulatory closure incorporating the above recommendations is presented in Section 13.0 of this SEDR.

Table 11.1-1

DRO/Monterey MRA –Parcel Numbers, Acreage, and MRS Identifiers

USACE Parcel Number (for land transfer)	Acreage (approximate)	MRS Identifier
L6.2	6	MRS-43
L20.13.1.2	0.245	No related MRS
L20.13.3.1	5	No related MRS
E29.1	23	MRS-43
MRA TOTAL	34.245	

Table 11.1-2

DRO/Monterey MRA – Site Features

Feature	Description
Roadways	• South Boundary Road is a major roadway that traverses the MRA and is open to daily traffic. • South Boundary Road is a major roadway of the FORA transportation network and is scheduled for upgrade and improvement in the FORA Capital Improvement Program. • Unpaved roads and dirt trails are located throughout the undeveloped area of the MRA south of South Boundary Road.
Structures and Utilities	• No buildings or structures are present at the MRA. • No utilities serve the MRA.
Fencing and Access	• The MRA is partially restricted by four-strand barbed-wire fencing, which is not complete around the entire MRA, allowing access to the MRA.

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Table 11.1-3
DRO/Monterey MRA – Historical Military Use

Location	Description
MRS-43	• Portions of the ridge in this area were used as a backstop for rifle grenades and shoulder launched projectiles from 1942 to 1944. Firing positions were excavated along South Boundary Road, and firing was from the southeast to the northwest at a diagonal to the hill. Impact occurred just north of a large stand of trees and continued up to the next to last large fire break. The firing positions were buried when the use was discontinued. The area was control burned in the 1940s to support this training (USACE 1997a). • Based on the results of previous investigations and removal actions, it is anticipated that weapons capable of firing 37mm projectiles had been fired from east of the DRO MRA (Phase I) toward the hillside in MRS-43 at some time up through the 1940s (Shaw/MACTEC 2007). • Items encountered in the MRS included practice rifle grenades, 37mm low-explosive (LE) projectile (MK1), and a fragmentation hand grenade.
MRS-15 DRO.1 (adjacent to MRA to the northeast)	• A portion of South Boundary Road is adjacent to MRS-15 DRO-1. • MRS-15 DRO-1 is not being evaluated in this CSM. This information is included because it is adjacent to the portion of South Boundary Road that lies within this MRA. There were several known ranges in MRS-15 DRO-1, all with firing points positioned such that they fired into the former impact area away from MRS-43. • Range 24 was a sniper range (small arms range) at the time of base closure. Historical maps and photographs indicate that in the mid-1960s it was used for automatic rifle training, but past records also indicate that 40mm projectiles have been found or used on the range. Records and recent fieldwork also suggest that this range was used for antitank 35mm subcaliber training (Shaw/MACTEC 2007). • Range 25 was an offensive overhead firing range (small arms range) at the time of base closure. Historical maps and photographs indicate that in the early 1950s the range was also used for automatic rifle training. Past records indicate that 37mm projectiles were found or used on Range 25 (Shaw/MACTEC 2007). • Range 26 was a machine gun transition range at the time of base closure. Past records indicate that this range may have been used for training with 3.5-inch rockets, 37mm projectiles, and mortars. Records and recent field investigations also indicate that Range 26 was used for 2.36-inch rocket training. A range shown on a 1945 training map in the same vicinity as Range 26 is labeled “Austin Anti-Tank” (Shaw/MACTEC 2007).

Table 11.1-4
DRO/Monterey MRA – Administrative Controls

Type	Description
Land Use Covenants	• To further ensure protection of human health and the environment, the Army has agreed to enter into CRUPs with the State of California. The CRUPs place additional use restrictions on all of the transferring property, as appropriate. • Due to Fort Ord's former use as a military installation, the property may contain MEC and there remains a risk of encountering subsurface MEC. Any person conducting ground-disturbing or intrusive activities (e.g., digging or drilling) must comply with the applicable municipal code. Any alterations, additions, or improvements to the property in any way that may violate excavation restrictions are prohibited. No actual or potential hazard exists on the surface of the property from MEC that may be in the subsurface of the property provided the CRUPs are adhered to (Army 2007). • The CRUPs are defined in the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxics Substances Control Concerning the Monitoring and Reporting of Environmental Restrictions on the Former Fort Ord, Monterey County, California." • These restrictions involve the enforcement of site review and reporting requirements and agency cost recovery/reimbursement requirements as imposed by the DTSC.
Restrictions to Digging / Excavation	• City of Del Rey Oaks and City of Monterey established ordinances that prohibit excavation, digging, development, or ground disturbance of any type on the former Fort Ord that involves the displacement of 10 or more cubic yards of soil without approval.
FORA Resolution 98-1	• An approved FORA resolution that contains proposed and suggested measures to avoid or minimize hazardous material impact.
ESCA MOA	• MOA between FORA and the jurisdictions for the purpose of defining terms of an agreement for holding and managing (ownership and responsibilities) property while remedial work is accomplished under an ESCA. • MOA establishes FORA's ownership during the MEC remediation period; identifies that jurisdictions need to provide public safety response from police, fire, and other emergency personnel as needed; establishes control of access to ESCA properties during the MEC remediation period; and agreement that access to properties will be governed by the restrictions included in the Land Use Covenant accompanying the transfer of the property.
Habitat Management Plan	• The HMP incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. Specific MEC activities were addressed in Chapter 3 of the HMP (USACE 1997b).
Biological Opinions	• Since the release of the HMP, three additional BOs have been issued that are relevant to the MEC remediation period (USFWS 1999, 2002, and 2005). Accordingly, some information has been updated and additions have been made to the sections that address MEC activities. • Future MEC work is required to be consistent with the applicable conservation measures.

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Table 11.2-1

DRO/Monterey MRA – Geology and Soils

Type	Description
General Geology	• The former Fort Ord is located within the Coast Ranges Geomorphic Province, which consists of northwest-trending mountain ranges, broad basins, and elongated valleys generally paralleling the major geologic structures. • The former Fort Ord is located at the transition between the mountains of the Santa Lucia Range and the Sierra de la Salinas to the south and southeast, respectively, and the lowlands of the Salinas River Valley to the north. • The geology of the former Fort Ord generally reflects this transitional condition. Older, consolidated rocks are characteristically exposed in the mountains near the southern base boundary but are buried under a northward-thickening sequence of younger, unconsolidated alluvial fan and fluvial sediments in the valleys and lowlands to the north. In the coastal lowlands, these younger sediments commonly interfinger with marine deposits. • The former Fort Ord and the adjacent areas are underlain, from depth to ground surface, by one or more of the following older, consolidated units: Mesozoic granite and metamorphic rocks; Miocene marine sedimentary rocks of the Monterey Formation; and upper Miocene to lower Pliocene marine sandstone of the Santa Margarita Formation (and possibly the Pancho Rico and/or Purisima Formations). • Locally, these units are overlain and obscured by geologically younger sediments, including: Pliocene-Pleistocene alluvial fan, lake, and fluvial deposits of the Paso Robles Formation; Pleistocene eolian and fluvial sands of the Aromas Sand; Pleistocene to Holocene valley fill deposits consisting of poorly consolidated gravel, sand, silt, and clay; Pleistocene and Holocene dune sands; recent beach sand and alluvium. • The extreme southern portion of the MRA is in the Arnold Santa Ynez Complex. Limestone was noted at a quarry adjacent to South Boundary Road, which likely represents an outcrop of the Paso Robles Formation. • Depth to groundwater is likely to be more than 100 feet bgs. Layers of perched groundwater may be present.
Topography and Soils	• Terrain consists of rolling hills. • Elevation ranges from approximately 150 to 350 feet msl. • Surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. • The primary soil types present in the MRA are Baywood Sand with 2 to 15 percent slopes and Arnold-Santa Ynez Complex. The Baywood Sand has high infiltration capacity and is made up of poorly graded sand.

References: EA 1991, HLA 1995, and the Fort Ord MMRP Database

Table 11.2-2
DRO/Monterey MRA – Vegetation

USACE Parcel Number	MRS Identifier	Vegetation
L6.2	MRS-43	Maritime chaparral
L20.13.1.2	No related MRS	Maritime chaparral
L20.13.3.1	No Related MRS	Maritime chaparral
E29.1	MRS-43	Maritime chaparral

Reference: USACE/Jones & Stokes 1992

Table 11.3-1
DRO/Monterey MRA – Investigation, Sampling, and Removal Activities

Activity	Summary
MRS-43	- In 1999, 19 100-foot by 200-foot grids were investigated using SS/GS protocol. The SS/GS program statistically selects random sampling locations within sampling grids in order to collect representative data for the MRS (USA 2001j). - Between December 1999 and March 2000, 11 100-foot by 100-foot grids were sampled in MRS-43. In addition, seven of the SS/GS grids were reinvestigated as part of a confirmation/evaluation of the SS/GS methodology. All sampling was to a depth of 4 feet using a Schonstedt GA-52/Cx magnetometer (Parsons 2001). - A 4-foot removal action was conducted in MRS-43 using the Schonstedt GA-52/Cx. This removal action included the unpaved shoulders of South Boundary Road for the majority of the road bordering MRS-43 and MRS-15 DRO.1 (Parsons 2001). - Twenty-three 100-foot by 100-foot grids and partial grids (approximately 5.5 acres) were investigated using the G-858 digital magnetometer. None of these grids were GS/SS grids. At the time these grids were investigated, the grids had only been surface swept and had not yet been subject to removal efforts using Schonstedt GA-52/Cx magnetometers (Parsons 2001). - An area equivalent to 164 100-foot by 100-foot grids and partial grids in MRS-43 (in addition to the ten 100 percent sampling grids) were investigated using the cart-mounted EM61 instrument (Parsons 2001). - Twenty 100-foot by 100-foot grids were investigated using an EM-61HH instrument.
MRS-15 DRO 01 (adjacent to MRA to the northeast)	Provided in the “Track 2 Munitions Response, Remedial Investigation/Feasibility Study, Del Rey Oaks Munitions Response Area, Former Fort Ord, California” (Shaw/MACTEC 2007).

Section 11 – DRO/Monterey MRA Conceptual Site Model

Table 11.3-2

DRO/Monterey MRA – Types of MEC Removed and Hazard Classification

MEC ITEMS	UXO	DMM	ISD	Hazard Classification
Projectile, 37mm, low explosive, MK I	1	0	0	3
Grenade, rifle, smoke, M23 series	1	0	0	1
Pot, 10 pounds, smoke, HC, screening, M1	1	0	0	1
Charge, 0.25 pound, demolition, TNT *	0	0	0	2
Cartridge, ignition, M2 series	0	2	0	1
Cartridge, 40mm, practice, M781	0	1	0	1
MRA TOTAL	3	3	0	

Note: * MMRP database identified item as UXO with a quantity of zero.

Reference: Fort Ord MMRP Database

Please note: Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data sources.

Table 11.3-3

DRO/Monterey MRA – Summary of Recovered MEC and MD

Type	Summary
UXO	3 items
DMM	3 items
MD	1,012 pounds (includes MD-E and MD-F items if weights were documented)
Aerial Extent	MEC items were encountered in the northwestern portion of MRS-43 and along the northeastern side of South Boundary Road.
Vertical Extent	MEC were located within 6 inches bgs.

Table 11.3-4
DRO/Monterey MRA – HTW History and Conditions

Type	Summary
MRS-43	The investigation of HA-173 (MRS-43) included a literature review, site reconnaissance, and sampling for MC in an area where fragments from 37mm projectiles were found. No explosive compounds were detected and no further action related to MC was recommended for HA-173 under the BRA (Shaw/MACTEC 2006).
Reported in MRA	- There is no evidence that non-munitions-related hazardous substances were stored, released, or disposed of on transfer Parcels E29.1, L6.2, L20.13.1.2, and L20.13.3.1 (Army 2007). - Hazardous substances were not stored for one year or more, released, or disposed of on transfer Parcels E29.1, L6.2, L20.13.1.2, and L20.13.3.1 (Army 2007).

Table 11.4-1
DRO/Monterey MRA - Future Land Use by Parcel

USACE Parcel Number	MRS Number	Land Use Category	Description	Acreage
L6.2	MRS-43	Habitat	Reserve – Development Buffer	6
L20.13.1.2	No related MRS	Development	Roadway	0.245
L20.13.3.1	No related MRS	Development	Roadway	5
E29.1	MRS-43	Development	Light Industrial – Business Park	23
MRA - TOTAL				34.245

Section 11 – DRO/Monterey MRA Conceptual Site Model

Table 11.5-1
DRO/Monterey MRA – Ecological Information

Type	Summary
Biological	• Dominant vegetation in the area is maritime chaparral. Maritime chaparral consists of variable sclerophyllous (hard-leaved) shrub communities within a scrub-live oak forest region that is best developed on sandy soils within the summer fog zone. This type of chaparral is considered rare by the CDFG and is declining statewide. Development has now limited the majority of this community type in the Monterey Bay Area to undeveloped portions of the former Fort Ord. As identified in the HMP there are a number of species that could be found on the MRA.
Habitat Management Plan / Biological Opinions	• The USFWS BO required that a habitat management plan be developed and implemented to reduce the incidental take of listed species and loss of habitat that supports these species. The HMP for former Fort Ord complies with the USFWS biological opinion and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival. The HMP incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. • To maintain compliance with habitat management and monitoring requirements presented in the HMP biological resources are monitored after MEC removal activities have been completed. The HMP specifies mitigation measures to monitor the successful regeneration of species and habitat following removal of MEC. Monitoring includes conducting follow-up monitoring for a period of 5 years following MEC removal to document habitat conditions. Since the inception of the MEC removal program the Army had elected to augment the monitoring program, where feasible to include the collection of baseline data prior to MEC removal. Baseline data have been collected to provide additional information on preexisting species composition and distribution of herbaceous annual sensitive species. Both baseline and follow-up data are used to compare community regeneration to HMP success criteria. • The HMP identifies the area as development and habitat reserve. • FORA will implement the mitigation requirements identified in the HMP in accordance with the BO developed during formal consultation between the Army and the USFWS under Section 7 of the ESA. For habitat areas these measures include conducting habitat monitoring in compliance with Chapter 3 of the HMP (USACE 1997b). • Since April 1997, three additional BOs have been issued that are relevant to the MEC remediation activities (USFWS 1999, 2002, and 2005). Future MEC remediation is required to be consistent with the applicable conservation measures.
Threatened and Endangered Species	• Special-status biological resources are those resources, including plant, wildlife and native biological communities that receive various levels of protection under local, state, or federal laws, regulations, or policies. The closure and disposal of former Fort Ord is considered a major federal action that could affect several species proposed for listing or listed as threatened or endangered under the federal ESA. • The Monterey spineflower is a threatened plant species and has been identified as having possible occurrence in the DRO/Monterey MRA. • In 2004, the CTS was identified as a threatened species. CTS may be found as far as 2 km from aquatic breeding habitats. Most of the DRO/Monterey MRA is located within 500 meters of an aquatic feature in which CTS may be present.

Table 11.5-2

DRO/Monterey MRA – HMP Category by Parcel and Possible Occurrence of HMP Species

USACE Parcel Number	HMP Designated Use	HMP Species
E29.1	Development	Monterey spineflower; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; California black legless lizard; California tiger salamander
L6.2	Habitat Reserve	Monterey spineflower, Seaside bird's beak, sandmat manzanita, Monterey ceanothus, Eastwood's ericameria, California black legless lizard; California tiger salamander
L20.13.1.2	Development	Monterey spineflower; Seaside bird's beak; toro manzanita; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; coast wallflower; California linderiella; California black legless lizard; California tiger salamander
L20.13.3.1	Development	Monterey spineflower; Seaside bird's beak; toro manzanita; sandmat manzanita; Monterey ceanothus; Eastwood's ericameria; coast wallflower; California linderiella; California black legless lizard; California tiger salamander

Reference: USACE 1997b

Table 11.6-1

DRO/Monterey MRA – Potential Receptors and Exposure Media

Potential Receptor	Exposure Media			Exposure Media		
	Current	Ground Surface	Below Grade	Future	Ground Surface	Below Grade
Construction Workers	✓	✓	✓	✓	✓	✓
Utility Workers	✓	✓	✓	✓	✓	✓
Trespassers	✓	✓		✓	✓	
Firefighters	✓	✓	✓	✓	✓	✓
Emergency Response Workers	✓	✓		✓	✓	
Ancillary Workers	✓	✓	✓	✓	✓	✓
Recreational Users				✓	✓	✓

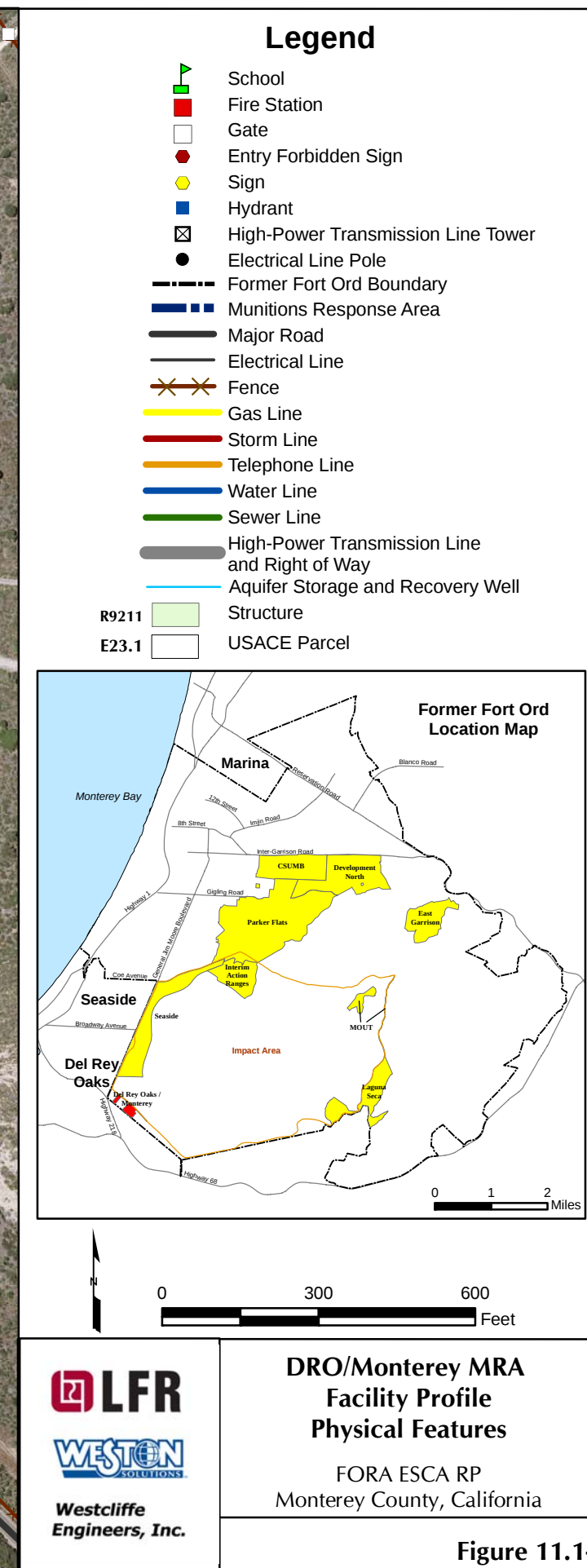
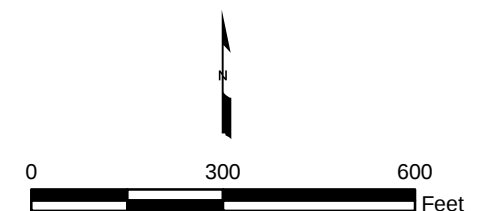
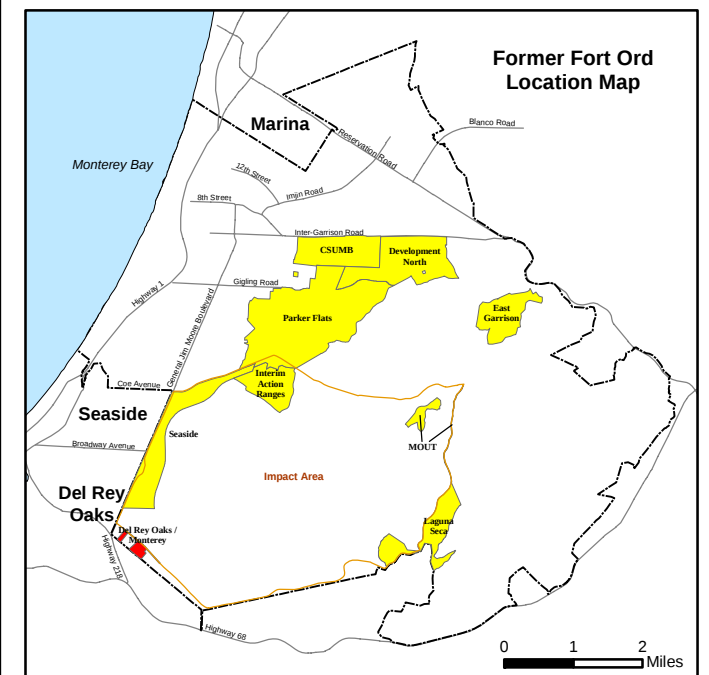


Figure 11.1-1



Legend

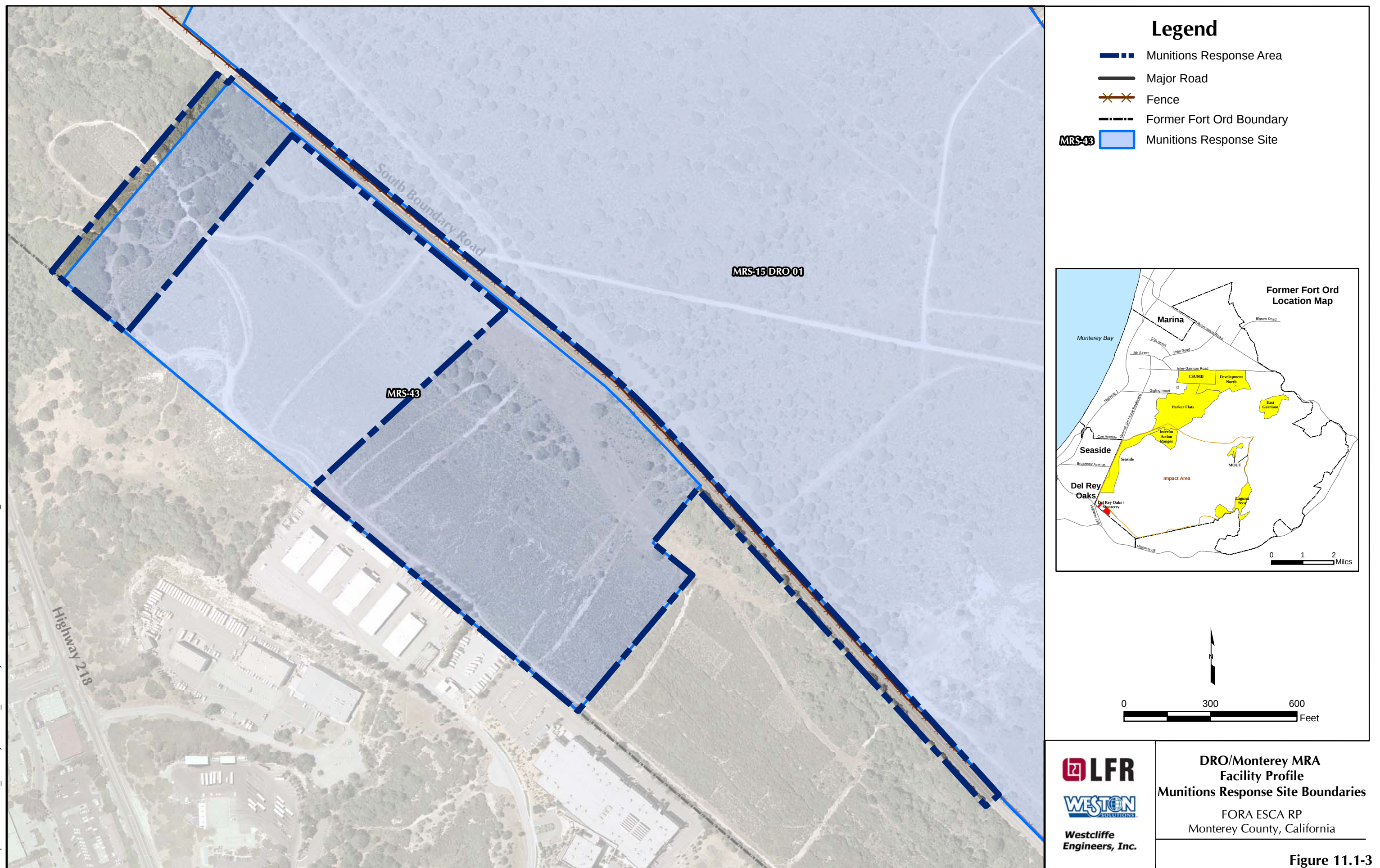
-  Munitions Response Area
-  Major Road
-  Fence
-  Former Fort Ord Boundary



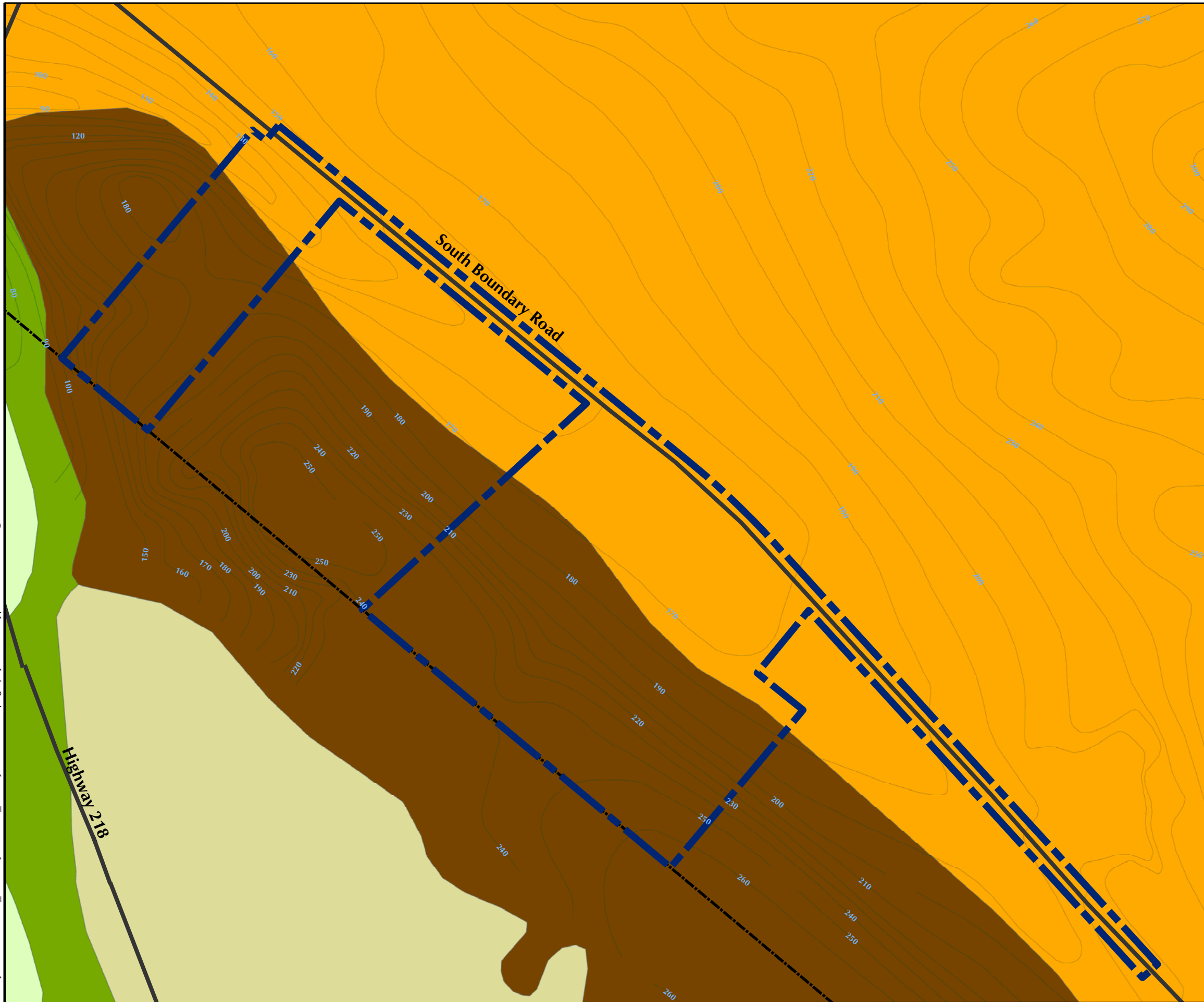
**DRO/Monterey MRA Facility Profile
Ranges and Training Sites**

FORA ESCA RP
Monterey County, California

Figure 11.1-2



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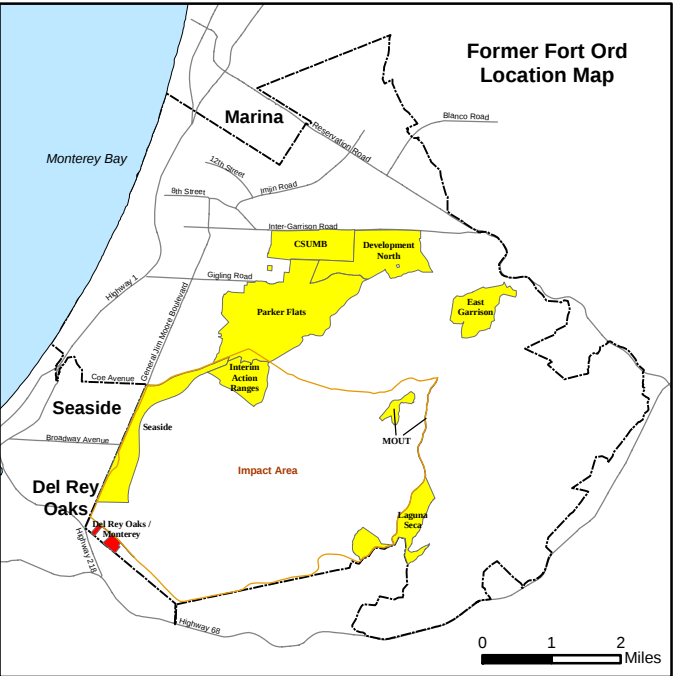


Legend

- 540 Topography 10 ft
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary

Soil Type

- Arnold-Santa Ynez Complex
- Baywood Sand, 2 to 15 Percent Slopes
- Arnold Loamy Sand, 15 to 50 Percent Slopes
- Santa Ynez Fine Sandy Loam, 15 to 30 Percent Slopes
- Rindge Muck

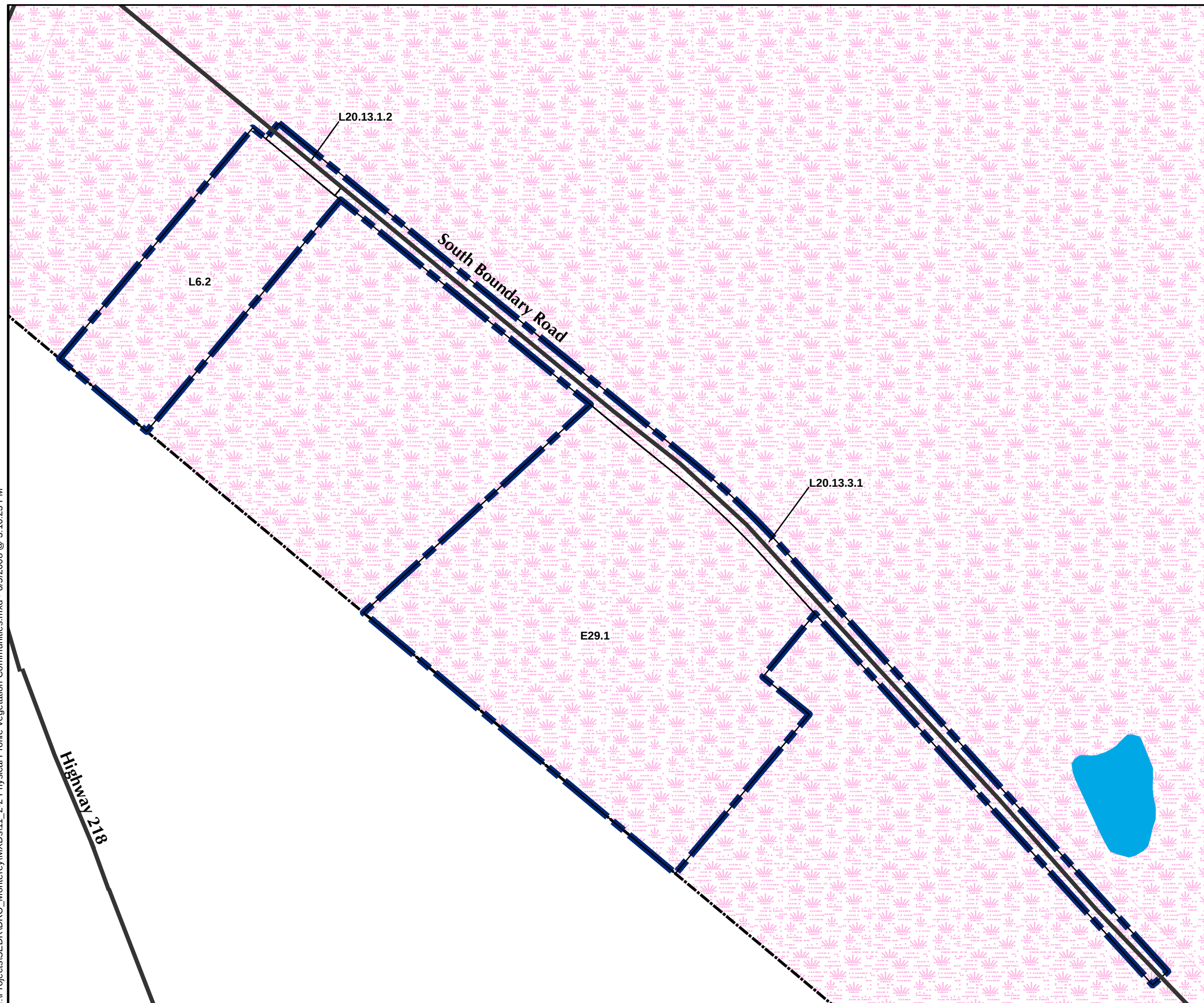


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DRO/Monterey MRA
Physical Profile
Topography and Soil Type
FORA ESCA RP
Monterey County, California

Figure 11.2-1



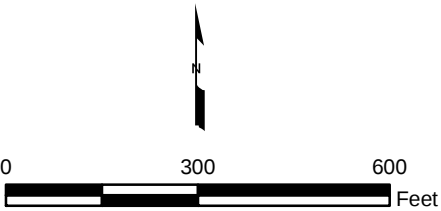
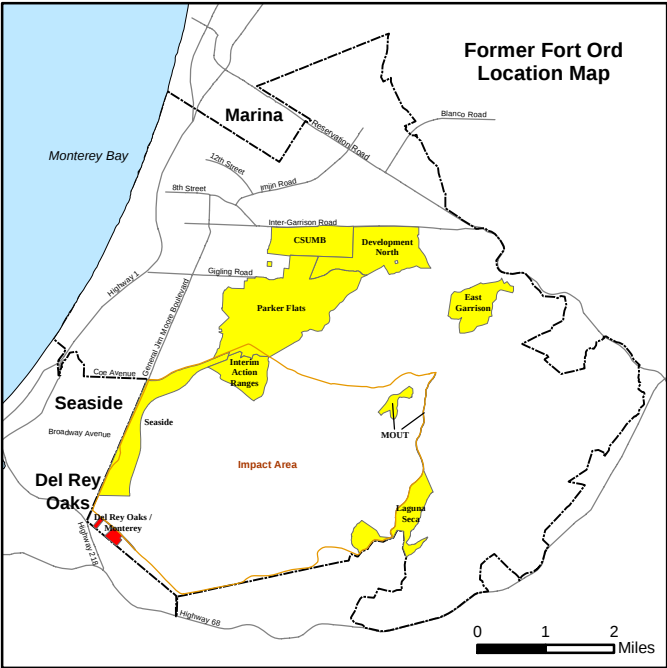
Legend

-  Munitions Response Area
 Major Road
 Former Fort Ord Boundary
 USACE Parcel

Vegetation Type

- Grassland
 - Maritime Chaparral
 - Inland Coast Live Oak Woodland
 - Aquatic Feature

Source: Flora and Fauna Baseline Study of Fort Ord, California,
Jones and Stokes Association Inc., December 1992.

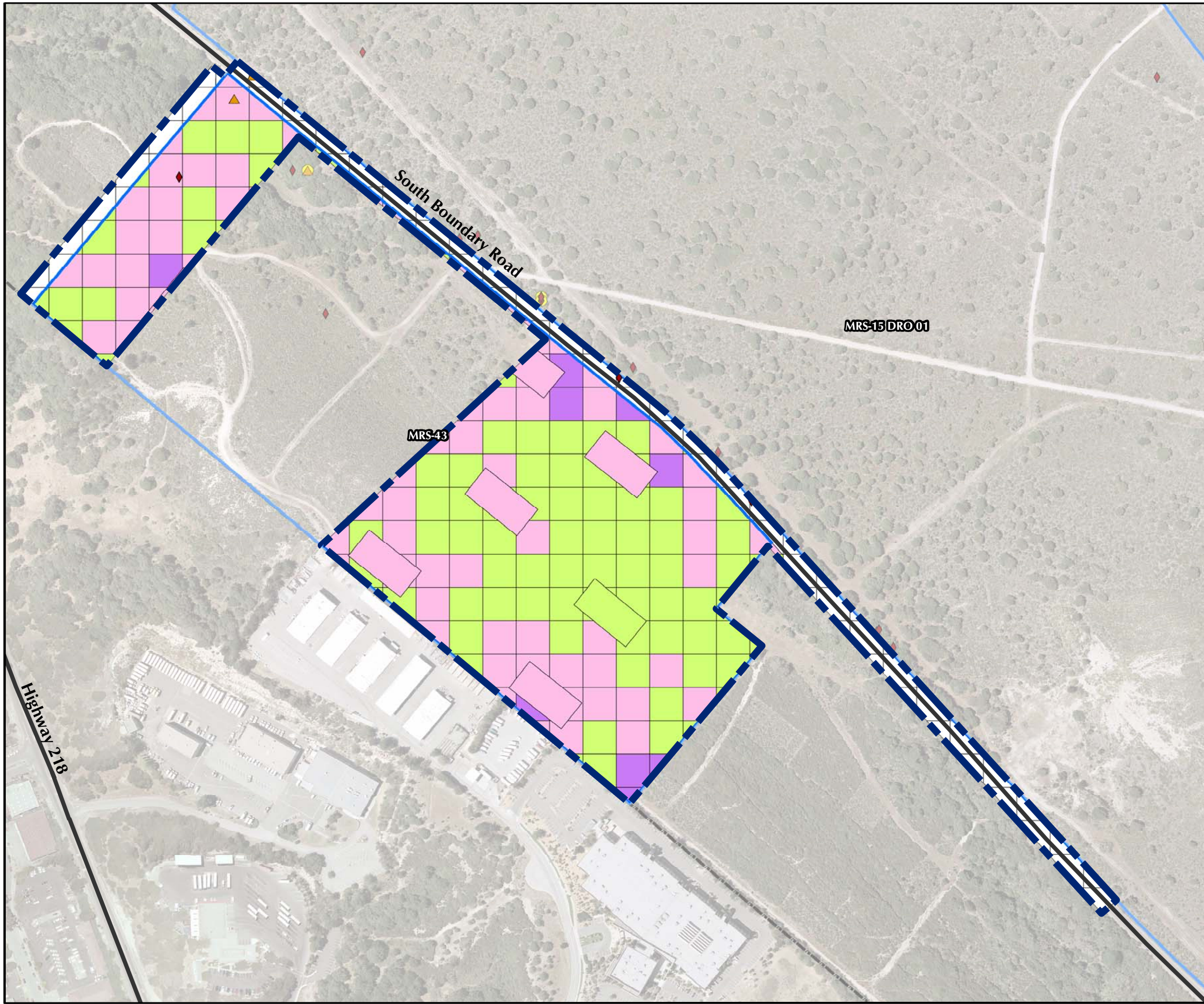


DRO/Monterey MRA Physical Profile Generalized Vegetation Communities

FORA ESCA RP
Monterey County, California

Figure 11.2-2

T:\Projects\SED\RDRO_Monterey\MXDs\11_3-1 Release Profile MEC and MD Locations.mxd - 6/5/2008 @ 4:07:19 PM



Legend

- Munitions Response Area
- Munitions Response Site
- Major Road
- Former Fort Ord Boundary

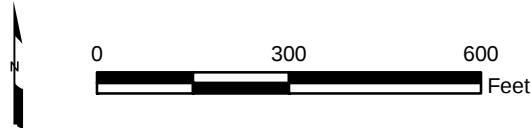
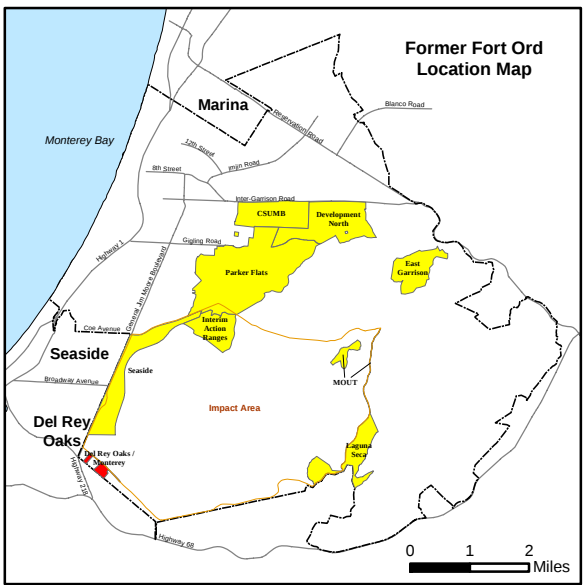
MEC Type

- Unexploded Ordnance (UXO)
- Discarded Military Munition (DMM)
- Insufficient Data (ISD)
- Burial Pit Containing MEC

Munitions Debris (MD) by Weight (total pounds per grid)

- No Data
- 0
- < 10
- 10 to 100
- > 100

Note: Munitions Debris (MD) includes scrap related to small arms ammunition.



**DRO/Monterey MRA
Release Profile
MEC and MD Locations**
FORA ESCA RP
Monterey County, California

Figure 11.3-1

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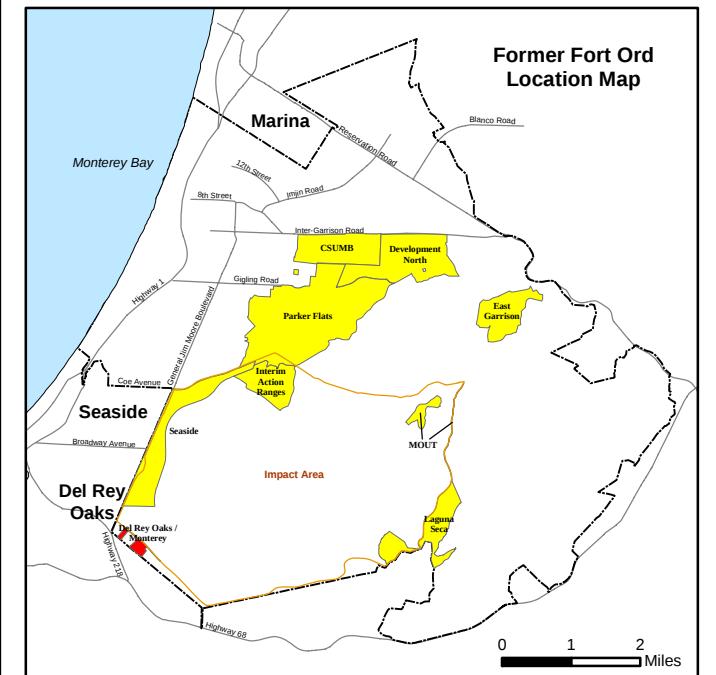
Legend

- Munitions Response Area
- Munitions Response Site
- Major Road
- Former Fort Ord Boundary

MEC Type

- Unexploded Ordnance (UXO)
- Discarded Military Munition (DMM)
- Insufficient Data (ISD)
- Burial Pit Containing MEC

Note: MEC locations may include more than one item.



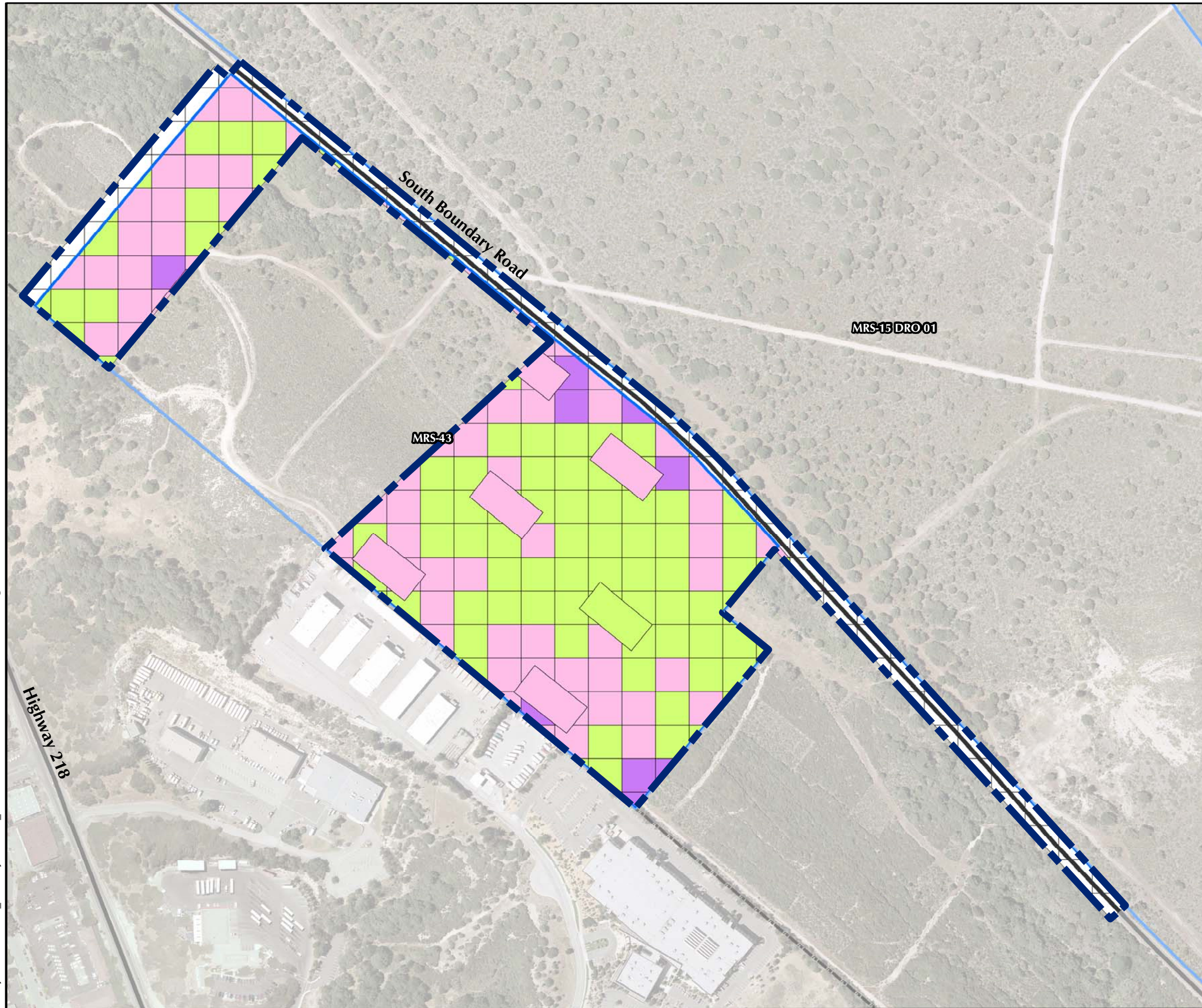
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DRO/Monterey MRA
Release Profile
MEC Locations
FORA ESCA RP
Monterey County, California

Figure 11.3-2

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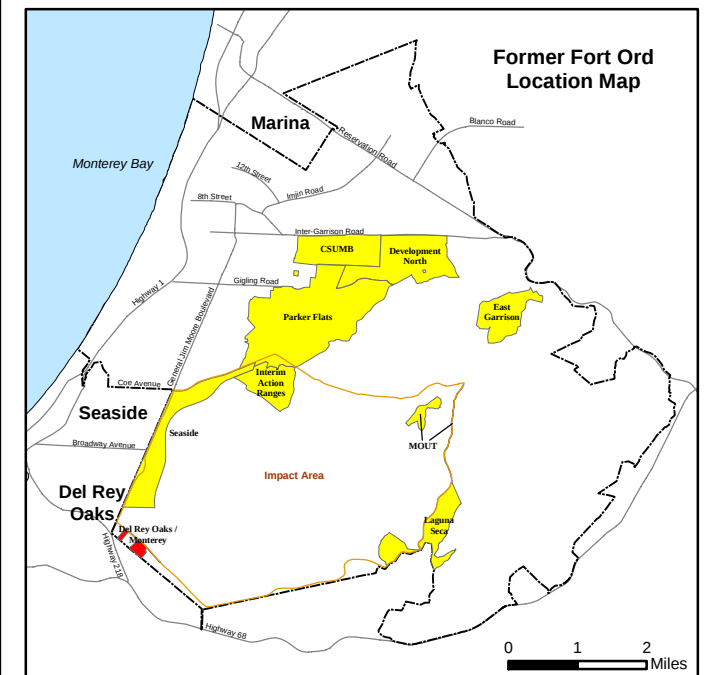
Legend

- Munitions Response Area
- Munitions Response Site
- Major Road
- Former Fort Ord Boundary

Munitions Debris (MD) by Weight (total pounds per grid)

- No Data
- 0
- < 10
- 10 to 100
- > 100

Note: Munitions Debris (MD) includes scrap related to small arms ammunition.

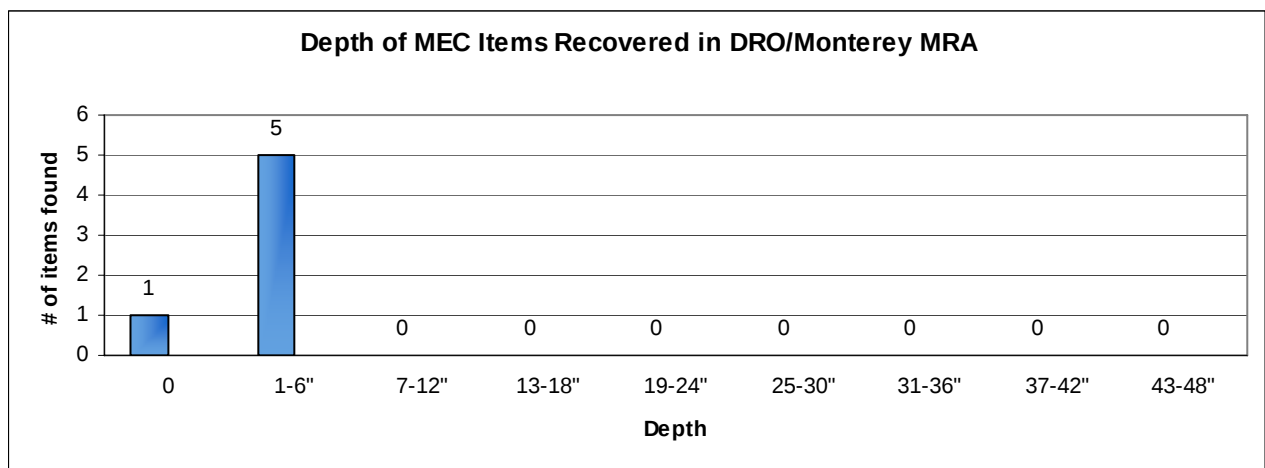


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Feet



**DRO/Monterey MRA
Release Profile
MD Locations**
FORA ESCA RP
Monterey County, California

Figure 11.3-3



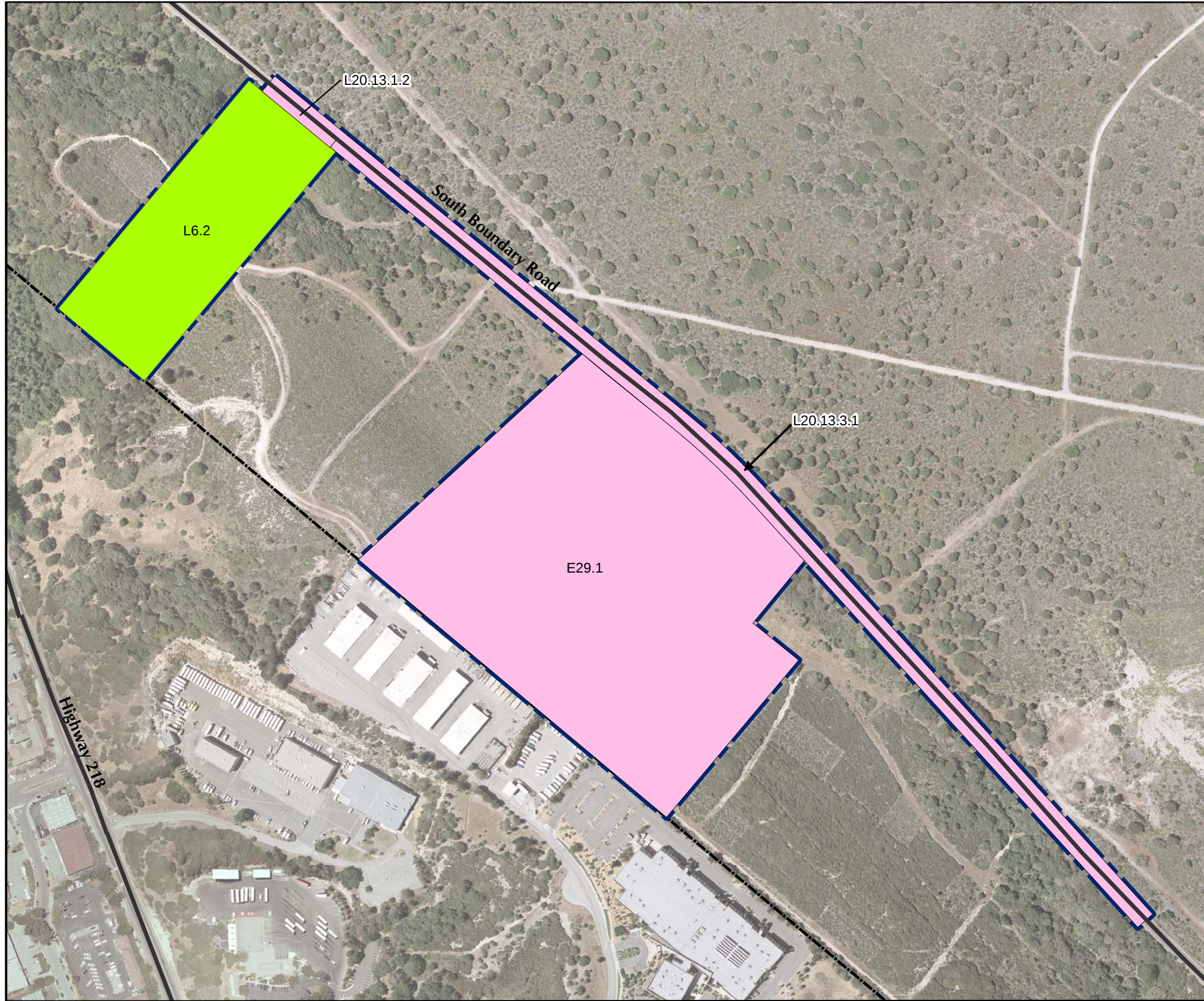
**Westcliffe
Engineers, Inc.**

**DRO/Monterey MRA
Distribution of MEC
Recovered by Depth Interval**

FORA ESCA RP
Monterey County, California

Figure 11.3-4

T:\Projects\SED\RDRO_Monterey\MXD\11_4-1 Land Use Profile Reuse Plan.mxd - 6/5/2008 @ 3:27:54 PM

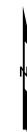
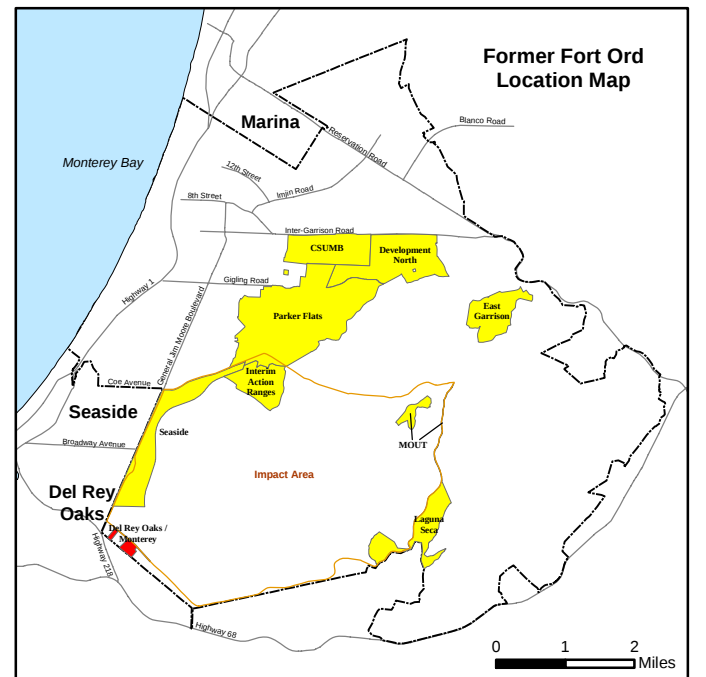


Legend

-  Munitions Response Area
-  Major Road
-  Former Fort Ord Boundary
-  E29.1 USACE Parcel

Future Land Use

-  Residential
-  Non-Residential
-  Habitat Reserve

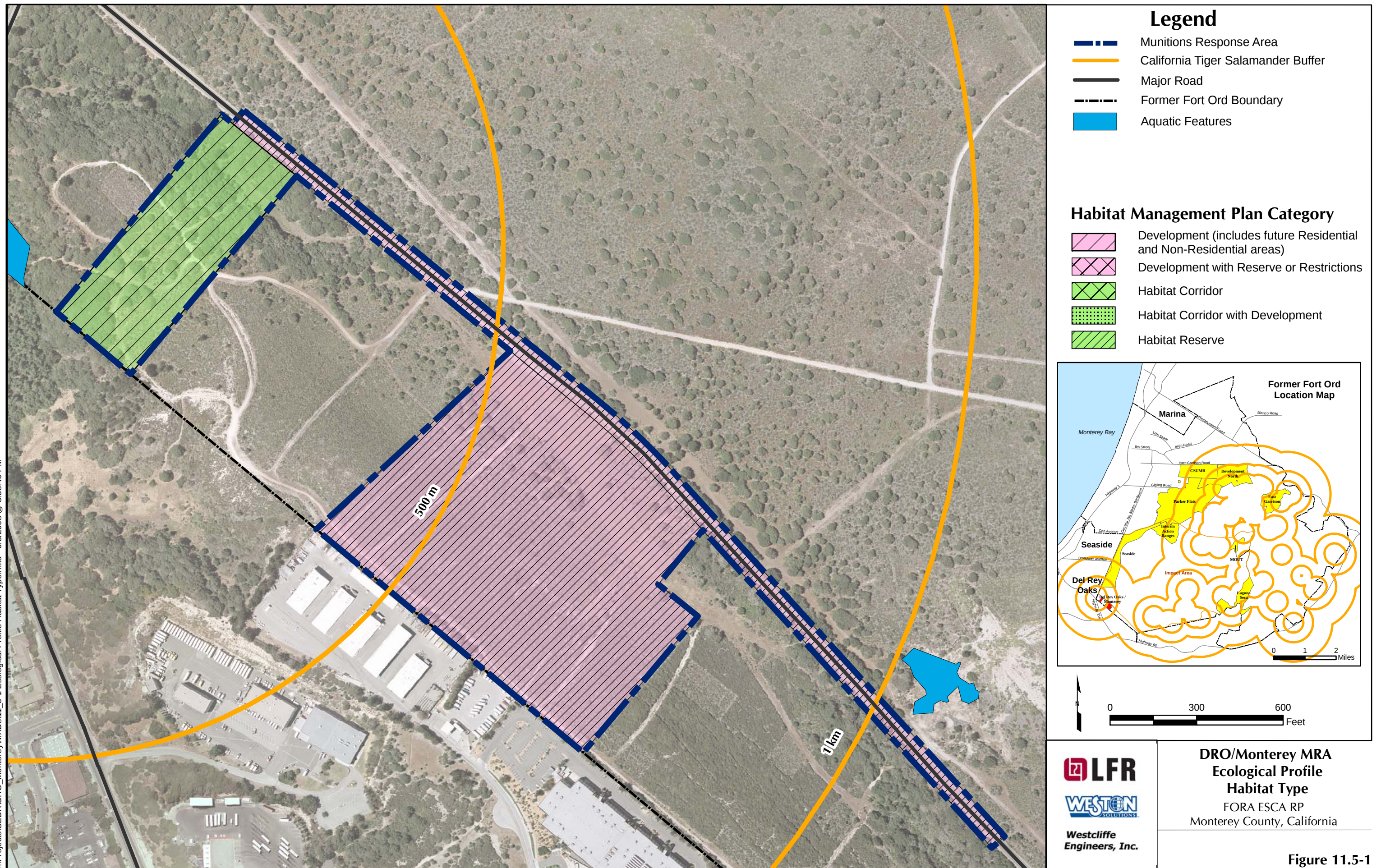


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**DRO/Monterey MRA
Land Use Profile
Reuse Plan**
FORA ESCA RP
Monterey County, California

Figure 11.4-1



Activity	Primary Sources	Release Mechanism	Expected Contamination	Secondary Sources	Migration and Transport	Exposure Media	Exposure Pathways	Potential Receptors
Why was the MEC originally present?	Where was MEC handled?	How did the MEC get into the environment?	Types of MEC that may be encountered?	Initial media(s) contaminated by MEC?	Ways MEC could be moved from its initial point of contamination?	Where the MEC may be now?	How People or other receptors may be exposed to MEC?	Who may be exposed either Current (C) or Future (F)?

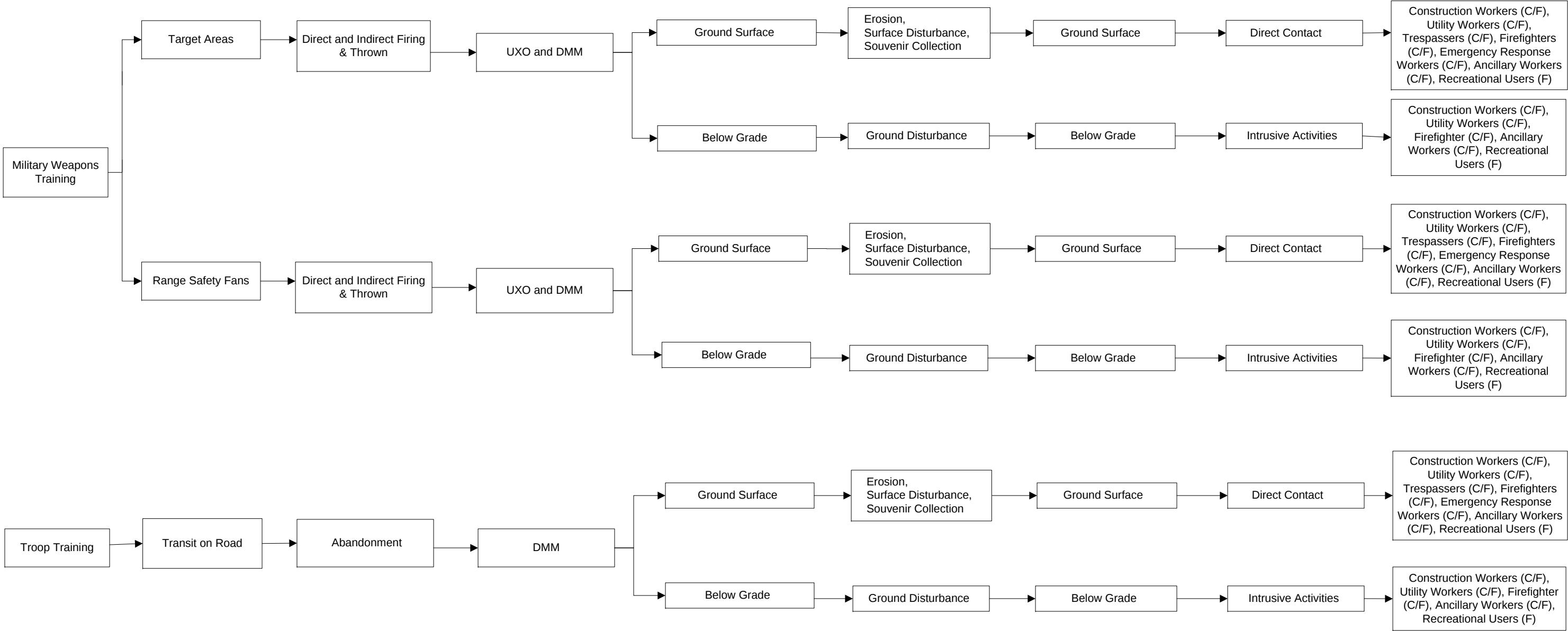
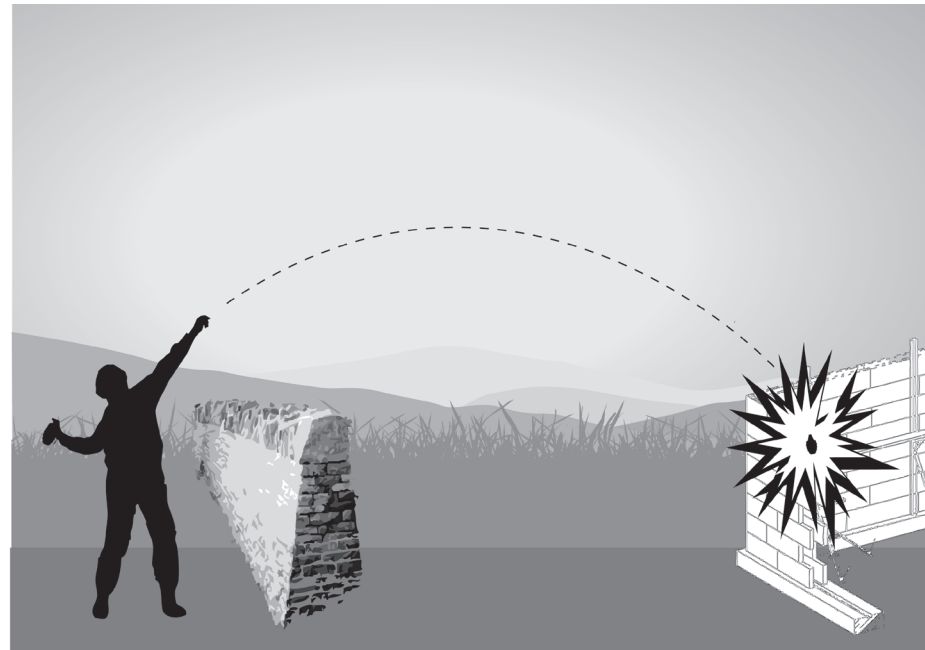


Figure 11.6-1



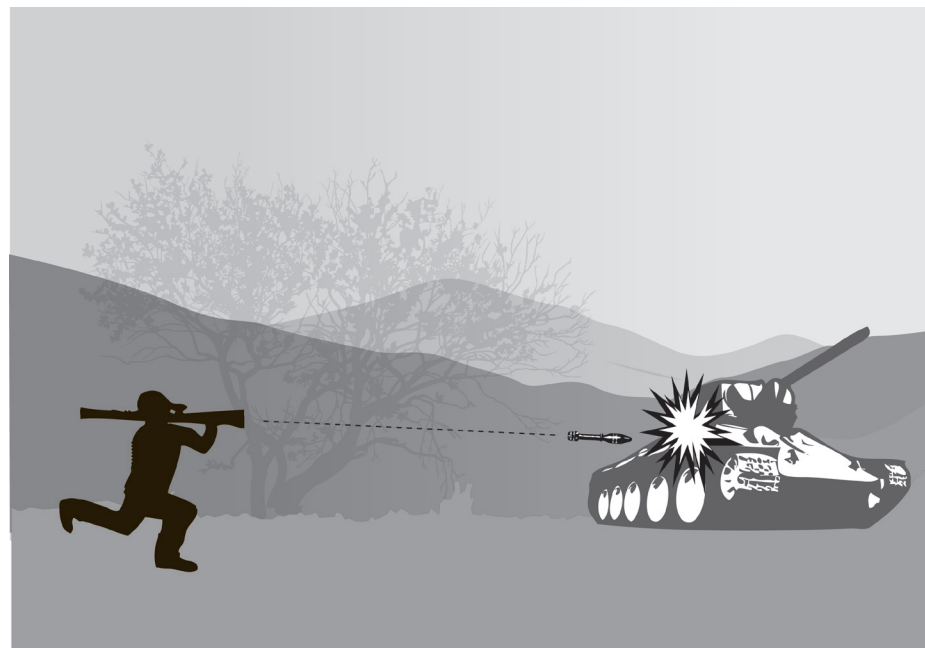
Thrown Ordnance



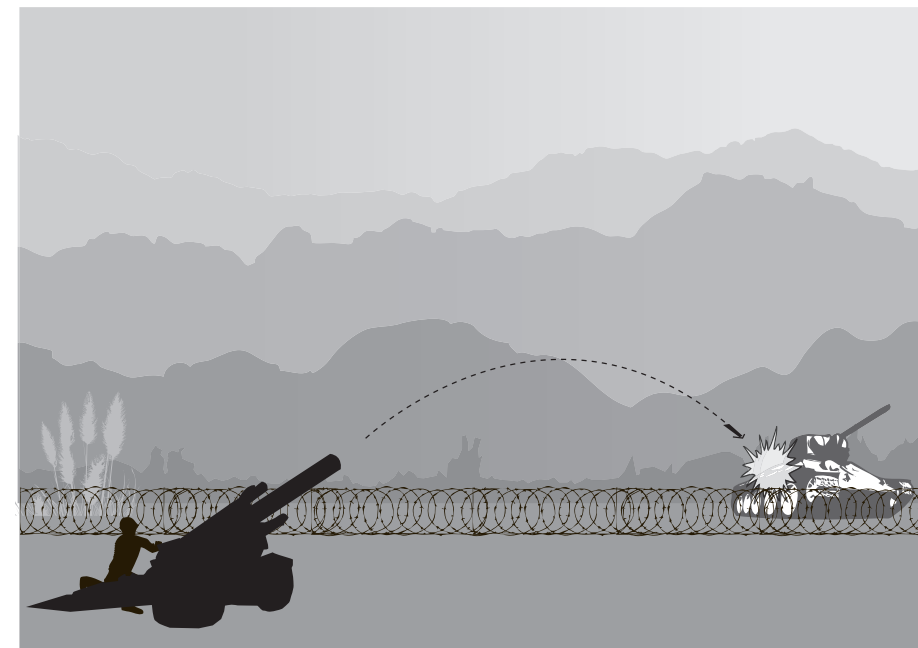
Burial / Mishandling / Loss



Troop Training



Direct Fire



Indirect Fire