



**DEPARTMENT OF THE ARMY**  
FORT ORD OFFICE, ARMY BASE REALIGNMENT AND CLOSURE  
P.O. BOX 5008, BUILDING #4463 GIGLING ROAD  
MONTEREY, CA 93944-5008

REPLY TO  
ATTENTION OF:

MAY 13 2009

Fort Ord BRAC Office

Franklin Mark  
Department of Toxic Substances Control  
8800 Cal Center Drive  
Sacramento, CA 95826

**Approval Memorandum**  
**Proposed No Action**  
**Site HA-100 – Demolition Training Area**  
**Former Fort Ord, California**

Dear Mr. Mark:

This letter presents the approval memorandum for No Action (NoA) Site HA-100 which is known as the Demolition Training Area, also designated as MRS-11, former Fort Ord, California. Copies of this letter have been sent to the United States Environmental Protection Agency (EPA), and departments of the California Environmental Protection Agency (Cal/EPA), including the Central Coast Regional Water Quality Control Board (RWQCB) and the Department of Toxic Substances Control (DTSC).

No further action for chemical contamination in soil is proposed for site HA-100. Site HA-100 meets the criteria specified in the approved *No Action Plug-In Record of Decision, Fort Ord, California* (NoA ROD) dated February 1995. The NoA ROD outlined a process and established necessary criteria for identifying and approving sites for NoA. NoA sites at Fort Ord are either Category 1 sites that are already in a protective state and pose no current or potential threat to human health or the environment, or Category 2 sites where CERCLA does not provide authority to take any remedial action. This approval memorandum provides a description of the site and completed investigations, and demonstrates the site's conformance with the NoA criteria for Category 1 sites established in the NoA ROD. This memo evaluates the risk of the chemicals present in soil, and does not address possible physical hazards related to munitions and explosives of concern (MEC). The MEC hazards are being addressed as part of the former Fort Ord Munitions Response Remedial Investigation/Feasibility Study (RI/FS) program.

**CHARACTERIZATION REPORT SUMMARY**

The Army has documented the results of the HA-100 characterization in the *Comprehensive Basewide Range Assessment Report Revision 1C* dated November 2006. The results of the characterization are summarized below.

Site HA-100 is located south of the main East Garrison area. This site (Plate 1) was used as a live grenade training range as noted on a 1946 Fort Ord Master Plan map. The area is also shown on a 1957 Fort Ord training and facilities map as a "Frag Zone" and "Engineer

Training Area C.” During the 1998 to 1999 military munitions removal by USA, Environmental, Inc. over 1,000 munitions debris and small arms items were removed. UXO items removed included eleven MK II Fragmentation grenades, two rifle smoke grenades, grenade fuzes, signals, and flares. Site reconnaissance was conducted in July 1999, at which time one live small arms cartridge was discovered in addition to a high density MK II fragment area, three vegetation slash piles, six areas of blank casings, a military munitions excavation hole, and two grenade fragment piles. Sampling at this site was conducted in order to evaluate the possibility of explosive residue related to use as a live-grenade training area.

### **Field Program**

Twenty-one soil samples were collected at thirteen locations in July 2002. Five more samples from five locations were collected in December 2004 based on detections in soil samples collected in July 2002 as part of the step-out sampling protocol. Sample locations and concentrations of detected analytes are shown on Plate 2. Surface soil samples were collected from all locations and samples from one and two feet below ground surface were collected at locations HA100SI003 and HA100SI004. Sample locations and concentrations of detected analytes are shown on Plate 2. Perchlorate, and 2,4,6-trinitrotoluene (TNT) were each detected in one sample at low concentrations. As part of the site characterization, two step-out samples were collected by MACTEC/Shaw personnel in December 2004, adjacent to the TNT detection at HA100A1003 (HA100HSC0001 and -0002) (Plate 2). Three additional samples were also collected in the southeast portion of the range to provide a more thorough sample coverage in areas where heavy accumulations of munitions debris were observed (HA100HSC0003 through -0005). The data indicates that explosives, antimony, and cadmium were below laboratory reporting limits for all samples analyzed, and lead was detected at concentrations below the Fort Ord Preliminary Remediation Goal (PRG) of 240 milligrams per kilogram (mg/kg). Therefore, the subsurface samples did not require analyses.

### **Subsurface Conditions**

In general, subsurface soil at HA-100 consists predominately of light brown silty sand with some gravel to a depth of 2.0 feet bgs (the maximum depth explored). Most of the sand was classified as loose, dry, and fine- to medium-grained. Some gravel and bedrock was also noted. No groundwater was encountered during soil sampling procedures. Depth to groundwater at the site is approximately 240 feet bgs.

### **Analytical Results**

A comparison of maximum detected chemical concentrations in soil at HA-100 with preliminary remediation goals (PRGs) is provided on Table 1. PRGs are chemical concentrations in soil expected to result in acceptable cancer risks (i.e. one-in-one-million) and noncancer health effects. Based on historical use of the site as the Demolition Training Area and live hand grenade training area, the chemicals analyzed for were antimony, beryllium, cadmium, copper and lead using EPA Method 6010, perchlorate by EPA Method 314.0, and explosives by EPA Method 8330. Beryllium was detected in one of the three samples collected (HA100HSC0004) at a concentration of 0.183 milligrams per kilogram (mg/kg), which is half the PRG of 0.39 mg/kg. Copper and lead were detected above the reporting limit in all of the samples with maximum detected concentrations of 5.02 mg/kg and 16 mg/kg, respectively, which are below their respective PRGs. The maximum copper concentration is nearly three

orders of magnitude lower than the PRG of 2,500 mg/kg, and the lead maximum concentration is over an order of magnitude lower than the PRG of 240 mg/kg. The maximum concentrations for these three metals were also compared to background concentrations that were established for Fort Ord as part of the *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California* dated October 1995 and presented on Table 2. Beryllium, copper, and lead were below their maximum background concentrations of 0.56 mg/kg, 18.2 mg/kg, and 51.8 mg/kg, respectively. The explosive TNT and perchlorate were also detected at HA-100 in 1 of 26 samples and 1 of 20 samples, respectively. The detected concentrations for TNT at HA100SI0003 and perchlorate at HA100SI0012 were 0.5 mg/kg and 0.106 mg/kg, respectively, which are one to two orders of magnitude below their EPA Region 9 PRGs of 16 mg/kg and 7.8 mg/kg, respectively. Because Fort Ord specific PRGs were not developed for TNT and perchlorate, TNT and perchlorate concentrations were compared to EPA Region 9 PRGs. TNT and perchlorate were retained as site-related chemicals (SRC).

### Screening Risk Evaluation

MACTEC conducted a screening risk evaluation (SRE) based on the site characterization data presented in Table 1. The SRE consisted of the following:

- Comparing concentrations of chemicals detected in soil at HA-100 with chemical-specific PRGs to evaluate the need for further action at the site;
- Evaluating potential impacts to groundwater; and
- Providing a qualitative discussion of ecological receptors.

The NoA ROD identified Category 1 sites as sites where the level of contamination is below the levels required for protection of human health (e.g., PRGs) and the environment. PRGs were developed specifically for Fort Ord and represent soil concentrations considered to result in estimated daily doses (1) associated with an estimated one-in-one-million probability that an exposed individual would develop cancer (i.e.,  $10^{-6}$  cancer risk) or (2) expected to be without appreciable risk of deleterious noncancer health effects (i.e., hazard quotient less than 1). The methodology and assumptions used to develop PRGs were presented in the *Draft Final Technical Memorandum, Preliminary Remediation Goals*, dated June 24, 1994. Following review of soil sample analytical results from HA-100, detected chemicals were divided into two categories: (1) chemicals that may be present as a result of Army activities at the site (i.e., site-related) and (2) chemicals considered naturally occurring and not related to Army activities (i.e., background). The same chemical can have both background- and site-related components where there are contributions from site activities as well as from natural occurrences. Background concentrations were not established for perchlorate and explosives because they are automatically assumed to be site-related chemicals. Beryllium, copper, and lead were considered to be present at concentrations representative of natural background and were therefore evaluated as background-related chemicals.

### Comparison of Site Soil Data with PRGs

PRGs for chemicals detected in the soil at HA-100 were compared with site-specific data by calculating ratios of chemical concentrations to PRGs (Table 2). The chemical concentrations used in these ratios include:

- Maximum detected site concentration (MSC);
- Calculated component concentration representing the portion attributed to site activities (MSRC); and
- Calculated component concentration representing the portion attributed to background (MBC).

A chemical-specific ratio of 1 or less indicates that the maximum detected or calculated concentration is less than or equal to the PRG and, therefore, substantial health risks are not likely to be associated with that chemical. A ratio greater than 1 indicates that the concentration of the chemical exceeds the health-based PRG. To evaluate possible exposure to multiple chemicals, the effects of multiple chemicals were assumed to be additive and the ratios were added together to calculate a ratio sum (RS). A RS less than 1 indicates that substantial health risks are not likely to be associated with exposure to the multiple chemicals evaluated; a RS greater than 1 indicates further action may be necessary.

Table 2 is divided into a top panel for chemicals considered to be site-related and a bottom panel for chemicals considered to be background-related. For SRCs, the background component is assumed to be equivalent to the maximum background concentration (MBC) for that chemical as identified in the *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California, Volume II – Remedial Investigation, Basewide Background Soil Investigation, Final* dated October 1995. The maximum site-related component (MSRC) is then calculated by subtracting this background component from the maximum site concentration (MSC). For SRCs, the total, background-related, and site-related concentrations were compared with the chemical-specific PRG using the ratios and RS calculations mentioned above. For background-related chemicals, the site-related component was considered to be 0, and the MSC has only a background component. As a result, for background-related chemicals, the MSC/PRG ratio is equivalent to the MBC/PRG ratio.

#### *Site-Related Chemicals*

The site-related components of SRCs evaluated at HA-100 were compared to PRGs (MSRC/PRG ratios, Table 2). The chemical-specific MSRCs for perchlorate and TNT evaluated at HA-100 is below the PRG, as indicated by the MSRC/PRG ratios of less than 1.0 (Table 2, top panel). The site-related RS subtotal for the SRC is 0.04 (Table 2, top panel).

The site- and background-related components of SRCs were summed for use by risk managers (Table 2, top panel). The MSCs for chemicals evaluated at HA-100 are all less than the PRGs, as indicated by MSC/PRG ratios of less than 1.0 and the MSC/PRG RS subtotal for the SRCs of 0.04. This analysis indicates that health risks from possible exposure to the site-related components of the SRCs evaluated at HA-100 are acceptably low.

#### *Background-Related Chemicals*

The maximum detected concentrations of other metals at HA-100 were also compared with corresponding PRGs using background-related ratios (MSC/PRGs) and RS (Table 2, bottom panel). The measured concentrations of these metals, as well as the background component of the SRCs evaluated above, were considered to be naturally occurring, and not

related to discharge or other activities at the site. Accordingly, possible health effects of these metals were considered to be part of the risks inherent in day-to-day living in the region. MSC/PRG ratios and RSs are presented herein to provide a context for risk management decisions at Fort Ord sites.

### Potential Groundwater Impacts

The potential for explosives including TNT to impact groundwater was evaluated as part of the Site 39 RI which was presented in the *Basewide RI/FS Volume II - Remedial Investigation* dated October 1995. The Site 39 RI which concluded that explosives including TNT are unlikely to migrate to groundwater for the following reasons: 1) most of the chemical compounds detected at Site 39 are relatively immobile, 2) the depth to groundwater is approximately 60 to 180 feet bgs, and 3) although areas within Site 39 have been used for at least 20 years or more, chemical concentrations appear to decrease significantly (one or more orders of magnitude) from surface and shallow soil to deep soil (greater than 2 feet). Soil conditions at HA-100 are similar to portions of Site 39 and depth to water is estimated at about 240 feet, therefore TNT is not expected to impact groundwater at HA-100. Perchlorate is also not expected to impact groundwater due to the very low concentration detected at the site and because the concentration is less than the EPA Region IX PRG and the Regional Water Quality Control Board, Region II Environmental Screening Level (ESL) published in November 2007.

It is not anticipated that metals detected at the site would impact groundwater because all detected concentrations were below the Fort Ord maximum background concentrations and based on the results of the 1995 Basewide Remedial Investigation/Feasibility Study which indicate that leaching of metals to subsurface soil or groundwater at former small arms ranges at the former Fort Ord is not significant due to the depth of groundwater (generally greater than 80 feet) and soil conditions. Depth to groundwater at HA-100 is estimated at about 240 feet. Based on the results of the 1995 RI/FS and the depth to groundwater at HA-100, impacts to groundwater from metals at the site are not expected.

### Ecological Receptors

A qualitative ecological SRE was conducted for TNT and perchlorate at HA-100 using the findings from the *Basewide RI/FS Ecological Risk Assessment (BERA)* dated October 1995 and the *Ecological Risk Assessment for Site 39 Ranges, Habitat Areas, Impact Area, Former Fort Ord, California (ERA)* dated October 31, 2007. The BERA and the ERA included a thorough evaluation of chemicals of potential ecological concern (COPECs) and the risks to ecological receptors associated with COPECs. Several chemicals were identified, sampled for in the RI, and evaluated as COPECs in the Basewide RI/FS ERA (*HLA, 1995*). However, that evaluation indicated that the only chemicals which showed the potential for risk to ecological receptors were lead and the explosive compound cyclotetramethylene tetranitramine (HMX). The other COPECs were evaluated but showed no or low potential for risks to ecological receptors.

As part of the Feasibility Study (*MACTEC, 2007*), ecological screening levels were compiled for explosive compounds. TNT had a proposed lowest-observed adverse effect level (LOAEL)-based screening level of 5.9 mg/kg for areas without ponds that is protective of all receptors including the bushtit and no-observed adverse effect level (NOAEL)-based screening level of 0.59 mg/kg for areas with ponds that is protective of the California tiger salamander.

The maximum concentration of 0.5 mg/kg for TNT is below both ecological screening levels. The chemical perchlorate does not have an established ecological screening level established, but is over two orders of magnitude lower than the PRG of 7.8 mg/kg. Therefore, no additional action is needed to address ecological receptors at HA-100.

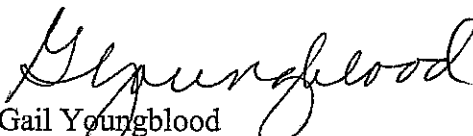
### **RECOMMENDED ACTION**

On the basis of investigations completed and summarized above, no further action at HA-100 is recommended.

Please feel free to contact me at (831) 242-7918 with any questions you may have regarding the proposed No Action. Notification of the proposed No Action will be placed in a major local newspaper within 2 weeks of approval of this memorandum.

Your prompt attention to this proposed No Action approval Memorandum is sincerely appreciated.

Sincerely,

  
Gail Youngblood  
BRAC Environmental Coordinator

Enclosures:

Table 1	Soil Analytical Results for HA-100
Table 2	Comparison of Maximum Detected HA-100 Chemical Concentrations and Preliminary Remediation Goals
Plate 1	Site Location Map
Plate 2	Investigation Results

Table 1. Soil Analytical Results for HA-100  
 No Action Approval Memorandum  
 Former Fort Ord

Sample Location	Sample Date	Sample Depth (feet bgs)	2,4,6-Trinitrotoluene mg/kg		Beryllium mg/kg	Copper mg/kg		Lead mg/kg	Perchlorate mg/kg		
HA100HSC0001	12/13/2004	0	ND(0.075)	U / U	NT		NT		NT		NT
HA100HSC0002	12/13/2004	0	ND(0.073)	U / U	NT		NT		NT		NT
HA100HSC0003	12/13/2004	0	ND(0.081)	U / U	ND(0.0029)	U / U	2.91 / A	11.2 / J			NT
HA100HSC0004	12/13/2004	0	ND(0.089)	U / U	0.183	B / A	5.02 / A	16 / J			NT
HA100HSC0005	12/13/2004	0	ND(0.079)	U / U	ND(0.003)	U / U	1.77 / A	7.28 / J			NT
HA100SI0001	7/11/2002	0.08	ND(0.4)	U / A	NT		NT		NT		NT
HA100SI0002	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.103) U / A
HA100SI0003	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.102) U / A
	7/11/2002	1.08	0.5	/ A	NT		NT				ND(0.104) U / A
	7/11/2002	2.08	ND(0.4)	U / A	NT		NT				ND(0.103) U / A
HA100SI0004	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.1) U / A
	7/11/2002	1.08	ND(0.4)	U / A	NT		NT				ND(0.109) U / A
	7/11/2002	2.08	ND(0.4)	U / A	NT		NT				ND(0.106) U / A
HA100SI0005	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
HA100SI0006	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
Duplicate	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
HA100SI0007	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
HA100SI0008	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.105) U / A
HA100SI0009	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
HA100SI0010	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.105) U / A
HA100SI0011	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
HA100SI0012	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				0.106 / A
Duplicate	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.109) U / A
HA100SI0013	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.102) U / A
HA100SI0014	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.103) U / A
HA100SI0015	7/11/2002	0.08	ND(0.4)	U / A	NT		NT				ND(0.101) U / A
Preliminary Remediation Goals <sup>a</sup>			16		0.39		2,500		240		7.8

**Abbreviations:**

feet bgs = Feet below ground surface.

mg/kg = Milligram per kilogram.

ND = Not detected.

NT = Not analyzed.

J / A = Laboratory qualifier / validation qualifier.

Laboratory Qualifiers:

B = Estimated result; result is less than the reporting limit.

U = Compound was analyzed for but not detected.

Validation Qualifiers:

A = Data were subjected to routine data validation.

U = Compound was analyzed for but not detected.

J = Data are qualified as estimated; it is not possible to assess the direction of the potential bias; false positives or false negatives are unlikely to have been reported.

= Maximum detected concentration

<sup>a</sup> The Preliminary Remediation Goals (PRGs) for beryllium, copper and lead are from the No Action Plug-In Record of Decision, Fort Ord, California (Army, 1995). The Preliminary Remediation Goals (PRGs) for 2,4,6-Trinitrofluorene and Perchlorate are from the United States Environmental Protection Agency (EPA) Region 9 PRGs (EPA, 2004). These were used for chemicals that do not have a Fort Ord specific PRG.

Table 2. Comparison of Maximum Detected HA-100 Soil Chemical Concentrations with Background Concentrations and Preliminary Remediation Goals  
 No Action Approval Memorandum  
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Chemical	Maximum Detected Site Concentration (MSC) (mg/kg)	Maximum Background Concentration in Soil (MBC) <sup>a</sup> (mg/kg)	Maximum Site-Related Concentration (MSRC) <sup>b</sup> (mg/kg)	Preliminary Remediation Goal (PRG) <sup>c</sup> (mg/kg)	Chemical Total MSC/PRG <sup>d</sup> Ratio	Background-Related MBC/PRG <sup>e,f</sup> Ratio	Site-Related MSRC/PRG <sup>g</sup> Ratio
<b>Site-Related Chemicals</b>							
2,4,6-Trinitrotoluene	0.5	NA	NA	16	0.031	NA	0.031
Perchlorate	0.106	NA	NA	7.8	0.014	NA	0.014
Ratio Sum Subtotal (site-related)					0.04	0.00	0.04
<b>Background-Related Chemicals</b>							
Beryllium	0.183	0.56	NA	0.39	0.469	0.469	NA
Copper	5.02	18.2	NA	2,500	0.002	0.002	NA
Lead	16	51.8	NA	240	0.067	0.067	NA
Ratio Sum Subtotal (background-related)					0.54	0.54	NA
Ratio Sum Total (site- and background-related)					0.58	0.54	0.04

**Abbreviations:**

MSC = Maximum detected site concentration.

mg/kg = Milligram per kilogram.

MBC = Maximum background concentration in soil.

MSRC = Maximum site-related concentration.

PRG = Preliminary Remediation Goal.

NA = Not applicable.

**Footnotes:**

<sup>a</sup> Background concentrations in soil are from *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California, Volume II - Remedial Investigation, Basewide Background Soil Investigation, Final* (HLA, 1995).

<sup>b</sup> MSRC = MSC - MBC

<sup>c</sup> The Preliminary Remediation Goals (PRGs) for copper and lead are from the *No Action Plug-In Record of Decision, Fort Ord, California (Army, 1995)*.

The Preliminary Remediation Goals (PRGs) for 2,4,6-Trinitrotoluene, Beryllium, and Perchlorate are from the United States Environmental Protection Agency (EPA) Region 9 PRGs (*EPA, 2004*). These were used for chemicals that do not have a Fort Ord specific PRG.

<sup>d</sup> Chemical Total = MSC ÷ PRG.

<sup>e</sup> Background-Related = MBC ÷ PRG.

<sup>f</sup> For background-related chemicals (antimony and copper) this value is the same as the chemical-related ratio because the site related component is assumed to be zero.

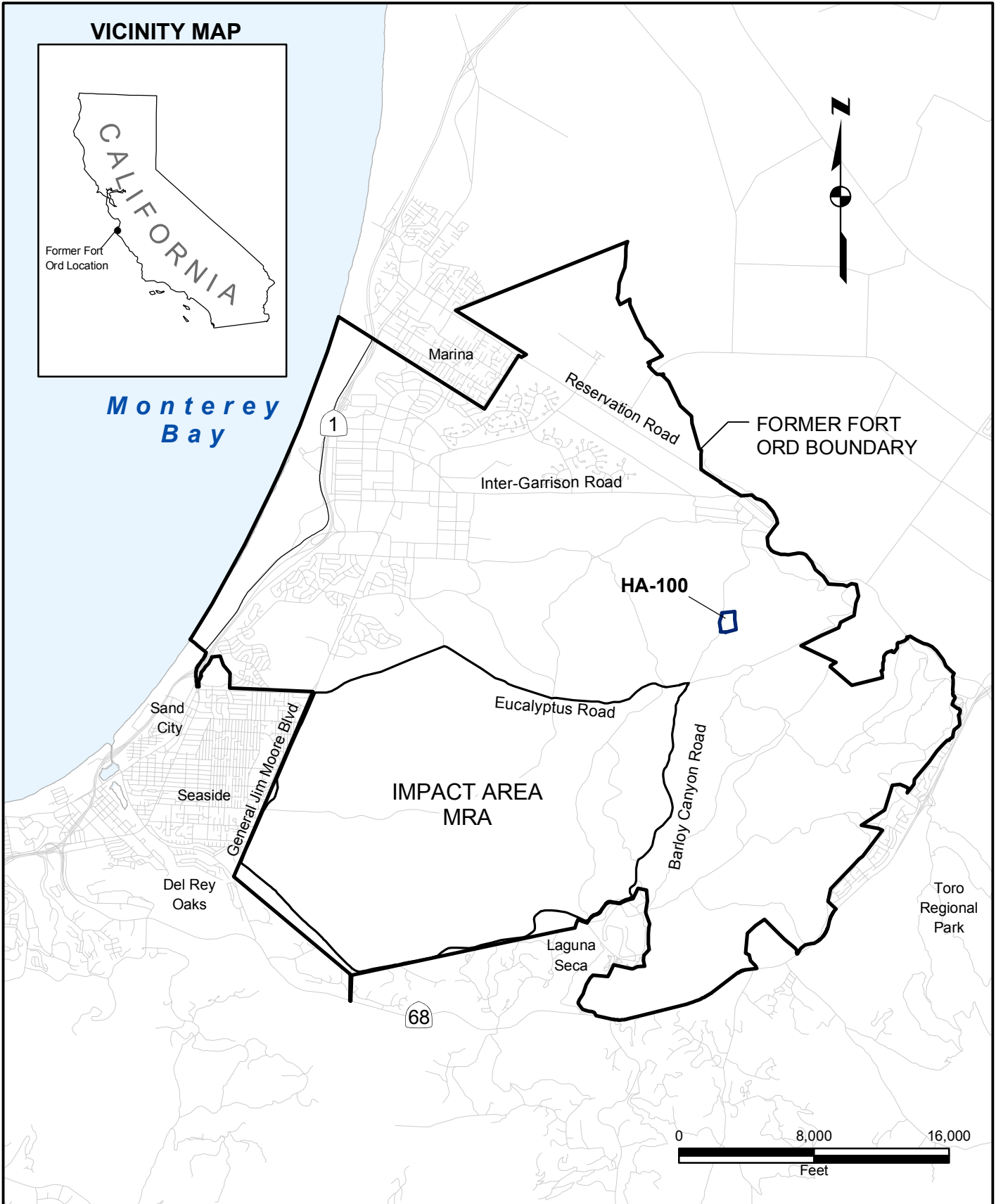
<sup>g</sup> Site-Related = MSRC ÷ PRG.

VICINITY MAP



Former Fort Ord Location

Monterey Bay

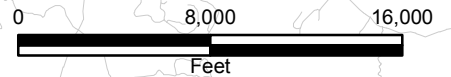


IMPACT AREA MRA

FORMER FORT ORD BOUNDARY

HA-100

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Site Location Map

Approval Memorandum  
Site HA-100 - Old Demolition Training Area  
Former Fort Ord, California

PLATE

1

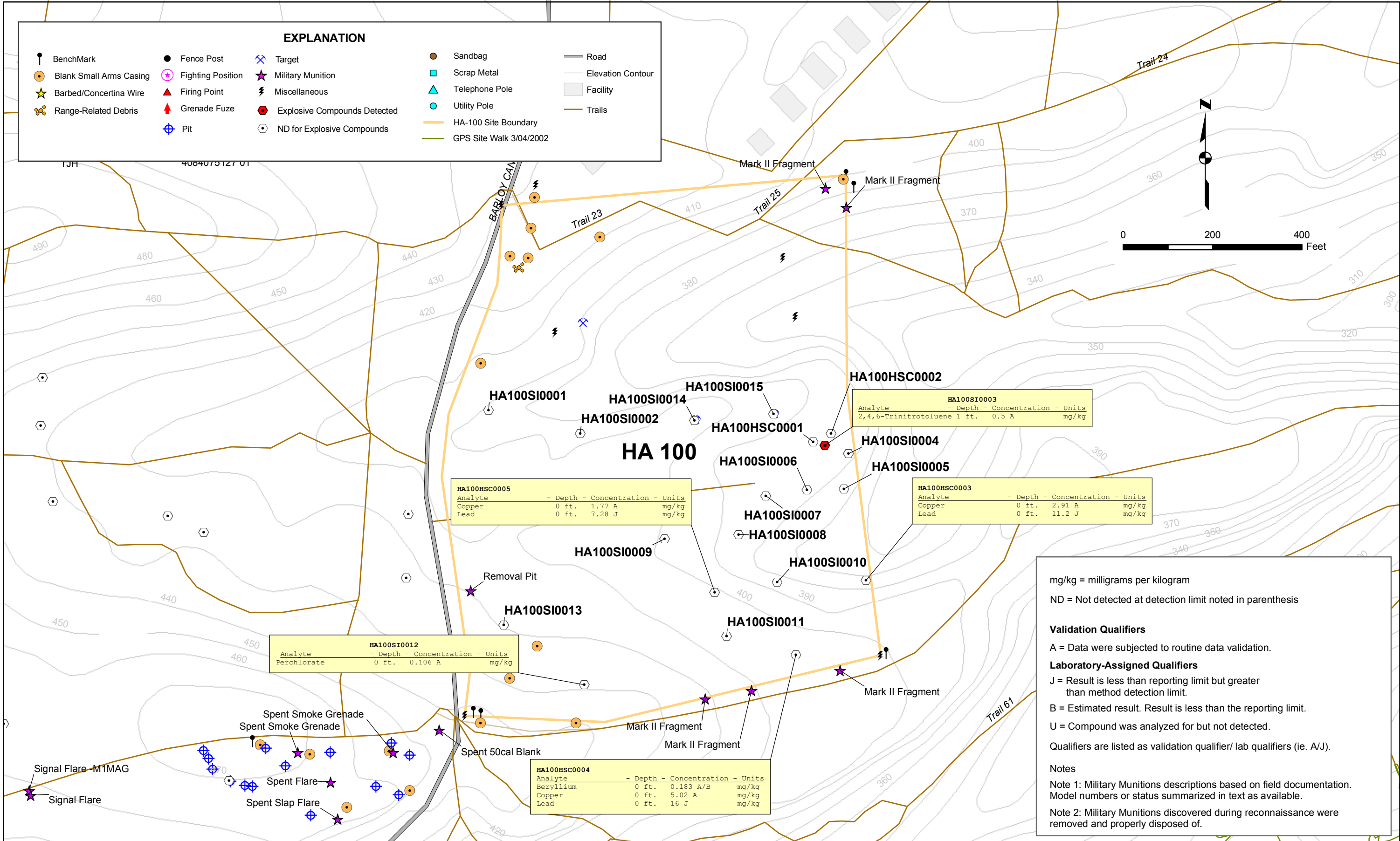
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JOB NUMBER  
4084075127 01

CHECKED CHECKED DATE

APPROVED APPROVED DATE  
2/2008

EXPLANATION				



mg/kg = milligrams per kilogram  
 ND = Not detected at detection limit noted in parenthesis

**Validation Qualifiers**  
 A = Data were subjected to routine data validation.

**Laboratory-Assigned Qualifiers**  
 J = Result is less than reporting limit but greater than method detection limit.  
 B = Estimated result. Result is less than the reporting limit.  
 U = Compound was analyzed for but not detected.

Qualifiers are listed as validation qualifier/ lab qualifiers (ie. A/J).

**Notes**  
 Note 1: Military Munitions descriptions based on field documentation. Model numbers or status summarized in text as available.  
 Note 2: Military Munitions discovered during reconnaissance were removed and properly disposed of.

DRAWN:	PROJECT NO:
ENGINEER:	SCALE: AS SHOWN
CHECKED:	APPROVED:
DATE: 1/2008	DATE:



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 Site HA-100 - Old Demolition Training Area  
 Former Fort Ord, California

Investigation Results HA-100	<b>2</b>
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HA100-Plate2.mxd - 2/28/08