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FINAL TECHNICAL MEMORANDUM ENVIRONMENTAL UPDATE SUMMARY D-9 SKEET  
RANGE MCB CAMP LEJEUNE NC  
10/01/2011  
CH2M HILL

**Final Technical Memorandum**  
**Environmental Update Summary**  
**D-9 Skeet Range**

Marine Corps Base Camp Lejeune  
Jacksonville, North Carolina



Prepared for

**Department of the Navy**

**Naval Facilities Engineering Command**  
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Prepared by

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# Environmental Update Summary

## D-9 Skeet Range, Marine Corps Base Camp Lejeune

### Jacksonville, North Carolina

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DATE: October 3, 2011



## 1 Introduction

### 1.1 Project Overview

Marine Corps Base Camp Lejeune (MCB CamLej) is planning a military construction (MILCON) project in the vicinity of the D-9 Skeet Range. In 2007, lead and polycyclic aromatic hydrocarbons (PAHs) were detected in surface soil samples collected within the shot fall zone at concentrations posing potential unacceptable risks to human health and ecological receptors. As a result, the *Expanded Site Inspection Report for Wallace Creek MILCON Environmental Support* recommended a removal action for impacted soil to reduce risks from lead and PAH contamination on the site (CH2M HILL, 2010b).

In 2010, a draft Engineering Evaluation/Cost Analysis (EE/CA) for a Non-time-critical Removal Action (NTCRA) at the D-9 Skeet Range was prepared, which identified the removal action area and evaluated the effectiveness, implementability, and cost of various alternatives to treat the impacted soil (CH2M HILL, 2010a).

After the draft EE/CA was submitted, fill was placed and graded in the northwestern portion of the D-9 Skeet Range. This fill was spread into the proposed removal area. As a result, the Department of the Navy (Navy) executed a project to verify and update the planned NTCRA removal area. Additionally, construction of a road within the graded area is proposed. Construction of an Armory is planned adjacent to the eastern portion of the removal area. Further sampling was completed in these construction areas to determine any impacts on the proposed MILCON activities.

### 1.2 Project Objectives

The objective of this additional investigation was to more finely delineate the NTCRA removal area, to determine any environmental impacts within MILCON areas, and to update the EE/CA. The following tasks were completed to achieve this objective:

- Delineated the extent of lead and PAH impacts in soil in the graded area and within the proposed Armory site
- Updated the extent of contamination for the EE/CA and NTCRA

## 2 Site Background

### 2.1 Site Location and Description

The D-9 Skeet Range is an inactive range located west of Holcomb Boulevard and north of Parachute Tower Road and encompasses approximately 187 acres (**Figure 1**). Based on site use and features, the D-9 Skeet Range is divided into three areas: the north area (north of Bearhead Creek), the south area (south of Bearhead Creek and excluding the theoretical shot fall zone), and the theoretical shot fall zone. Current investigation activities only included the recently disturbed areas in the south area and the theoretical shot fall zone.

On a skeet range, the area in which most shot will fall (and is expected to have the highest skeet-related contamination) is approximately 375 to 600 feet from the firing position (Interstate Technology and Regulatory Council [ITRC], 2005). The theoretical shot fall zone is a fan-shaped area that extends a maximum distance of 680 feet from the shooting position, based on the load, angle at which the shot was fired, wind, and other factors. The theoretical shot fall zone on **Figure 1** is based on historical shooting positions at the D-9 Skeet Range.

The majority of the total range area is wooded; however, there are cleared areas near the firing position and theoretical shot fall zone, along the power line corridor that runs north-south through the range, and around the developed portions. The D-9 Skeet Range is bisected by Bearhead Creek, which flows from east to west across the site. Bearhead Creek flows into Wallace Creek, which flows into the New River. Several smaller drainage features are also present throughout the D-9 Skeet Range. The topography generally slopes toward Bearhead Creek from both the north and south, with a change in elevation of approximately 20 feet and 15 feet, respectively, between the north and south boundaries to the creek.

Based on historical investigation activities, lead and PAHs had been detected in surface soil within the shot fall zone. The area identified for treatment in the draft EE/CA was based on exceedances of the site-specific clean-up levels defined in **Table 1**. A total of 15.8 acres of impacted soil to a depth of one foot below ground surface (bgs) were recommended for removal action, as shown on **Figure 2**.

### 2.2 Current MILCON Activities

The Wallace Creek MILCON project consists of barracks support buildings (e.g., mess hall, fitness center) and parking areas, covering approximately 100 acres north of Hadnot Point and south of Wallace Creek. Current MILCON activities in the vicinity of the D-9 Skeet Range include the construction of a road within the 11.5-acre graded area and the construction of an Armory within the eastern portion of the removal area (**Figure 2**). Approximately 500 linear feet of the proposed roadway overlaps the graded area immediately northwest of the shot fall zone. The project limits for the proposed Armory overlap approximately 5,100 square feet of the removal area. The remaining activities for the Wallace Creek MILCON project will not be initiated until the NTCRA is completed.

## 3 Field Investigation Activities

Field activities were conducted in July 2011 in accordance with the Environmental Update Work Plan (CH2M HILL, 2011) and the Standard Operating Procedures (SOPs) provided in the MCB CamLej Master Project Plans (CH2M HILL, 2008).

The Environmental Update field activities consisted of the following:

- Vegetation clearing
- Utility locating
- Surface and subsurface soil sampling

Detailed investigation activities conducted at the D-9 Skeet Range are summarized below.

### 3.1 Vegetation Clearance

On July 18, 2011, vegetation clearance was conducted to clear four transects in the vicinity of the proposed Armory to allow access to sample locations. Each transect was approximately six feet wide and 450 feet long, as shown on **Figure 3**. Trees and brush less than three inches in diameter were mulched and stumps ground to within six inches of the ground surface. Vegetation material was discarded in the areas adjacent to the transects. All vegetation clearing was performed by Mid-Atlantic Drilling, Inc. of Carolina Beach, North Carolina.

### 3.2 Utility Locate

All buried utilities within the entire 11.5-acre graded area and the 16 sample locations in the vicinity of the proposed Armory were located and clearly marked within a 20-foot radius of each proposed sampling location prior to the start of sampling. Utilities were located by East Coast Land Surveying of Erwin, North Carolina on July 18, 2011.

### 3.3 Soil Sampling

#### Proposed Armory

On July 19, 2011, soil samples were collected in the vicinity of the proposed Armory, as shown on **Figure 3**. Sixteen discrete surface soil samples (SR-SS54 to SR-SS69) were collected from zero to one foot bgs and 16 discrete subsurface samples (SR-SB54 to SR-SB69) were collected from one to three feet bgs using decontaminated steel hand augers. No drainage features or wetlands were identified in this area.

Soil samples collected in the vicinity of the proposed Armory were sent to Environmental Conservation Laboratories (ENCO) of Orlando, Florida for analysis of lead by Method 6020 and PAHs by Method 8270. Sample analysis was conducted in accordance with the Environmental Update Work Plan (CH2M HILL, 2011).

#### Graded Area and Proposed Road

During the weeks of July 18, and July 25, 2011, surface soil and subsurface soil samples were collected in the graded area, beginning with the proposed road area. The 11.5-acre graded area was divided into 75-foot by 75-foot grids, as shown on **Figure 3**. A composite surface soil sample (zero to one foot bgs) was collected from each grid that had graded material overlying the native material, a total of 102 grids. A composite subsurface soil sample was collected from each grid that contained more than one foot of graded material. Since the

depth of material was less than a foot in many places, only 58 grids were sampled. Composite samples were comprised of five evenly spaced aliquots collected within each grid using decontaminated stainless steel hand augers and then composited using decontaminated stainless steel spoons and bowls.

Surface soil samples were collected from zero to one foot bgs. Subsurface soil samples were collected from a depth of one foot bgs to a depth representative of the underlying native material. Field conditions, such as changes in compaction and lithology, were used to determine the depth of native soil at each location. In areas where fill was present, native soil was encountered between 0.5 and 6 feet bgs. At most locations, native soil was identified by the presence of dark sand or dark soil with roots. Based on field observations, impacted soil within the removal area was not disturbed. Rather, the graded material appeared to be new soil (fill) only.

Four mounds of soil were encountered within the graded area in grids E6, G1/G2, I2/J2, and I7/I8/J6/J7/J8. The mounds were approximately 5 feet to 10 feet tall with square footage ranging from approximately 400 square feet to 2,300 square feet. At least one out of the five composite sample aliquots for grids containing mounds was taken from the mound. If the mound overlapped more than one grid, the mound was sampled in association with each grid.

The composited surface and subsurface soil samples were screened in the field for lead using a portable x-ray fluorescence (XRF) analyzer. Confirmation samples were collected from 20 percent of the sample locations and submitted to ENCO for analysis of lead by Method 6020 and PAHs by Method 8270. Sample analysis was conducted in accordance with the Environmental Update Work Plan (CH2M HILL, 2011).

Environmental Data Services Inc. of Williamsburg, Virginia was subcontracted to validate laboratory analytical data. The analytical results were evaluated to assess the technical adequacy and usability of the data. Data was technically reviewed as described in the Environmental Update Work Plan (CH2M HILL, 2011).

## 4 Investigation Results

### 4.1 Proposed Armory Area

Surface soil and subsurface soil analytical results for the proposed Armory area are presented in **Tables 2** and **3**, respectively. Surface soil exceedances for the proposed Armory area are presented on **Figure 4**.

#### Surface Soil

Three surface soil samples contained lead at concentrations exceeding the clean-up level of 400 milligrams per kilogram (mg/kg). Surface soil samples collected from locations SR-SS55, SR-SS56, and SR-SS57 contained lead at concentrations of 717 mg/kg, 83,700 mg/kg, and 411 mg/kg respectively. These surface soil sample locations are located on the western-most transect within the proposed removal area and outside of the proposed project limits (**Figure 4**). No PAHs were detected in the surface soil samples collected from within the proposed Armory area at concentrations exceeding the clean-up levels.

## Subsurface Soil

No subsurface soil samples collected in the proposed Armory area contained lead or PAHs at concentrations exceeding the clean-up levels.

## 4.2 Graded Area and Proposed Road

Surface soil and subsurface soil analytical results for the graded area and proposed road are presented in **Tables 4** and **5**, respectively. Surface soil and subsurface soil exceedances for the proposed graded area and proposed road are presented on **Figures 5** and **6**, respectively.

### XRF Data Correlation

Soil samples collected within the graded area and proposed road area were screened in the field for lead using a portable XRF analyzer. Thirty-six confirmation samples were collected for laboratory analysis; 23 from surface soil and 13 from subsurface soil. A comparison of lead results from the XRF and confirmatory samples are presented in **Tables 6** and **7**. With the exclusion of two outliers, the XRF results strongly correlate to the fixed lab results, as shown on **Figure 7**. Lead was detected in 18 of the confirmation samples at concentrations higher than the XRF results and in 18 of the confirmation samples at concentrations lower than the XRF results. The lower detection limit for lead using the XRF analyzer is 20 mg/kg. Only considering lead results greater than 20 mg/kg, lead was detected in 13 of 19 confirmation samples at concentrations lower than the XRF results. This suggests that the XRF results discussed herein are conservative. The discrepancy between the XRF results and the analytical results for the two outliers, surface soil samples collected from grids J08 and K08, is over three orders of magnitude, suggesting that the confirmation samples may have contained pieces of lead shot, which may have skewed the analytical results.

### Graded Area Surface Soil

Based on XRF results, surface soil samples collected from four grids contained lead at concentrations exceeding the clean-up level of 400 mg/kg. Of these, only three grids are located outside the NTCRA area presented in the Draft EE/CA. Surface soil samples collected from grids G04, H03, and H04 contained lead at concentrations of 558 mg/kg, 476 mg/kg, and 463 mg/kg, respectively. Confirmation samples collected from these locations confirmed the presence of lead in exceedance of the clean-up level.

Four PAHs, including benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected at concentrations exceeding clean-up levels in the surface soil sample collected from SR-SSM07; however, this location is within the NTCRA area.

There were no exceedances of clean-up levels in soil samples collected from grids containing mounds.

### Graded Area Subsurface Soil

No subsurface soil samples collected in the graded area contained lead or PAHs at concentrations exceeding the clean-up levels.

## Proposed Road

Based on XRF results and analysis of confirmation samples, neither lead nor PAHs were detected in surface or subsurface soil samples collected from grids within the proposed road area at concentrations exceeding the clean-up levels.

## 5 Conclusions

Based on the results of this environmental update, the NTCRA area will be revised as shown on **Figure 8**.

In the proposed Armory area, the NTCRA area will be reduced to only include those locations where samples contained lead in exceedance of clean-up levels. The construction limits for the proposed Armory will be outside of the NTCRA area; therefore, no further human health risk screening is necessary and MILCON activities can proceed as planned.

In the graded area, the NTCRA area will be expanded to include the three grids that exceeded lead clean-up levels, G04, H03, and H04. The proposed road will be outside of the NTCRA area; therefore, no further human health risk screening is necessary and MILCON activities can proceed as planned.

The EE/CA will be updated accordingly to include any changes to the nature and extent of contamination, extent of the removal area, treatment alternatives, removal quantities, and cost estimates.

Prior to initiating MILCON activities in the proposed road or Armory areas, adequate signage and/or barriers will be installed to prevent accidental intrusion into known impacted areas.

## 6 References

CH2M HILL. 2011. *Environmental Update Work Plan Technical Memorandum, D-9 Skeet Range, MCB CamLej, Jacksonville, North Carolina*. June.

CH2M HILL. 2010a. *Draft EE/CA, D-9 Skeet Range Source Removal, MCB CamLej, Jacksonville, North Carolina*. June.

CH2M HILL. 2010b. *Final Expanded Site Inspection Report, Wallace Creek MILCON Environmental Support, Former Naval Research Lab Area (IR Sites 19 and 20), IR Site 25, and D-9 Skeet Range South Area, MCB CamLej, Jacksonville, North Carolina*. October.

CH2M HILL. 2008. *Final MCB CamLej Master Project Plans, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina*. June.

Interstate Technology and Regulatory Council (ITRC). 2005. *Technical Guideline: Environmental Management at Operating Outdoor Small Arms Firing Ranges*. February.

## Tables

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**TABLE 1**  
 Summary of Site Specific Clean-up Levels  
*Environmental Update Tech Memo*  
*D-9 Skeet Range*  
*MCB CamLej*  
*Jacksonville, North Carolina*

<b>Soil Screening Criteria</b>	<b>Clean-up Levels<sup>1</sup></b>
<b>Metals (mg/kg)</b>	
Lead	400
<b>PAHs (mg/kg)</b>	
Benzo(a)anthracene	1.5
Benzo(a)pyrene	0.15
Benzo(b)fluoranthene	1.5
Dibenz(a,h)anthracene	0.15
Indeno(1,2,3-cd)pyrene	1.5

1. Site-specific clean-up levels are the Residential Soil Risk Screening Levels (RSLs) adjusted to target risk of  $1 \times 10^{-5}$  so that the cumulative risk associated with exposure to the PAHs is below  $1 \times 10^{-4}$ , the upper end of EPA's acceptable risk range.

mg/kg = milligrams per kilogram

PAHs = polycyclic aromatic hydrocarbons

TABLE 2  
Proposed Armory Area Surface Soil Analytical Results  
Environmental Update Tech Memo  
D-9 Sleet Range  
MCB CamLej  
Jacksonville, North Carolina

Station ID	Site Specific Clean-up Level	SR-IS54	SR-IS55	SR-IS56	SR-IS57		SR-IS58	SR-IS59	SR-IS60	SR-IS61	SR-IS62	SR-IS63		SR-IS64	SR-IS65	SR-IS66	SR-IS67	SR-IS68	SR-IS69	
Sample ID		SR-SS54-11C	SR-SS55-11C	SR-SS56-11C	SR-SS57-11C	SR-SS57D-11C	SR-SS58-11C	SR-SS59-11C	SR-SS60-11C	SR-SS61-11C	SR-SS62-11C	SR-SS63-11C	SR-SS63D-11C	SR-SS64-11C	SR-SS65-11C	SR-SS66-11C	SR-SS67-11C	SR-SS68-11C	SR-SS69-11C	
Sample Date		07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11
Chemical Name																				
<b>Semivolatile Organic Compounds (MG/KG)</b>																				
Benzo(a)anthracene	1.5	<b>0.058</b>	<b>0.022 J</b>	<b>0.033 J</b>	<b>0.029 J</b>	<b>0.028 J</b>	<b>0.037</b>	<b>0.02 J</b>	<b>0.03 J</b>	<b>0.027 J</b>	<b>0.03 J</b>	<b>0.026 J</b>	<b>0.026 J</b>	<b>0.015 J</b>	<b>0.018 J</b>	<b>0.029 J</b>	<b>0.03 J</b>	<b>0.043</b>	<b>0.024 J</b>	
Benzo(a)pyrene	0.15	<b>0.087</b>	<b>0.022 J</b>	<b>0.038 J</b>	<b>0.03 J</b>	<b>0.027 J</b>	<b>0.046</b>	<b>0.015 J</b>	<b>0.03 J</b>	<b>0.029 J</b>	<b>0.035</b>	<b>0.028 J</b>	<b>0.028 J</b>	<b>0.009 J</b>	<b>0.014 J</b>	<b>0.034 J</b>	<b>0.029 J</b>	<b>0.059</b>	<b>0.026 J</b>	
Benzo(b)fluoranthene	1.5	<b>0.1</b>	<b>0.027 J</b>	<b>0.045</b>	<b>0.042</b>	<b>0.039</b>	<b>0.062</b>	<b>0.021 J</b>	<b>0.04</b>	<b>0.037 J</b>	<b>0.043</b>	<b>0.037</b>	<b>0.037</b>	<b>0.014 J</b>	<b>0.02 J</b>	<b>0.043</b>	<b>0.053</b>	<b>0.17</b>	<b>0.043</b>	
Benzo(g,h,i)perylene	17,000	<b>0.066</b>	0.026 U	<b>0.026 J</b>	<b>0.025 J</b>	<b>0.022 J</b>	<b>0.039</b>	<b>0.012 J</b>	<b>0.022 J</b>	<b>0.02 J</b>	<b>0.025 J</b>	<b>0.019 J</b>	<b>0.019 J</b>	0.027 U	0.027 U	<b>0.022 J</b>	<b>0.024 J</b>	<b>0.039 J</b>	<b>0.017 J</b>	
Benzo(k)fluoranthene	15	<b>0.042</b>	0.026 U	<b>0.018 J</b>	<b>0.016 J</b>	<b>0.014 J</b>	<b>0.024 J</b>	0.026 U	<b>0.015 J</b>	<b>0.014 J</b>	<b>0.017 J</b>	<b>0.014 J</b>	<b>0.014 J</b>	0.027 U	0.027 U	<b>0.018 J</b>	<b>0.02 J</b>	<b>0.066</b>	<b>0.015 J</b>	
Chrysene	150	<b>0.065</b>	<b>0.015 J</b>	<b>0.027 J</b>	<b>0.024 J</b>	<b>0.024 J</b>	<b>0.036</b>	<b>0.012 J</b>	<b>0.025 J</b>	<b>0.021 J</b>	<b>0.026 J</b>	<b>0.022 J</b>	<b>0.022 J</b>	0.027 U	0.027 U	<b>0.023 J</b>	<b>0.04</b>	<b>0.14</b>	<b>0.02 J</b>	
Dibenz(a,h)anthracene	0.15	<b>0.012 J</b>	0.026 U	0.03 U	0.028 U	0.028 U	0.025 U	0.026 U	0.026 U	0.03 U	0.026 U	0.026 U	0.026 U	0.027 U	0.027 U	0.026 U	0.026 U	0.031 U	0.026 U	
Fluoranthene	23,000	<b>0.074</b>	<b>0.022 J</b>	<b>0.033 J</b>	<b>0.03 J</b>	<b>0.03 J</b>	<b>0.046</b>	<b>0.017 J</b>	<b>0.035</b>	<b>0.029 J</b>	<b>0.032 J</b>	<b>0.031 J</b>	<b>0.03 J</b>	0.027 U	<b>0.015 J</b>	<b>0.031 J</b>	<b>0.072</b>	<b>0.32</b>	<b>0.029 J</b>	
Indeno(1,2,3-cd)pyrene	1.5	<b>0.053</b>	0.026 U	<b>0.021 J</b>	<b>0.021 J</b>	<b>0.018 J</b>	<b>0.031 J</b>	0.026 U	<b>0.018 J</b>	<b>0.018 J</b>	<b>0.021 J</b>	<b>0.016 J</b>	<b>0.017 J</b>	0.027 U	0.027 U	<b>0.018 J</b>	<b>0.02 J</b>	<b>0.041</b>	<b>0.015 J</b>	
Phenanthrene	170,000	<b>0.025 J</b>	<b>0.028 J</b>	0.03 U	0.028 U	0.028 U	0.025 U	0.026 U	0.026 U	0.03 U	0.026 U	0.026 U	0.026 U	0.027 U	0.027 U	0.026 U	0.026 U	<b>0.097</b>	0.026 U	
Pyrene	17,000	<b>0.069</b>	0.026 U	<b>0.031 J</b>	<b>0.027 J</b>	<b>0.027 J</b>	<b>0.043</b>	<b>0.015 J</b>	<b>0.031 J</b>	<b>0.027 J</b>	<b>0.03 J</b>	<b>0.027 J</b>	<b>0.026 J</b>	0.027 U	<b>0.014 J</b>	<b>0.028 J</b>	<b>0.057</b>	<b>0.22</b>	<b>0.026 J</b>	
<b>Total Metals (MG/KG)</b>																				
Lead	400	<b>365</b>	<b>717</b>	<b>83,700</b>	<b>411</b>	<b>235</b>	<b>45.2</b>	<b>235</b>	<b>270</b>	<b>99.8</b>	<b>96.3</b>	<b>217</b>	<b>229</b>	<b>28.2</b>	<b>97.6</b>	<b>68.1</b>	<b>61.1</b>	<b>31.4</b>	<b>27.2</b>	

Notes:  
**Exceeds Site Specific Clean-Up Levels**  
**Bold indicates detections**  
J - Analyte present, value may or may not be accurate or precise  
U - The material was analyzed for, but not detected  
MG/KG - Milligrams per kilogram

TABLE 3  
Proposed Armory Area Subsurface Soil Analytical Results  
Environmental Update Tech Memo  
D-9 Skeet Range  
MCB CamLej  
Jacksonville, North Carolina

Station ID	Site Specific	SR-IS54	SR-IS55	SR-IS56	SR-IS57	SR-IS58	SR-IS59	SR-IS60	SR-IS61	SR-IS62	SR-IS63	SR-IS64	SR-IS65	SR-IS66	SR-IS67	SR-IS68	SR-IS69		
Sample ID	Clean-Up	SR-SB54-1-3-11C	SR-SB55-1-3-11C	SR-SB56-1-3-11C	SR-SB57-1-3-11C	SR-SB57D-1-3-11C	SR-SB58-1-3-11C	SR-SB59-1-3-11C	SR-SB60-1-3-11C	SR-SB61-1-3-11C	SR-SB62-1-3-11C	SR-SB63-1-3-11C	SR-SB64-1-3-11C	SR-SB65-1-3-11C	SR-SB66-1-3-11C	SR-SB67-1-3-11C	SR-SB67D-1-3-11C	SR-SB68-1-3-11C	SR-SB69-1-3-11C
Sample Date	Level	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11	07/19/11
Chemical Name																			
<b>Semivolatile Organic Compounds (MG/KG)</b>																			
Benzo(a)anthracene	1.5	<b>0.02 J</b>	0.026 U	<b>0.014 J</b>	<b>0.012 J</b>	<b>0.016 J</b>	0.026 U	0.026 U	0.026 U	<b>0.014 J</b>	<b>0.011 J</b>	<b>0.011 J</b>	<b>0.011 J</b>	0.028 U	<b>0.032 J</b>	<b>0.018 J</b>	<b>0.016 J</b>	<b>0.037 J</b>	<b>0.011 J</b>
Benzo(a)pyrene	0.15	<b>0.018 J</b>	0.026 U	0.026 U	0.026 U	<b>0.0092 J</b>	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.041</b>	0.031 U	0.032 U	<b>0.049</b>	0.026 U
Benzo(b)fluoranthene	1.5	<b>0.024 J</b>	0.026 U	0.026 U	0.026 U	<b>0.013 J</b>	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.053</b>	<b>0.016 J</b>	0.032 U	<b>0.17</b>	0.026 U
Benzo(g,h,i)perylene	17,000	<b>0.012 J</b>	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.034</b>	0.031 U	0.032 U	<b>0.043</b>	0.026 U
Benzo(k)fluoranthene	15	0.026 U	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.017 J</b>	0.031 U	0.032 U	<b>0.05</b>	0.026 U
Chrysene	150	<b>0.013 J</b>	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.031 J</b>	0.031 U	0.032 U	<b>0.14</b>	0.026 U
Fluoranthene	23,000	<b>0.017 J</b>	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	0.026 U	0.031 U	<b>0.018 J</b>	<b>0.29</b>	0.026 U
Indeno(1,2,3-cd)pyrene	1.5	0.026 U	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.026 J</b>	0.031 U	0.032 U	<b>0.042</b>	0.026 U
Phenanthrene	170,000	0.026 U	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	0.026 U	0.031 U	0.032 U	<b>0.084</b>	0.026 U
Pyrene	17,000	<b>0.016 J</b>	0.026 U	0.026 U	0.026 U	0.028 U	0.026 U	0.026 U	0.026 U	0.03 U	0.026 U	0.027 U	0.026 U	0.028 U	<b>0.033 J</b>	0.031 U	0.032 U	<b>0.2</b>	0.026 U
<b>Total Metals (MG/KG)</b>																			
Lead	400	<b>119</b>	<b>32</b>	<b>92.8</b>	<b>90.4</b>	<b>71.4</b>	<b>10.3</b>	<b>24</b>	<b>29.3</b>	<b>38.2</b>	<b>10.3</b>	<b>24.8</b>	<b>8.33</b>	<b>11.6</b>	<b>28.7</b>	<b>20</b>	<b>18.9</b>	<b>20</b>	<b>7.48</b>

Notes:  
**Bold indicates detections**  
J - Analyte present, value may or may not be accurate or precise  
U - The material was analyzed for, but not detected  
MG/KG - Milligrams per kilogram

TABLE 4  
 Graded Area and Proposed Roadway Surface Soil Analytical Results  
*Environmental Update Tech Memo*  
*D-9 Skeet Range*  
*MCB CamLej*  
*Jacksonville, North Carolina*

Station ID	Site Specific Clean-Up Level	SR-ISC06	SR-ISD06		SR-ISE03		SR-ISE04	SR-ISE06	SR-ISE08	SR-ISE10	SR-ISF09	SR-ISG04	SR-ISH03	SR-ISH04	SR-ISH08
Sample ID		SR-SSC06-11C	SR-SSD06-11C	SR-SSD06D-11C	SR-SSE03-11C	SR-SSE03D-11C	SR-SSE04-11C	SR-SSE06-11C	SR-SSE08-11C	SR-SSE10-11C	SR-SSF09-11C	SR-SSG04-11C	SR-SSH03-11C	SR-SSH04-11C	SR-SSH08-11C
Sample Date		07/22/11	07/19/11	07/19/11	07/20/11	07/20/11	07/20/11	07/25/11	07/25/11	07/20/11	07/25/11	07/21/11	07/26/11	07/26/11	07/26/11
Chemical Name															
<b>Semivolatile Organic Compounds (MG/KG)</b>															
Acenaphthene	34,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U	0.027 U	0.026 U
Anthracene	170,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U	0.027 U	0.026 U
Benzo(a)anthracene	1.5	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.034 J</b>	<b>0.018 J</b>	<b>0.03 J</b>	<b>0.013 J</b>	<b>0.025 J</b>	0.026 U
Benzo(a)pyrene	0.15	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.038</b>	<b>0.0081 J</b>	<b>0.034 J</b>	0.028 U	<b>0.023 J</b>	0.026 U
Benzo(b)fluoranthene	1.5	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.047</b>	<b>0.013 J</b>	<b>0.041</b>	0.028 U	<b>0.032 J</b>	0.026 U
Benzo(g,h,i)perylene	17,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.028 J</b>	0.026 U	<b>0.027 J</b>	0.028 U	<b>0.021 J</b>	0.026 U
Benzo(k)fluoranthene	15	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.021 J</b>	0.026 U	<b>0.018 J</b>	0.028 U	0.027 U	0.026 U
Chrysene	150	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.027 J</b>	0.026 U	<b>0.023 J</b>	0.028 U	<b>0.017 J</b>	0.026 U
Dibenz(a,h)anthracene	0.15	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U	0.027 U	0.026 U
Fluoranthene	23,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.031 J</b>	<b>0.016 J</b>	<b>0.031 J</b>	0.028 U	<b>0.021 J</b>	0.026 U
Fluorene	23,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U	0.027 U	0.026 U
Indeno(1,2,3-cd)pyrene	1.5	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.022 J</b>	0.026 U	<b>0.022 J</b>	0.028 U	<b>0.016 J</b>	0.026 U
Phenanthrene	170,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U	0.027 U	0.026 U
Pyrene	17,000	0.026 U	0.027 U	0.027 U	0.027 U	0.027 U	0.032 U	0.028 U	0.027 U	<b>0.031 J</b>	<b>0.013 J</b>	<b>0.028 J</b>	0.028 U	<b>0.019 J</b>	0.026 U
<b>Total Metals (MG/KG)</b>															
Lead	400	<b>5.82</b>	<b>7.38</b>	<b>7.23</b>	<b>7.74</b>	<b>7.86</b>	<b>7.34</b>	<b>8.41</b>	<b>6.7</b>	<b>44.1</b>	<b>10.5</b>	<b>484</b>	<b>411</b>	<b>660</b>	<b>6.89</b>

Notes:  
**Exceeds Site Specific Clean-Up Levels**  
**Bold indicates detections**  
 J - Analyte present, value may or may not be accurate or precise  
 U - The material was analyzed for, but not detected  
 MG/KG - Milligrams per kilogram

TABLE 4

Graded Area and Proposed Roadway Surface Soil Analytical Results  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 Jacksonville, North Carolina

Station ID	SR-ISI01	SR-ISI06		SR-ISJ03	SR-ISJ07	SR-ISJ08	SR-ISK08	SR-ISL05	SR-ISL09	SR-ISM05	SR-ISM07	SR-ISM08	
Sample ID	SR-SSI01-11C	SR-SSI06-11C	SR-SSI06D-11C	SR-SSJ03-11C	SR-SSJ07-11C	SR-SSJ08-11C	SR-SSK08-11C	SR-SSL05-11C	SR-SSL09-11C	SR-SSM05-11C	SR-SSM07-11C	SR-SSM08-11C	SR-SSM08D-11C
Sample Date	07/22/11	07/26/11	07/26/11	07/27/11	07/27/11	07/27/11	07/27/11	07/27/11	07/27/11	07/28/11	07/28/11	07/28/11	07/28/11
Chemical Name													
Semivolatile Organic Compounds (MG/KG)													
Acenaphthene	0.027 U	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	0.029 U	<b>0.18</b>	0.028 U	0.027 U
Anthracene	0.027 U	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	0.029 U	<b>0.12</b>	0.028 U	0.027 U
Benzo(a)anthracene	<b>0.072</b>	0.028 U	0.028 U	<b>0.013 J</b>	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.03 J</b>	<b>1.50</b>	0.028 U	0.027 U
Benzo(a)pyrene	<b>0.110</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.027 J</b>	<b>2.90</b>	0.028 U	0.027 U
Benzo(b)fluoranthene	<b>0.120</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.036 J</b>	<b>3.2</b>	0.028 U	0.027 U
Benzo(g,h,i)perylene	<b>0.089</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.026 J</b>	<b>1.70</b>	0.028 U	0.027 U
Benzo(k)fluoranthene	<b>0.050</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.015 J</b>	<b>0.99</b>	0.028 U	0.027 U
Chrysene	<b>0.067</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.022 J</b>	<b>1.60</b>	0.028 U	0.027 U
Dibenz(a,h)anthracene	<b>0.013 J</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	0.029 U	<b>0.42</b>	0.028 U	0.027 U
Fluoranthene	<b>0.100</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.026 J</b>	<b>1.40</b>	0.028 U	0.027 U
Fluorene	0.027 U	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	0.029 U	<b>0.037 J</b>	0.028 U	0.027 U
Indeno(1,2,3-cd)pyrene	<b>0.070</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.019 J</b>	<b>1.6</b>	0.028 U	0.027 U
Phenanthrene	<b>0.048</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	0.029 U	<b>0.43</b>	0.028 U	0.027 U
Pyrene	<b>0.092</b>	0.028 U	0.028 U	0.026 U	0.028 U	0.028 U	0.029 U	0.027 U	0.027 U	<b>0.026 J</b>	<b>1.30</b>	0.028 U	0.027 U
Total Metals (MG/KG)													
Lead	258	149	111	314	79.8	49,900	57,400	31.5	9.54	44.3	1,040	13.2	17.8

Notes:

**Exceeds Site Specific Clean-Up Levels**

**Bold indicates detections**

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

MG/KG - Milligrams per kilogram

TABLE 5  
 Graded Area and Proposed Roadway Subsurface Soil Analytical Results  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 Jacksonville, North Carolina

Station ID	Site Specific Clean-Up Level	SR-ISC05	SR-ISD03	SR-ISE07	SR-ISF04	SR-ISF06	SR-ISG04	SR-ISH03	SR-ISH04	SR-ISI03	SR-ISI07	SR-ISJ04	SR-ISJ11	SR-ISM06	
Sample ID		SR-SBC05-1-2-11C	SR-SBD03-1-2_5-11C	SR-SBE07-1-2-11C	SR-SBF04-1-2-11C	SR-SBF06-1-3-11C	SR-SBG04-1-4_5-11C	SR-SBH03-1-3-11C	SR-SBH04-1-2_5-11C	SR-SBI03-1-3_5-11C	SR-SBI07-1-4-11C	SR-SBJ04-1-2_5-11C	SR-SBJ11-1-1_5-11C	SR-SBM06-1-2-11C	SR-SBM06D-1-2-11C
Sample Date		07/21/11	07/20/11	07/25/11	07/21/11	07/25/11	07/21/11	07/26/11	07/26/11	07/26/11	07/26/11	07/27/11	07/26/11	07/28/11	07/28/11
Chemical Name															
<b>Semivolatile Organic Compounds (MG/KG)</b>															
No Detections		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Total Metals (MG/KG)</b>															
Lead	400	<b>6.89</b>	<b>9.01</b>	<b>5.62</b>	<b>19.5</b>	<b>8.7</b>	<b>134</b>	<b>270</b>	<b>373</b>	<b>12.7</b>	<b>30.5</b>	<b>21.1</b>	<b>227</b>	<b>18.9</b>	<b>14.8</b>

Notes:  
 Bold indicates detections  
 MG/KG - Milligrams per kilogram

TABLE 6  
 Surface Soil XRF and Lab Results  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 Jacksonville, North Carolina

Sample ID	XRF Value ppb	Lab Results mg/kg
SR-SSA04-11C	0	NA
SR-SSA05-11C	14	NA
SR-SSB03-11C	0	NA
SR-SSB04-11C	0	NA
SR-SSB05-11C	0	NA
SR-SSB06-11C	0	NA
SR-SSC03-11C	0	NA
SR-SSC04-11C	13	NA
SR-SSC05-11C	12	NA
SR-SSC06-11C	0	5.82
SR-SSC07-11C	0	NA
SR-SSC08-11C	18	NA
SR-SSD03-11C	0	NA
SR-SSD04-11C	0	NA
SR-SSD05-11C	14	NA
SR-SSD06-11C	0	7.38
SR-SSD07-11C	0	NA
SR-SSD08-11C	0	NA
SR-SSD09-11C	26	NA
SR-SSD10-11C	41	NA
SR-SSE02-11C	0	NA
SR-SSE03-11C	0	7.86
SR-SSE04-11C	0	7.34
SR-SSE05-11C	0	NA
SR-SSE06-11C	0	8.41
SR-SSE07-11C	0	NA
SR-SSE08-11C	0	6.7
SR-SSE09-11C	15	NA
SR-SSE10-11C	51	44.1
SR-SSF02-11C	0	NA
SR-SSF03-11C	0	NA
SR-SSF04-11C	87	NA
SR-SSF05-11C	0	NA
SR-SSF06-11C	13	NA
SR-SSF07-11C	0	NA
SR-SSF08-11C	0	NA
SR-SSF09-11C	0	10.5
SR-SSF10-11C	0	NA
SR-SSG01-11C	13	NA
SR-SSG02-11C	0	NA
SR-SSG03-11C	0	NA
SR-SSG04-11C	558	484
SR-SSG05-11C	123	NA
SR-SSG06-11C	0	NA
SR-SSG07-11C	14	NA
SR-SSG08-11C	0	NA
SR-SSG09-11C	12	NA
SR-SSH01-11C	65	NA
SR-SSH02-11C	12	NA
SR-SSH03-11C	476	411
SR-SSH04-11C	463	660
SR-SSH05-11C	264	NA
SR-SSH06-11C	27	NA

TABLE 6  
 Surface Soil XRF and Lab Results  
*Environmental Update Tech Memo*  
*D-9 Skeet Range*  
*MCB CamLej*  
*Jacksonville, North Carolina*

Sample ID	XRF Value ppb	Lab Results mg/kg
SR-SSH07-11C	15	NA
SR-SSH08-11C	13	6.89
SR-SSH09-11C	0	NA
SR-SSH10-11C	19	NA
SR-SSI01-11C	255	258
SR-SSI02-11C	48	NA
SR-SSI03-11C	41	NA
SR-SSI04-11C	64	NA
SR-SSI05-11C	45	NA
SR-SSI06-11C	150	149
SR-SSI07-11C	92	NA
SR-SSI08-11C	217	NA
SR-SSI09-11C	16	NA
SR-SSI10-11C	95	NA
SR-SSI11-11C	61	NA
SR-SSJ01-11C	38	NA
SR-SSJ02-11C	0	NA
SR-SSJ03-11C	325	314
SR-SSJ04-11C	67	NA
SR-SSJ05-11C	75	NA
SR-SSJ06-11C	74	NA
SR-SSJ07-11C	270	79.8
SR-SSJ08-11C	77	49,900
SR-SSJ09-11C	0	NA
SR-SSJ10-11C	16	NA
SR-SSJ11-11C	26	NA
SR-SSK02-11C	107	NA
SR-SSK03-11C	160	NA
SR-SSK04-11C	220	NA
SR-SSK05-11C	66	NA
SR-SSK06-11C	47	NA
SR-SSK07-11C	166	NA
SR-SSK08-11C	41	57,400
SR-SSK09-11C	12	NA
SR-SSK10-11C	0	NA
SR-SSL03-11C	11	NA
SR-SSL04-11C	23	NA
SR-SSL05-11C	27	31.5
SR-SSL06-11C	46	NA
SR-SSL07-11C	35	NA
SR-SSL08-11C	34	NA
SR-SSL09-11C	11	9.54
SR-SSL10-11C	0	NA
SR-SSM04-11C	12	NA
SR-SSM05-11C	55	44.3
SR-SSM06-11C	41	NA
SR-SSM07-11C	1,080	1,040
SR-SSM08-11C	15	17.8
SR-SSM09-11C	51	NA

NA - Not analyzed

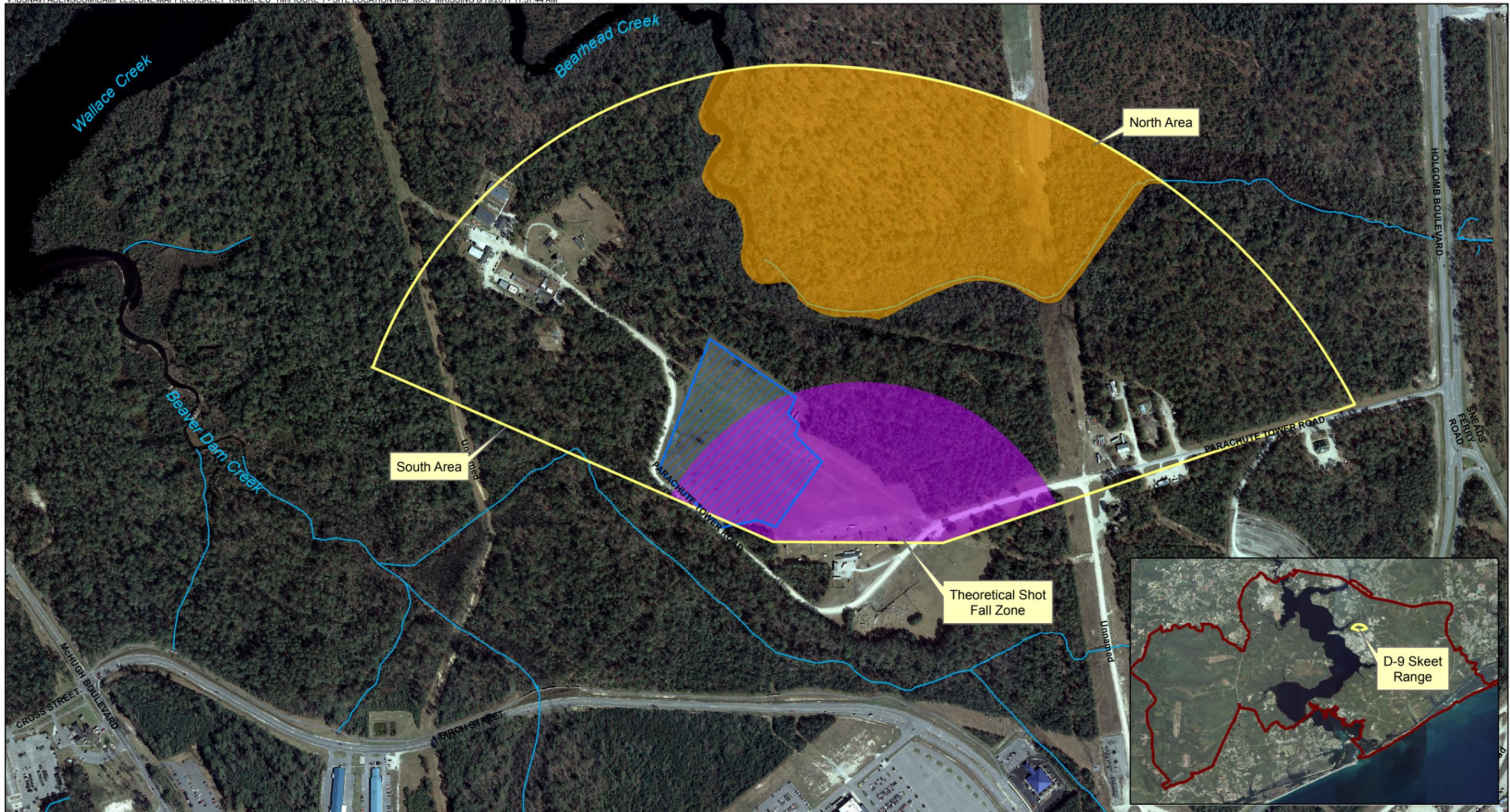
TABLE 7  
 Subsurface Soil XRF and Lab Results  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 Jacksonville, North Carolina

Sample ID	XRF Value ppb	Lab Results mg/kg
SR-SBB05-1-1.5-11C	0	NA
SR-SBC05-1-2-11C	0	6.89
SR-SBC06-1-2-11C	0	NA
SR-SBD03-1-2.5-11C	0	9.01
SR-SBD04-1-1.5-11C	0	NA
SR-SBD05-1-3-11C	23	NA
SR-SBD06-1-4-11C	0	NA
SR-SBE02-1-3-11C	0	NA
SR-SBE03-1-2-11C	0	NA
SR-SBE04-1-3-11C	0	NA
SR-SBE05-1-3-11C	16	NA
SR-SBE06-1-4-11C	0	NA
SR-SBE07-1-2-11C	0	5.62
SR-SBE08-1-1.5-11C	0	NA
SR-SBF02-1-3-11C	17	NA
SR-SBF03-1-1.5-11C	16	NA
SR-SBF04-1-2-11C	24	19.5
SR-SBF05-1-5-11C	16	NA
SR-SBF06-1-4-11C	13	8.7
SR-SBF07-1-3-11C	19	NA
SR-SBG02-1-3.5-11C	0	NA
SR-SBG03-1-3-11C	16	NA
SR-SBG04-1-4.5-11C	263	134
SR-SBG05-1.5-2.5-11C	0	NA
SR-SBG06-1.5-2-11C	14	NA
SR-SBG07-1-2.5-11C	0	NA
SR-SBG08-1-2.5-11C	17	NA
SR-SBG09-1-1.5-11C	28	NA
SR-SBH02-1-2-11C	0	NA
SR-SBH03-1-3-11C	186	270
SR-SBH04-1-2.5-11C	389	373
SR-SBH05-1-4-11C	146	NA
SR-SBH06-1-2-11C	94	NA
SR-SBH07-1-2-11C	11	NA
SR-SBH08-1-2.5-11C	0	NA
SR-SBH09-1-4-11C	15	NA
SR-SBH10-1-2.5-11C	40	NA
SR-SBI02-1-3-11C	17	NA
SR-SBI03-1-3.5-11C	14	12.7
SR-SBI04-1-2.5-11C	19	NA
SR-SBI05-1-2.5-11C	127	NA
SR-SBI07-1-4-11C	93	30.5
SR-SBI08-1-2.5-11C	38	NA
SR-SBI09-1-2.5-11C	0	NA
SR-SBI10-1-2.5-11C	21	NA
SR-SBI11-1-3-11C	15	NA
SR-SBJ02-1-6-11C	0	NA
SR-SBJ03-1-2-11C	43	NA
SR-SBJ04-1-2.5-11C	35	21.1
SR-SBJ09-1-2-11C	0	NA
SR-SBJ10-1-2.5-11C	13	NA
SR-SBJ11-1-1.5-11C	293	227
SR-SBK04-1-2-11C	54	NA
SR-SBK09-1-3-11C	16	NA
SR-SBL08-1-3-11C	20	NA
SR-SBL09-1-2-11C	16	NA
SR-SBL10-1-2.5-11C	22	NA
SR-SBM06-1-2-11C	18	18.9

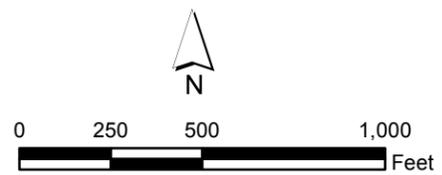
NA - Not analyzed

Figures

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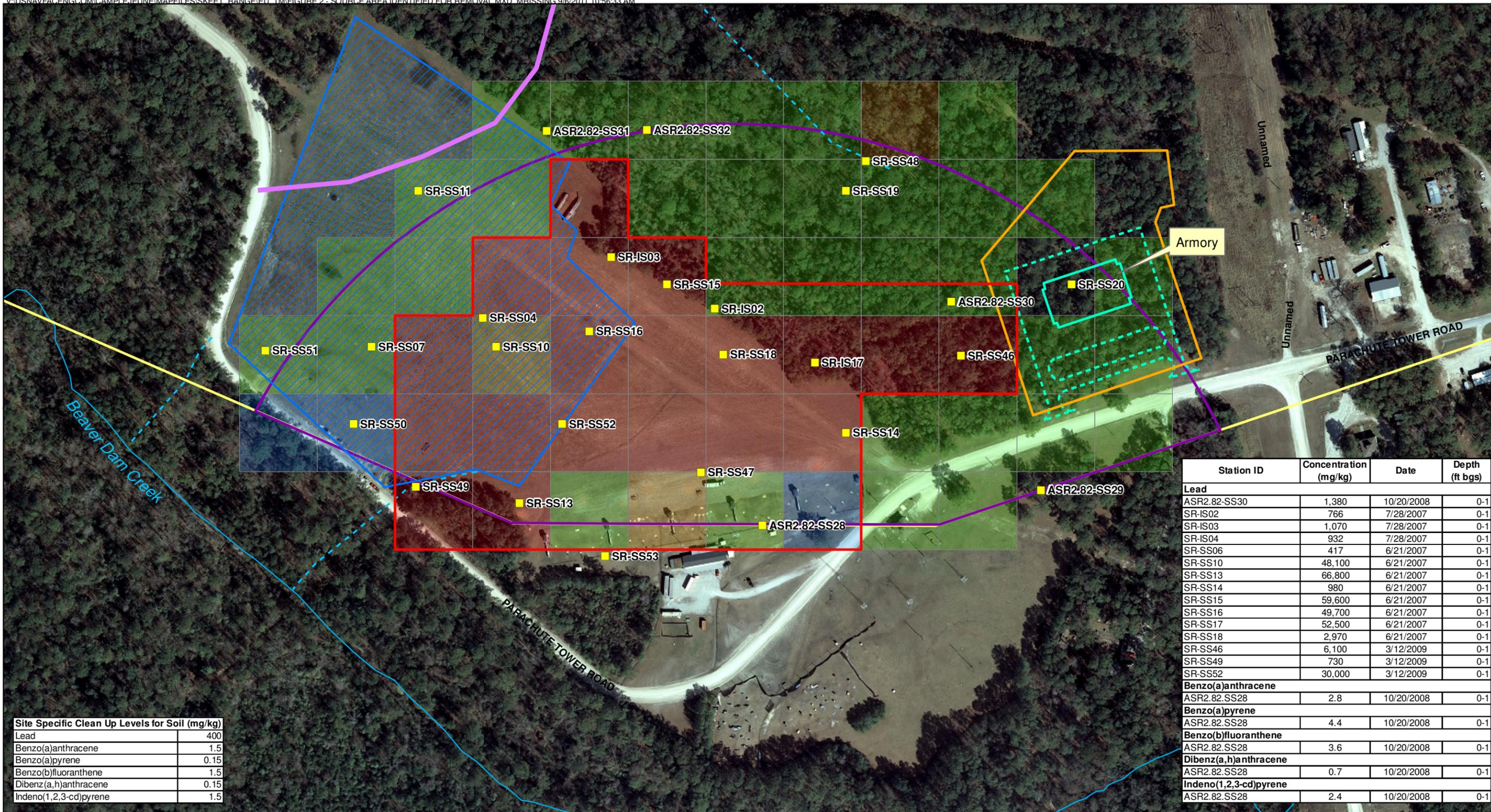
- Legend**
- Surface Water Course Centerline
  - D-9 Skeet Range
  - ▨ Graded Area
  - D-9 Skeet Range North Area
  - Theoretical Shot Fall Zone



**1 inch = 500 feet**

Figure 1  
 Site Location Map  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 North Carolina





Site Specific Clean Up Levels for Soil (mg/kg)	
Lead	400
Benzo(a)anthracene	1.5
Benzo(a)pyrene	0.15
Benzo(b)fluoranthene	1.5
Dibenz(a,h)anthracene	0.15
Indeno(1,2,3-cd)pyrene	1.5

Station ID	Concentration (mg/kg)	Date	Depth (ft bgs)
<b>Lead</b>			
ASR2.82-SS30	1,380	10/20/2008	0-1
SR-IS02	766	7/28/2007	0-1
SR-IS03	1,070	7/28/2007	0-1
SR-IS04	932	7/28/2007	0-1
SR-SS06	417	6/21/2007	0-1
SR-SS10	48,100	6/21/2007	0-1
SR-SS13	66,800	6/21/2007	0-1
SR-SS14	980	6/21/2007	0-1
SR-SS15	59,600	6/21/2007	0-1
SR-SS16	49,700	6/21/2007	0-1
SR-SS17	52,500	6/21/2007	0-1
SR-SS18	2,970	6/21/2007	0-1
SR-SS46	6,100	3/12/2009	0-1
SR-SS49	730	3/12/2009	0-1
SR-SS52	30,000	3/12/2009	0-1
<b>Benzo(a)anthracene</b>			
ASR2.82.SS28	2.8	10/20/2008	0-1
<b>Benzo(a)pyrene</b>			
ASR2.82.SS28	4.4	10/20/2008	0-1
<b>Benzo(b)fluoranthene</b>			
ASR2.82.SS28	3.6	10/20/2008	0-1
<b>Dibenz(a,h)anthracene</b>			
ASR2.82.SS28	0.7	10/20/2008	0-1
<b>Indeno(1,2,3-cd)pyrene</b>			
ASR2.82.SS28	2.4	10/20/2008	0-1

- Legend**
- Sample Location
  - Proposed Road
  - - - Approximate Drainage Feature Location
  - Surface Water Course Centerline
  - ▭ Proposed Removal Area (2010 EE/CA)
  - ▨ Graded Area
  - ▭ Project Limits
  - ▭ Armory
  - ▭ Parking
  - ▭ Theoretical Shot Fall Zone
  - ▭ D-9 Skeet Range
  - ▭ XRF Screening Grid

- Soil Lead Concentration (mg/kg)**
- Discrete Sample/XRF**
- 0 - 8
  - 9 - 269
  - 270 - 399
  - 400 - 799
  - >= 800

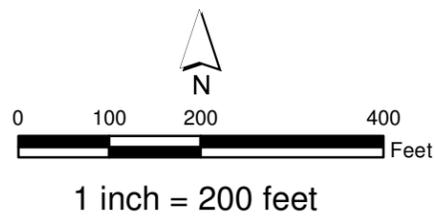
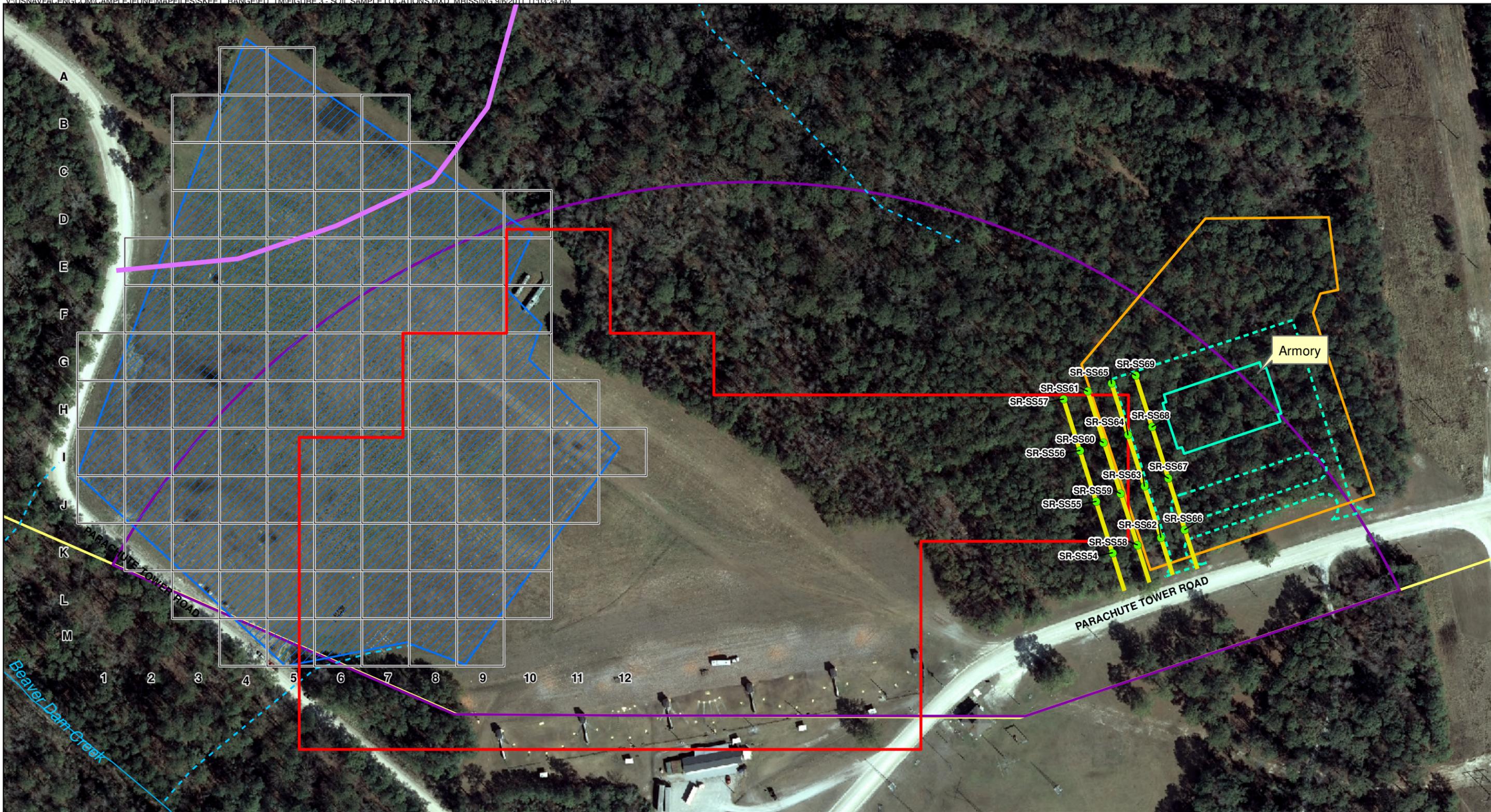


Figure 2  
Source Area Identified for Removal (2010 EE/CA)  
Environmental Update Tech Memo  
D-9 Skeet Range  
MCB CamLej  
North Carolina





- Legend**
- Proposed Discrete Soil Sample Location (Armory)
  - - - Approximate Drainage Feature Location
  - Surface Water Course Centerline
  - Vegetation Clearance Transects
  - Proposed Road
  - ▭ Proposed Removal Area (2010 EE/CA)
  - ▭ 75ft Grid
  - ▨ Graded Area
  - ▭ Project Limits
  - ▭ Armory
  - ▭ Parking
  - ▭ Theoretical Shot Fall Zone
  - ▭ D-9 Skeet Range

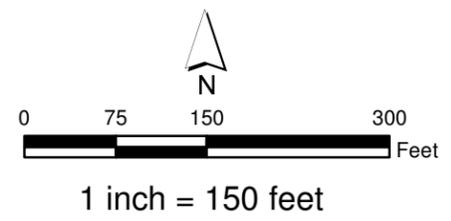
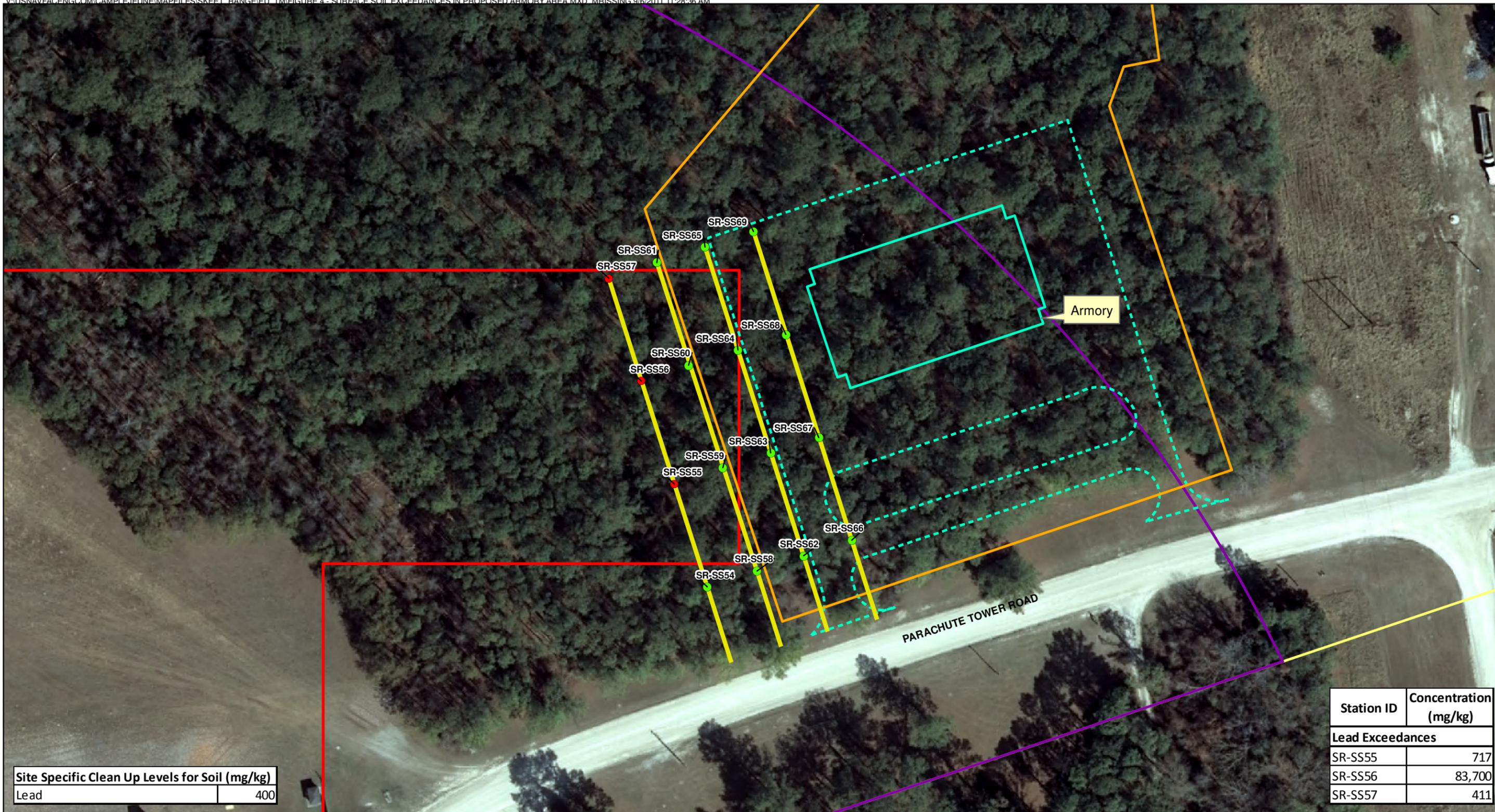


Figure 3  
Soil Sample Locations  
Environmental Update Tech Memo  
D-9 Skeet Range  
MCB CamLej  
North Carolina





Site Specific Clean Up Levels for Soil (mg/kg)	
Lead	400

Station ID	Concentration (mg/kg)
<b>Lead Exceedances</b>	
SR-SS55	717
SR-SS56	83,700
SR-SS57	411

- Legend**
- Surface Soil Sample did not Contain Lead in Exceedance of Clean-up Level (400 mg/kg)
  - Surface Soil Sample Contained Lead in Exceedance of Clean-up Level (400 mg/kg)
  - Vegetation Clearance Transects
  - Project Limits
  - Armory
  - Parking
  - Proposed Removal Area (2010 EE/CA)
  - Theoretical Shot Fall Zone
  - D-9 Skeet Range

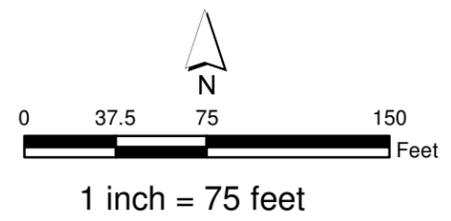
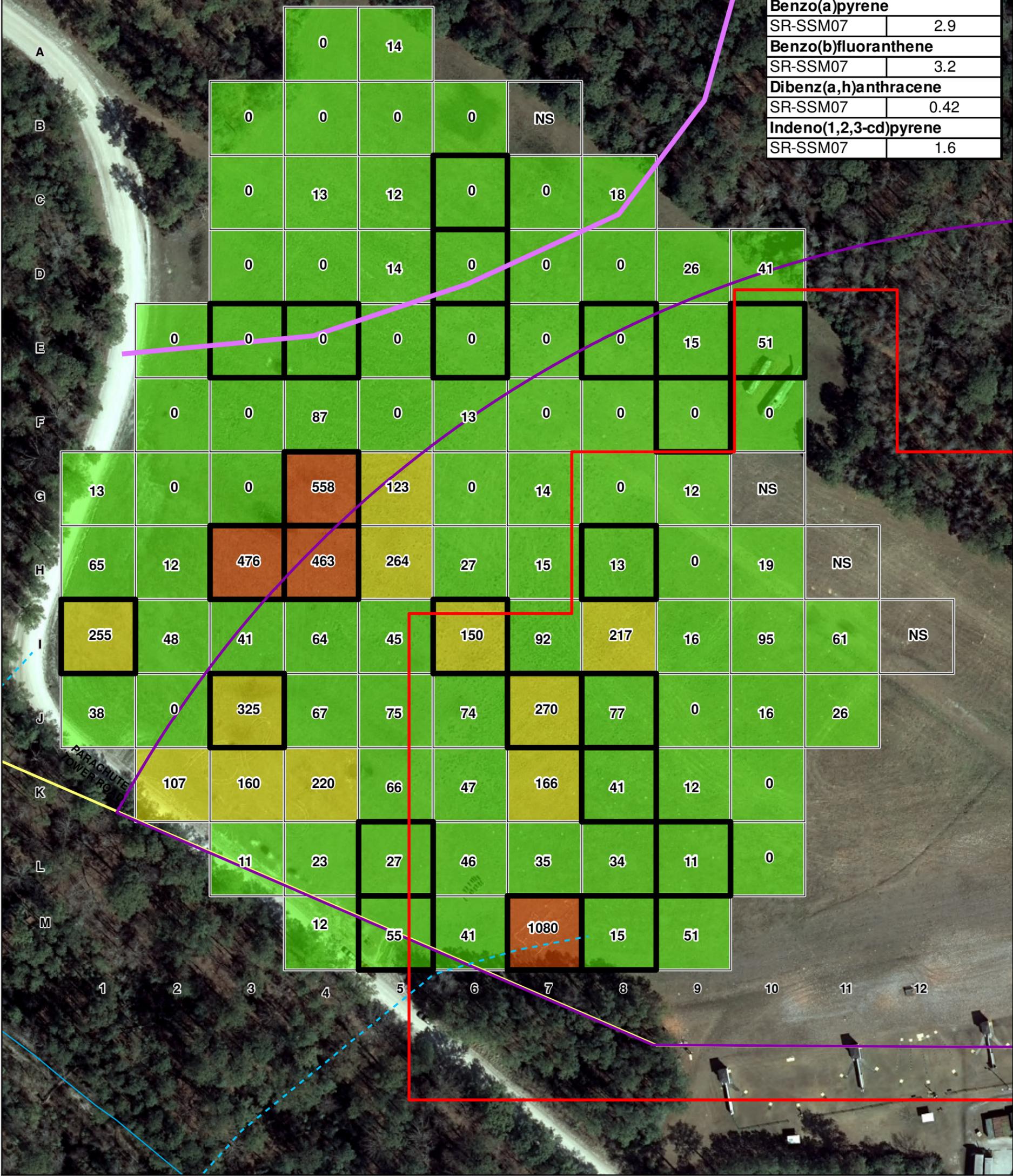


Figure 4  
 Surface Soil Exceedances in  
 Proposed Armory Area  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 North Carolina

Site Specific Clean Up Levels for Soil (mg/kg)	
Benzo(a)pyrene	0.15
Benzo(b)fluoranthene	1.5
Dibenz(a,h)anthracene	0.15
Indeno(1,2,3-cd)pyrene	1.5
Lead	400

Station ID	Concentration (mg/kg)
<b>Lead</b>	
SR-SSG04	484
SR-SSH03	411
SR-SSH04	660
SR-SSJ08	49,900
SR-SSK08	57,400
SR-SSM07	1,040
<b>Benzo(a)pyrene</b>	
SR-SSM07	2.9
<b>Benzo(b)fluoranthene</b>	
SR-SSM07	3.2
<b>Dibenz(a,h)anthracene</b>	
SR-SSM07	0.42
<b>Indeno(1,2,3-cd)pyrene</b>	
SR-SSM07	1.6



- Legend**
- Proposed Road
  - - - Approximate Drainage Feature Location
  - Surface Water Course Centerline
  - Proposed Removal Area (2010 EE/CA)
  - Theoretical Shot Fall Zone
  - D-9 Skeet Range
  - Confirmatory sample collected from this location
  - 75ft Grid

- Lead concentrations below 100 mg/kg (XRF results)
- Lead concentrations greater than 100 mg/kg (XRF results)
- Lead concentrations greater than 400 mg/kg (XRF results)
- NS - Not Sampled

Note:  
Tabulated analytical results show exceedances of site-specific clean-up levels in samples submitted to the laboratory

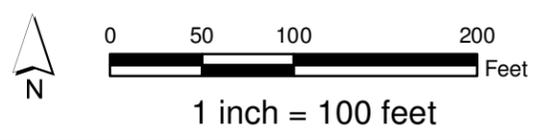
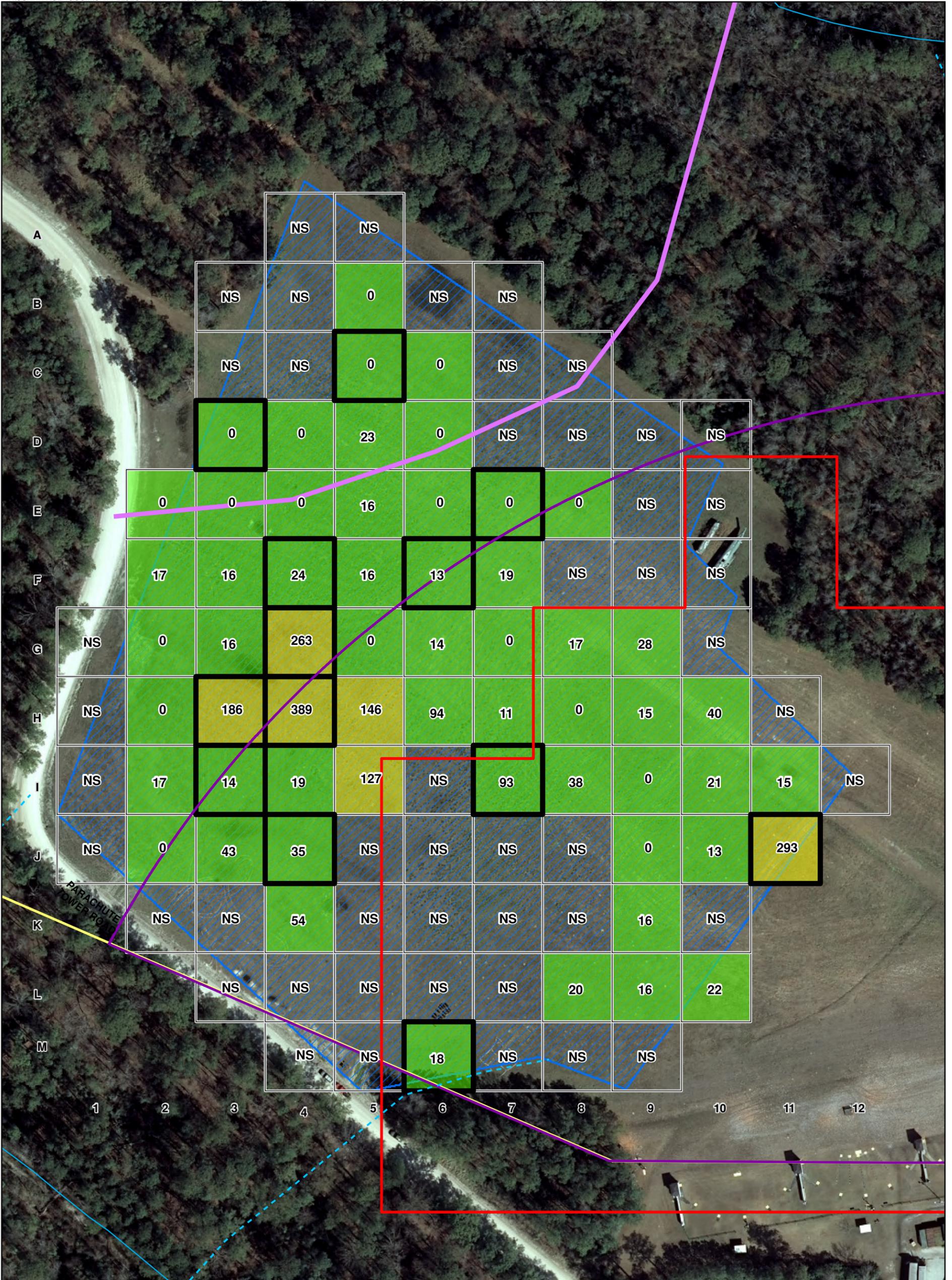


Figure 5  
Graded Area Surface Soil Results  
Environmental Update Tech Memo  
D-9 Skeet Range  
MCB CamLej  
North Carolina





**Legend**

- Proposed Road
- - - Approximate Drainage Feature Location
- Surface Water Course Centerline
- Proposed Removal Area (2010 EE/CA)
- Theoretical Shot Fall Zone
- D-9 Skeet Range
- Confirmatory sample collected from this location
- 75ft Grid x
- Graded Area
- Lead concentrations below 100 mg/kg (XRF results)
- Lead concentrations greater than 100 mg/kg (XRF results)
- NS - Not Sampled



1 inch = 100 feet

Figure 6  
Graded Area Subsurface Soil Results  
Environmental Update Tech Memo  
D-9 Skeet Range  
MCB CamLej  
North Carolina



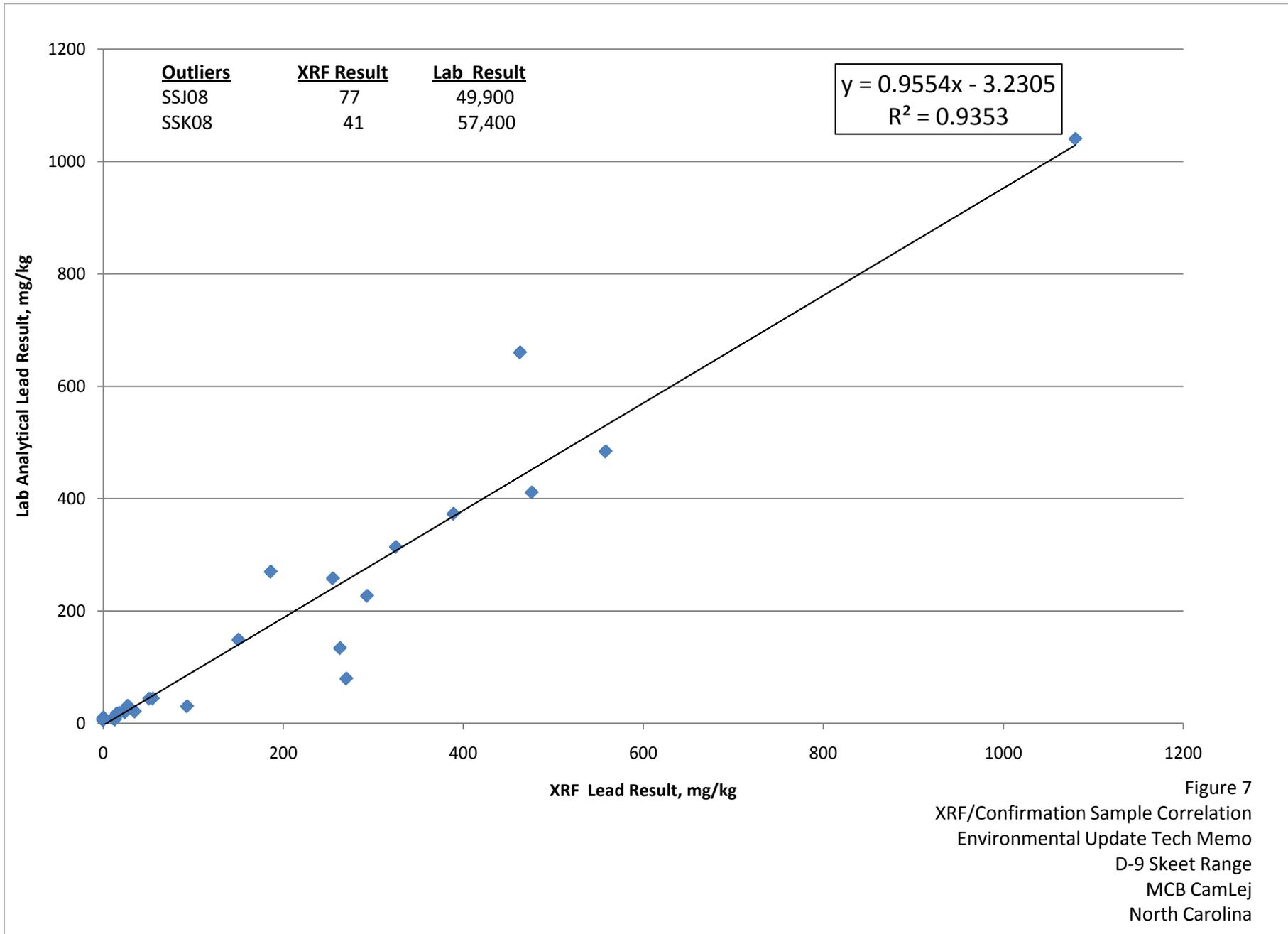
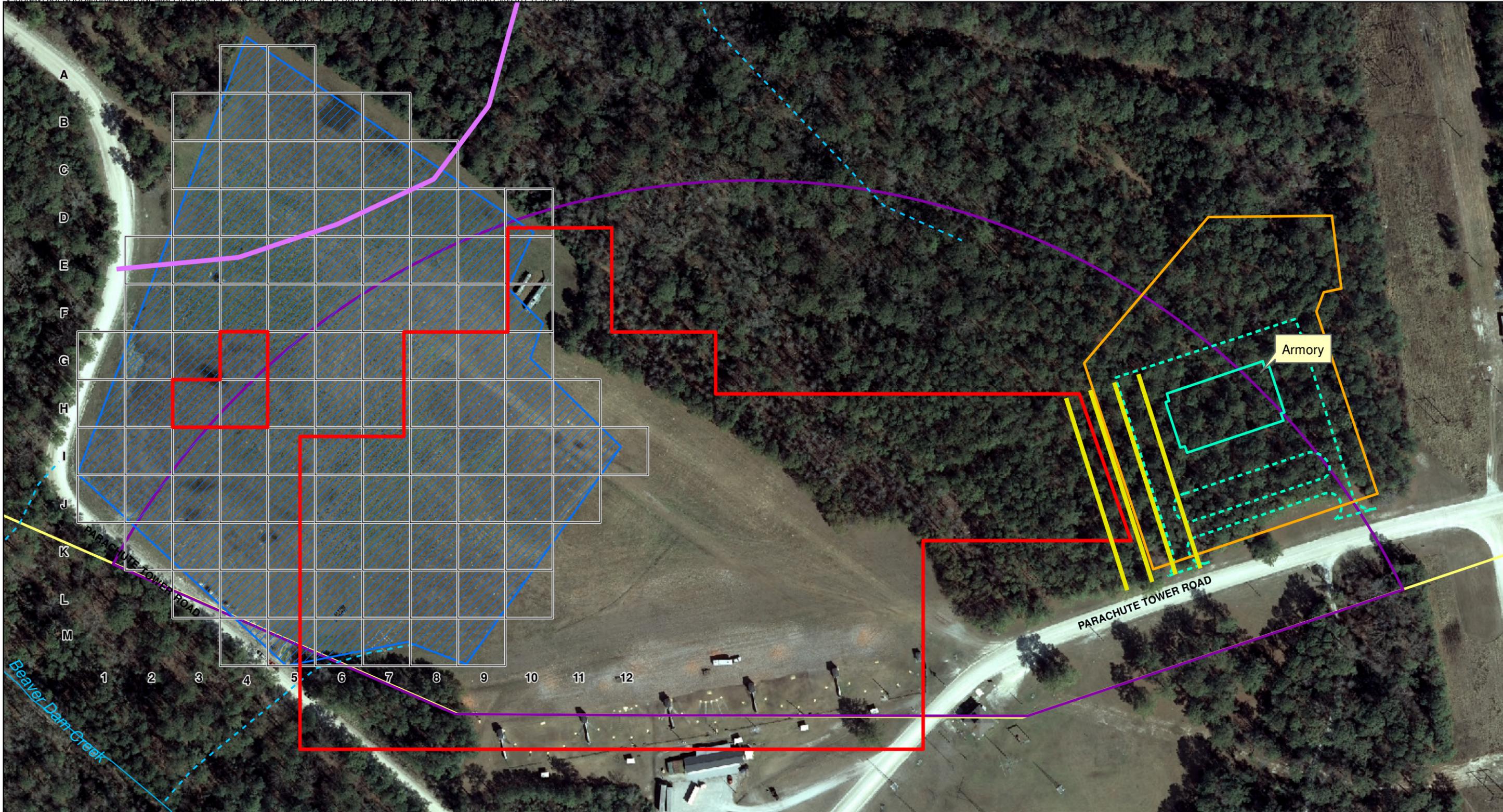


Figure 7  
 XRF/Confirmation Sample Correlation  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 North Carolina



- Legend**
- Vegetation Clearance Transects
  - Proposed Road
  - - Approximate Drainage Feature Location
  - Surface Water Course Centerline
  - Updated Proposed Removal Area
  - 75ft Grid
  - ▨ Graded Area
  - Armory Project Limits
  - ▭ Proposed Armory
  - - Proposed Parking
  - Theoretical Shot Fall Zone
  - D-9 Skeet Range

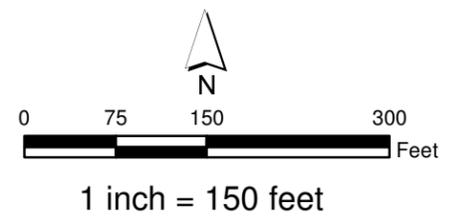


Figure 8  
 Updated Removal Area  
 Environmental Update Tech Memo  
 D-9 Skeet Range  
 MCB CamLej  
 North Carolina