



DEPARTMENT OF THE AIR FORCE  
27TH SPECIAL OPERATIONS CIVIL ENGINEER SQUADRON (AFSOC)  
CANNON AIR FORCE BASE NEW MEXICO

ENTERED



JUN 24 2010

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Ms. Patricia Stewart  
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Dear Ms. Stewart

Cannon Air Force Base, NM is forwarding two hardbound and two electronic copies of the *Corrective Action Complete Proposals (SWMUs 2, 4, 6, 10, 50, 72, 75, 81, 82, 96, 98, 102, 106, and 125)*, Cannon Air Force Base, New Mexico, June 2010 for your approval (Attachment).

If you have any questions, please contact Mr. Hugh G. Hanson, Asset Management Flight, at 575-784-6391.

Sincerely

RONALD A. LANCASTER  
Chief, Asset Management Flight

Attachment:  
Hardbound and Electronic Documents (2)

cc:  
NMED (D. Cobrain) w/o Attachment  
EPA Region VI (W. Jacques) w/o Attachment

# Corrective Action Complete Proposals (SWMUs 2, 4, 6, 10, 50, 72, 75, 81, 82, 96, 98, 102, 106, AND 125)

## CANNON AIR FORCE BASE NEW MEXICO

June 2010



Air Force Special  
Operations Command



27<sup>th</sup> Special  
Operations Wing

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## List of Acronyms

µg/kg	micrograms per kilogram
ADD	average daily dose
AFB	Air Force Base
AST	aboveground storage tank
bgs	below ground surface
BRA	Baseline Risk Assessment
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAC	Corrective Action Complete
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC(s)	Chemical(s) of Potential Concern
COPEC(s)	Chemical(s) of Potential Ecological Concern
DAF	dilution attenuation factor
ESQ	ecological screening quotient
HSWA	Hazardous and Solid Waste Amendments
IEUBK	Integrated, Exposure, Uptake and Biokinetic
IRP	Installation Restoration Program
Lee Wan	Lee Wan Associates, Inc.
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
msl	mean sea level
MTBE	methyl tert-butyl ether
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
No(s).	number(s)
NOAEL	no-observed-adverse-effects level
OVA	organic vapor analyzer
OWS	oil/water separator
PCB(s)	polychlorinated biphenyl(s)
POL	petroleum, oil, and lubricants
PVC	polyvinyl chloride

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Radian	Radian Corporation
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SSL(s)	soil screening level(s)
SVOC(s)	semivolatile organic compound(s)
SWMU(s)	Solid Waste Management Unit(s)
TAL	Target Analyte List
TCE	trichloroethylene
TPH	total petroleum hydrocarbons
TRV	toxicity reference value
URS	URS Group, Inc.
USACE	United States Army Corp of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC(s)	volatile organic compound(s)
Walk Haydel	Walk Haydel & Associates, Inc.
W-C	Woodward-Clyde Consultants, Inc.

# **CORRECTIVE ACTION COMPLETE PROPOSALS**

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## **Introduction**

The United States Air Force (USAF) and Cannon Air Force Base (AFB) (Permittee) is requesting Corrective Action Complete (CAC) Without Controls status for eight Solid Waste Management Units (SWMUs) and CAC With Controls status for six SWMUs from the New Mexico Environment Department (NMED) in accordance the New Mexico Hazardous Waste Act (Section 74-4-1 *et seq.*, New Mexico Statutes Annotated 1978, as amended, 1992) and the New Mexico Hazardous Waste Management Regulations 20.4.1 New Mexico Administrative Code (NMAC). These 14 SWMUs are listed in the Permitte's Resource Conservation and Recovery Act (RCRA) Part B Permit pursuant to 40 Code of Federal Regulations 270.42(c) of the Hazardous and Solid Waste Amendments of 1984.

If approved, the Permittee requests NMED to initiate a modification of Cannon AFB's RCRA permit to adjust the content of the three corrective action tables (Attachment 1 of Cannon AFB's RCRA Permit). The tables list the status of SWMUs at the Base, and their content is as follows:

- Table 1 – List of SWMUs Requiring Corrective Action (corrective action may be necessary to characterize and/or remediate past releases of hazardous wastes or hazardous constituents)
- Table 2 – List of SWMUs with Corrective Action Complete, With Controls (corrective action has been completed, and further corrective action is not currently required, controls are required)
- Table 3 – List of SWMUs with Corrective Action Complete, Without Controls (corrective action has been completed, and further corrective action is not currently required, no controls are required)

The proposed modification would also grant CAC With Controls for six SWMUs. The following SWMUs would move from Table 1 to Table 2:

- SWMU 2 – Recovered Diesel Tank No. 108
- SWMU 4 – Recovered Diesel Tank No. 121
- SWMU 6 – POL Tank No. 129
- SWMU 82 – Landfill No. 2
- SWMU 96 – Old Entomology Rinse Area
- SWMU 102 – Wastewater Treatment Effluent Discharge

The proposed modification would grant CAC Without Controls status for eight SWMUs. The following SWMUs would move from Table 1 to Table 3:

- SWMU 10 – Petroleum, Oil, and Lubricants (POL) Tank Number (No.) 170
- SWMU 50 – Inactive POL Storage Tank No. 4028A
- SWMU 72 – Oil/Water Separator (OWS) No. 390
- SWMU 75 – Sanitary Sewer Lift Station Overflow Pit

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- SWMU 81 – Solvent Disposal Site
- SWMU 98 – Sanitary Sewer Line
- SWMU 106 – Fire Department Training Area No. 2
- SWMU 125 – Inactive Underground Storage Tank No. 2

The 14 SWMUs addressed by this document are listed in the following table:

Section D	Sub-section	SWMU / AOC	Description
	1	SWMU 2	Recovered Diesel Tank No. 108
	2	SWMU 4	Recovered Diesel Tank No. 121
	3	SWMU 6	POL Tank No. 129
	4	SWMU 10	POL Tank No. 170
	5	SWMU 50	Inactive POL Storage Tank No. 4028A
	6	SWMU 72	OWS No. 390
	7	SWMU 75	Sanitary Sewer Lift Station Overflow Pit
	8	SWMU 81	Solvent Disposal Site
	9	SWMU 82	Landfill No. 2
	10	SWMU 96	Old Entomology Rinse Area
	11	SWMU 98	Sanitary Sewer Line
	12	SWMU 102	Wastewater Treatment Effluent Discharge
	13	SWMU 106	Fire Department Training Area No. 2
	14	SWMU 125	Inactive Underground Storage Tank No. 2

### **A. Facility Description**

Cannon AFB is located in Curry County, New Mexico, approximately 7 miles west of the City of Clovis. The Base is situated on approximately 4,320 acres of land. Cannon AFB is situated in a nearly flat plain sloping gently (10 to 15 feet per mile) to the east and southeast. Elevations in the vicinity of Cannon AFB range from 4,250 feet to 4,350 feet above mean sea level (msl).

Cannon AFB dates to 1929, when Portair Field was established on the site as a civilian passenger terminal for early commercial transcontinental flights. In 1942 the Army Air Corps took control of the civilian airfield and it became known as the Clovis Army Air Base. In early 1945, the Base was renamed Clovis Army Air Field, where flying, bombing, and gunnery classes continued until the Base was de-activated in May 1947.

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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The Base was reassigned to the Tactical Air Command and formally reactivated as Clovis AFB in 1951. The Base was renamed Cannon AFB in 1957. Several Fighter-Bomber Groups and Tactical Fighter Wings have occupied the Base since 1951. In June 2006, it was announced that Cannon AFB would transfer from the Air Combat Command and become an Air Force Special Operations Command installation.

### **B. History of Investigation**

The United States Environmental Protection Agency (USEPA) issued the Hazardous and Solid Waste Amendments (HSWA) Module IV to Cannon AFB's RCRA Operating Permit effective December 17, 1989. The HSWA module required investigation of approximately 130 environmental restoration sites, referred to as SWMUs in the permit. In January 1996, NMED received authorization for corrective action under the HSWA and became the administrative authority for this action.

**Section C** of this document briefly describes the location and history of each SWMU, a summary of relevant information from previous site investigations, and the basis for determination for each of SWMU proposed for CAC With Controls or CAC Without Controls. Detailed descriptions of the investigative results for each SWMU appear in the original investigative reports and/or administrative records. References for these sources are provided in **Section J**.

### **C. SWMU Descriptions**

The following sections describe the location, history, and land use conditions for each SWMU. A summary of relevant information from previous investigations and a basis for CAC determination for the fourteen sites are also presented in this section. All data tables are presented in the RFI (URS 2007). Screening criteria were obtained from two NMED documents: Technical Background Document for Development of Soil Screening Levels (NMED 2006a) and TPH Screening Guidelines (NMED 2006b). A site map showing all 14 SWMUs is presented as **Figure I-1** in **Section I**.

#### **1. SWMU 2, RECOVERED DIESEL TANK NO. 108 (ST-28)**

##### **Location – SWMU 2**

SWMU 2, Recovered Diesel Tank No. 108 (Installation Restoration Program [IRP] Site No. ST-28) was located near Hangar 108, approximately 100 feet east of an OWS (SWMU 3). Hangar 108 was located in the west central portion of Cannon AFB (**Figure I-1**). Hangar 108 was demolished and replaced by Building 125. A site map is presented as **Figure I-2** in **Section-I**.

##### **History / Current and Anticipated Future Land Use – SWMU 2**

A RCRA Facility Assessment (RFA) (A.T. Kearney 1987) described the suspected SWMU 2 location as a recovered diesel fuel tank connected to an OWS (SWMU 3). However, the only

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storage tank ever associated with Hangar 108 was a 2,000-gallon UST located approximately 100 feet east of the OWS (SWMU 3), which stored new diesel fuel used as heating oil for the building.

In 1989, Hangar 108 was demolished and replaced with Hangar 125. During demolition, a 2,000-gallon heating oil tank was removed from the suspected location of SWMU 2, and the former UST location was covered with the concrete floor of the new hangar.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial.

### **Evaluation of Relevant Information – SWMU 2**

#### **2007 RFI**

A RCRA Facility Investigation (RFI) (URS Group, Inc. [URS] 2007) was completed for this site. Sample locations were based on institutional knowledge and available demolition drawings. Four soil borings were advanced to depths of 15 to 16 feet below ground surface (bgs). Nine soil samples were collected from the borings at depths of 8 to 10 feet bgs and 13 to 15 feet bgs. The soil samples were submitted and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and Target Analyte List (TAL) metals.

VOCs, SVOCs, and selenium were not detected above the reporting limits in any of the samples. The detected analytes were compared to current NMED soil screening levels (SSLs). TAL metals did not exceed construction worker SSLs. Arsenic in subsurface soil (9.9 milligrams per kilogram [mg/kg]) exceeded the soil-to-groundwater SSL (0.292 mg/kg) and the residential SSL (3.9 mg/kg), but was within the range of background values at Cannon AFB. Maximum iron (6,610 mg/kg), mercury (0.0021 mg/kg), and thallium (4.3 mg/kg) concentrations exceeded soil-to-groundwater SSLs. The remaining TAL metals did not exceed any SSLs. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. **Table 1** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

Ecological screening was not completed because the site is located in an industrial area near the flight line. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC With Controls status for SWMU 2.

### **Basis of Determination – SWMU 2**

SWMU 2 is proposed for CAC With Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available

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data indicated that contaminants pose an acceptable level of risk under current and projected land use.

### **2. SWMU 4, RECOVERED DIESEL TANK NO. 121 (ST-29)**

#### **Location – SWMU 4**

SWMU 4, Recovered Diesel Tank No. 121 (IRP Site No. ST-29) was located near Hangar 121, in the west central portion of Cannon AFB (**Figure I-1**). Hangar 121 was demolished and replaced by Hangar 126. A site map is presented as **Figure I-3** in **Section I**.

#### **History / Current and Anticipated Future Land Use – SWMU 4**

An RFA (A.T. Kearney 1987) described the suspected SWMU 4 location as having a recovered diesel fuel tank connected to an OWS. However, the only storage tank ever associated with Hangar 108 was a 2,000-gallon UST, which stored new diesel fuel used as heating oil for the building, located approximately 50 feet east of the OWS.

In 1989, Hangar 121 was demolished and replaced with Hangar 126. During demolition, a 2,000-gallon heating oil tank was removed from the suspected location of SWMU 4, and the former UST location was covered with the concrete floor of the new hangar.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial.

#### **Evaluation of Relevant Information – SWMU 4**

##### **2007 RFI**

An RFI (URS 2007) was completed for this site. Sample locations were based on institutional knowledge and available demolition drawings. Four soil borings were advanced to depths of 16 feet bgs. Eight soil samples and two duplicates were collected from the borings at depths of 8 to 10 feet bgs and 13 to 15 feet bgs. The soil samples were submitted and analyzed for VOCs, SVOCs, and TAL metals.

No VOCs or SVOCs were detected above the reporting limits in any of the samples. The detected analytes were compared to current NMED screening levels. None of the TAL metals exceeded the construction worker SSLs. Iron (9,630 mg/kg), mercury (0.027 mg/kg), and thallium (4.3 mg/kg) exceeded the soil-to-groundwater SSLs. Arsenic (7.2 mg/kg) exceeded residential and soil-to-groundwater SSLs, but did not exceed background concentrations. The remaining TAL metals did not exceed any SSLs. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. **Table 2** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

Ecological screening was not completed because the site is located in an industrial area near the flight line. The SWMU was characterized in accordance with current applicable state and

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federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for CAC With Controls status for SWMU 4.

### **Basis of Determination – SWMU 4**

SWMU 4 is proposed for CAC With Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

### **3. SWMU 6, POL TANK NO. 129**

#### **Location – SWMU 6**

SWMU 6, POL Tank No. 129 was located near Hangar 129, in the west central portion of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-4** in **Section I**.

#### **History / Current and Anticipated Future Land Use – SWMU 6**

An RFA (A.T. Kearney 1987) described the suspected SWMU 6 location as having a recovered diesel fuel tank connected to an OWS (SWMU 7). However, the only storage tank ever associated with Hangar 129 was a 2,000-gallon UST located approximately 60 feet east of the OWS (SWMU 7), which stored new diesel fuel used as heating oil for the building. The tank was originally positioned 30 feet south of this location, but was moved when Cannon AFB buildings were converted to natural gas heat. The conditions of the tank and excavation soil were not documented.

In 1992, the 2,000-gallon UST was removed from the suspected location of SWMU 6 and confirmatory samples were collected following NMED UST regulations.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial.

#### **Evaluation of Relevant Information – SWMU 6**

##### **1992 UST Removal**

Two samples were collected during the UST's removal in 1992 and were analyzed for total petroleum hydrocarbons (TPH) and individual fuel oil constituents including methyl tert-butyl ether (MTBE), and benzene, toluene, ethylbenzene, and xylenes (BTEX).

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### 2007 RFI

An RFI (URS 2007) was completed for this site. It was determined that additional sampling in the vicinity of the UST's original location was needed. Sample locations were based on institutional knowledge and available demolition drawings. Four soil borings were advanced to depths of 16 feet bgs. Eight soil samples were collected from the borings at depths of 8 to 10 feet bgs and 13 to 15 feet bgs. The soil samples were submitted and analyzed for VOCs, SVOCs, and TAL metals. Additionally, historical data was screened against current NMED standards.

SVOCs were not detected above the reporting limit in any of the samples. The detected analytes were compared to current NMED SSLs. Maximum benzene (0.003 mg/kg) and TPH (6.438 mg/kg) concentrations did not exceed any SSLs. No other VOCs were detected.

Selenium was not detected in any of the samples. The remaining detected metals were compared to current NMED SSLs, and none exceeded construction worker SSLs. Arsenic (5.9 mg/kg), iron (9,430 mg/kg), mercury (0.017 mg/kg), and thallium (4.6 mg/kg) exceeded soil-to-groundwater SSLs. Arsenic exceeded the residential SSL (3.9 mg/kg), but was considered to be only slightly higher than background values, and was not considered to be related to the former UST. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet.

Because arsenic, iron, mercury, and thallium exceeded the generic Soil to Groundwater SSLs with a dilution attenuation factor (DAF) of 20, site-specific Soil to Groundwater SSLs were calculated for these four metals. To calculate a site-specific DAF for SWMU 6, NMED Equation 17 (NMED 2006) was used:

$$DAF = 1 + \left( \frac{K \times i \times D}{I \times L} \right)$$

Where:

$$D = (0.0112 \times L^2)^{0.5} + D_a \left( 1 - \exp \left[ \frac{-L \times I}{K \times i \times D_a} \right] \right)$$

Parameter	Definition (units)	Site-Specific Value (basis)
DAF	Dilution/attenuation factor (unitless)	Calculated
K	Aquifer Hydraulic conductivity (m/yr)	34,713 (Radian 1994)
i	Hydraulic gradient (m/m)	0.0032 (Lee Wan 1990)
D	Mixing zone depth (m)	Calculated
I	Infiltration rate (m/yr)	0.011 (Wood and Sanford 1995)
L	Length of source parallel to groundwater flow (m)	6.1 (Figure I-4)
D <sub>a</sub>	Aquifer thickness (m)	36.6 (Lee Wan 1990)

Inserting the site-specific values used for each parameter, resulted in a calculated, site-specific DAF for SWMU 6 of 1,070.7. **Table 3** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

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Ecological screening was not completed because the site is located in an industrial area near the flight line. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC With Controls for SWMU 6.

### **Basis of Determination – SWMU 6**

SWMU 6 is proposed for CAC With Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

## **4. SWMU 10, POL TANK NO. 170**

### **Location – SWMU 10**

SWMU 10, POL Tank No. 170 was located near Hangar 170, in the central portion of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-5** in **Section I**.

### **History / Current and Anticipated Land Use – SWMU 10**

An RFA (A.T. Kearney 1987) described the suspected SWMU 10 location as having a recovered diesel fuel tank connected to an OWS (SWMU 11). However, the only storage tank ever associated with Hangar 170 was a 2,000-gallon UST located approximately 120 feet east of the OWS (SWMU 11), which stored new diesel fuel used as heating oil for the building. In 1992, the 2,000-gallon heating oil tank was removed from the suspected location of SWMU 10, and confirmatory samples were collected following NMED UST regulations.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial.

### **Evaluation of Relevant Information – SWMU 10**

#### **1992 UST Removal**

Two samples were collected during the UST removal in 1992 and analyzed for TPH and individual fuel oil constituents including MTBE and BTEX.

#### **2007 RFI**

The RFI (URS 2007) screened historical data against current NMED SSLs, and confirmed that no further sample collection was needed. Maximum subsurface soil concentrations for all

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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detected chemicals were compared with NMED SSLs. None of the VOCs were detected above reporting limits. Low levels of TPH were detected at a concentration (3.14 mg/kg) well below the screening levels. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. **Table 4** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

Ecological screening was not completed because the site is located in an industrial area. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 10.

### **Basis of Determination – SWMU 10**

SWMU 10 is proposed for CAC Without Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

## **5. SWMU 50, INACTIVE POL STORAGE TANK NO. 4028A (ST-26)**

### **Location – SWMU 50**

SWMU 50, Inactive POL Storage Tank (No. 4028A) (IRP Site No. ST-26), was reported as an inactive storage tank associated with Facility No. 4028, a World War II era gas station. SWMU 50 is located in the north-central portion of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-6** in **Section I**.

### **History / Current and Anticipated Land Use – SWMU 50**

An RFA (A.T. Kearney 1987) described SWMU 50 as an inactive POL storage tank associated with Facility No. 4028, a historical gas station built during the World War II era. There are four SWMU sites associated with this historical gas station: 48A, 48B, 49, and 50. The description of SWMU 50 was very similar to the description of SWMU 48A. According to Cannon AFB records, it appears that SWMU 50 is a duplication of SWMU 48A.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 50**

SWMU 50 is a duplicate of SWMU 48A, and therefore no investigation of SWMU 50 has taken place. Investigations have been conducted at SWMU 48A, so no further work is required for

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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SWMU 50. As a result of the work completed for the RFI (URS 2007), a letter from NMED to Cannon AFB (NMED 2008a) stated SWMU 50 is eligible for CAC Without Controls status.

### **Basis of Determination- SWMU 50**

SWMU 50 is proposed for CAC Without Controls because the SWMU is a duplicate of SWMU 48A.

## **6. SWMU 72, OWS NO. 390**

### **Location – SWMU 72**

The RFA (A.T. Kearney 1987) placed the reported SWMU 72, OWS No. 390, in the Bulk Storage Area of the Cantonment Area, Cluster H. The SWMU is located along the north-central boundary of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-7** in **Section I**.

### **History / Current and Anticipated Land Use – SWMU 72**

The RFA described SWMU 72, OWS No. 390, as a 2,000-gallon UST located in the Bulk Storage Area of the Cantonment Area, Cluster H, which was nearly identical to the description of SWMU 71. SWMU 71 was removed in 1991 and no evidence of an OWS was found at that time. An OWS was installed after the removal of SWMU 71, but the unit is not considered to be SWMU 72. Other than its appearance in the RFA report, there is no institutional knowledge, or other existing evidence, that indicates that an OWS or any other UST was ever associated with Facility No. 390 prior to the installation of the new unit.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 72**

SWMU 72 is a duplicate of SWMU 71, and therefore no investigation of SWMU 72 has taken place. In response to the work completed as part of the RFI (URS 2007), a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 72.

### **Basis of Determination – SWMU 72**

SWMU 72 is proposed for CAC Without Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

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### **7. SWMU 75, SANITARY SEWER LIFT STATION OVERFLOW PIT (SD-13)**

#### **Location – SWMU 75**

SWMU 75, Sanitary Sewer Lift Station Overflow Pit (IRP Site No. SD-13) was located in the northwest part of Cannon AFB (**Figure I-1**). It is now encompassed by a water hazard at the golf course. A site map is presented as **Figure I-8** in **Section I**.

#### **History / Current and Anticipated Land Use – SWMU 75**

This SWMU served as an emergency overflow containment area for a lift station in the northwest part of Cannon AFB. The pit was reportedly 100 feet wide by 600 feet long by 3 feet deep. The exact location of the SWMU is unknown, and no drawings of the pit have been identified.

According to historical records, the pit was used once in February 1983 when 100,000 to 150,000 gallons of raw domestic sewage were bypassed to the pit after the lift station pumps failed. The area around the pit was rebuilt twice following that event to improve drainage around the golf course and to create water hazards for a new section of the golf course.

Domestic sewage or sanitary waste from households, office buildings, factories, and any other place where people live and work, that are carried by sewer to a municipal wastewater treatment plant, are not solid waste based on 40 CFR 261.4. Beginning with the original development of this portion of Canon AFB (approximately 1955), the lift station associated with SWMU 75 has only received sanitary waste waters from residential base housing (Joe Cannon Estates) and the former base hospital (now an emergency medical clinic).

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain recreational in nature.

#### **Evaluation of Relevant Information – SWMU 75**

##### **1986 IRP Phase II**

As part of the IRP Phase II Stage 1 investigation (Radian Corporation [Radian] 1986), four samples were collected from two shallow borings located within the overflow pit. These samples were analyzed for purgeable organic; oil, grease, and metals.

##### **2007 RFI**

The RFI (URS 2007) verified that samples collected in 1986 were likely obtained from the pit, and screened historical data to current NMED SSLs. Maximum concentrations of arsenic (2.6 mg/kg) and mercury (3.8 mg/kg) exceeded generic soil-to-groundwater SSLs. Manganese (550 mg/kg) exceeded construction worker SSLs. No other metals exceeded NMED SSLs.

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Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. The maximum manganese concentration (550 mg/kg) only slightly exceeds the December 2009 SSL for construction workers (463 mg/kg), and is well below the residential SSL (3,590 mg/kg). In addition, manganese is a naturally occurring metal, and all metals detected at SWMU 75 are generally within the range of background.

Purgeable organics were not detected in any samples. Oil and grease were detected at a maximum concentration of 24 mg/kg. **Table 5** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

Based on site conditions, no ecological screening was warranted. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 75.

### **Basis of Determination – SWMU 75**

SWMU 75 is proposed for CAC Without Controls because the SWMU has never been used for the management of solid or hazardous wastes, or other hazardous substances. The characterization of this site as a SWMU is questionable based on the historical information for the site detailed above in relation to applicable regulations.

SWMU 75 was classified as a SWMU based on a single sanitary sewage overflow event that occurred in 1983. However, based on 40 CFR 261.4, domestic and sanitary sewage is excluded from the definition of solid waste. The 1983 release at SWMU 75 does not meet the definition of a solid waste. Therefore, Corrective Action Complete Without Controls is appropriate for SWMU 75.

## **8. SWMU 81, SOLVENT DISPOSAL SITE (DP-16)**

### **Location – SWMU 81**

SWMU 81, Solvent Disposal Site (IRP Site No. DP-16) was located approximately 300 feet east of Fire Training Area No. 1 (SWMU 78) and 100 feet south of the northern Base boundary fence (**Figure I-1**). A site map is presented as **Figure I-9** in **Section I**.

### **History / Current and Anticipated Land Use – SWMU 81**

SWMU 81 was first identified in the 1983 IRP Phase I Records Search (CH2M Hill 1983) as two empty drums labeled “trichloroethylene” lying on the ground. The drums had been positioned in such a way that they would have drained into a shallow pit.

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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The site could not be located during preparation of the 1987 RFA (A.T. Kearney 1987) or during the site visit performed as part of the preparation of the Appendix I, Phase I RFI Work Plan (Lee Wan Associates Inc. [Lee Wan] 1990). Air Force personnel were able to identify the location of the site as part of the preparations for the Remedial Investigation (RI) completed in 1991 (Woodward-Clyde [W-C] 1992).

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 81**

#### **1992 RI**

The RI (W-C 1992) involved drilling and sampling ten soil borings in the area of the shallow pit. One surface soil sample (0.5 foot bgs) and one subsurface soil sample (4 feet bgs) were collected from each of the ten borings. Based on elevated organic vapor analyzer (OVA) readings in subsurface soil, two additional soil borings were drilled and sampled continuously. Additional soil samples were collected from 5 to 9 feet bgs in the two borings to evaluate the vertical extent of potential contamination. Replacement samples were collected from this site due to missed holding times. This resulted in a total of 10 surface and 12 subsurface samples collected and analyzed at SWMU 81. All samples were analyzed for VOCs. Only acetone and toluene were detected at SWMU 81 above the reporting limits.

#### **2007 RFI**

The RFI (URS 2007) verified that samples collected during the RI were collected from the pit, and screened the historical analytical data against current NMED SSLs. Ten VOCs were detected above the method detection limits in surface and subsurface soil. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. The historical data screening confirmed that no further sample collection was needed. **Tables 6 and 7** in the **Attachments** present the comparison of maximum soil concentrations to NMED SSLs and ecological screening levels (USEPA 2003).

Ecological risks were not identified during previous investigations or associated risk evaluations. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 81.

### **Basis of Determination – SWMU 81**

SWMU 81 is proposed for CAC Without Controls because the drums were removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available

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data indicated that contaminants pose an acceptable level of risk under current and projected land use.

### **9. SWMU 82, LANDFILL NO. 2 (LF-02)**

#### **Location – SWMU 82**

SWMU 82, Landfill No. 2 (IRP Site No. LF-02) occupies approximately 15 acres of vacant and grass-covered land in the northeast corner of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-10** in **Section I**.

#### **History / Current and Anticipated Land Use – SWMU 82**

SWMU 82 accepted wastes from 1946 to 1947 and again from 1952 to 1959. The 4-year period of inactivity occurred when Cannon AFB was in deactivated status. The landfill's operation reportedly consisted of placing waste in trenches and burning it before burying it. The landfill reportedly received domestic solid wastes and shop wastes, which included; waste oils, solvents, paint strippers and thinners, outdated paint, pesticide containers, and various empty cans and drums (Radian 1986).

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Use classification will continue to remain industrial in nature.

#### **Evaluation of Relevant Information – SWMU 82**

##### **1993 RFI**

A geophysical survey was conducted as part of the 1993 RFI (W-C 1993) to identify landfill cell locations. A subsurface soil investigation was then designed based on the locations of the interpreted cells. The subsurface soil investigation involved digging a 28-foot-long trench into one of the landfill cells. Landfill materials were excavated and field screened with an OVA. No readings were above background level. The landfill material and cap were replaced.

Twenty-seven soil borings were also drilled to depths of 76 feet bgs. A total of 108 samples from 13 of the borings located within the landfill were analyzed for VOCs, SVOCs, pesticides / polychlorinated biphenyls (PCBs), and TAL Metals.

Low levels of two VOCs (toluene and xylene) were detected in surface soil and several VOCs (acetone, benzene, 2-butanone, chloromethane, ethylbenzene, methylene chloride, toluene, vinyl acetate, and xylene) were detected in subsurface soil. Many of these were eliminated as COPCs in the 1993 RFI due to their low frequency of detection, and the possibility of laboratory contamination.

Low levels of twenty-five SVOCs, 4,4-DDE, 4,4-DDT, and Aroclor 1254 were also detected in surface and subsurface soils. The pesticides 4,4-DDE and 4,4-DDT were only detected in surface soils and were probably not associated with landfill waste. TPH was detected in one

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boring at 18 feet bgs at a concentration of 97.2 mg/kg. Many of the metals detected were present at concentrations exceeding the background range; however this was attributed to the presence of caliche and calcium carbonate-cemented sands and metal fragments in the trash debris. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet.

A risk assessment was completed for SWMU 82 based on the results of the 1993 RFI, which identified toluene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorine, indeno(1,2,3-cd)pyrene, and naphthalene as COPCs. Ecological risk screening indicated that COPCs did not pose an unacceptable risk to the environment.

### **2007 RFI**

As part of the 2007 RFI (URS 2007), historical data was compared to current NMED SSLs. TPH, VOCs, and pesticides/PCBs did not exceed SSLs. Maximum concentrations of the SVOCs naphthalene (0.395 mg/kg) and phenathrene (464 mg/kg) exceeded soil-to-groundwater SSLs. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. Benzo(a)pyrene (0.621 mg/kg) exceeded the residential SSL, but was not considered a COPC because it was detected in subsurface soil (approximately 20 feet bgs) where residential exposure was unlikely. None of the SVOCs were considered to be COPCs for this site.

Maximum concentrations of antimony (16.1 mg/kg), arsenic (2.8 mg/kg), iron (11,400 mg/kg), and mercury (0.048 mg/kg) exceeded soil-to-groundwater SSLs. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet. Manganese (174 mg/kg) exceeded the construction worker SSL. All concentrations were under or near Cannon AFB background levels. **Tables 8 and 9** in the **Attachments** present the comparison of maximum soil concentrations to NMED SSLs.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC With Controls for SWMU 82.

### **Basis of Determination – SWMU 82**

SWMU 82 is proposed for CAC With Controls because the SWMU has been adequately characterized in accordance with applicable regulations and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

## **10. SWMU 96, OLD ENTOMOLOGY RINSE AREA (SD-17)**

### **Location – SWMU 96**

SWMU 96, Old Entomology Rinse Area (IRP Site No. SD-17) was located behind Building 2160, Pesticide Storage Building, which was abandoned in October 1983 and demolished in

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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September 1984. The site is located at the eastern end of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-11** in **Section I**.

### **History / Current and Anticipated Future Land Use – SWMU 96**

Pesticide and herbicide application equipment was cleaned in a sink located within Building 2160. The sink drained into a 3-foot-square and 2-foot-deep pit at the rear of the building. The bottom of the pit was reported to be unlined and open to the soil (W-C 1992).

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 96**

#### **1986 IRP Phase II**

An IRP Phase II investigation (Radian 1986) of SWMU 96 detected potentially significant concentrations of pesticides and herbicides in samples collected from two of three soil borings. The soil borings were drilled to depths of approximately 60 feet bgs and analyzed for arsenic, mercury, herbicides, pesticides, and VOCs. Low concentrations of 4,4-DDD, 4,4-DDE, 4,4-DDT, dieldrin, and toxaphene were detected between 2 to 4 feet bgs, and the herbicide 2,4-D was detected at 5 feet bgs.

#### **1990 IRP Phase IV**

An IRP Phase IV-A investigation (Walk Haydel 1990) was completed to confirm and delineate potential contamination detected during the IRP Phase II investigation. One surface soil sample collected near the foundation of Building 2160 was analyzed for PCBs and pesticides, and one monitoring well sample was collected and analyzed for PCBs, pesticides, and TAL metals. Low concentrations of the pesticides 4,4-DDE, 4,4-DDT, alpha- and gamma-chlordane, and heptachlor epoxide were detected in the soil sample. Seven metals were detected in the groundwater sample. Only lead slightly exceeded the maximum contaminant level (MCL). No pesticides or PCBs were detected in groundwater.

A baseline risk assessment (BRA) was developed for this site, and two additional SWMUs, as part of the IRP Phase IV-A investigation. Toluene, barium, cadmium, chromium, cobalt, lead, mercury, nickel, zinc, 4,4-DDE, 4,4-DDT, chlordane, and heptachlor epoxide were identified as COPCs. None of the compounds exceeded the historical RFI soil criteria / proposed RCRA levels. Cobalt and lead did not have published toxicity values for the development of RCRA action levels but were qualitatively evaluated. An ecological risk assessment also identified cadmium, chromium, cobalt, copper, lead, and zinc as metals of concern in soil. No organic chemicals of concern were identified in soil. No unacceptable human health or ecologic risks due to chemical releases were expected from this SWMU.

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### **1994 RFI**

A Supplemental RFI (W-C 1994) was conducted to define potential contamination of the deeper soil beneath the suspected rinse sink pit location. One soil boring was drilled to 102 feet bgs and samples were collected at 10-foot intervals starting at 10 feet bgs. The soil samples were analyzed for VOCs, SVOCs, PCBs, TAL metals, TPH, and pesticides. Two pesticides (4,4-DDE and 4,4-DDT) were detected at 10 feet bgs. The concentrations of pesticides were lower than concentrations detected at other non-pesticide-related SWMUs. Low concentrations of acetone, methylene chloride, toluene, and TPH were detected at multiple depths, in concentrations well below the historical corrective action levels and were attributed to laboratory contamination. Seventeen metals were detected within the range of naturally occurring background levels.

### **2007 RFI**

The 2007 RFI (URS 2007) compared the historical data to NMED SSLs. None of the pesticides or metals detected above the reporting limits exceeded the industrial or construction worker SSLs. Arsenic (5.6 mg/kg) and mercury (0.24 mg/kg) exceeded soil-to-groundwater SSLs; however, impacts to groundwater are considered minimal because the depth to groundwater was greater than 250 feet. Although arsenic concentrations exceeded the residential SSL, arsenic was not considered a COPC. The slightly elevated arsenic concentrations were within the range of background levels, and were associated with a subsurface soil sample. Low concentrations of arsenic detected in groundwater samples was likely due to naturally occurring arsenic, and not activities associated with this site.

No unacceptable ecological risks were identified during previous investigations or associated risk evaluations. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

Because arsenic and mercury exceeded the generic Soil to Groundwater SSLs with a DAF of 20, site-specific Soil to Groundwater SSLs were calculated for these two metals. To calculate a site-specific DAF for SWMU 96, NMED Equation 17 (NMED 2006) was used:

$$DAF = 1 + \left( \frac{K \times i \times D}{I \times L} \right)$$

Where:

$$D = (0.0112 \times L^2)^{0.5} + D_a \left( 1 - \exp \left[ \frac{-L \times I}{K \times i \times D_a} \right] \right)$$

<b>Parameter</b>	<b>Definition (units)</b>	<b>Site-Specific Value (basis)</b>
DAF	Dilution/attenuation factor (unitless)	Calculated
K	Aquifer Hydraulic conductivity (m/yr)	34,713 (Radian 1994)
i	Hydraulic gradient (m/m)	0.0032 (Lee Wan 1990)
D	Mixing zone depth (m)	Calculated
I	Infiltration rate (m/yr)	0.011 (Wood and Sanford 1995)

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L	Length of source parallel to groundwater flow (m)	39.6 (Figure I-11)
D <sub>a</sub>	Aquifer thickness (m)	36.6 (Lee Wan 1990)

Inserting the site-specific values used for each parameter, resulted in a calculated, site-specific DAF for SWMU 96 of 1,070.7. **Tables 10** and **11** in the **Attachments** present the comparison of maximum soil concentrations to NMED SSLs. **Table 12** in the **Attachments** presents the comparison of maximum groundwater concentrations to water screening criteria.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC With Controls for SWMU 96.

### **Basis of Determination – SWMU 96**

SWMU 96 is proposed for CAC With Controls because the building has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

## **11. SWMU 98, SANITARY SEWER LINE**

### **Location – SWMU 98**

SWMU 98, Sanitary Sewer Line, is present throughout Cannon AFB. The sanitary sewer system's main trunk line flows northeast along Torch Boulevard in the aircraft maintenance area. A smaller branch flows south along Torch Boulevard near the main entrance to Cannon AFB. A secondary line flows southeast and enters the main trunk at Argentia Avenue, and a transmission line flows east across the runways to the wastewater lagoon. Maps of the sanitary sewer system are presented as **Figure I-12a** through **I-12d** in **Section I**.

### **History / Current and Anticipated Future Land Use – SWMU 98**

The sanitary sewer system at Cannon AFB was constructed in 1943, and has undergone expansion and upgrade in subsequent years. The sewer lines are located underground and are used to transport sanitary wastewater to the wastewater treatment plant. The sewer lines are constructed of 8-inch diameter polyvinyl chloride (PVC) in the housing area of the Base, and of 15-inch diameter clay tile in the main Base area. Typically, the lines are buried 5 to 17 feet bgs. The system has an approximate flow-rate of 0.4 million gallons per day. No indication of significant sewage loss from the sewer lines has been observed.

Only the main trunk, the south-flowing branch, and the east flowing transmission line potentially received hazardous waste. All other lines, including the secondary branch lines, receive only domestic sewage.

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Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 98**

#### **1992 RI**

The RI of this SWMU (W-C 1992) consisted of a video camera survey of over 8,900 feet of sanitary sewer line, drilling 42 soil borings, and collecting 44 subsurface soil samples to identify locations where the sewer line may have leaked. Soil samples were analyzed for TPH, VOCs, and metals. Low concentrations of TPH and VOCs (acetone, 2-butanone, methylene chloride, and toluene) were detected. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet.

A BRA was also completed using the data collected during the RI and the cumulative hazard index was below 1.0 for the future maintenance worker. None of the COPCs were carcinogens. No unacceptable human health or ecological risks due to chemical releases are expected from this SWMU.

#### **2007 RFI**

Historical subsurface data was compared to current NMED SSLs (URS 2007). None of the detected organic or inorganic chemicals exceeded the industrial or construction worker SSLs. The maximum detected concentrations of arsenic (2.4 mg/kg) and iron (1,310 mg/kg) in subsurface soil exceeded soil-to-groundwater SSLs (0.29 mg/kg and 554 mg/kg, respectively), but were not considered to be COPCS. No other metals exceeded NMED SSLs. **Table 13** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

No unacceptable ecological risks were identified during previous investigations or associated risk evaluations. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 98.

### **Basis of Determination – SWMU 98**

SWMU 98 is proposed for CAC Without Controls because the SWMU has been adequately characterized in accordance with applicable regulations and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

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### **12. SWMU 102, WASTEWATER TREATMENT EFFLUENT DISCHARGE (WP-21)**

#### **Location – SWMU 102**

SWMU 102, Wastewater Treatment Effluent Discharge (IRP Site No. WP-21), was located along the eastern boundary of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-13** in **Section I**.

#### **History / Current and Anticipated Future Land Use – SWMU 102**

SWMU 102 was an effluent discharge that directed wastewater from the former sewage lagoons (SWMU 101) to the self-contained Playa Lake (SWMU 103) to the east. The site consisted of a discharge pipe and an inlet chamber equipped with two slide gates.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use classification will continue to remain industrial in nature. However, the area is currently vacant and unoccupied.

#### **Evaluation of Relevant Information – SWMU 102**

##### **2007 RFI**

An RFI (URS 2007) was conducted at this site because previous sampling results were not available. Institutional knowledge and Base drawings were used to locate the discharge area. Four soil borings were advanced to depths of 16 to 17 feet bgs. Soil samples were collected from the 5- to 7-foot interval, and, depending on the depth of the boring, from the 15- to 17-foot interval or the 14- to 16-foot interval. Nine soil samples were submitted for the laboratory analysis of VOCs, SVOCs, pesticides, and TAL metals.

Maximum subsurface soil concentrations for all detected chemicals were compared with NMED SSLs. Two VOCs (toluene and xylene) were detected in one sample at very low concentrations that did not exceed any NMED SSL. No SVOCs or PCBs were detected above reporting limits. Five pesticides were detected (4,4-DDE, 4,4-DDT, alpha- and gamma-chlordane, and gamma-BHC), but did not exceed any NMED SSLs.

Selenium was not detected above the reporting limit in any of the samples. None of the metals exceeded the construction worker SSLs. Arsenic (5.8 mg/kg), iron (7,460 mg/kg), mercury (0.03 mg/kg), and thallium (5.2 mg/kg) exceeded the soil-to-groundwater SSL. Arsenic and thallium also exceeded residential soil SSLs. Both arsenic and thallium concentrations were within the range of Cannon AFB background levels. None of the metals were considered COPCs. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet.

Because arsenic, iron, mercury, and thallium exceeded the generic Soil to Groundwater SSLs with a DAF of 20, site-specific Soil to Groundwater SSLs were calculated for these four metals. To calculate a site-specific DAF for SWMU 102, NMED Equation 17 (NMED 2006) was used:

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$$DAF = 1 + \left( \frac{K \times i \times D}{I \times L} \right)$$

Where:

$$D = (0.0112 \times L^2)^{0.5} + D_a \left( 1 - \exp \left[ \frac{-L \times I}{K \times i \times D_a} \right] \right)$$

Parameter	Definition (units)	Site-Specific Value (basis)
DAF	Dilution/attenuation factor (unitless)	Calculated
K	Aquifer Hydraulic conductivity (m/yr)	34,713 (Radian 1994)
i	Hydraulic gradient (m/m)	0.0032 (Lee Wan 1990)
D	Mixing zone depth (m)	Calculated
I	Infiltration rate (m/yr)	0.011 (Wood and Sanford 1995)
L	Length of source parallel to groundwater flow (m)	2.0 (Figure I-13)
D <sub>a</sub>	Aquifer thickness (m)	36.6 (Lee Wan 1990)

Inserting the site-specific values used for each parameter, resulted in a calculated, site-specific DAF for SWMU 102 of 1,070.7. **Table 14** in the **Attachments** presents the comparison of maximum soil concentrations to NMED SSLs.

In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC With Controls for SWMU 102.

### Ecological Risk Evaluation

An ecological risk evaluation of SWMU 102 was completed in two steps: (1) a screening step to identify preliminary contaminants of potential ecological concern (COPECs); and, (2) a more detailed evaluation using a food-web model (NMED 2008b). In the initial screening step, the maximum detected soil concentrations were compared with conservative ecological screening levels and with background soil concentrations (Table 14). The maximum soil concentrations of cadmium, mercury, and thallium exceeded both ecological screening levels and background. In a subsequent step, exposure to cadmium, mercury, and thallium through ingestion was evaluated for three representative mammals. These species were: (1) the short-tailed shrew as a representative insectivore and surrogate for the desert shrew which is more likely to be present; (2) the red fox as a representative of a top carnivore and surrogate for the kit fox; and, (3) the American badger as an additional representative of a top carnivore. The shrew, fox, and badger were chosen because they are in close contact with the soil and likely to ingest soil and soil-dwelling organisms. Although the shrew is unlikely to burrow to subsurface soil depths, its diet consists of earthworms and insects that may come in contact with subsurface soil. Birds were not evaluated because few species are known to use burrows; it was assumed that concentrations protective of the shrew and fox would also be protective of such bird species as the burrowing owl.

Receptor characteristics, uptake assumptions and sources, and estimated ingestion exposures (as the average daily dose [ADD]) are presented in **Table 15**. ADDs were calculated following the

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ingestion model provided in NMED guidance (Equation 1 of NMED 2008b). The sources for all assumptions are provided in the footnotes to **Table 15**. The size of SWMU 102 is approximately 0.4 acre. Because the number of samples was limited (8 plus one duplicate), the maximum detected concentration was used to estimate exposure. **Table 15** also presents the toxicity reference values (TRVs) for cadmium, mercury, and thallium and the estimated ecological screening quotients (ESQs). The ESQ is expressed as the ratio between the ADD and the TRV; an ESQ greater than one indicates that additional evaluation may be required to more accurately estimate potential risk. The selected TRV for this evaluation was the no-observed-adverse-effects level (NOAEL), a dose below which adverse effects are unlikely to occur. ESQs for the shrew, badger, and fox are all less than one, indicating that risks from exposure to SWMU 102 soil are negligible.

### **Basis of Determination – SWMU 102**

SWMU 102 is proposed for CAC With Controls because the sewage lagoons have been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

### **13. SWMU 106, FIRE DEPARTMENT TRAINING AREA NO. 2 (FT-07)**

#### **Location – SWMU 106**

SWMU 106, Fire Department Training Area No. 2 (IRP Site No. FT-07) was located in the southeast corner of Cannon AFB near abandoned north-south taxiway T-5 (**Figure I-1**). A site map is presented as **Figure I-14** in **Section I**.

#### **History / Current and Anticipated Future Land Use – SWMU 106**

The site consisted of two small, round depressions in the land surface, each sparsely vegetated and measuring about 100 feet in diameter. From 1968 to 1974, SWMU 106 was used concurrently with SWMU 107, Fire Department Training Area No. 3. During training exercises, the ground was saturated with water, and JP-4 jet fuel was introduced and ignited. Approximately 300 gallons of fuel were burned during each training exercise. The exercises occurred approximately eight times per year.

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land classification will continue to remain industrial in nature.

#### **Evaluation of Relevant Information – SWMU 106**

##### **1986 IRP Phase II**

An IRP Phase II – Confirmation / Quantification Stage I (Radian 1986) investigation was completed for this site. One deep soil boring was drilled at the lowest point of the area to define subsurface conditions in samples collected at approximately 1, 5, and 57 feet bgs. Samples were

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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analyzed for oil, grease, TPH, lead, and VOCs. Oil, grease, and lead were detected in all samples.

### **1992 RI**

An RI / BRA was conducted in 1992 (W-C 1992) to further evaluate the SWMU. During the RI, four soil borings, two in each depression, were drilled to depths between 31 and 32 feet bgs. Four subsurface soil samples were collected and analyzed from each soil boring. Samples were analyzed for VOCs, TPH, lead, and chromium. In addition, four surface soil samples were collected, one from each boring location. The surface soil samples were analyzed for BTEX, TPH, lead, and chromium. Two soil borings were redrilled due to missed sample holding times.

BTEX analysis indicated the presence of toluene at 140 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) in one surface soil sample and benzene at 170  $\mu\text{g}/\text{kg}$  in another. TPH was detected in surface soil samples ranging from 49.6 to 232 mg/kg. No petroleum or BTEX compounds were present in subsurface soils. In summary, the extent of soil petroleum contamination is limited to the shallow soils at this site and probably does not extend beyond the boundary of the SWMU. Impacts to groundwater were considered minimal because the depth to groundwater is greater than 250 feet.

A combined BRA (also including SWMU Nos. 106, 107, 109, and 113) was developed. The BRA identified benzene, toluene, xylenes, trichloroethylene (TCE), ethylbenzene, chromium and lead as COPCs. It also indicated that there were no unacceptable adverse effects due to non-carcinogenic chemicals, and the risks due to carcinogenic chemicals were within the acceptable risk range with the exception of VOC inhalation by future child residents.

The inhalation risk was due to benzene at SWMU 106 where it was detected at a concentration of 0.17 mg/kg in one of 37 samples. Based on the low frequency of detection, the 95-percent UCL was primarily based on nondetect values, and did not account for the biodegradation of VOCs in the environment and more than likely overestimated the risk due to potential concentrations of VOCs in ambient air.

### **2007 RFI**

The RFI (URS 2007) compared historical data to current NMED SSLs. Only benzene (0.17 mg/kg) exceeded the soil-to-groundwater SSL, however the pathway was not considered applicable due to the depth of groundwater (250 feet bgs) at this site. Maximum concentrations of chromium (19 mg/kg) and lead (41 mg/kg) exceeded background levels, but did not exceed SSLs.

Based on the comparison of current maximum site soil concentrations with current applicable human health-based SSLs, no COPCs were identified. No unacceptable ecological risks were identified during previous investigations or associated risk evaluations. The SWMU was characterized in accordance with current applicable state and federal regulations, and the available data indicate the chemicals present do not pose an unacceptable level of risk under current and projected land uses. **Tables 16 and 17** in the **Attachments** present the comparison of maximum soil concentrations to NMED SSLs.

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 106.

### **Basis of Determination – SWMU 106**

SWMU 106 is proposed for CAC Without Controls because the site is no longer used for fire training, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use.

## **14. SWMU 125, INACTIVE UNDERGROUND STORAGE TANK NO. 2 (ST-31)**

### **Location – SWMU 125**

SWMU 125, Inactive Underground Storage Tank No. 2 (IRP Site No. ST-31) was located adjacent to Building 357, in the north central part of Cannon AFB (**Figure I-1**). A site map is presented as **Figure I-15** in **Section I**.

### **History / Current and Anticipated Future Land Use – SWMU 125**

An RFA (A.T. Kearney 1987) described the suspected SWMU as a UST of unknown dimensions, construction, and capacity. Visual inspections and record searches failed to reveal the existence of the unit. Interviews with Base personnel indicated that a UST had been removed prior to the implementation of NMED UST regulations, but real property records indicated that the tank had been abandoned in place.

In February 1996, during the demolition of the former Civil Engineering Compound (including Building 357 and the adjacent parking area), two 500-gallon USTs were discovered and removed. The tanks were reportedly empty with no signs of leakage and had no associated piping.

Cannon AFB is an integral part of the defense system of the United States therefore, the Base will remain active for the foreseeable future. Land classification will continue to remain industrial in nature.

### **Evaluation of Relevant Information – SWMU 125**

After removal of the USTs in 1996, four soil samples were collected from the corners of each excavation (eight samples total) and analyzed for TPH. The analytical results of all eight samples were all nondetects. The data did not warrant a comparison to current NMED SSLs.

SWMU 125 has been characterized in accordance with current state and federal regulations, and the available data indicated that the site does not pose an unacceptable level of risk under current and projected land uses.

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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In response to the work completed as part of the RFI, a letter dated May 14, 2008 from NMED (NMED 2008a) stated that the RFI report was accepted, and the permittee (Cannon AFB) may petition for a CAC Without Controls for SWMU 125.

### **Basis of Determination – SWMU 125**

SWMU 125 has been determined to be appropriate for CAC Without Controls because the UST has been removed, the SWMU has been adequately characterized in accordance with applicable regulations, and the available data indicated that contaminants pose an acceptable level of risk under current and projected land use. All evidence indicates that no release to the environment has occurred or is likely to occur in the future from SWMU 125.

### **D. References**

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- CH2M Hill. 1983. Installation Restoration Program Records Search for Cannon Air Force Base. August.
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- NMED. 2006a. Technical Background Document for Development of Soil Screening Levels. Rev 4.0. June.
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- Radian. 1994. Final RCRA Facility Investigation (RFI) Final Report, SWMU No. 105, Landfill No. 3, IRP Site LF-3. Prepared for USACE, Omaha District.

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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- W-C. 1993. RCRA Facility Investigation Report for Landfill No. 1 (SWMU 74) and Landfill No. 2 (SWMU 82). Final. Cannon AFB, New Mexico. February.
- W-C. 1994. RCRA Facility Investigation Activities Phase II to Appendix I (Old Entomology Rinse Area Boring), Supplemental RFI Report (19 SWMU Boundary Survey). Final. Cannon Air Force Bas; Clovis, new Mexico. September.

**Attachment I  
Maps and Figures**

## **CORRECTIVE ACTION COMPLETE PROPOSALS**

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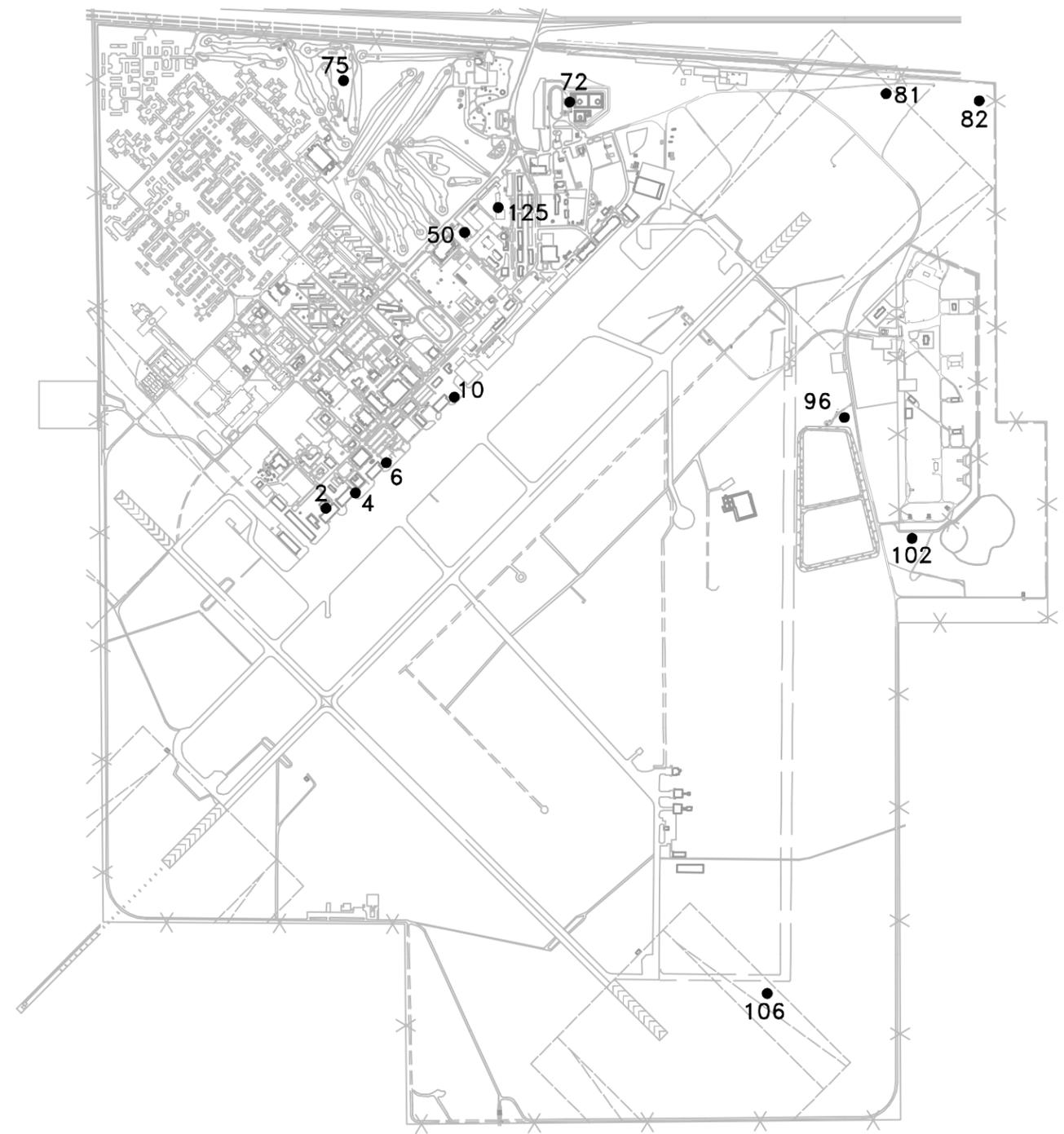
### **I. Maps and Figures**

- Figure I-1 Base Map and Location of SWMU Sites Proposed for Corrective Action Complete
- Figure I-2 Site Layout and Sampling Locations, SWMU 2 – Recovered Diesel Tank No. 108
- Figure I-3 Site Layout and Sampling Locations, SWMU 4 – Recovered Diesel Tank No. 121
- Figure I-4 Site Layout and Sampling Locations, SWMU 6 – POL Tank No. 129
- Figure I-5 Site Layout and Sampling Locations, SWMU 10 – POL Tank No. 170
- Figure I-6 Reported Location of SWMU 50, and Site Layout and Sampling Locations, SWMU 48A – Inactive POL Storage Tank No 4028A
- Figure I-7 Reported Location of SWMU 72, and Site Layout and Sampling Locations, SWMU 71 – OWS No. 390.
- Figure I-8 Site Layout and Sampling Locations, SWMU 75 – Sanitary Sewer Lift Station Overflow Pit
- Figure I-9 Site Layout and Sampling Locations, SWMU 81 – Solvent Disposal Site
- Figure I-10 Site Layout and Sampling Locations, SWMU 82 – Landfill No. 2
- Figure I-11 Site Layout and Sampling Locations, SWMU 96 – Old Entomology Rinse Area
- Figure I-12A Site Layout and Sampling Locations, SWMU 98 – Sanitary Sewer Line (N. Torch Blvd)
- Figure I-12B Site Layout and Sampling Locations, SWMU 98 – Sanitary Sewer Line (S. Torch Blvd)
- Figure I-12C Site Layout and Sampling Locations, SWMU 98 – Sanitary Sewer Line (Taxiway B)
- Figure I-12D Site Layout and Sampling Locations, SWMU 98 – Sanitary Sewer Line (E. of Main Runway)
- Figure I-13 Site Layout and Sampling Locations, SWMU 102 – Wastewater Treatment Effluent Discharge
- Figure I-14 Site Layout and Sampling Locations, SWMU 106 – Fire Training Area No. 2
- Figure I-15 Site Layout and Sampling Locations, SWMU 125 – Inactive Underground Storage Tank No. 2

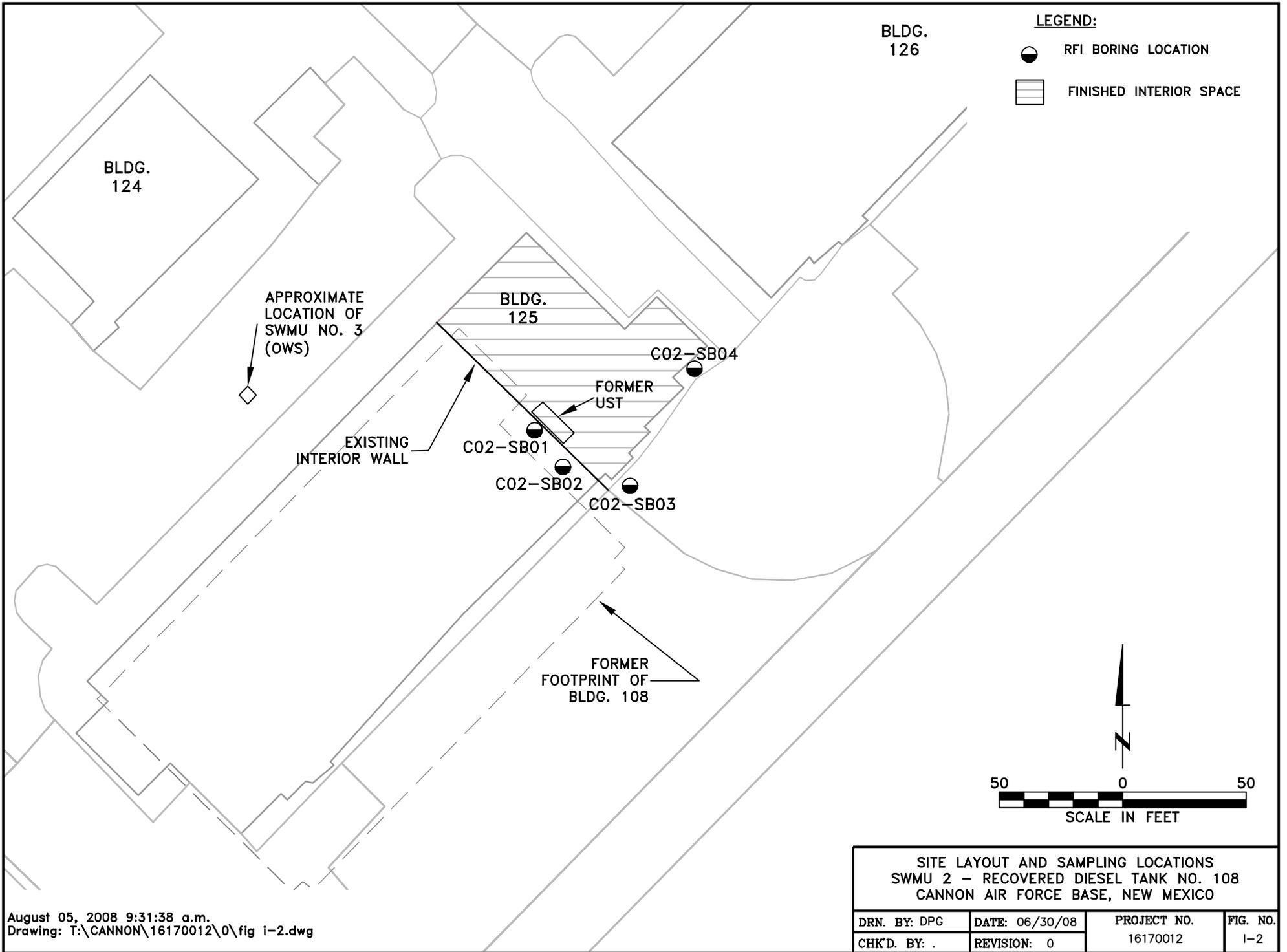
**LEGEND**

2 ● SOILD WASTE MANAGEMENT UNIT (SWMU) LOCATION AND NUMBER

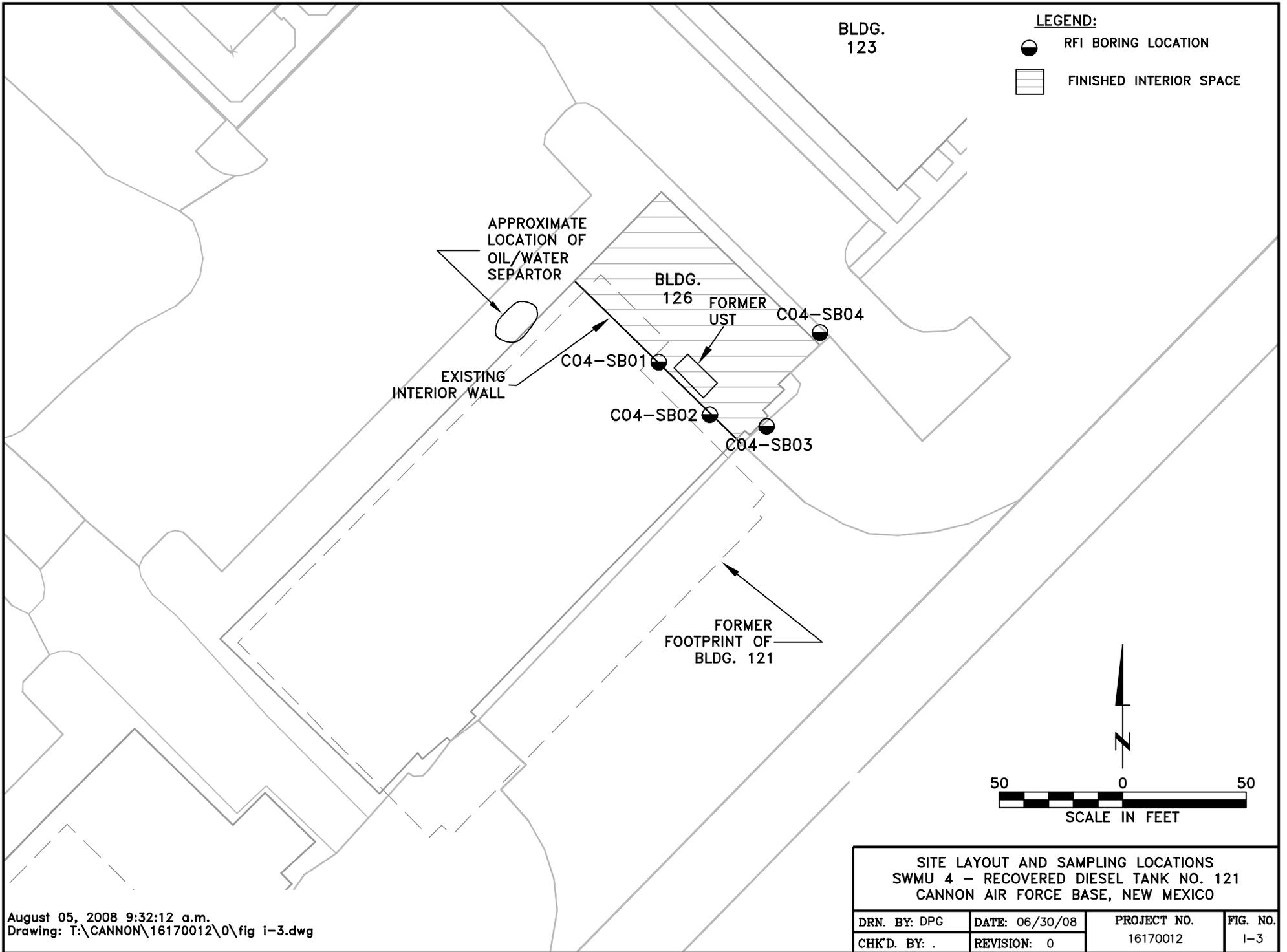
SWMU No.	DESIGNATED AREA
2	RECOVERED DIESEL TANK No. 108
4	RECOVERED DIESEL TANK No. 121
6	POL TANK No. 129
10	POL TANK NO. 170
50	INACTIVE POL STORAGE TANK NO. 4028 A & B
72	OIL/WATER SEPARATOR No. 390
75	SANITARY SEWAGE LIFT STATION OVERFLOW PIT
81	SOLVENT DISPOSAL SITE
82	LANDFILL No. 2
96	OLD ENTOMOLOGY RINSE AREA
98	SANITARY SEWER LINE (NOT SHOWN)
102	WASTEWATER TREATMENT EFFLUENT DISCHARGE
106	FIRE DEPARTMENT TRAINING AREA No. 2
125	INACTIVE UNDERGROUND TANK No. 2



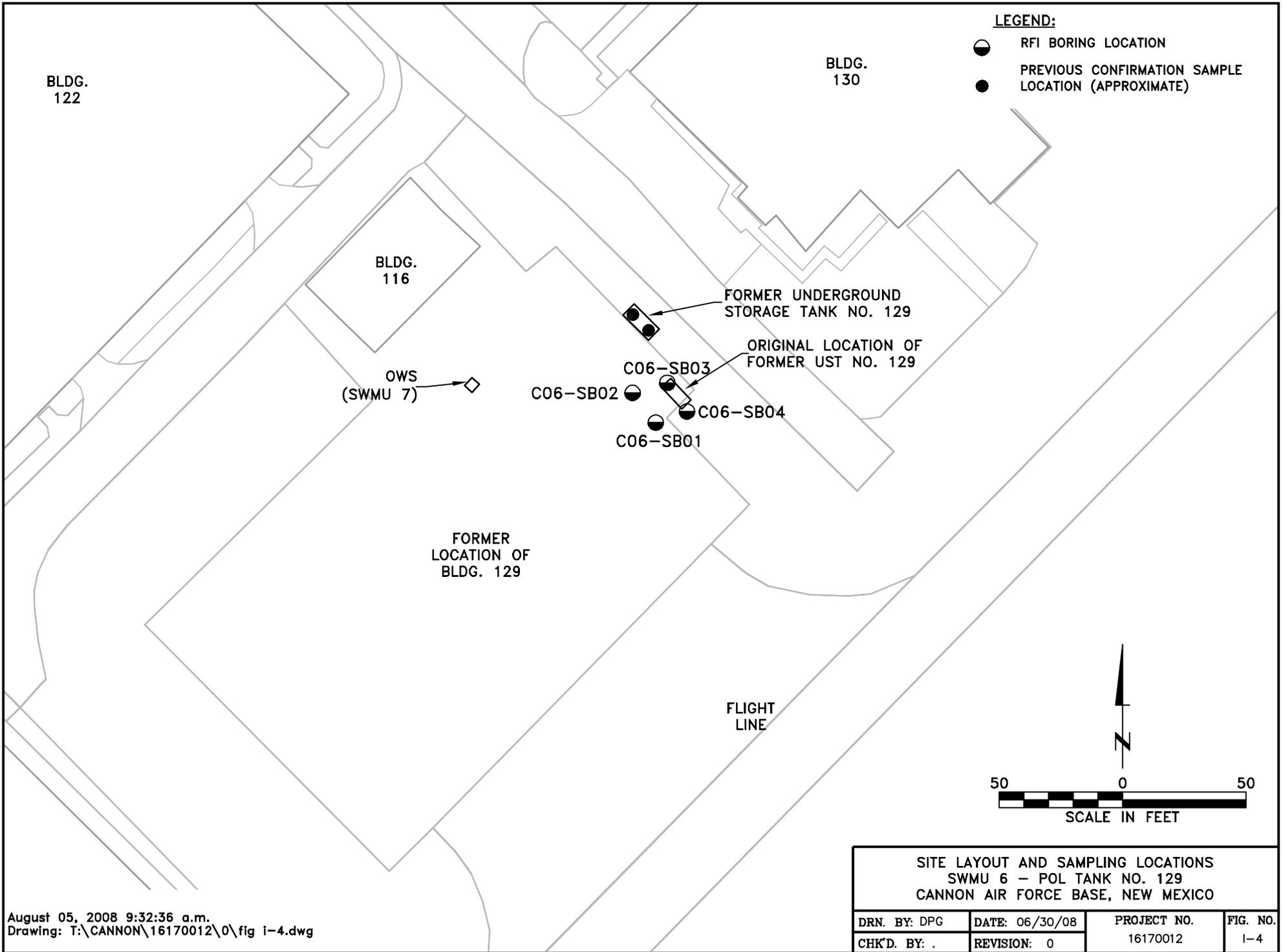
BASE MAP AND LOCATION OF SWMU SITES PROPOSED FOR CORRECTIVE ACTION COMPLETE CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. 1-1
CHK'D. BY: .	REVISION: 0		



August 05, 2008 9:31:38 a.m.  
 Drawing: T:\CANNON\16170012\0\fig 1-2.dwg



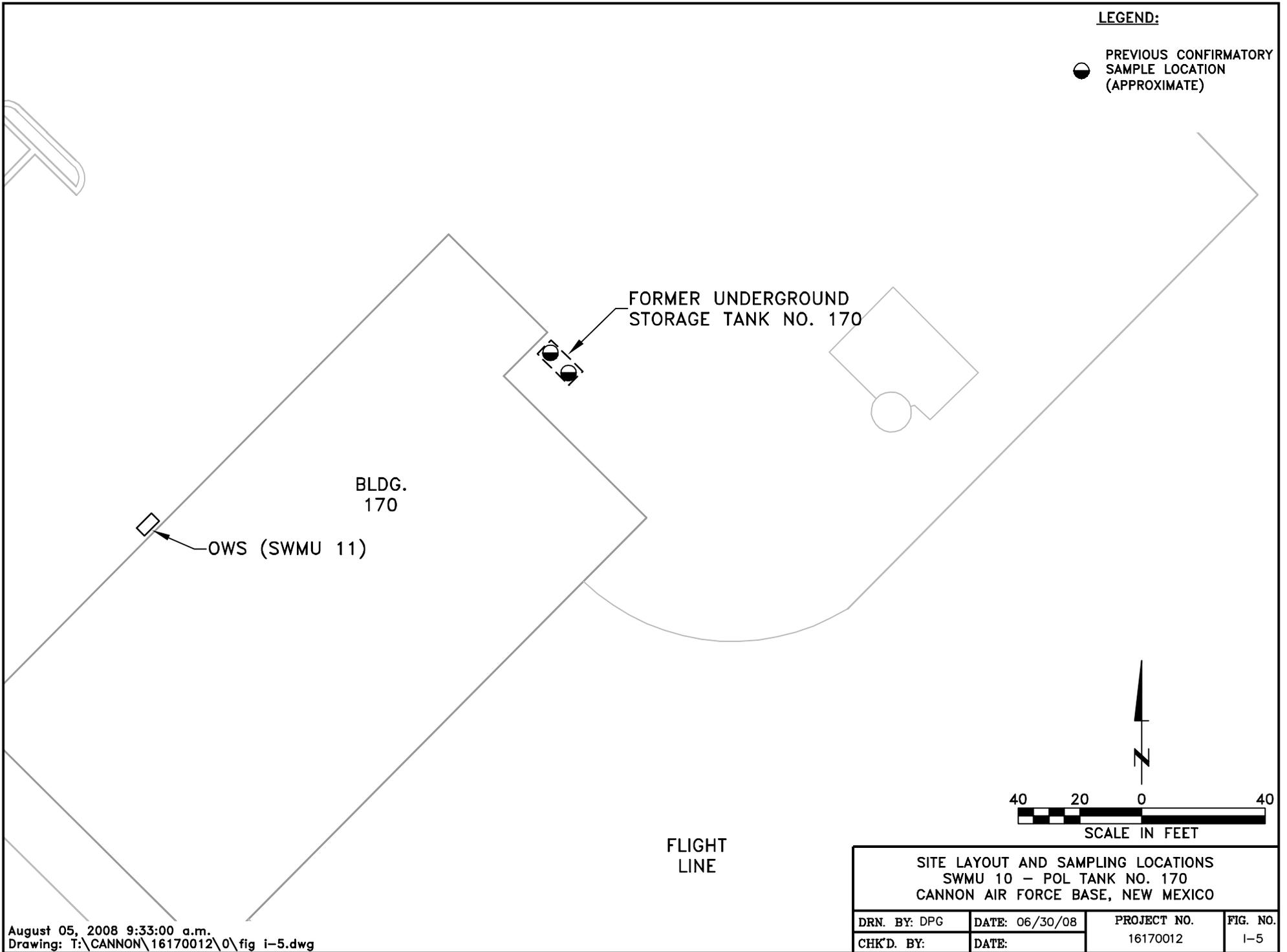
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 Drawing: T:\CANNON\16170012\0\fig 1-3.dwg



August 05, 2008 9:32:36 a.m.  
 Drawing: T:\CANNON\16170012\0\fig 1-4.dwg

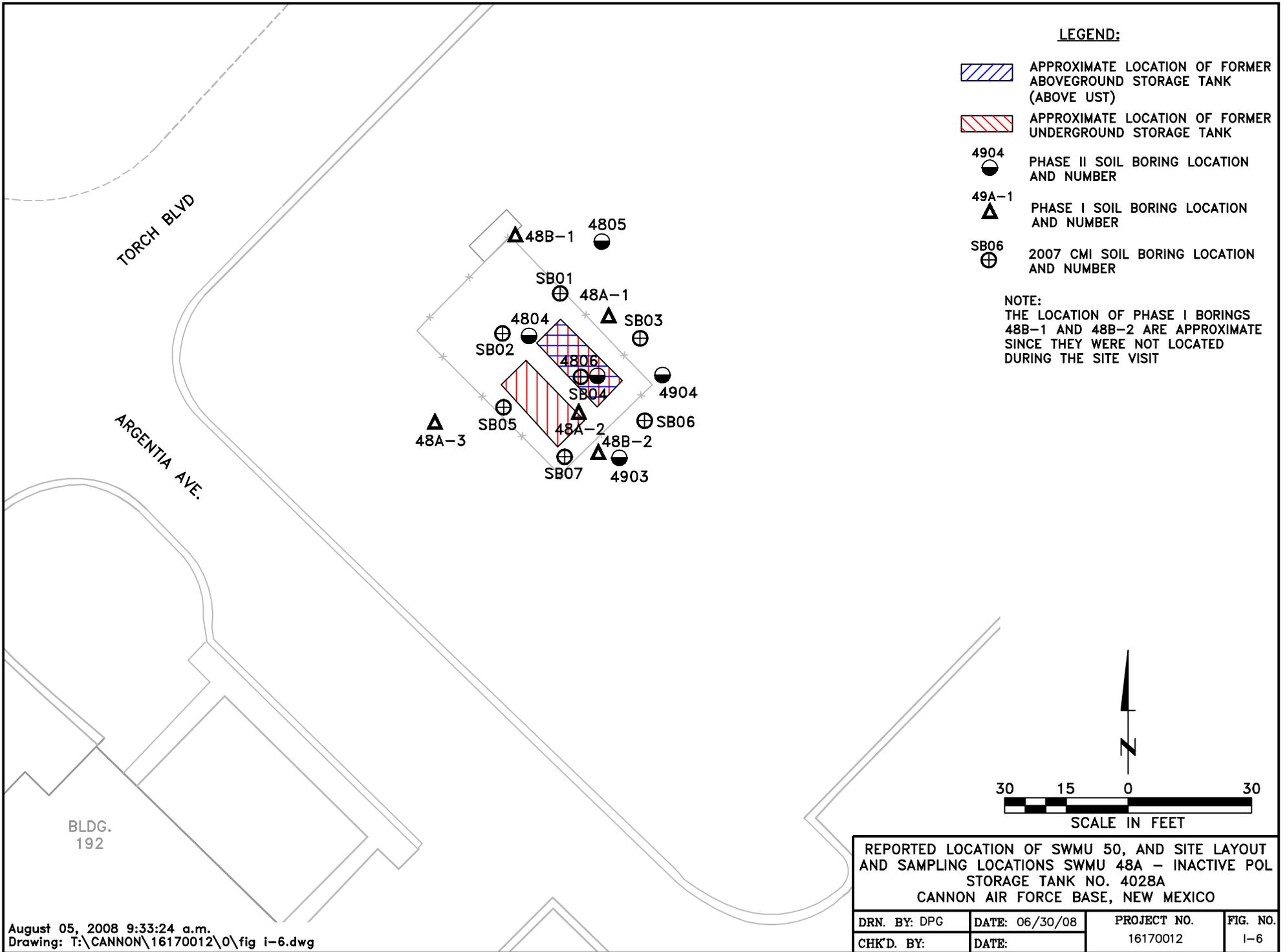
**LEGEND:**

● PREVIOUS CONFIRMATORY  
SAMPLE LOCATION  
(APPROXIMATE)



August 05, 2008 9:33:00 a.m.  
Drawing: T:\CANNON\16170012\0\fig i-5.dwg

<b>SITE LAYOUT AND SAMPLING LOCATIONS</b> SWMU 10 - POL TANK NO. 170 CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO.	FIG. NO.
CHK'D. BY:	DATE:	16170012	I-5

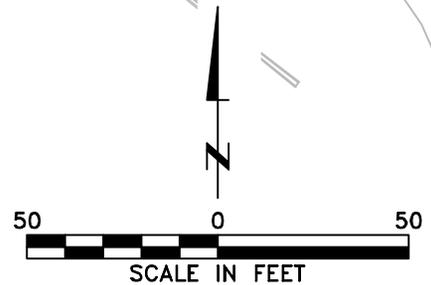
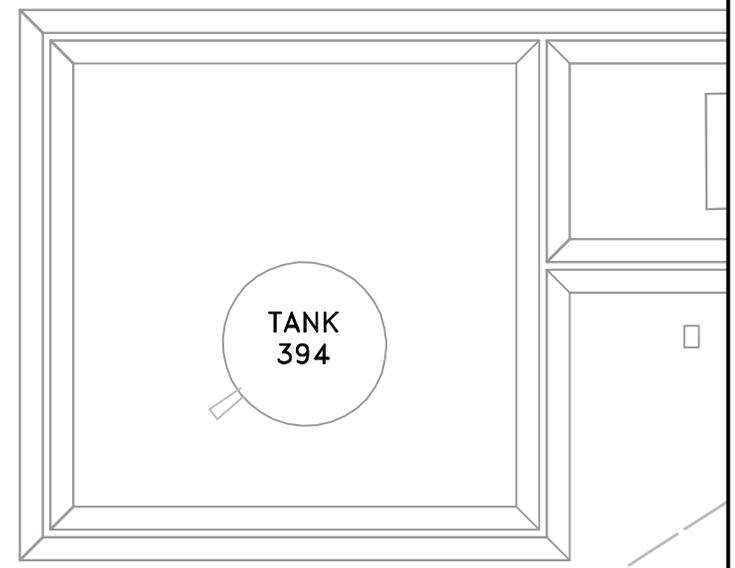
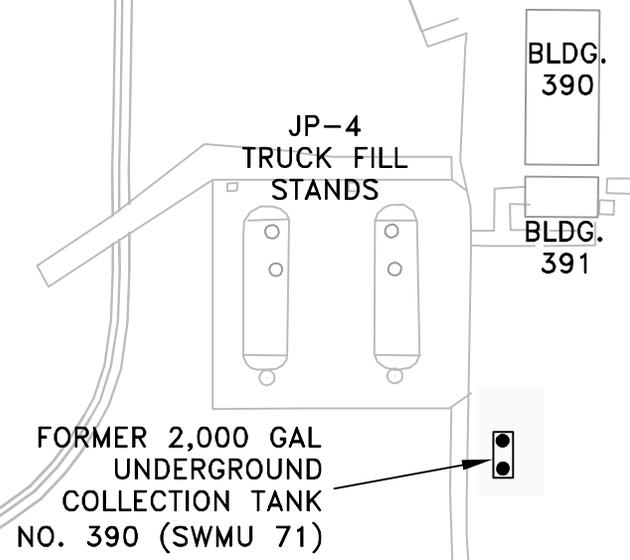


REPORTED LOCATION OF SWMU 50, AND SITE LAYOUT AND SAMPLING LOCATIONS SWMU 48A - INACTIVE POL STORAGE TANK NO. 4028A  
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 06/30/08	PROJECT NO.	FIG. NO.
CHK'D. BY:	DATE:	16170012	1-6

**LEGEND:**

- FORMER UST
- CONFIRMATION SAMPLE LOCATION (APPROXIMATE)



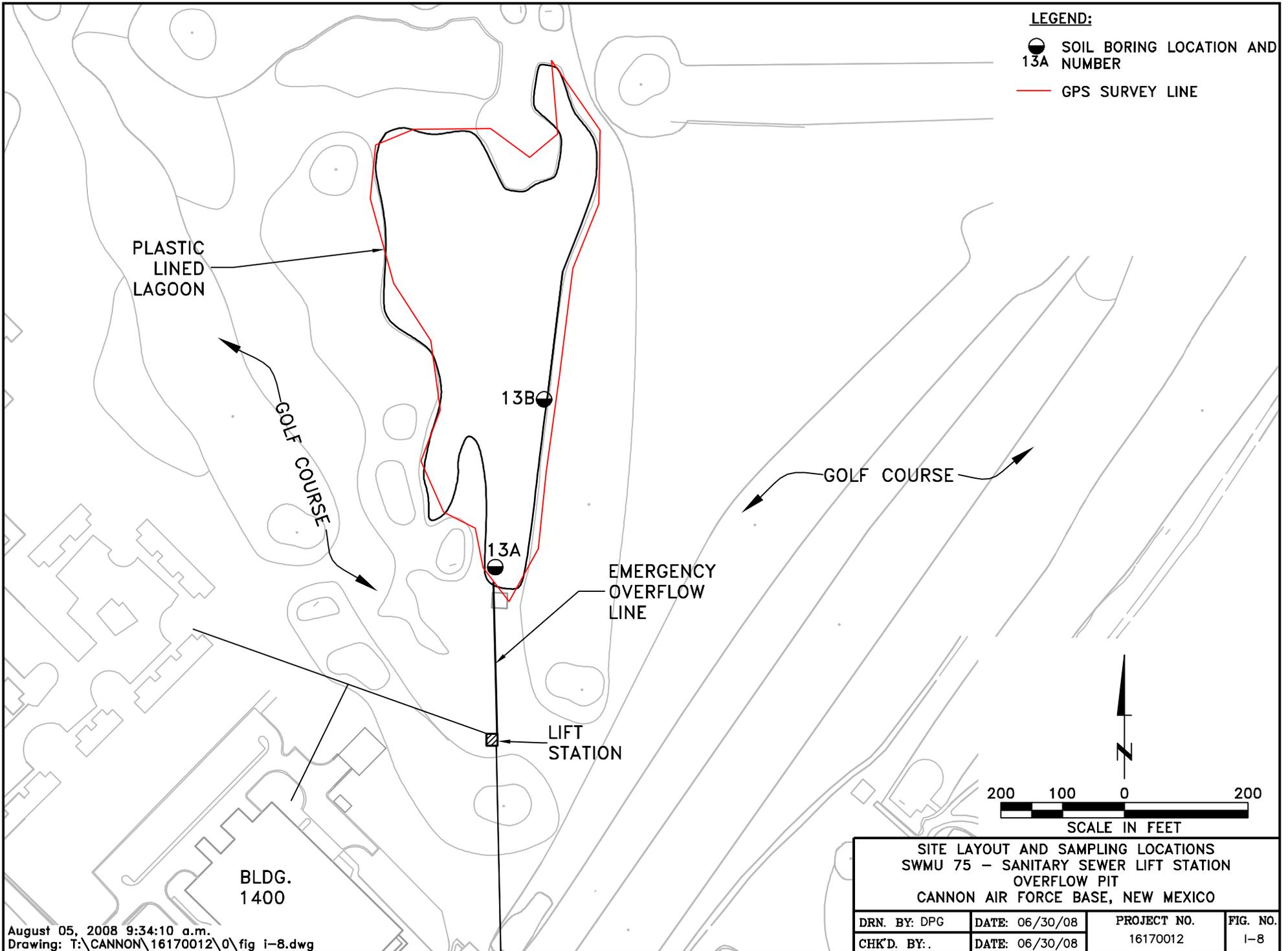
REPORTED LOCATION OF SWMU 72, SITE LAYOUT AND  
SAMPLING LOCATIONS SWMU 71 - OWS NO. 390  
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. 1-7
CHK'D. BY:	DATE:		

**LEGEND:**

● SOIL BORING LOCATION AND  
13A NUMBER

— GPS SURVEY LINE

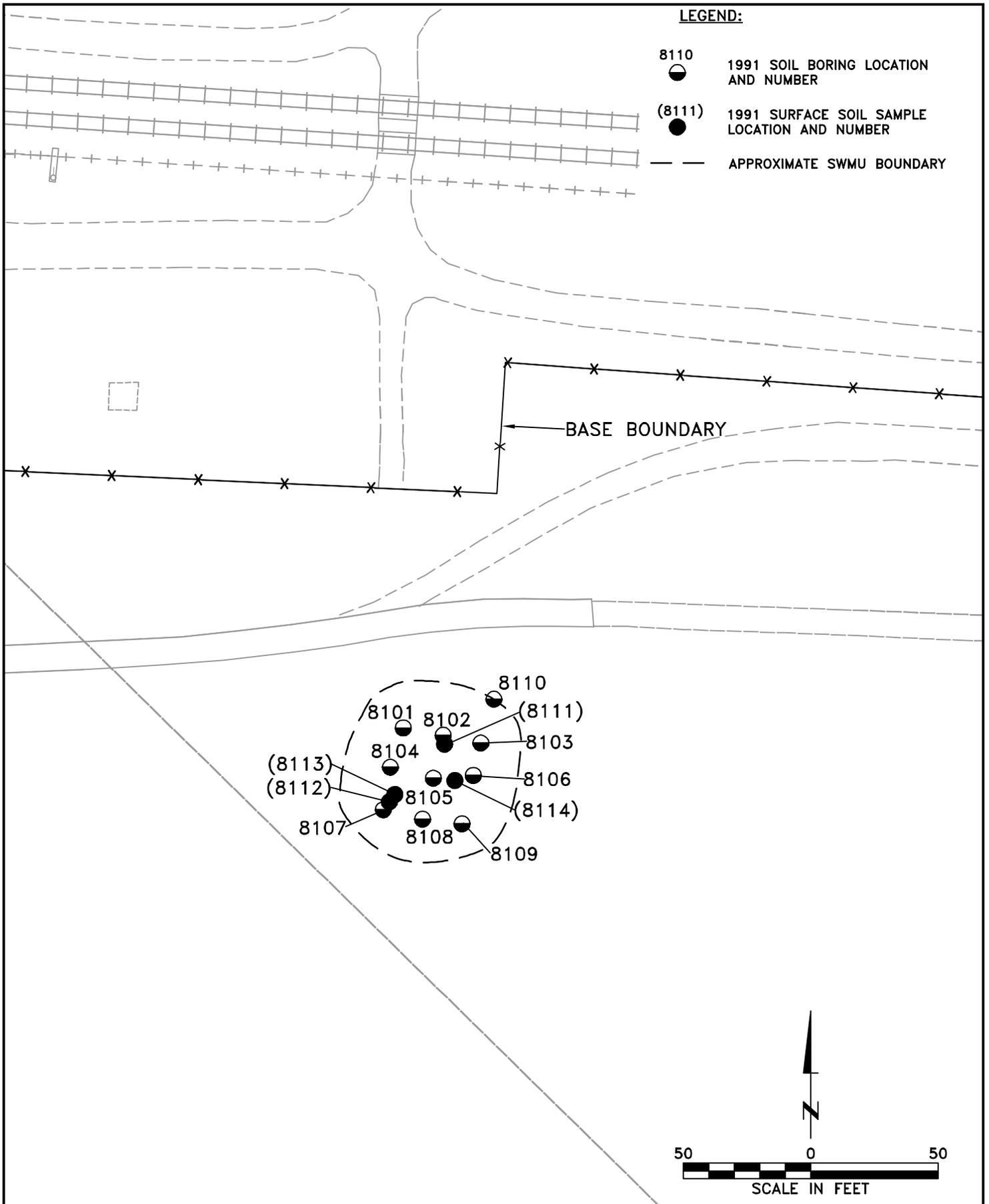


August 05, 2008 9:34:10 a.m.  
Drawing: T:\CANNON\16170012\0\fig i-8.dwg

SITE LAYOUT AND SAMPLING LOCATIONS SWMU 75 - SANITARY SEWER LIFT STATION OVERFLOW PIT CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO.	FIG. NO.
CHK'D. BY: .	DATE: 06/30/08	16170012	I-8

**LEGEND:**

- 8110  
 1991 SOIL BORING LOCATION AND NUMBER
- (8111)  
 1991 SURFACE SOIL SAMPLE LOCATION AND NUMBER
- — — — —  
APPROXIMATE SWMU BOUNDARY

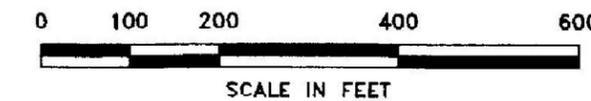
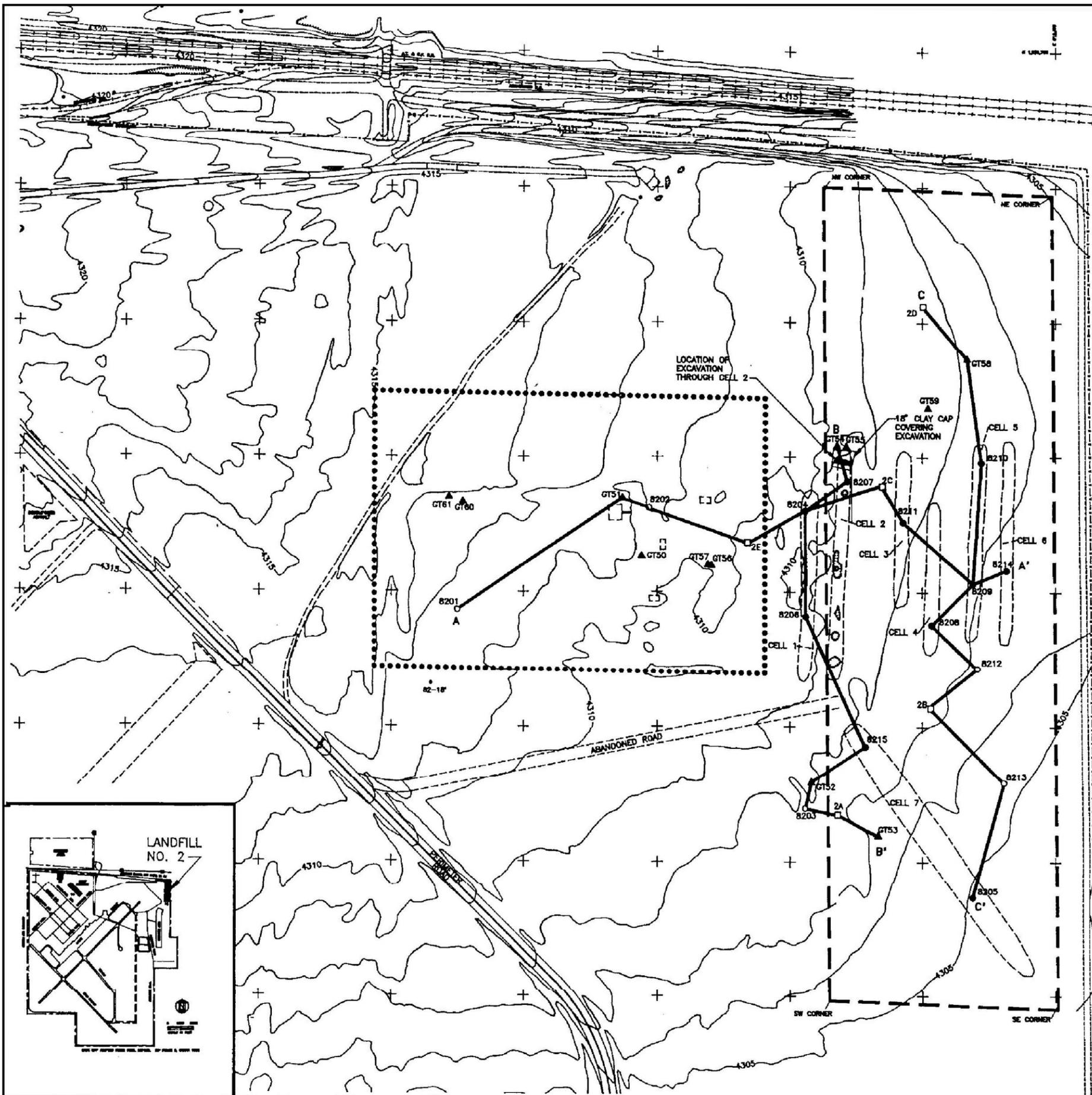


NOTE: SAMPLING LOCATIONS ARE APPROXIMATE

**SITE LAYOUT AND SAMPLING LOCATIONS  
SWMU 81 – SOLVENT DISPOSAL SITE  
CANNON AIR FORCE BASE, NEW MEXICO**

August 05, 2008 9:34:36 a.m.  
Drawing: T:\CANNON\16170012\0\fig i-9.dwg

DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. 1-9
CHK'D. BY:	REVISION:		



- LEGEND:**
- x - x - x - 4 WIRE B/W CANNON AFB BOUNDARY FENCE
  - ==== PAVED ROAD
  - UNPAVED ROAD
  - ++++ RAILROAD
  - BUILDING
  - CONCRETE FOUNDATIONS
  - TOPOGRAPHIC CONTOUR IN FEET MEAN SEA LEVEL  
CONTOUR INTERVAL = 1 FOOT
  - DEPRESSION
  - RAISED
  - 8204 WCC 1992 ANALYTICAL SOIL BORING LOCATION WHICH ENCOUNTERED LANDFILL MATERIAL
  - 8201 WCC 1992 ANALYTICAL SOIL BORING LOCATION WHICH DID NOT ENCOUNTER LANDFILL MATERIAL
  - ▲ GT51 WCC 1992 GEOTECHNICAL SOIL BORING LOCATION WHICH DID NOT ENCOUNTER LANDFILL MATERIAL
  - 2A RADIAN CORP. 1985 SOIL BORING LOCATION
  - ESTIMATED EXTENT OF LANDFILL NO. 2 BASED ON WCC'S REVIEW OF AERIAL PHOTOGRAPHS
  - ESTIMATED EXTENT OF LANDFILL CELLS BASED ON AERIAL PHOTOGRAPHS, GEOPHYSICAL RESULTS, AND FIELD OBSERVATIONS
  - A --- A' GEOLOGICAL CROSS-SECTION LOCATION
  - ..... AREA SHOWING EVIDENCE OF SURFACE DISTURBANCE FROM AERIAL PHOTOGRAPHS

**NOTE:**

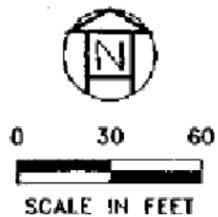
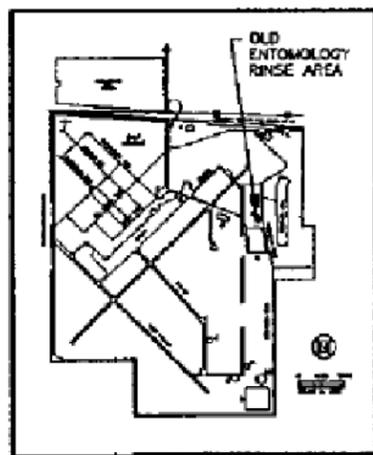
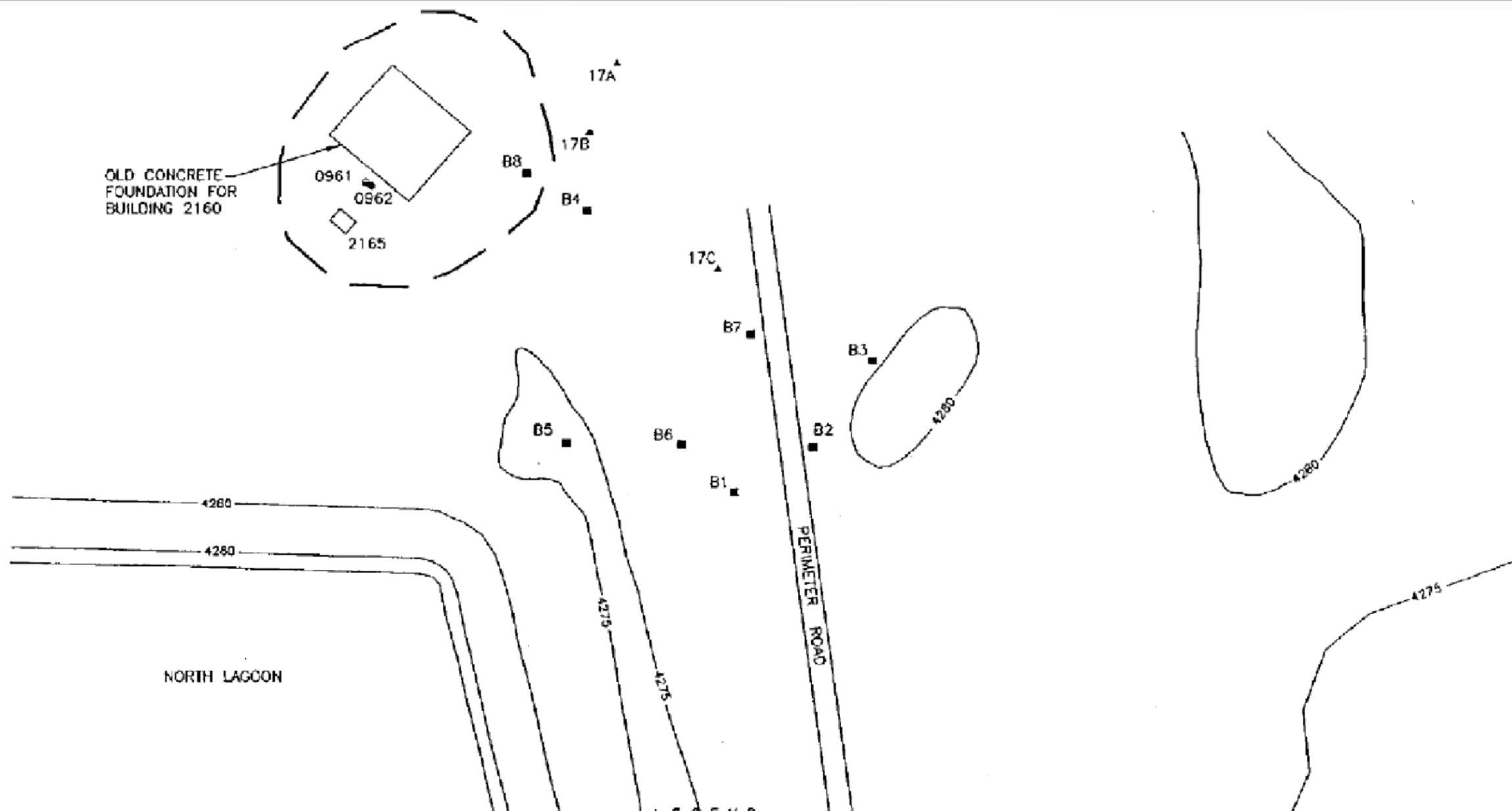
1. THE LOCATIONS OF THE SOIL BORINGS DRILLED BY WCC IN MARCH AND APRIL 1992, ARE BASED ON SURVEY DATA COLLECTED ON APRIL 28 AND 30, 1992. THE LOCATIONS OF THE SOIL BORINGS DRILLED BY RADIAN IN JANUARY 1985 ARE APPROXIMATIONS BASED ON FIGURE 4-3 FROM RADIAN'S 1986 IRP PHASE II REPORT.

August 05, 2008 9:35:02 a.m.  
Drawing: T:\CANNON\16170012\0\figs.dwg

SOURCE: WOODWARD-CLYDE, 1992

SITE LAYOUT AND SAMPLING LOCATIONS SWMU 82 - LANDFILL NO. 2 CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-10
CHK'D. BY: .	REVISION: 0		

OLD CONCRETE FOUNDATION FOR BUILDING 2160

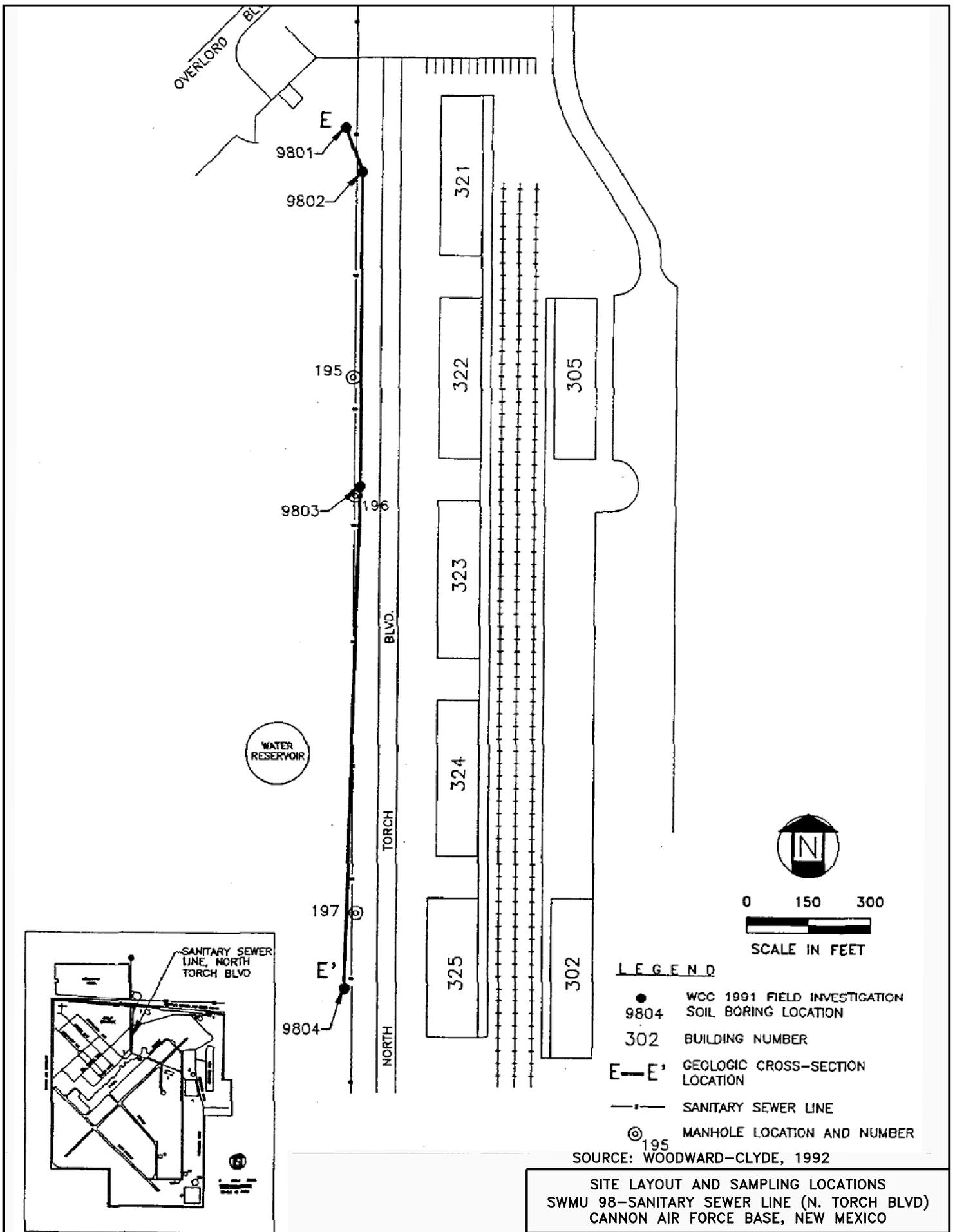


LEGEND

- ▲ 17C RADIAN 1985 FIELD INVESTIGATION SOIL BORING LOCATION
- B6 WALK, HAYDEL & ASSOCIATES 1986. FIELD INVESTIGATION SOIL BORING LOCATION
- 0961 W-C 1991 FIELD INVESTIGATION SURFACE SOIL SAMPLE LOCATION
- 0962 W-C 1993 FIELD INVESTIGATION SOIL BORING LOCATION
- ⊙ 096K MONITORING WELL LOCATION
- SWMU BOUNDARY
- ~4280~ GROUND SURFACE CONTOUR LINE IN FEET MSL CONTOUR INTERVAL = 5 FEET
- 2165 BUILDING NUMBER

MONITORING WELL K  
096K

SITE LAYOUT AND SAMPLING LOCATIONS SWMU 96-OLD ENTOMOLOGY RINSE AREA CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-11
CHK'D. BY: .	REVISION: 0		



WATER RESERVOIR



0 150 300  
SCALE IN FEET

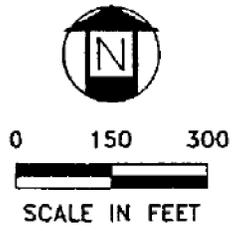
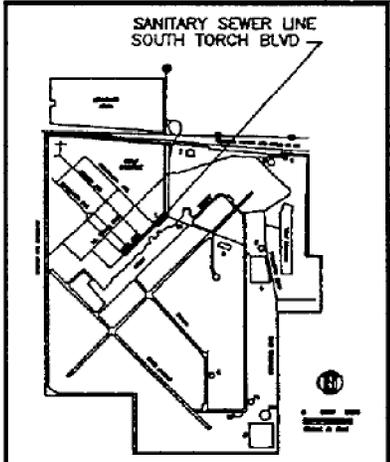
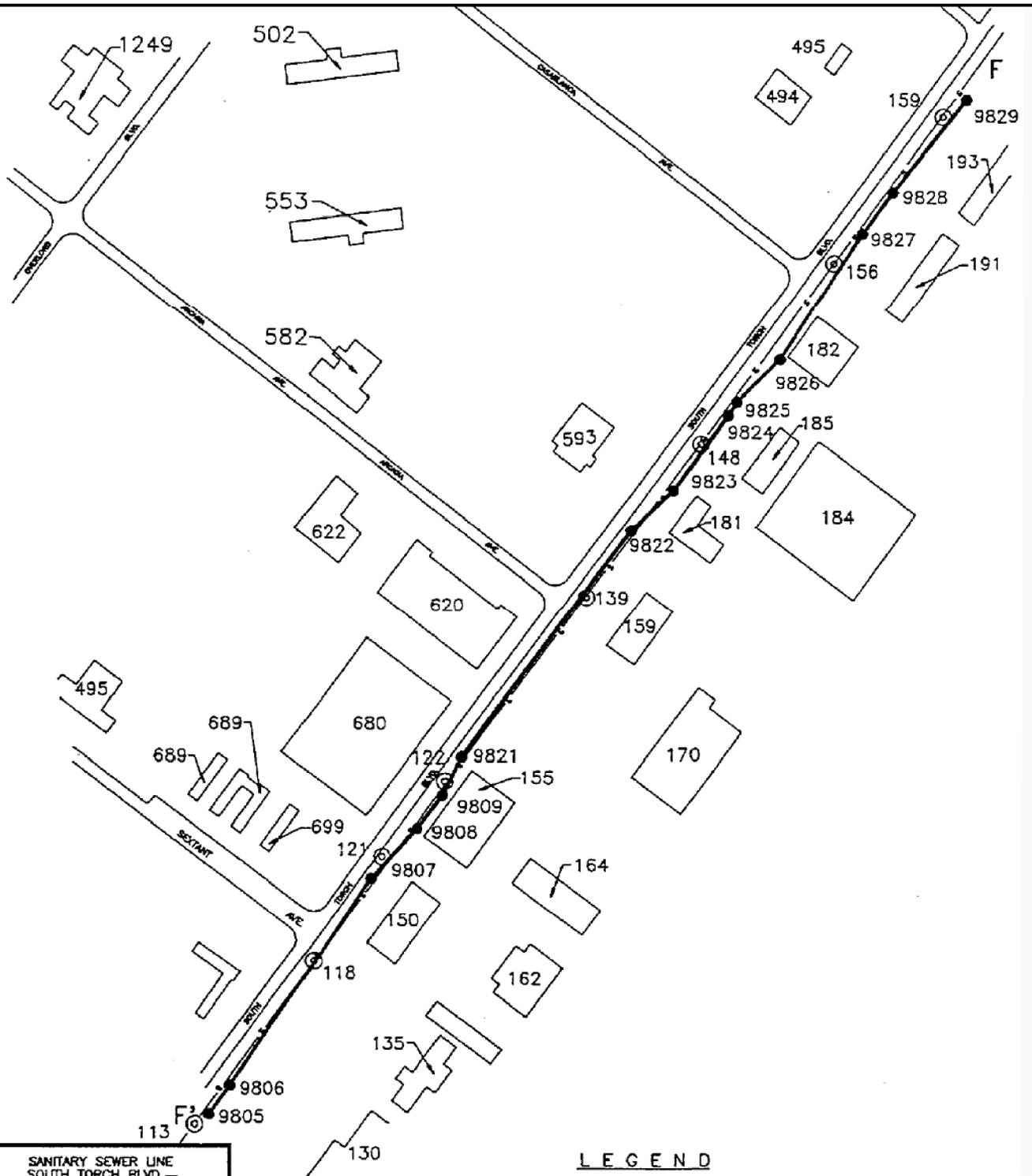
**LEGEND**

- WCC 1991 FIELD INVESTIGATION
- 9804 SOIL BORING LOCATION
- 302 BUILDING NUMBER
- E—E' GEOLOGIC CROSS-SECTION LOCATION
- SANITARY SEWER LINE
- ⊙ MANHOLE LOCATION AND NUMBER

SOURCE: WOODWARD-CLYDE, 1992

SITE LAYOUT AND SAMPLING LOCATIONS  
SWMU 98—SANITARY SEWER LINE (N. TORCH BLVD)  
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-12A
CHK'D. BY:	REVISION: 0		

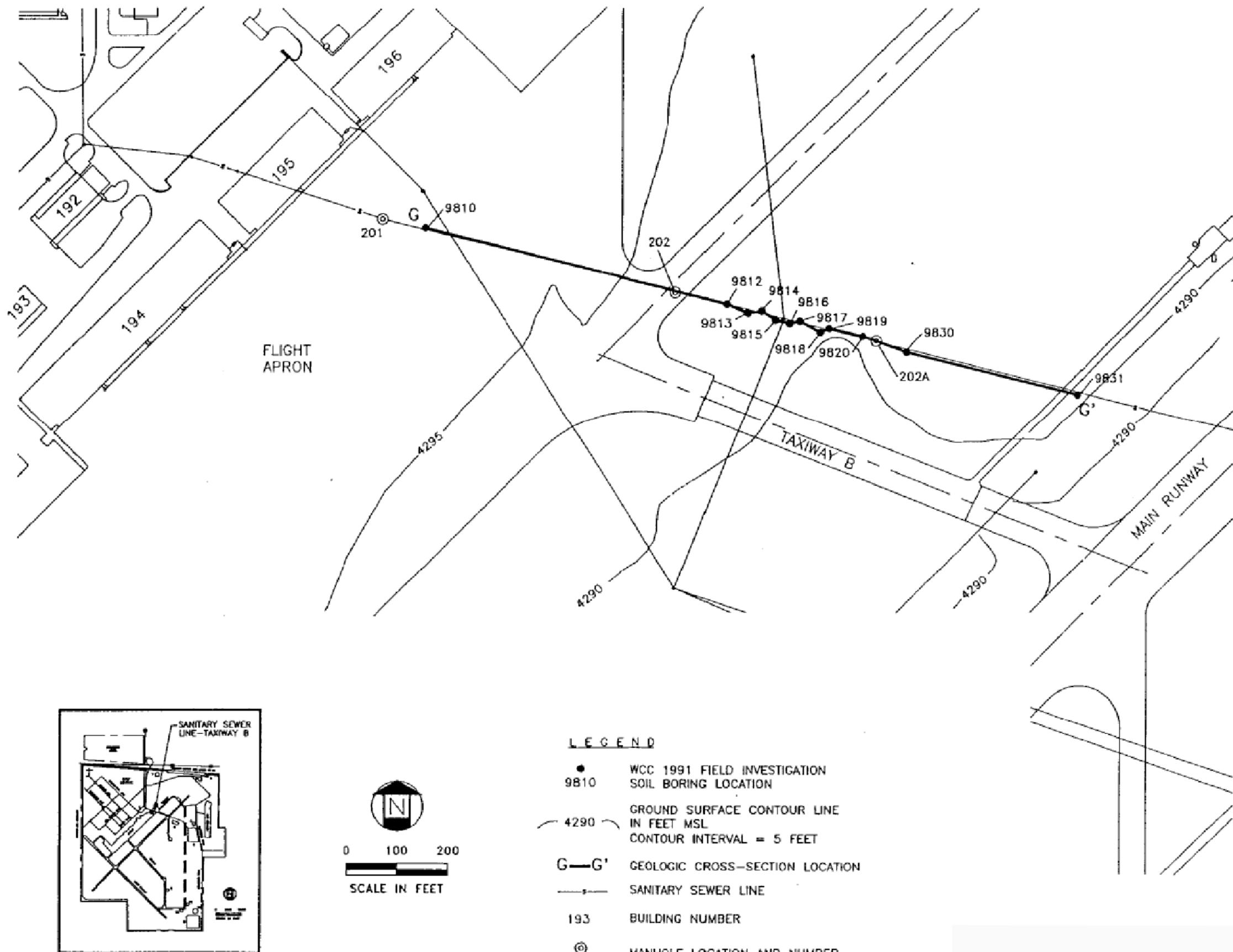


**LEGEND**

- 9807 WCC 1991 FIELD INVESTIGATION SOIL BORING LOCATION
  - 130 BUILDING NUMBER
  - F—F' GEOLOGIC CROSS-SECTION LOCATION
  - SANITARY SEWER LINE
  - ⊙113 MANHOLE LOCATION AND NUMBER
- SOURCE: WOODWARD-CLYDE, 1992

**SITE LAYOUT AND SAMPLING LOCATIONS  
SWMU 98—SANITARY SEWER LINE (S. TORCH BLVD)  
CANNON AIR FORCE BASE, NEW MEXICO**

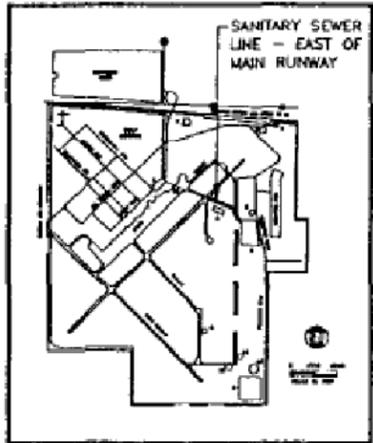
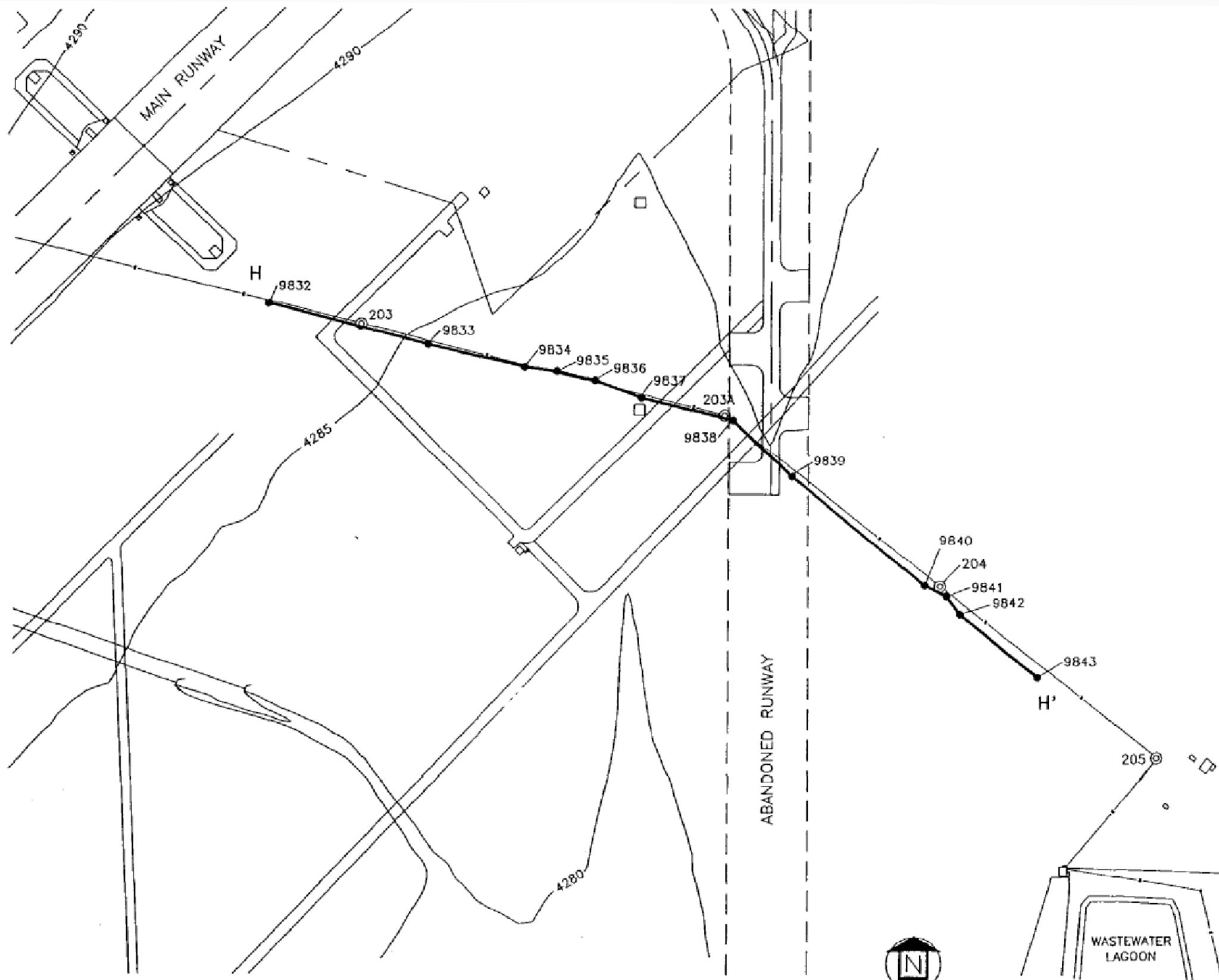
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-12B
CHK'D. BY:	REVISION: 0		



**LEGEND**

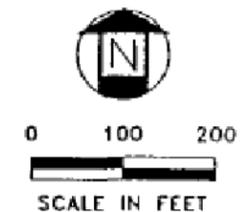
- WCC 1991 FIELD INVESTIGATION SOIL BORING LOCATION
- 9810
- 4290 — GROUND SURFACE CONTOUR LINE IN FEET MSL  
CONTOUR INTERVAL = 5 FEET
- G—G' GEOLOGIC CROSS-SECTION LOCATION
- SANITARY SEWER LINE
- 193 BUILDING NUMBER
- ⊙ MANHOLE LOCATION AND NUMBER
- 202

SITE LAYOUT AND SAMPLING LOCATIONS SWMU 98—SANITARY SEWER LINE (TAXIWAY B) CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-12C
CHK'D. BY: .	REVISION: 0		

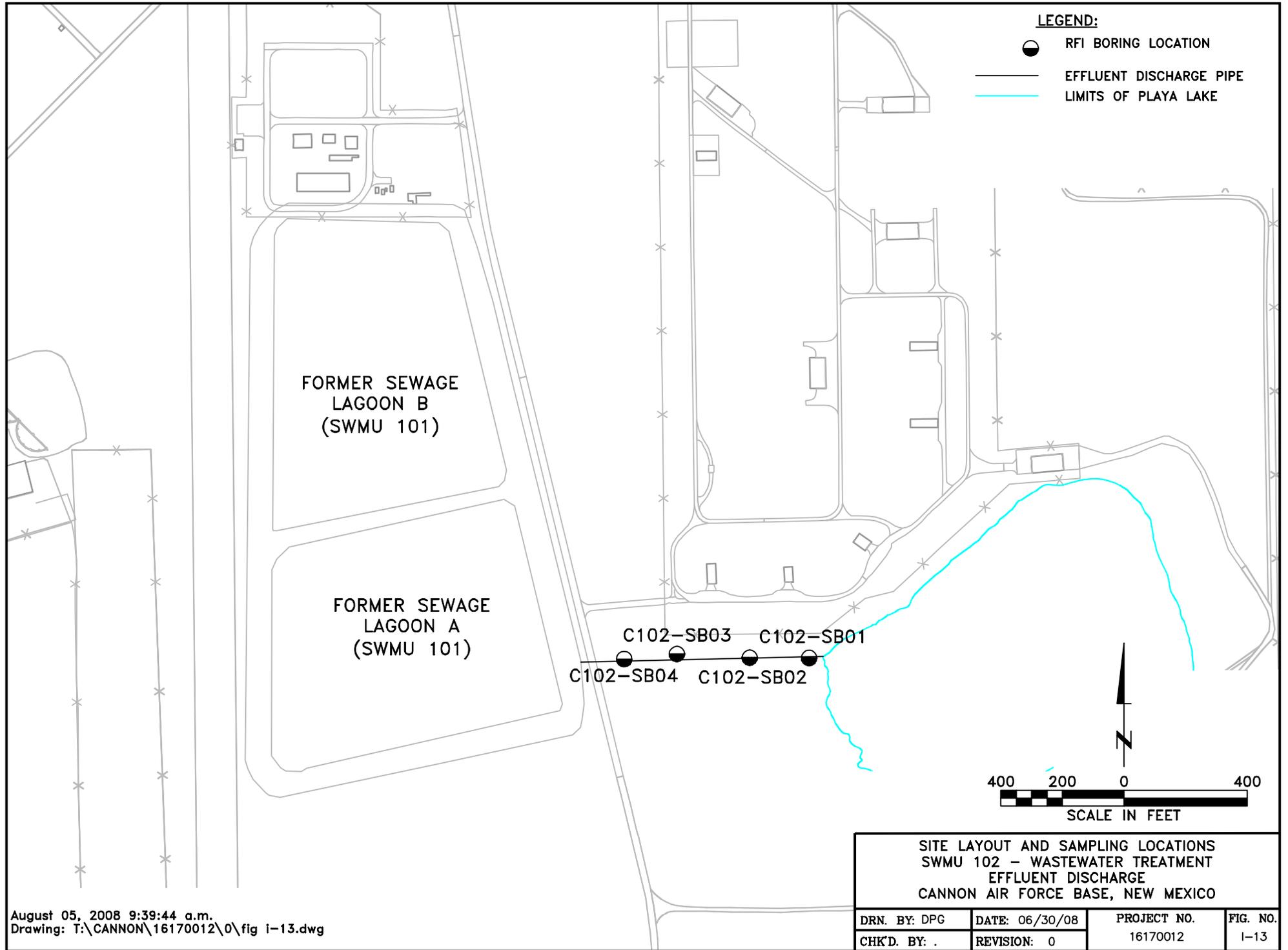


**LEGEND**

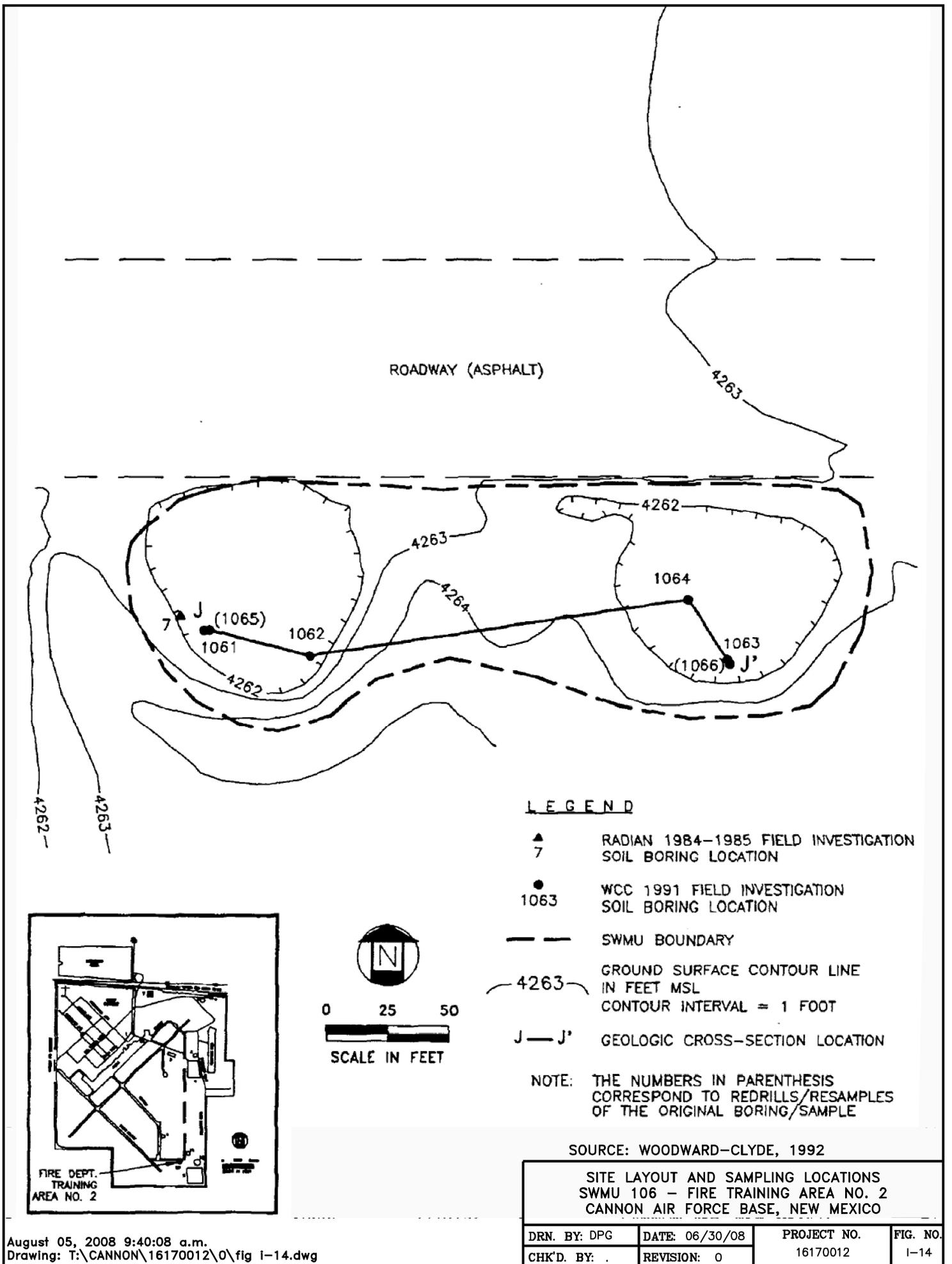
- WCC 1991 FIELD INVESTIGATION SOIL BORING LOCATION
- 4290 — GROUND SURFACE CONTOUR LINE IN FEET MSL. CONTOUR INTERVAL = 5 FEET
- H—H' GEOLOGIC CROSS-SECTION LOCATION
- SANITARY SEWER LINE
- ⊙ MANHOLE LOCATION AND NUMBER
- 205



SITE LAYOUT AND SAMPLING LOCATIONS SWMU 98—SANITARY SEWER LINE (E. OF MAIN RUNWAY) CANNON AIR FORCE BASE, NEW MEXICO			
DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. I-12D
CHK'D. BY: .	REVISION: 0		



August 05, 2008 9:39:44 a.m.  
Drawing: T:\CANNON\16170012\0\fig i-13.dwg



ROADWAY (ASPHALT)

**LEGEND**

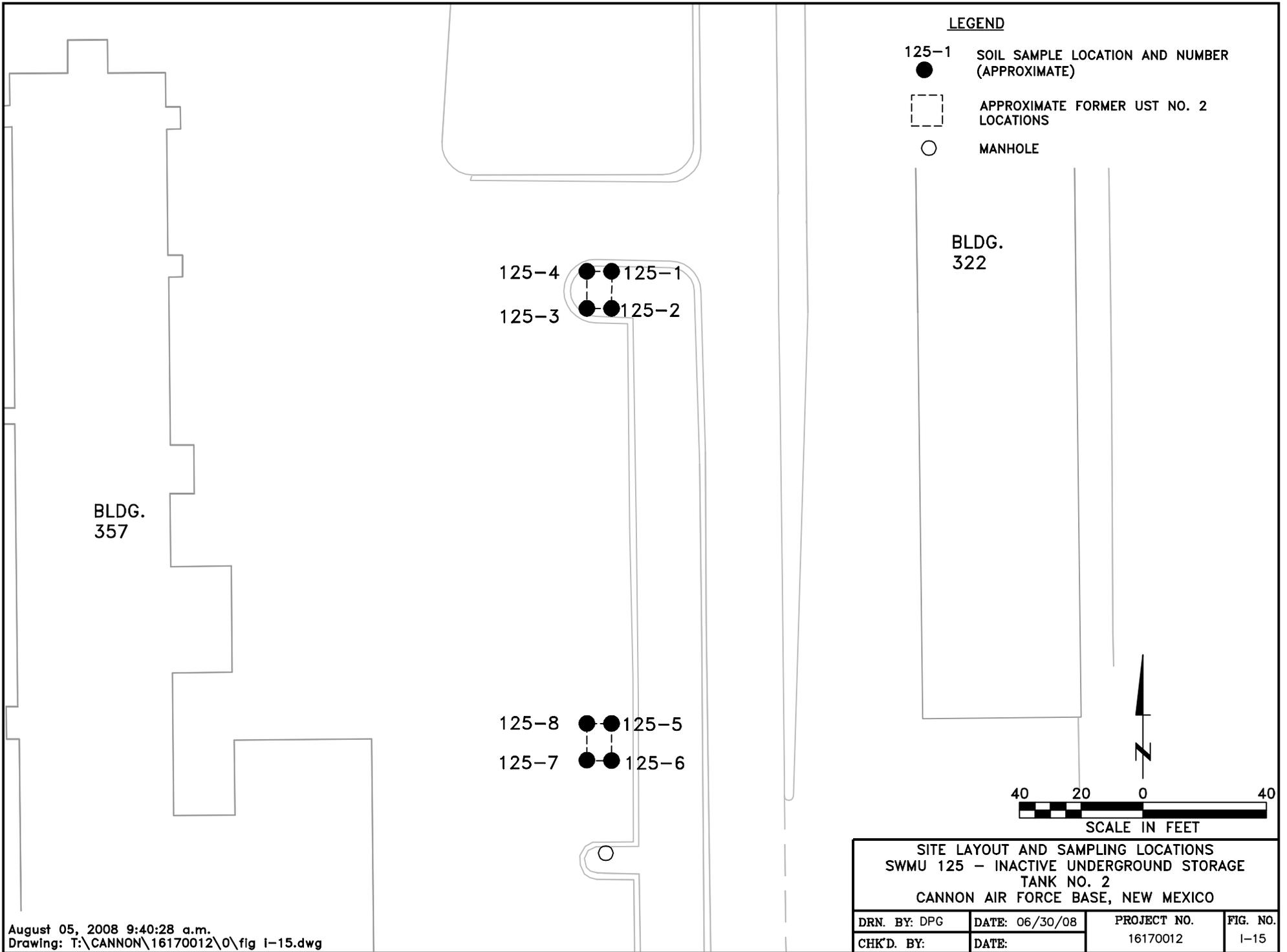
- ▲ 7 RADIAN 1984-1985 FIELD INVESTIGATION SOIL BORING LOCATION
- 1063 WCC 1991 FIELD INVESTIGATION SOIL BORING LOCATION
- SWMU BOUNDARY
- 4263 — GROUND SURFACE CONTOUR LINE IN FEET MSL  
CONTOUR INTERVAL = 1 FOOT
- J — J' GEOLOGIC CROSS-SECTION LOCATION

NOTE: THE NUMBERS IN PARENTHESIS CORRESPOND TO REDRILLS/RESAMPLES OF THE ORIGINAL BORING/SAMPLE

SOURCE: WOODWARD-CLYDE, 1992

SITE LAYOUT AND SAMPLING LOCATIONS  
SWMU 106 - FIRE TRAINING AREA NO. 2  
CANNON AIR FORCE BASE, NEW MEXICO

DRN. BY: DPG	DATE: 06/30/08	PROJECT NO. 16170012	FIG. NO. 1-14
CHK'D. BY: .	REVISION: 0		



**Attachment II  
Tables**

**TABLE 1  
COMPARISON OF SWMU 2 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>VOLATILE ORGANICS</b>	All ND										
<b>SEMIVOLATILE ORGANICS</b>	All ND										
<b>METALS</b>											
Aluminum	8/8	8.93E+03		1.22E+04			7.78E+04	1.00E+05	1.44E+04	1.10E+06	NO
Antimony	8/8	5.90E+00	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02	1.32E+01	NO
Arsenic	8/8	9.90E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01	2.90E-01	YES
Barium	8/8	7.42E+02		8.90E+02			1.56E+04	1.00E+05	6.02E+04	6.03E+03	NO
Beryllium	8/8	5.70E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01	1.15E+03	NO
Cadmium	8/8	2.30E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02	2.75E+01	YES
Calcium	8/8	2.69E+05		2.37E+05	2.69E+01	1.20E+03	NA	NA	NA	NA	YES
Chromium	8/8	7.20E+00		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max 1.97E+09	NO
Cobalt	8/8	4.40E+00		4.70E+00			1.52E+03	2.05E+04	6.10E+01	6.61E+02	NO
Copper	8/8	4.70E+00		8.30E+00			3.13E+03	4.54E+04	1.24E+04	1.03E+03	NO
Iron	8/8	8.61E+03		1.31E+04			2.35E+04	1.00E+05	9.29E+04	5.54E+03	NO
Lead	8/8	5.70E+00		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK	NO
Magnesium	8/8	4.27E+03		1.93E+04	4.27E-01	4.00E+02	NA	NA	NA	NA	NO
Manganese	8/8	1.51E+02		3.33E+02			3.59E+03	4.84E+04	1.50E+02	2.24E+03	NO
Mercury	5/8	2.10E-02	J	1.90E-02			1.00E+05	1.00E+05	9.27E+02	2.09E-03	YES
Nickel	8/8	7.60E+00		1.49E+01			1.56E+03	2.27E+04	6.19E+03	9.53E+02	NO
Potassium	8/8	2.27E+03		2.51E+03	2.27E-01	3.90E+02 - 7.80E+02	NA	NA	NA	NA	NO
Selenium	0/8	ND		2.60E-01			3.91E+02	5.68E+03	1.55E+03	1.90E+01	NO
Silver	3/8	9.20E-01	J	2.65E+00			3.91E+02	5.68E+03	1.55E+03	3.13E+01	NO
Thallium	4/8	4.30E+00	J	2.65E+00			5.16E+00	7.49E+01	2.04E+01	3.43E+00	YES
Vanadium	8/8	1.82E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02	7.30E+02	NO
Zinc	6/8	1.63E+01	J	3.06E+01			2.35E+04	1.00E+05	9.29E+04	1.36E+04	NO

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

ND = Not detected

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from current investigation at SWMU 2.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 2  
COMPARISON OF SWMU 4 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?	
<b>VOLATILE ORGANICS</b>												
All ND												
<b>SEMIVOLATILE ORGANICS</b>												
All ND												
<b>METALS</b>												
Aluminum	8/8	1.10E+04		1.22E+04			7.78E+04	1.00E+05	1.44E+04	1.10E+06	NO	
Antimony	8/8	4.50E+00	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02	1.32E+01	NO	
Arsenic	8/8	7.20E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01	2.90E-01	YES	
Barium	8/8	5.33E+02		8.90E+02			1.56E+04	1.00E+05	6.02E+04	6.03E+03	NO	
Beryllium	8/8	6.60E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01	1.15E+03	NO	
Cadmium	8/8	1.60E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02	2.75E+01	YES	
Calcium	8/8	2.00E+05		2.37E+05	2.00E+01	1.20E+03	NA	NA	NA	NA	NO	
Chromium	8/8	8.50E+00		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09	NO
Cobalt	8/8	5.00E+00		4.70E+00			1.52E+03	2.05E+04	6.10E+01	6.61E+02	YES	
Copper	8/8	4.70E+00		8.30E+00			3.13E+03	4.54E+04	1.24E+04	1.03E+03	NO	
Iron	8/8	9.36E+03		1.31E+04			2.35E+04	1.00E+05	9.29E+04	5.54E+03	NO	
Lead	8/8	5.80E+00		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK	NO	
Magnesium	8/8	4.61E+03		1.93E+04	4.61E-01	4.00E+02	NA	NA	NA	NA	NO	
Manganese	8/8	1.34E+02		3.33E+02			3.59E+03	4.84E+04	1.50E+02	2.24E+03	NO	
Mercury	3/8	2.70E-02	J	1.90E-02			1.00E+05	1.00E+05	9.27E+02	2.09E-03	YES	
Nickel	8/8	7.10E+00		1.49E+01			1.56E+03	2.27E+04	6.19E+03	9.53E+02	NO	
Potassium	8/8	2.20E+03		2.51E+03	2.20E-01	3.90E+02 - 7.80E+02	NA	NA	NA	NA	NO	
Silver	3/8	9.20E-01	J	2.65E+00			3.91E+02	5.68E+03	1.55E+03	3.13E+01	NO	
Sodium	1/8	2.38E+02		1.23E+03	2.38E-02	1.00E+03	NA	NA	NA	NA	NO	
Thallium	4/8	4.30E+00	J	2.65E+00			5.16E+00	7.49E+01	2.04E+01	3.43E+00	YES	
Vanadium	8/8	2.34E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02	7.30E+02	NO	
Zinc	8/8	1.73E+01		3.06E+01			2.35E+04	1.00E+05	9.29E+04	1.36E+04	NO	

**Notes:**

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

ND = Not detected

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from current investigation at SWMU 4.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 3  
COMPARISON OF SWMU 6 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration <sup>1</sup> (mg/kg)	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Site-Specific Soil to Groundwater SSL Using DAF <sup>9</sup> = 1,070.7 (mg/kg)	Exceeds Background ?
<b>TOTAL PETROLEUM HYDROCARBONS*</b>	2/2	6.44E+00					5.20E+02	1.12E+03	NA	NA		
<b>VOLATILE ORGANICS</b>												
Benzene*	1/9	3.00E-03					1.03E+01	2.58E+01	1.74E+02	2.01E-02		
<b>SEMIVOLATILE ORGANICS</b>												
	0/8	All ND										
<b>METALS</b>												
Aluminum	8/8	9.94E+03		1.22E+04			7.78E+04	1.00E+05	1.44E+04	1.10E+06		NO
Antimony	7/8	3.80E+00	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02	1.32E+01		NO
Arsenic	8/8	5.90E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01	2.62E-01	1.40E+01	YES
Barium	8/8	2.83E+02		8.90E+02			1.56E+04	1.00E+05	6.02E+04	6.03E+03		NO
Beryllium	8/8	6.20E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01	1.15E+03		NO
Cadmium	7/8	4.20E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02	2.75E+01		YES
Calcium	8/8	2.51E+05		2.37E+05	2.51E+01	1.20E+03	NA	NA	NA	NA		YES
Chromium	8/8	8.90E+00		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max 1.97E+09		NO
Cobalt	8/8	4.30E+00		4.70E+00			NA	NA	NA	NA		NO
Copper	8/8	4.60E+00		8.30E+00			3.13E+03	4.54E+04	1.24E+04	1.03E+03		NO
Iron	8/8	9.43E+03		1.31E+04			2.35E+04	1.00E+05	9.29E+04	1.29E+04	6.92E+05	NO
Lead	8/8	5.90E+00		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK NA		NO
Magnesium	8/8	5.47E+03		1.93E+04	5.47E-01	4.00E+02	NA	NA	NA	NA		NO
Manganese	8/8	1.47E+02		3.33E+02			3.59E+03	4.84E+04	1.50E+02	5.40E+00	2.89E+02	NO
Mercury	7/8	1.70E-02	J	1.90E-02			1.00E+05	1.00E+05	9.27E+02	5.87E-01	3.14E+01	NO
Nickel	8/8	8.30E+00		1.49E+01			1.56E+03	2.27E+04	6.19E+03	9.53E+02		NO
Potassium	8/8	2.30E+03		2.51E+03	2.30E-01	3.90E+02 - 7.80E+02	NA	NA	NA	NA		NO
Silver	7/8	9.40E-01	J	2.65E+00			3.91E+02	5.68E+03	1.55E+03	3.13E+01		NO
Sodium	8/8	1.17E+02		1.23E+03	1.17E-02	1.00E+03	NA	NA	NA	NA		NO
Thallium	8/8	4.60E+00	J	2.65E+00			5.16E+00	7.49E+01	2.04E+01	3.43E+00	1.84E+02	YES
Vanadium	8/8	1.97E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02	3.65E+03		NO
Zinc	8/8	1.94E+01		3.06E+01			2.35E+04	1.00E+05	9.29E+04	1.36E+04		NO

**TABLE 3**  
**COMPARISON OF SWMU 6 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS**  
**CANNON AFB, NEW MEXICO**

Notes:

mg/kg = milligrams per kilogram

\* Sampling result from second (northern) tank location sampled during tank removal activities in 1992.

J = Estimated

NA = Not applicable

ND = Not detected

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from current investigation at SWMU 6.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure. - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2009) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

(9) Site-Specific Soil-to-Groundwater Screening Levels calculated in accordance with Equation 17 (NMED 2009) and a resultant DAF of 1,070.7.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 4  
COMPARISON OF SWMU 10 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>TOTAL PETROLEUM HYDROCARBONS</b>	2/2	3.136E+00					5.20E+02	1.12E+03	NA	NA	
<b>VOLATILE ORGANICS</b>	0/2	All ND									

Notes:

mg/kg = milligrams per kilogram

NA = Not applicable

ND = Not detected

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

(1) Maximum detected concentration from current investigation at SWMU 10.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure. - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 5  
COMPARISON OF SWMU 75 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration <sup>1</sup> (mg/kg)	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>OIL AND GREASE</b>	4/4	2.40E+01					NA	NA	NA	NA	
<b>PURGEABLE ORGANICS</b>	0/4	ND									
<b>METALS</b>											
Arsenic	4/4	2.60E+00		3.60E+00			3.90E+00	1.77E+01	8.52E+01	2.90E-01	NO
Barium	4/4	1.30E+02		6.70E+02			1.56E+04	1.00E+05	6.02E+04	6.03E+03	NO
Cadmium	3/4	3.40E-01		4.35E-01			3.90E+01	5.64E+02	1.54E+02	2.75E+01	NO
Chromium	4/4	7.40E+00		1.05E+01			1.00E+05	1.00E+05	1.00E+05	max 1.97E+09	NO
Copper	4/4	7.40E+00		1.83E+01			3.13E+03	4.54E+04	1.24E+04	1.03E+03	NO
Lead	4/4	9.90E+00		1.20E+01			4.00E+02	8.00E+02	8.00E+02	IEUBK NA	NO
Manganese	4/4	5.50E+02		3.07E+02			3.59E+03	4.84E+04	1.50E+02	2.24E+03	YES
Mercury	4/4	3.80E-01		5.60E-02			1.00E+05	1.00E+05	9.27E+02	2.09E-03	YES
Selenium	4/4	1.50E+00		2.60E-01			3.91E+02	5.68E+03	1.55E+03	1.90E+01	YES
Silver	3/4	1.60E+00		4.00E-01			3.91E+02	5.68E+03	1.55E+03	3.13E+01	YES
Zinc	4/4	2.40E+01	J	3.22E+01			2.35E+04	1.00E+05	9.29E+04	1.36E+04	NO

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 75.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006).

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006) - NOT APPLICABLE TO THIS SITE.

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 6  
COMPARISON OF SWMU 81 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Cumulative Risk Calculations	Ecological Risk Screening Concentration <sup>9</sup> (mg/kg)	Exceeds Background ?	
<b>VOLATILE ORGANICS</b>														
1,1,1-Trichloroethane	5/10	2.00E-03	J				5.63E+02	5.63E+02	5.63E+02	sat	2.65E+01	3.55E-06	nc	2.98E+01
Methyl Ethyl Ketone (2-Butanone)	1/10	1.00E-03	J				3.18E+04	4.87E+04	4.87E+04	sat	2.55E+01	3.14E-08	nc	8.96E+01
Acetone	5/10	1.30E+00	J				2.81E+04	1.00E+05	9.85E+04		1.91E+01	4.63E-05	nc	2.50E+00
Ethylbenzene	5/10	2.00E-03	J				1.28E+02	1.28E+02	1.28E+02	sat	2.02E+01	1.56E-05	nc	5.16E+00
Tetrachloroethene	4/10	2.00E-03	J				1.25E+01	3.16E+01	1.34E+02	sat	5.74E-02	1.60E-04	ca	9.92E+00
Toluene	9/10	1.70E-02	J				2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01	6.75E-05	nc	5.45E+00
Trichloroethene	6/10	2.00E-03	J				6.38E-01	1.56E+00	3.36E+01		2.00E-03	3.13E-03	ca	-
Xylene (total)	7/10	6.00E-03	J				8.20E+01	8.20E+01	8.20E+01	sat	2.06E+00	7.32E-05	nc	1.00E+01
											Total Carcinogenic Cumulative Risk Calculation:	3.29E-03		
											Total Noncarcinogenic Cumulative Risk Calculation:	2.06E-04		

**Notes:**

mg/kg = milligrams per kilogram

J = Estimated

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

(1) Maximum detected concentration from all investigations at SWMU 81.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006).

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006) - NOT APPLICABLE TO THIS SITE.

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

(9) USEPA Region 5 RCRA Ecological Screening Levels (USEPA 2003)

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 7  
COMPARISON OF SWMU 81 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Cumulative Risk Calculations	Exceeds Background ?	
<b>VOLATILE ORGANICS</b>													
1,1,1-Trichloroethane	6/25	2.00E-03	J				5.63E+02	5.63E+02	5.63E+02	sat	2.65E+01	3.55E-06	nc
Methyl Ethyl Ketone (2-Butanone)	3/25	3.00E-03	J				3.18E+04	4.87E+04	4.87E+04	sat	2.55E+01	9.43E-08	nc
Acetone	16/25	1.30E+00	J				2.81E+04	1.00E+05	9.85E+04	sat	1.91E+01	4.63E-05	nc
Ethylbenzene	6/25	2.00E-03	J				1.28E+02	1.28E+02	1.28E+02	sat	2.02E+01	1.56E-05	nc
Tetrachloroethene	4/25	2.00E-03	J				1.25E+01	3.16E+01	1.34E+02	sat	5.74E-02	1.60E-04	ca
Toluene	10/25	1.70E-02					2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01	6.75E-05	nc
Trichloroethene	7/25	3.00E-03	J				6.38E-01	1.56E+00	3.36E+01		2.00E-03	4.70E-03	ca
Xylene (total)	8/25	6.00E-03	J				8.20E+01	8.20E+01	8.20E+01	sat	2.06E+00	7.32E-05	nc
Total Carcinogenic Cumulative Risk Calculation:											4.86E-03		
Total Noncarcinogenic Cumulative Risk Calculation:											2.06E-04		

**Notes:**

mg/kg = milligrams per kilogram

J = Estimated

ND = Not detected

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

(1) Maximum detected concentration from all investigations at SWMU 81.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006) - NOT APPLICABLE TO THIS SITE.

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 8  
COMPARISON OF SWMU 82 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?	
<b>VOLATILE ORGANICS</b>												
Toluene	4/5	1.40E-02					2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01	
Xylene (total)	2/5	1.10E-03	J				8.20E+01	8.20E+01	8.20E+01	sat	2.06E+00	
<b>SEMIVOLATILE ORGANICS</b>												
Bis(2-Ethylhexyl)phthalate	2/5	1.60E-01	J				3.47E+02	1.37E+03	4.66E+03		2.15E+04	
Benzo(a)anthracene	1/5	5.50E-02	J				6.21E+00	2.34E+01	2.12E+02		1.09E+01	
Chrysene	1/5	4.90E-02	J				6.15E+02	2.31E+03	2.12E+04		3.48E+02	
Di-n-butylphthalate	1/5	4.80E-02	J				6.11E+03	6.84E+04	2.33E+04		3.72E+03	
Pyrene	1/5	5.60E-02	J				2.29E+03	3.09E+04	9.01E+03		3.73E+02	
<b>PESTICIDES/PCBs</b>												
4,4-DDE	4/5	2.90E-02					1.72E+01	7.81E+01	5.70E+02		2.62E+02	
4,4-DDT	2/5	1.70E-02					1.72E+01	7.81E+01	1.38E+02		1.54E+02	
<b>METALS</b>												
Aluminum	5/5	1.05E+04		8.95E+03			7.78E+04	1.00E+05	1.44E+04		1.10E+06	YES
Antimony	1/5	4.20E+00	J	3.15E+00			3.13E+01	4.54E+02	1.24E+02		1.32E+01	YES
Arsenic	5/5	2.80E+00		3.60E+00			3.90E+00	1.77E+01	8.52E+01		2.90E-01	NO
Barium	5/5	2.48E+02		6.70E+02			1.56E+04	1.00E+05	6.02E+04		6.03E+03	NO
Beryllium	5/5	8.20E-01		7.80E-01			1.56E+02	2.25E+03	5.62E+01		1.15E+03	YES
Cadmium	3/5	1.40E+00		4.35E-01			3.90E+01	5.64E+02	1.54E+02		2.75E+01	YES
Calcium	5/5	8.68E+04		4.48E+04	8.68E+00	1.20E+03	NA	NA	NA		NA	YES
Chromium	5/5	1.14E+01		1.05E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09	YES
Cobalt	5/5	5.30E+00		6.60E+00			1.52E+03	2.05E+04	6.10E+01		6.61E+02	NO
Copper	3/5	1.86E+01	J	1.83E+01			3.13E+03	4.54E+04	1.24E+04		1.03E+03	YES
Iron	5/5	1.14E+04		1.01E+04			2.35E+04	1.00E+05	9.29E+04		5.54E+03	YES
Lead	5/5	7.26E+01		1.20E+01			4.00E+02	8.00E+02	8.00E+02	IEUBK	NA	YES
Magnesium	5/5	2.64E+03		1.93E+03	2.64E-01	4.00E+02	NA	NA	NA		NA	YES
Manganese	5/5	1.74E+02		3.07E+02			3.59E+03	4.84E+04	1.50E+02		2.24E+03	NO
Mercury	1/5	4.80E-02	J	5.60E-02			1.00E+05	1.00E+05	9.27E+02		2.09E-03	NO
Nickel	5/5	9.70E+00	J	1.10E+01			1.56E+03	2.27E+04	6.19E+03		9.53E+02	NO
Potassium	5/5	2.46E+03		2.69E+03	2.46E-01	3.90E+02 - 7.80E+02	NA	NA	NA		NA	NO
Silver	1/5	1.00E+00	J	4.00E-01			3.91E+02	5.68E+03	1.55E+03		3.13E+01	YES
Sodium	1/5	3.25E+02	J	1.02E+02	3.25E-02	1.00E+03	NA	NA	NA		NA	YES
Vanadium	5/5	2.02E+01		2.33E+01			7.82E+01	1.14E+03	3.10E+02		7.30E+02	NO
Zinc	5/5	8.73E+01	J	3.22E+01			2.35E+04	1.00E+05	9.29E+04		1.36E+04	YES

**TABLE 8**  
**COMPARISON OF SWMU 82 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS**  
**CANNON AFB, NEW MEXICO**

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 82.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006).

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 9  
COMPARISON OF SWMU 82 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS (0-75 FEET) TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>TOTAL PETROLEUM HYDROCARBONS</b>	1/1	9.72E+01					7.60E+02	1.81E+03	1.81E+03	NA	
<b>VOLATILE ORGANICS</b>											
2-Butanone (MEK)	4/108	5.40E-03	J				3.18E+04	4.87E+04	4.87E+04	sat	2.55E+01
Acetone	33/104	2.50E+00	J				2.81E+04	1.00E+05	9.85E+04		1.91E+01
Benzene	1/108	1.20E-03	J				1.03E+01	2.58E+01	1.74E+02		2.01E-02
Ethylbenzene	1/108	3.80E-03	J				1.28E+02	1.28E+02	1.28E+02	sat	2.02E+01
Chloromethane	1/108	1.20E-03	J				2.18E+01	5.34E+01	2.84E+02		1.00E-01
Methylene Chloride	31/108	6.20E-03					1.82E+02	4.90E+02	2.63E+03	sat	1.70E-01
Toluene	33/108	3.50E-02					2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01
Vinyl Acetate	1/108	1.50E-03	J				1.07E+03	3.68E+03	3.52E+03		1.51E+00
Xylene (total)	1/108	1.10E-03	J				8.20E+01	8.20E+01	8.20E+01	sat	2.06E+00
<b>SEMIVOLATILE ORGANICS</b>											
2-Methylnaphthalene*	2/108	2.30E-01	J				7.95E+01	9.25E+01	8.25E+01		3.94E-01
4-Nitrophenol*	3/108	1.60E-01	J				1.83E+04	1.00E+05	6.90E+04		2.11E-02
Acenaphthene	2/108	7.10E-01					3.73E+03	3.35E+04	1.41E+04		5.49E+01
Anthracene	4/108	1.30E+00					2.20E+04	1.00E+05	8.60E+04		1.62E+03
Benzo(a)anthracene	8/108	2.10E+00					6.21E+00	2.34E+01	2.12E+02		1.09E+01
Benzo(a)pyrene	4/108	1.60E+00					6.21E-01	2.34E+00	2.12E+01		2.78E+00
Benzo(b)fluoranthene	6/108	2.20E+00					6.21E+00	2.34E+01	2.12E+02		3.35E+01
Benzo(g,h,i)perylene*	2/108	4.60E-01					7.95E+01	9.25E+01	8.25E+01		3.94E-01
Benzo(k)fluoranthene	2/108	9.30E-01					6.21E+01	2.34E+02	2.12E+03		3.35E+02
Benzoic Acid	1/108	3.90E-02	J				1.00E+05	1.00E+05	1.00E+05	max	4.00E+02
Bis(2-Ethyl hexyl)phthalate	63/108	7.80E-01	J				3.47E+02	1.37E+03	4.66E+03		2.15E+04
Butylbenzylphthalate	2/108	4.90E-02	J				2.40E+02	2.40E+02	2.40E+02	sat	8.10E+02
Chrysene	7/108	1.90E+00					6.15E+02	2.31E+03	2.12E+04		3.48E+02
Dibenzo(a,h)anthracene	2/108	9.10E-02	J				6.21E-01	2.34E+00	2.12E+01		1.04E+01
Dibenzofuran	2/108	6.20E-01					1.42E+02	1.62E+03	5.52E+02		2.87E+00
Diethylphthalate	1/108	4.60E-02	J				4.89E+04	1.00E+05	1.00E+05	max	3.54E+02
Di-n-butylphthalate	11/108	6.10E-02	J				6.11E+03	6.84E+04	2.33E+04		3.72E+03
Di-n-octylphthalate	1/108	6.00E-02	J				2.40E+03	8.20E+04	2.70E+04		2.00E+05
Fluoranthene	6/108	5.10E+00					2.29E+03	2.44E+04	8.73E+03		4.69E+03
Fluorene	2/108	8.90E-01					2.66E+03	2.65E+04	1.02E+04		5.85E+01
Indeno(1,2,3)pyrene	2/108	8.50E-01					6.21E+00	2.34E+01	2.12E+02		9.46E+01
Naphthalene	2/108	5.30E-01					7.95E+01	3.00E+02	2.62E+02		3.94E-01
Pentachlorophenol	1/108	8.80E-02	J				2.98E+01	1.00E+02	1.02E+03		1.17E-01
Phenanthrene	6/108	4.70E+00					1.83E+03	2.05E+04	6.99E+03		4.64E+02
Pyrene	8/108	4.10E+00					2.29E+03	3.09E+04	9.01E+03		3.73E+02
<b>PESTICIDES/PCBs</b>											
4,4-DDE	3/108	2.90E-02					1.72E+01	7.81E+01	5.70E+02		2.62E+02
4,4-DDT	2/108	1.70E-02					1.72E+01	7.81E+01	1.38E+02		1.54E+02
Aroclor 1254	3/108	3.60E-01					1.12E+00	8.26E+00	4.28E+00		5.28E+00

**TABLE 9  
COMPARISON OF SWMU 82 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS (0-75 FEET) TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>METALS</b>											
Aluminum	108/108	1.05E+04		1.22E+04			7.78E+04	1.00E+05	1.44E+04	1.10E+06	NO
Antimony	18/99	1.61E+01	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02	1.32E+01	YES
Arsenic	107/108	2.80E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01	2.90E-01	NO
Barium	108/108	5.60E+03	J	8.90E+02			1.56E+04	1.00E+05	6.02E+04	6.03E+03	YES
Beryllium	87/108	8.20E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01	1.15E+03	YES
Cadmium	2/108	1.40E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02	2.75E+01	YES
Calcium	108/108	3.58E+05		2.37E+05	3.58E+01	1.20E+03	NA	NA	NA	NA	YES
Chromium	105/108	1.17E+02		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max 1.97E+09	YES
Cobalt	85/108	1.02E+01	J	6.60E+00			1.52E+03	2.05E+04	6.10E+01	6.61E+02	YES
Copper	3/108	6.17E+01		8.30E+00			3.13E+03	4.54E+04	1.24E+04	1.03E+03	YES
Iron	108/108	1.14E+04		1.31E+04			2.35E+04	1.00E+05	9.29E+04	5.54E+03	NO
Lead	102/108	7.26E+01		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK NA	YES
Magnesium	108/108	2.32E+04		1.93E+04	2.32E+00	4.00E+02	NA	NA	NA	NA	YES
Manganese	107/108	1.74E+02		3.33E+02			3.59E+03	4.84E+04	1.50E+02	2.24E+03	NO
Mercury	2/108	4.80E-02	J	1.90E-02			1.00E+05	1.00E+05	9.27E+02	2.09E-03	YES
Nickel	97/108	3.30E+02	J	1.49E+01			1.56E+03	2.27E+04	6.19E+03	9.53E+02	YES
Potassium	108/108	2.46E+03		2.51E+03	2.46E-01	3.90E+02 - 7.80E+02	NA	NA	NA	NA	NO
Silver	22/108	2.60E+00		2.65E+00			3.91E+02	5.68E+03	1.55E+03	3.13E+01	NO
Sodium	28/108	9.01E+02	J	1.23E+03	9.01E-02	1.00E+03	NA	NA	NA	NA	NO
Thallium	5/91	1.30E+00		2.65E+00			5.16E+00	7.49E+01	2.04E+01	3.43E+00	NO
Vanadium	108/108	2.75E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02	7.30E+02	NO
Zinc	9/108	8.73E+01	J	3.06E+01			2.35E+04	1.00E+05	9.29E+04	1.36E+04	YES

Notes:

mg/kg = milligrams per kilogram

\* = Naphthalene used as a surrogate for 2-methylnaphthalene and benzo(g,h,i)perylene; phenol used as a surrogate for 4-nitrophenol.

J = Estimated

NA = Not applicable

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 82.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 10**  
**COMPARISON OF SWMU 96 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS**  
**CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>PESTICIDES/HERBICIDES</b>											
alpha Chlordane	8/8	1.60E-02	J				1.62E+01	7.19E+01	1.30E+02	6.83E+00	
gamma Chlordane	1/8	4.70E-02	J				1.62E+01	7.19E+01	1.30E+02	6.83E+00	
4,4-DDD	4/8	5.00E-01					2.44E+01	1.11E+02	8.07E+02	8.30E+01	
4,4-DDE	8/8	2.60E+00					1.72E+01	7.81E+01	5.70E+02	2.62E+02	
4,4-DDT	8/8	2.00E+00					1.72E+01	7.81E+01	1.38E+02	1.54E+02	
Heptachlor epoxide	8/8	1.90E-02	J				1.08E+00	4.26E+00	3.63E+01	6.24E+00	

Notes:

mg/kg = milligrams per kilogram

(1) Maximum detected concentration from all investigations at SWMU 96.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006).

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 11  
COMPARISON OF SWMU 96 MAXIMUM COMBINED SURFACE AND SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Site-Specific Soil to Groundwater SSL Using DAF <sup>9</sup> = 1,070.7 (mg/kg)	Exceeds Background ?
<b>PESTICIDES/HERBICIDES</b>												
alpha Chlordane	1/43	2.00E-01	J				1.62E+01	7.19E+01	1.30E+02	6.83E+00		
gamma Chlordane	1/43	4.70E-02	J				1.62E+01	7.19E+01	1.30E+02	6.83E+00		
2,4-D	2/43	3.41E+00					1.22E+02	1.37E+03	4.66E+02	1.05E+00		
4,4-DDD	6/43	5.00E-01					2.44E+01	1.11E+02	8.07E+02	8.30E+01		
4,4-DDE	12/43	2.60E+00					1.72E+01	7.81E+01	5.70E+02	2.62E+02		
4,4-DDT	12/43	2.00E+00					1.72E+01	7.81E+01	1.38E+02	1.54E+02		
Dieldrin	1/43	2.00E-03					3.04E-01	1.20E+00	1.02E+01	2.68E-02		
Heptachlor epoxide	1/43	1.90E-02	J				1.08E+00	4.26E+00	3.63E+01	6.24E+00		
Toxaphene	1/43	2.21E-01					4.42E+00	1.74E+01	1.48E+02	4.65E+00		
<b>METALS</b>												
Arsenic	7/7	5.60E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01	2.62E-01	1.40E+01	YES
Mercury	7/7	2.40E-01		1.90E-02			1.00E+05	1.00E+05	9.27E+02	5.87E-01		YES

Notes:

mg/kg = milligrams per kilogram

J = Estimated

- (1) Maximum detected concentration from all investigations at SWMU 96.
- (2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].
- (3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg
- (4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.
- (5) NMED Soil Screening Levels for Residential Soil (NMED 2006) - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.
- (6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).
- (7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).
- (8) NMED Soil-to-Groundwater Screening Levels (NMED 2009) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.
- (9) Site-Specific Soil-to-Groundwater Screening Levels calculated in accordance with Equation 17 (NMED 2009) and a resultant DAF of 1,070.7.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 12**  
**COMPARISON OF SWMU 96 MAXIMUM GROUNDWATER CONCENTRATIONS TO MCLS**  
**CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/L) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/L)	Primary Drinking	NMED Tap Water (mg/L) <sup>4</sup>	Exceeds Background ?
					Water Standard MCL <sup>3</sup> (mg/L)		
<b>METALS</b>							
Arsenic	1/1	4.70E-03	J		1.00E-02	4.42E-04	
Barium	1/1	6.60E-01			2.00E+00	7.30E+00	
Copper	1/1	1.50E-01			1.30E+00	1.46E+00	
Lead	1/1	3.40E-02	J		1.50E-02	NA	
Nickel	1/1	2.90E-02	J		NA	7.30E-01	
Vanadium	1/1	3.50E-02			NA	3.60E-02	
Zinc	1/1	4.90E-02			5.00E+00	1.10E+01	

Notes:

mg/L = milligrams per liter

J = Estimated

NA = Not applicable

(1) Detected concentration from Well 96K.

(2) Site-specific groundwater background is not available.

(3) Maximum Contaminant Level (MCL) (USEPA 2005)

(4) NMED tap water (NMED 2006).

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 13  
COMPARISON OF SWMU 98 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLs  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>TOTAL PETROLEUM HYDROCARBONS</b>	1/43	3.38E-01					7.60E+02	1.81E+03	1.81E+03	NA	
<b>VOLATILE ORGANICS</b>											
Acetone	16/43	7.80E+00	J				2.81E+04	1.00E+05	9.85E+04		1.91E+01
2-Butanone (MEK)	3/43	4.00E-03	J				3.18E+04	4.87E+04	4.87E+04	sat	2.55E+01
Methylene Chloride	8/43	2.00E-03	J				1.82E+02	4.90E+02	2.63E+03	sat	1.70E-01
Toluene	11/43	2.00E-03	J				2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01
<b>METALS</b>											
Aluminum	29/29	1.15E+04		1.22E+04			7.78E+04	1.00E+05	1.44E+04		1.10E+06
Antimony	3/29	5.30E+00	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02		1.32E+01
Arsenic	29/29	2.40E+00	J	4.30E+00			3.90E+00	1.77E+01	8.52E+01		2.90E-01
Barium	29/29	3.48E+03		8.90E+02			1.56E+04	1.00E+05	6.02E+04		6.03E+03
Beryllium	5/29	7.20E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01		1.15E+03
Cadmium	2/29	1.30E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02		2.75E+01
Calcium	29/29	2.46E+05		2.37E+05	2.46E+01	1.20E+03	NA	NA	NA		NA
Chromium	29/29	8.40E+00		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09
Cobalt	29/29	4.20E+00	J	4.70E+00			1.52E+03	2.05E+04	6.10E+01		6.61E+02
Copper	14/29	1.27E+01		8.30E+00			3.13E+03	4.54E+04	1.24E+04		1.03E+03
Iron	29/29	7.56E+03		1.31E+04			2.35E+04	1.00E+05	9.29E+04		5.54E+03
Lead	29/29	8.90E+00		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK	NA
Magnesium	29/29	3.53E+04		1.93E+04	3.53E+00	4.00E+02	NA	NA	NA		NA
Manganese	29/29	1.33E+02	J	3.33E+02			3.59E+03	4.84E+04	1.50E+02		2.24E+03
Nickel	29/29	7.50E+00	J	1.49E+01			1.56E+03	2.27E+04	6.19E+03		9.53E+02
Potassium	29/29	2.70E+03		2.51E+03	2.70E-01	3.90E+02 - 7.80E+02	NA	NA	NA		NA
Silver	3/29	1.00E+00	J	2.65E+00			3.91E+02	5.68E+03	1.55E+03		3.13E+01
Sodium	4/29	4.27E+02		1.23E+03	4.27E-02	1.00E+03	NA	NA	NA		NA
Thallium	3/29	2.30E-01		2.65E+00			5.16E+00	7.49E+01	2.04E+01		3.43E+00
Vanadium	29/29	2.33E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02		7.30E+02
Zinc	23/29	1.95E+01	J	3.06E+01			2.35E+04	1.00E+05	9.29E+04		1.36E+04

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

ND = Not detected

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 98.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 14  
COMPARISON OF SWMU 102 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLs  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Site-Specific Soil to Groundwater SSL Using DAF <sup>9</sup> = 1,070.7 (mg/kg)	Ecological Screening Level	Source	Cumulative Risk Calculations	Exceeds Background, Human Health and Ecological Screening Level	
<b>VOLATILE ORGANICS</b>																
Toluene	1/8	1.30E-03	J				2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01	2.30E+01	LANL	5.16E-06	nc	
Xylene (total)	1/8	2.10E-03	J				8.20E+01	8.20E+01	8.20E+01	sat	2.06E+00	1.40E+00	LANL	2.56E-05	nc	
<b>PESTICIDES</b>																
4,4-DDE	1/8	5.00E-03					1.72E+01	7.81E+01	5.70E+02		2.62E+02	1.10E-01	LANL	2.91E-04	ca	
4,4-DDT	1/8	1.00E-03	J				1.72E+01	7.81E+01	1.38E+02		1.54E+02	2.10E-02	Eco-SSL	5.81E-05	ca	
alpha Chlordane	1/8	8.00E-03					1.62E+01	7.19E+01	1.30E+02		6.83E+00	2.70E-01	LANL	4.94E-04	ca	
gamma Chlordane	1/8	7.00E-03					1.62E+01	7.19E+01	1.30E+02		6.83E+00	2.20E+00	LANL	4.32E-04	ca	
gamma-BHC (Lindane)	2/8	4.00E-03	J				4.37E+00	1.93E+01	8.09E+01		1.82E-02	9.40E-03	LANL	9.15E-04	ca	
<b>METALS</b>																
Aluminum	8/8	9.11E+03		1.22E+04			7.78E+04	1.00E+05	1.44E+04		1.10E+06	NA (unless pH<5.5)			NO	
Antimony	8/8	4.00E+00	J	1.60E+01			3.13E+01	4.54E+02	1.24E+02		1.32E+01	2.70E-01	Eco-SSL		NO	
Arsenic	8/8	5.80E+00		4.30E+00			3.90E+00	1.77E+01	8.52E+01		2.62E-01	1.80E+01	Eco-SSL		NO	
Barium	8/8	4.58E+02		8.90E+02			1.56E+04	1.00E+05	6.02E+04		6.03E+03	3.30E+02	Eco-SSL		NO	
Beryllium	8/8	6.00E-01	J	7.30E-01			1.56E+02	2.25E+03	5.62E+01		1.15E+03	2.10E+01	Eco-SSL		NO	
Cadmium	7/8	1.80E+00		1.30E+00			3.90E+01	5.64E+02	1.54E+02		2.75E+01	3.60E-01	Eco-SSL		NO	
Calcium	8/8	2.96E+05		2.37E+05	2.96E+01	1.20E+03	NA	NA	NA		NA	NA			NO	
Chromium	8/8	8.00E+00		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09	1.30E+02	Eco-SSL		NO	
Cobalt	8/8	4.20E+00		4.70E+00			1.52E+03	2.05E+04	6.10E+01		NA	1.30E+01	Eco-SSL		NO	
Copper	7/8	6.70E+00		8.30E+00			3.13E+03	4.54E+04	1.24E+04		1.03E+03	2.80E+01	Eco-SSL		NO	
Iron	8/8	7.46E+03		1.31E+04			2.35E+04	1.00E+05	9.29E+04		1.29E+04	6.92E+05			NO	
Lead	8/8	4.80E+00		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK	NA	1.10E+01	Eco-SSL		NO	
Magnesium	8/8	8.51E+03		1.93E+04	8.51E-01	4.00E+02	NA	NA	NA		NA	NA			NO	
Manganese	8/8	9.39E+01		3.33E+02			3.59E+03	4.84E+04	1.50E+02		5.40E+00	2.89E+02	Eco-SSL		NO	
Mercury	6/8	3.00E-02	J	1.90E-02			1.00E+05	1.00E+05	9.27E+02		5.87E-01	3.14E+01	LANL	1.30E-02	YES	
Nickel	8/8	6.80E+00		1.49E+01			1.56E+03	2.27E+04	6.19E+03		9.53E+02	3.80E+01	Eco-SSL		NO	
Potassium	8/8	2.23E+03		2.51E+03	2.23E-01	3.90E+02 - 7.80E+02	NA	NA	NA		NA	NA			NO	
Silver	8/8	1.30E+00	J	2.65E+00			3.91E+02	5.68E+03	1.55E+03		3.13E+01	4.20E+00	Eco-SSL		NO	
Sodium	8/8	3.53E+02		1.23E+03	3.53E-02	1.00E+03	NA	NA	NA		NA	NA			NO	
Thallium	8/8	5.20E+00	J	2.65E+00			5.16E+00	7.49E+01	2.04E+01		3.43E+00	1.84E+02	LANL	3.20E-02	YES	
Vanadium	8/8	1.91E+01		3.28E+01			7.82E+01	1.14E+03	3.10E+02		3.65E+03	7.80E+00	Eco-SSL		NO	
Zinc	8/8	1.47E+01		3.06E+01			2.35E+04	1.00E+05	9.29E+04		1.36E+04	4.60E+01	Eco-SSL		NO	
														Total Carcinogenic Cumulative Risk Calculation:	2.19E-03	
														Total Noncarcinogenic Cumulative Risk Calculation:	3.08E-05	

**TABLE 14**  
**COMPARISON OF SWMU 102 MAXIMUM SUBSURFACE SOIL CONCENTRATIONS TO NMED SSLS**  
**CANNON AFB, NEW MEXICO**

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model.

(1) Maximum detected concentration from current investigation at SWMU 102.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006).

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2009) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

(9) Site-Specific Soil-to-Groundwater Screening Levels calculated in accordance with Equation 17 (NMED 2009) and a resultant DAF of 1,070.7.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 15  
CALCULATION OF THE AVERAGE DAILY DOSE AND RISK ESTIMATES FOR MAMMALS - SWMU 102 SOILS  
CANNON AFB, NEW MEXICO**

Chemical	Maximum Soil Concentration* mg/kg	Soil Invertebrate BAF	Source	Concentration in Invertebrate Tissue mg/kg	Small Mammal BAF	Source	Concentration in Small Mammal Tissue mg/kg	ADD mg/kgBW-d			TRV		ESQ Shrew	ESQ Badger	ESQ Fox
								Short-tailed Shrew	American Badger	Red Fox	NOAEL mg/kgBW-d	Source			
Cadmium	1.80	$\ln(\text{C}_{\text{inv}}) = 0.795\ln(\text{C}_{\text{s}}) + 2.114$	1	13.21	$\ln(\text{C}_{\text{m}}) = 0.4723\ln(\text{C}_{\text{s}}) - 1.2571$	1	0.376	0.377	0.0055	0.012	0.77	4	0.49	0.007	0.02
Mercury	0.03	1.693	2	0.051	0.0543	3	0.002	0.0001	0.0001	0.011	0.032	5	0.14	0.003	0.4
Thallium	5.2	1		5.2	1		5.2	0.062	0.016	0.0014	0.2	6	0.31	0.08	0.007

\* Maximum detected concentration was used for calculations

ADD = average daily dose

BAF = bioaccumulation factor

C<sub>inv</sub> = concentration in invertebrates

C<sub>m</sub> = concentration in mammals

C<sub>s</sub> = concentration in soil

ESQ = ecological screening quotient

ln = natural log

mg/kg = milligrams per kilogram

mg/kgBW-d = milligrams per kilogram of body weight per day

NOAEL = no-observed-adverse-effects level

TRV = toxicity reference value

#### RECEPTOR CHARACTERISTICS

##### Short-tailed Shrew

Body Weight - 0.0168 kg; average of males and females (USEPA 1993)

Territory - 0.39 ha; mean of home ranges (USEPA 1993)

IR<sub>food</sub> - 0.008 kg/d; highest mean reported in USEPA (1993)

IR<sub>soil</sub> - 0.0002 kg dw/day; 2.4% of diet (dry weight) for meadow vole (Beyer et al., as cited in USEPA 1993)

Diet - assume 100% soil invertebrates

##### American Badger

Body Weight - 5.95 kg; *Mammals of Kansas* (2010); average of the range (4.6 to 7.3 kg)

Territory - 40 ha; estimate of smallest seasonal (autumn) home range *Mammals of Kansas* (2010)

IR<sub>food</sub> - 0.29 kg dw/day; Calculated from body weight (Nagy 1987, as cited in USEPA 1993)

IR<sub>soil</sub> - 0.017 kg dw/day; no data, assume soil comprises 6.0% of diet (dry weight)

Diet - 100% small mammals, *Mammals of Kansas* (2010)

##### Red Fox

Body Weight - 4.38 kg; Adult male and female mean in Iowa during autumn (USEPA 1993)

Territory - 406 ha; average of adult males and females all year (USEPA 1993)

IR<sub>food</sub> - Calculated from body weight using equation for all mammals (Nagy 1987, as cited in USEPA 1993)

IR<sub>soil</sub> - 0.006 kg dw/day; 2.8% of diet (dry weight) for red fox (Beyer et al., as cited in USEPA 1993)

Diet - varies seasonally (USEPA 1993), assume 90% small mammals and 10% soil invertebrates

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**TABLE 16  
COMPARISON OF SWMU 106 MAXIMUM SURFACE SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?
<b>PETROLEUM HYDROCARBONS</b>											
Oil and Grease	1/1	1.00E+03					NA	NA	NA	NA	
TPH	4/4	2.32E+02					7.60E+02	1.81E+03	1.81E+03	NA	
Purgeable Organic Compounds	0/1	ND					NA	NA	NA	NA	
<b>VOLATILE ORGANICS</b>											
Benzene	1/4	1.70E-01					1.03E+01	2.58E+01	1.74E+02	2.01E-02	
Toluene	2/4	1.40E-01					2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01
<b>METALS</b>											
Chromium	3/4	1.92E+01		1.05E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09
Lead	3/5	4.10E+01		1.20E+01			4.00E+02	8.00E+02	8.00E+02	IEUBK	NA

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

ND = Not detected

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 106.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.

**TABLE 17  
COMPARISON OF SWMU 106 MAXIMUM COMBINED SOIL CONCENTRATIONS TO NMED SSLS  
CANNON AFB, NEW MEXICO**

Chemical	Frequency Detected	Maximum Detected Concentration (mg/kg) <sup>1</sup>	Qual	Background Concentration <sup>2</sup> (mg/kg)	Daily Intake from the Site <sup>3</sup> (Essential Nutrients)	Recommended Daily Allowance <sup>4</sup> (Essential Nutrients)	Residential Soil SSL Concentration <sup>5</sup> (mg/kg)	Industrial Soil SSL Concentration <sup>6</sup> (mg/kg)	Construction Worker Soil SSL Concentration <sup>7</sup> (mg/kg)	Soil to Groundwater SSL Using DAF <sup>8</sup> = 20 (mg/kg)	Exceeds Background ?	
<b>PETROLEUM HYDROCARBONS</b>												
Oil and Grease	3/3	3.40E+03					NA	NA	NA	NA		
TPH	4/20	2.32E+02					7.60E+02	1.81E+03	1.81E+03	NA		
Purgeable Organic Compounds	0/3	ND					NA	NA	NA	NA		
<b>VOLATILE ORGANICS</b>												
Benzene	1/23	1.70E-01					1.03E+01	2.58E+01	1.74E+02	2.01E-02		
Toluene	2/23	1.40E-01					2.52E+02	2.52E+02	2.52E+02	sat	2.17E+01	
Ethylbenzene	1/23	2.70E-02										
Xylene	2/23	2.70E-02										
Trichloroethene	0/23	ND										
<b>METALS</b>												
Chromium	20/20	1.92E+01		1.33E+01			1.00E+05	1.00E+05	1.00E+05	max	1.97E+09	YES
Lead	23/23	4.10E+01		8.70E+00			4.00E+02	8.00E+02	8.00E+02	IEUBK	NA	YES

Notes:

mg/kg = milligrams per kilogram

J = Estimated

NA = Not applicable

ND = Not detected

sat = Detected concentrations above the "sat" value may indicate the presence of nonaqueous phase liquid (NAPL).

max = Indicates a chemical that exhibits relatively low toxicity, so a non-risk-based maximum concentration of 1.00E+05 mg/kg is used as the SSL.

IEUBK = Indicates that the SSL is derived using EPA's Integrated Exposure Uptake Biokinetic model

(1) Maximum detected concentration from all investigations at SWMU 106.

(2) Site-specific background is the 95% upper tolerance limit (UTL) [W-C 1997].

(3) Daily intake from site soil (mg/day) = maximum detected concentration (mg/kg) x ingestion rate of 100 mg/day for construction workers x conversion factor of 1.00E-06 kg/mg

(4) National Research Council 1989. RDAs have not been established for potassium and sodium. These numbers are based on recommendations for a 2,000 calorie diet.

(5) NMED Soil Screening Levels for Residential Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Residential Direct Exposure - NOT APPLICABLE TO SUBSURFACE SOILS AT THIS SITE.

(6) NMED Soil Screening Levels for Industrial Soil (NMED 2006) or NMED TPH Screening Guidelines (NMED 2006) for Industrial Direct Exposure.

(7) NMED Soil Screening Levels for the Construction Worker (NMED 2006).

(8) NMED Soil-to-Groundwater Screening Levels (NMED 2006) with a dilution attenuation factor (DAF) of 20 - NOT APPLICABLE TO THIS SITE.

Shading indicates the maximum concentration exceeds the designated SSL.