

MANAGEMENT ACTION PLAN



Cannon Air Force Base, New Mexico
December 2001



MANAGEMENT ACTION PLAN

Cannon AFB, NM (ACC)

Air Force Project No. ACCH20017544

December 2001

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ACRONYMS

A-E	Architecture-Engineering
AAFES	Army Air Force Exchange Service
ACC	Air Combat Command
ACL	Alternative Concentration Limits
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFCESA	Air Force Civil Engineering Support Agency
AFS	Air Force Station
ANSCs	Areas of No Suspected Contamination
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
BCP	Base Comprehensive Plan
BHC	1,2,3,4,5,6 - Hexachlorocyclohexane
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAFB	Cannon Air Force Base
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of Potential Concern
CMS	Corrective Measures Study
CRP	Community Relations Plan
CSMs	Conceptual Site Models
DDs	Decision Documents
DDT	Dichlorodiphenyltrichloroethane
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DPM	Defense Priority Model
DRMO	Defense Reutilization and Marketing Office
DSMOA	Defense-State Memorandum of Agreement
ECP	Environmental Condition of Property
EDMDS	Environmental Data Management and Decision Support
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ERA	Environmental Restoration Account

ACRONYMS (Continued)

ERP	Environmental Restoration Program (Formerly IRP)
ERPIMS	Environmental Resources Program Information Management System
FFA	Federal Facility Agreement
FTA	Fire Training Area
FS	Feasibility Study
FY	Fiscal Year
GSA	General Services Administration
HQ	Headquarters
HRS-II	Hazard Ranking System
IAGs	Interagency Agreements
IRA	Interim Remedial Action
IRP	Installation Restoration Program
JP-4	Jet Propulsion Fuel
LF	Launch Facility
LTM	Long-Term Monitoring
LTO	Long-Term Operation
MAF	Missile Alert Facility
MAP	Management Action Plan
MCL	Maximum Concentration Limit
MOGAS	Motor Gasoline
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NMED	New Mexico Environmental Department
NEPA	National Environmental Policy Act
NFA	No Further Action
NFRAP	No Further Response Action Planned
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OW	Observation Wells
PA	Preliminary Assessment
PCBs	Polychlorinated Biphenyls

ACRONYMS (Continued)

PID	Photoionization Detector
POL	Petroleum, Oils, Lubricants
PP	Proposed Plan
PPE	Pathways, Parameters, and Equations
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RA-C	Remedial Action – Construction
RA-O	Remedial Action – Operation
RAAS	Remedial Action Assessment System
RACER	Remedial Action Cost Engineering and Requirements System
RAGS	Risk Assessment Guidance for Superfund
RCAP	RCRA Corrective Action Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RNSI	Rational National Standards Initiative
ROD	Record of Decision
RPM	Remedial Project Manager
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SATAF	Site Activation Task Force
SDWA	Safe Drinking Water Act
SI	Site Investigation
SLA	Sanitary Landfill Area
SOW	Statement of Work
SVOCs	Semi-volatile Organic Compounds
SWMU	Solid Waste Management Unit
TAC	Tactical Air Command
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids

ACRONYMS (Continued)

THC-FO	Total Hydrocarbons as Fuel Oil
THC-G	Total Hydrocarbons as Gasoline
TOX	Total Organic Halogens
TPH-G	Total Petroleum Hydrocarbons as Gasoline
TPH	Total Petroleum Hydrocarbons
TPM	Technical Project Manager
TRPH	Total Recoverable Petroleum Hydrocarbons
TRC	Technical Review Committee
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WIMS-ES	Work Information Management System - Environmental Subsystem
WORB	Work Order Review Board
WSA	Weapons Storage Area

EXECUTIVE SUMMARY

Introduction

The Environmental Restoration Program (ERP) Management Action Plan (MAP) summarizes the history and current status of the ERP, discusses the strategy being followed to complete the Environmental Restoration Account (ERA) program in an effective manner, and presents funding requirements. The objective of the MAP is to execute cleanup remedies and to attain response complete (RC) as early as possible. Meeting cleanup/RC schedules will insure a corresponding reduction in risk to human health and the environment.

This MAP is updated annually using data from the installation's Restoration Project Manager (RPM), Command Program Manager, Air Force Restoration Information Management System (AFRIMS), contractors, and Service Center. Information and estimates provided on costs, schedules, relative risk, and remedial activities do not necessarily represent those that have been or will be approved by the Air Force or state and federal regulatory agencies. The cost estimates are based on the best available information at the time of printing, and may vary dramatically over time.

Environmental response actions are planned and executed under the ERP in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA) and the Resource Conservation and Recovery Act, as amended (RCRA). The ERP generally addresses contamination due to releases of hazardous substances or petroleum products that occurred prior to January 1984.

Restoration Program

Cannon AFB began its restoration program in 1983, and in 1987 the Base underwent a RCRA Facility Assessment as the result of an application for a RCRA Part B Permit to store hazardous waste. Numerous potentially contaminated areas were identified during the ERP and RCRA investigations. Cannon AFB has consolidated the eligible contaminated areas into 27 ERP sites encompassing 25 Solid Waste Management Units (SWMUs) and 8 Areas of Concern (AOCs). Of the 33 SWMUs/AOCs, 27 were listed in the original Part B permit and 6 were subsequently identified. Although one site, DP-33, was never listed as an SWMU or AOC and therefore falls under the category of miscellaneous sites, it was investigated and remediated using ERA funds.

The major contaminants identified on Cannon AFB have been petroleum constituents, although minor contamination by pesticides, herbicides, PCBs, and heavy metals has been found at some sites. Melrose Range, overall, is an additional site and in some respects is programmed separately. There are 8 SWMUs and AOCs at Melrose Range that are being investigated with environmental compliance funds because it is still an active range, but the historical impact area is scheduled for investigation under ERA since live bombs were used from 1952 to 1969.

Community involvement has been an integral part of the ERP, and Cannon AFB continues to have a very good working relationship with regulators and the public. Partnering meetings between DOD and NMED are held every two months on average and provide a forum where issues can be discussed and ironed out amicably. Cannon AFB started a Restoration Advisory

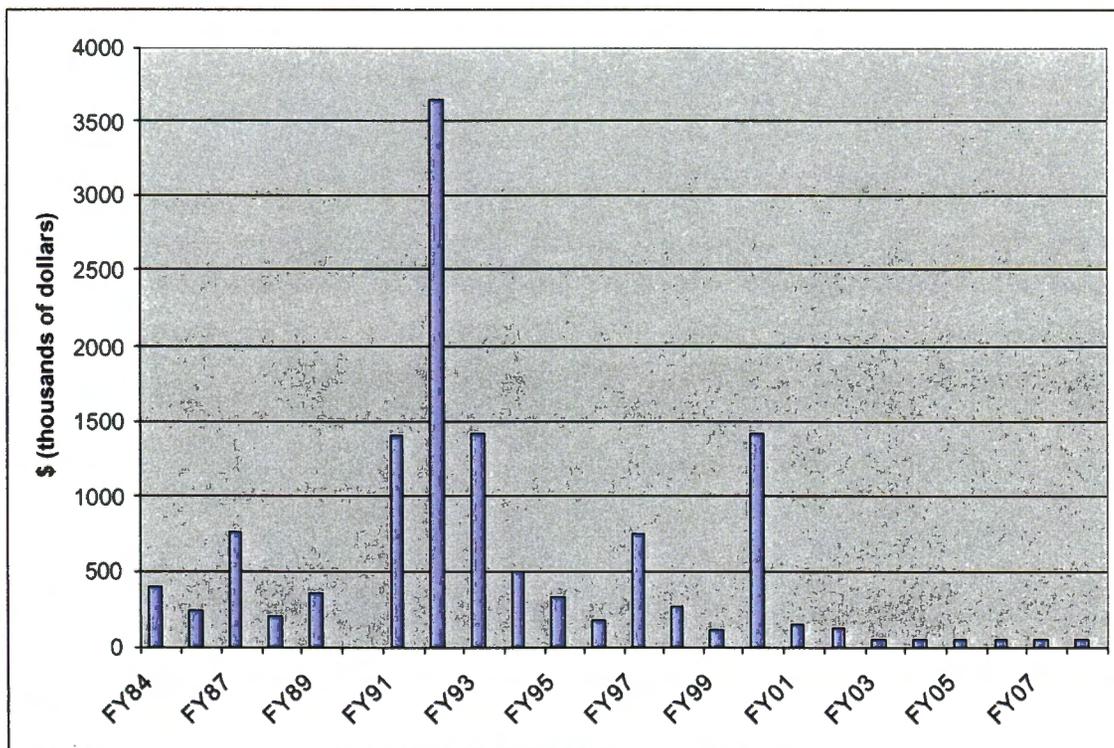
Board in 1995 which has been very successful, however public interest has begun to wane as the restoration program winds down. Overall, our relationship with the community remains good.

Remedial actions and additional investigations have been carried out since the initiation of the Restoration Program and are continuing at a few sites. The current status of the ERP projects is discussed below.

Past and Future ERA Costs

To date, the ERA portion of the restoration program has cost \$12.1M. The estimated cost to complete the program is \$8.3M, depending on the amount of unexploded ordnance detected at Melrose Range and other uncertainties discussed below. Cannon AFB expects to complete its restoration program for the Base itself by the end of FY2006, and for Melrose Range by 2011. (See Table D1-1 for Melrose Range.)

FIGURE ES-1
Cannon AFB Cost Summary
(Not including Melrose Range - See Table D1-1)



Relative Risk

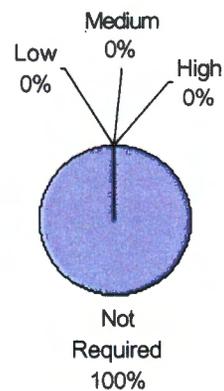
A relative risk site evaluation is a process used by DOD to categorize sites for funding based on the site's relative risk. Relative risk reduction at the ERP sites, a key measure of merit (MOM) for the Air Force ERP, is summarized in Figure ES-3. The current relative risk profile at Cannon AFB sites is as follows: 1 low, 26 not required (NR). By the end of 2006, all 27 sites on the Base itself are expected to be in RC or remedy in place (RIP) status, meeting relative risk reduction goals established for the ERP. Relative risk evaluation for sites at Melrose Range will be performed as investigation of those sites progresses.

The SWMUs and AOCs identified in the RCRA Facility Assessment were listed in three appendices in the Hazardous and Solid Waste Amendments of the permit in order of apparent risk (SWMUs listed in Appendix I were perceived to have a higher priority for investigation and correction than SWMUs in Appendix II, etc). The corrective actions on Cannon AFB generally followed the pattern of investigating the Appendix I sites first, then Appendix II, and finally Appendix III. Sites not eligible for ERA funding were investigated using environmental compliance funds as they became available.

FIGURE ES-3

Current ERP Relative Risk Status for Cannon AFB

Site ID	Risk	Site ID	Risk
LF001	NR	DP016	NR
LF002	NR	SD017	NR
LF003	NR	SS018	NR
LF004	NR	SS019	NR
LF005	NR	SD020	NR
FT006	NR	LF025	NR
FT007	NR	ST026	NR
FT008	NR	OT027	NR
OT010	NR	DP033	NR
SD011	NR	SD034	NR
SD012	NR	DP035	NR
SD013	NR	LF036	NR
WP014	NR	LF037	NR
SD015	NR		



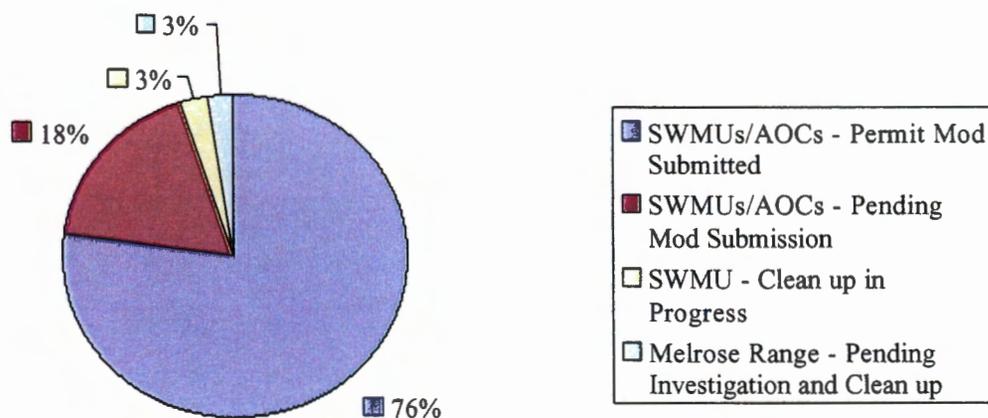
Project Status

All sites on Cannon AFB eligible for ERA funding have been investigated at this time. In September 2000, a Class 3 Permit Modification Request was submitted to the New Mexico Environment Department (NMED) to remove 65 SWMUs, 6 AOCs, and 1 miscellaneous unit from the RCRA Part B Permit. (The ERP includes the miscellaneous unit and 72 of the Base's SWMUs/AOCs.) An additional 7 ERP sites will be submitted for removal in FY04. The reason for waiting is that the fees for a Class 3 modification request make it more sensible to submit several sites at once and by then several more sites will be ready for "no further action" (NFA) categorization and removal from the permit.

Cannon AFB has been fortunate in that no areas of serious contamination have been discovered. Only three of the sites detailed in Chapter 2 of this Plan have required remediation and only one site is currently undergoing remediation. The status of the ERP projects is illustrated in Figure ES-4.

The remaining work to be done consists of finalizing the RFI and, if necessary, remediation at Melrose Air Force Range. Melrose Range was activated in 1952 and consists of approximately 77,000 acres of impact area and buffer zone. Approximately 7000 acres are impact area where live bombs were used until 1969. The object of the investigation will be to discover and detonate or remove any live ordnance remaining from this period. When Cannon AFB applied for a renewal of their Part B Permit in 1999, it was decided to drop the Subpart X Permit which had been obtained to allow open burning/open detonation at Melrose Range.

FIGURE ES-4
Cannon AFB - Project Status



Uncertainty Factors

The New Mexico Environment Department (NMED) is still reviewing Site SD-11 for no further action even though it has been proposed for removal from the permit. Levels of TPH above 5000 ppm still remain in-place, and this exceeds the action levels preferred by NMED as promulgated in a July 2000 position paper. Cannon has tried to justify the closure on risk-based grounds that the contamination presents no threat to groundwater or human health and is located in an isolated area of the Base where exposure is minimal. Two other fuel spill sites may have to be investigated further if original sampling data cannot be located to justify their closure. The projected closure schedule also assumes funding will be available, which may not be the case.

1. INTRODUCTION

Cannon Air Force Base (AFB) has contaminated areas due to past practices in the management of waste, hazardous wastes and compounds, and resource handling. Various environmental efforts are now in place at Cannon Air Force Base (hereafter referred to as the Base) to identify and remediate the contamination. Applicable laws and regulations are being complied with by the Base and are reflected in current waste and resource management practices as carried out by the Air Force, tenant units, and as a requirement of future property lessees. Management practices governed by regulation compliance will continue to protect human health and the environment during daily operations at the Base.

This Management Action Plan (MAP) has a two-fold purpose. First, it summarizes the current status of the Base environmental restoration program. Second, it presents a comprehensive strategy for implementing the proper actions necessary to protect human health and the environment. This strategy integrates activities under the Environmental Restoration Program (ERP) that support restoration of the base.

Information is compiled in this format to be accessible to the public and base personnel. The MAP is a dynamic document that will be updated regularly with new information to reflect the completion or change in status of remedial actions (RAs). Site specific information is located in Appendix D1. This MAP was prepared with information available as of December 2001.

In light of the ever-changing nature of environmental projects, this MAP is intended as a planning document only. Information, schedules, and remedial actions presented in this MAP do not necessarily represent those that have been, or will be, approved by the Air Force and/or state and federal regulatory agencies. It was necessary to make certain assumptions and interpretations to develop the estimates. As additional data become available, implementation programs and cost estimates could be dramatically altered. Such changes will be reflected in future updates to the MAP.

Chapter 1 summarizes the objectives of the environmental restoration program; introduces the MAP and Project Team; and provides an operations history that led to the contamination.

Chapter 2 summarizes the present status of the installation's environmental restoration program, including restoration projects related to environmental compliance issues; outlines community involvement efforts; and summarizes information on all ERP sites, areas of concern (AOC's), zones, and/or operable units.

Chapter 3 presents strategies and plans for completing the environmental restoration program; describes management strategies and projects for investigating and remediating contamination; summarizes remedy selection and community involvement strategies; and presents plans for specific problem areas and their sources by complying with specific programs such as the underground storage tank (UST) program.

Chapter 4 presents a schedule for restoration and restoration-related projects and identifies dates and issues for upcoming Project Team meetings.

Chapter 5 identifies key program issues to be addressed by the Project Team for implementation. Each program issue has an action item presented and its status is summarized.

1.1 ENVIRONMENTAL RESPONSE OBJECTIVES

The objectives of the Cannon AFB environmental restoration program are to:

- Protect human health and the environment;
- Comply with existing statutes and regulations;
- Meet Cannon AFB's RCRA Hazardous Waste Storage Permit deadlines and/or commitments in other agreements;
- Complete Remedial Investigations (RIs) and/or RFIs as soon as practicable for each ERP/Solid Waste Management Unit (SWMU) site, in order of priority as specified in the Hazardous and Solid Waste Amendments of 1984 (HSWA) Permit Appendices;
- Continue efforts to identify all potential source areas;
- Provide an accurate inventory of the environmental condition of base property (which identifies all potential sites and establishes areas of no suspected contamination, assisted by a restoration Geographic Information System);
- Initiate removal actions where necessary to control, eliminate, or reduce risks to manageable levels;
- Characterize risks associated with releases of hazardous substances, pollutants, contaminants, or hazardous wastes;
- Develop, screen, and select RAs that reduce risks in a manner consistent with statutory requirements;
- Commence RAs as soon as practicable;
- Conduct long-term groundwater monitoring and RAs; and
- Conduct appropriate modifications of the RCRA HSWA permit to have all ERP/SWMUs removed from the permit.

1.2 MAP PURPOSE, UPDATES, AND DISTRIBUTION

This MAP summarizes the status of Cannon AFB's environmental restoration program and presents a comprehensive long-range strategy, plans, and schedules to implement program objectives. It also defines the status of the current effort to resolve scientific and technical issues so that continued progress and implementation of scheduled activities can occur.

The Cannon AFB Project Team will use this MAP to direct and monitor environmental response actions and to schedule activities needed to resolve technical, administrative, and operational issues. This MAP is updated informally on an ongoing basis at the base level and formally once a year at the headquarters level. Copies of the Cannon AFB MAP will be distributed to the Project Team after every update. The annual update of the Cannon AFB MAP will be distributed to the Environmental Leadership Committee (ELC), RAB, and Headquarters (HQ) USAF.

1.3 PROJECT TEAM AND RESTORATION ADVISORY BOARD

The USAF maintains primary responsibility for conducting restoration and restoration-related compliance investigations and cleanups at Cannon AFB. The U.S. Environmental Protection Agency (EPA) Region VI (Dallas, Texas) and the New Mexico Environmental Department (NMED) provide oversight to the USAF in restoration decision-making processes. For most ERP sites, these actions are being conducted in a manner consistent with RCRA. Funding is provided by the U.S. Department of Defense (DoD) through the ERA and the Environmental Compliance Program (ECP) account.

The Environmental Flight Chief manages the environmental program at Cannon AFB. The 27 CEV is part of the 27 Support Group (27 SPTG) under the 27 Fighter Wing (27 FW). Currently, 27 CEV has 30 full-time employees, including 19 civilian and 2 military personnel. It has the primary responsibility of maintaining environmental compliance with local, state, federal, DoD, and USAF laws and regulations. 27 CEV has formed a project team to accomplish the goals of Cannon AFB's environmental restoration programs.

The Cannon AFB Project Team is comprised of a core group and associate members. The Project Team is led by the base Remedial Project Manager (RPM) from 27 CEV. In addition to the Base RPM, other core team members include representatives from HQ Air Combat Command (ACC), EPA Region VI, and the NMED. The core Project Team meets on an as-needed basis to address and resolve base restoration issues. Table 1-1 lists the current Project Team members and specifies their roles and responsibilities.

Topics of discussion and procedures for team members can include the following:

- Maintaining communication among all team members on an as-needed basis for review and discussion of the progress of work being performed at the Base. Communication may include correspondence, telephone conferences, and, if necessary, formal meetings.
- Preparing periodic summaries from the RPM of the status of the environmental restoration work at the Base and distributing them to other team members.
- Communicating through telephone conferences among team members the status of the work being conducted.
- Discussing issues related to the progress of the work being performed.
- Providing approval of minor modifications to the work being performed.
- Documenting teleconferences and, when necessary, following up in writing to all team members.

Associate members include representatives from four Cannon AFB offices: (1) the CEV office, (2) the Judge Advocate office, (3) the Bioenvironmental Engineering office, and (4) the Public Affairs office. Other associate members include the RCRA Facility Investigation (RFI) contractor, Defense and State Memorandum of Agreement contacts, and the ELC and RAB members. Associate Project Team members are consulted when their areas of expertise are required.

The Cannon AFB ELC was established to keep the Major Command updated on the entire environmental program at the Base. The ELC meets to discuss all environmental

TABLE 1-1

CURRENT CANNON AFB PROJECT TEAM MEMBERS

Management Action Plan
Cannon AFB, New Mexico

CORE TEAM MEMBERS			
Name	Title	Telephone	Role/Responsibility
Mr. Don White	Chief, Pollution Prevention	505-784-1092	Section Chief
Mr. Denny Timmons	Base RPM	505-784-4639	Remedial Project Manager
Mr. Tim Higgins	ACC CES/ESV	757-764-9420	USAF Program Manager
LtC. Nicholas L. Desport	BCE	505-784-2008	Cannon AFB - BCE
Mr. Gene Smith	UST Project Manager	505-784-1096	Cannon AFB - UST Project Manager
Lt Yang	BEE	505-784-4063	Cannon AFB - BEE
Col. Ecklund	Staff JA	505-784-2211	Cannon AFB - Staff JA
Cpt. Susan Romano	Public Affairs	505-784-4131	Cannon AFB - Public Affairs
EPA and State Regulatory Members			
Mr. Bob Sturdivant	EPA RPM (Cannon AFB and Melrose AFR)	214-655-7442	EPA Region VI Project Manager
Mr. Glenn von Gonten	RCRA Permit Manager	505-428-2551	NMED HWB
Mr. John Keiling	State RCRA Permit Manager	505-428-2535	NMED RCRA Supervisor
DSMOA			
Ms. Julie Jacobs	State DSMOA	505-827-1558	NMED
Mr. Paul Lancer	USACE DSMOA Contact	202-272-1176	USACE Contact for DSMOA
Contract Management			
Mr. Tom Zink	USACE Project Manager	402-221-7666	USACE Contract Management and Oversight
Mr. Steve Cox	Project Manager URS Consultants (Omaha)	402-334-8181	USACE Contractor Project Manager
Ms. Carol Bieniulis	Project Manager Foster-Wheeler Corp.	505-878-8924	USACE Contractor Project Manager

Notes:

ACC = Air Combat Command
 AFB = Air Force Base
 AFR = Air Force Range
 BCE = Base Civil Engineer
 BEE = Bioenvironmental Engineer
 DSMOA = Defense and State Memorandum of Agreement
 EPA = U.S. Environmental Protection Agency
 HQ ACC/CEVR = Headquarters, Air Combat Command Environmental
 JAG = Judge Advocate General
 NMED = New Mexico Environment Department
 RCRA = Resource Conservation and Recovery Act
 RPM = Remedial Project Manager
 USACE = U.S. Army Corps of Engineers
 USAF = U.S. Air Force
 UST = Underground Storage Tank

programs, including the ERP. Table 1-2A is a list of the primary ELC members. The Cannon AFB RAB was established in August 1995 to provide a forum for the exchange of information between the Base and the community. It is composed of USAF and community members that meet regularly to review and comment on technical documents and proposed RAs. Table 1-2 provides a list of the primary RAB members.

1.4 BRIEF HISTORY OF INSTALLATION AND LAND USE

1.4.1 Installation History

Figure 1-1 shows the location of Cannon AFB near Clovis, New Mexico, and Table 1-3 outlines the Base's operational history. Figure 1-5 provides the approximate locations of past hazardous substance and petroleum activities as presented in Table 1-3.

The land the Base currently occupies was originally farmland. In 1929 Portair Field was established as a transcontinental flight civilian air terminal. The DoD took control of Portair Field in 1942 and renamed it Clovis Army Air Base. In its early years as an Army Air Base it provided training facilities for B-17, B-24, and B-29 air crews during World War II. The Base was deactivated in 1947.

In 1951, the Air Base was reassigned to the Tactical Air Command and reactivated as Clovis AFB, operating P-51s and F-86s. The Base was renamed Cannon AFB in 1957 and operated F-100s. Since 1971, the primary mission of the Base has been to develop and maintain tactical fighter wings composed of various models of the F/EF-111 aircraft. Cannon AFB was reassigned to the ACC on 1 June 1992. In 1995, Cannon AFB transitioned from F/EF-111 aircraft to F-16 aircraft, and now operates 4 squadrons.

The mission of Cannon AFB is to maintain a combat-ready force capable of day, night, and all-weather operations and to provide replacement training of combat aircrews for tactical organizations worldwide. To support this mission, quantities of petroleum, oils, and lubricants (POL) as well as solvents and protective coatings are used, resulting in waste generation.

The main Base covers approximately 3782 acres (Figure 1-2). Figure 1-3 presents the current land use of off-base property surrounding the Cannon AFB boundary that is utilized for agricultural purposes, primarily for cattle and crops grown for cattle feed. Figure 1-4 shows the location of the Melrose Air Force Range, which is also part of the off-base property.

Open farmland borders the Base in every direction. Most of the Base is bounded to the north by U.S. Highway 60/84, with the exception of the Chaves Manor Housing Area located north of 60/84. Residences are scattered along the highway in the vicinity of the Base (Figure 1-3).

1.4.2 Current and Future Land Use

Land uses at Cannon AFB are categorized into 12 functional classes and are described in the most recent Cannon AFB *General Plan* (Higgenbotham/Briggs & Associates, 1998).

- **Airfield:** Active and inactive runways, taxiways, and parking aprons.
- **A/C Ops and Maintenance:** Hangars, aircraft maintenance shops, aerospace ground equipment maintenance and storage areas, air passenger terminals, fire/crash-rescue stations, base operations facilities.

TABLE 1-2

CANNON AFB RESTORATION ADVISORY BOARD MEMBERS

**Management Action Plan
Cannon AFB, New Mexico**

Name	Title	Telephone	Affiliation
Col. Scott Showers		784-2761	SPTG/CC
Ms. Mona Lee Norman-Armstrong	Community Co-Chair	762-0846	Public
Mr. Forrest Carper		784-4195	Public
Mr. Donald W. Davis	Portales Mayor	359-1205	City Government
Mr. Charles R. Ferguson		762-3728	NM Education Outreach
Maj. Christopher Harrell, Retired		359-6892	Public
Mr. Ray Hester	Melrose Mayor	253-4336 253-4274	City Government
Mr. Lawerance Palmer		359-0778 356-6662	Public
Mr. Jimmie N. Richards		356-4830	Public

TABLE 1-2A

**CANNON AFB ENVIRONMENTAL LEADERSHIP
COMMITTEE PRIMARY MEMBERS**

**Management Action Plan
Cannon AFB, New Mexico**

Name	Organization
Col. Dodd	27 FW/CV
Col. Scott Showers	27 SPTG/CC
Col. Lewis Lieb Jr.	27 MDG/CC
Col. Paul A. Davidson	27 LG/CC
Lt Col. Frank H. Lara	27 EMS/CC
Maj. Bobby J. Small, Jr.	27 LGV/CC
Lt. Col. Nicholas L. Desport	27 CE/CC
Maj. William K. Knehel	27 SV/CC
Maj. Kenneth J. Baumer	27 CRS/CC
Col. Ecklund	27 FW/JA
Lt. Yang	27 ADDOS/SGGB
Daniel Barnett	27 CE/CEV
SSgt. Tracie Aldrichf	27 FW/SE
Mr. Jim Festa	DECA
Ms. Norma Chapman	DRMO
TSgt. Roxane Torres	OSI

TABLE 1-3

HISTORY OF INSTALLATION OPERATIONS FOR CANNON AFB

Management Action Plan
Cannon AFB, New Mexico

Period	Type of Operation	Weapon System	Hazardous Substance Activities	Map Areas (Figure 1-5)
Pre-1929	Farmland	None	None	C
1929 to 1942	Portair Field Civilian Air Terminal	None	None	C
1942 to 1947	Clovis Army Air Base Bomber Training	B-17 B-24 B-29	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, discharge areas	A
1947 to 1951	Inactive	None	None	C
1951 to 1957	Clovis AFB Fighter/Bomber Training	P-51 F-86	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, discharge areas	B
1957 to 1971	Cannon AFB Fighter Training	F-100	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, discharge areas	C
1971 to 1992	Cannon AFB Fighter/Bomber Training TAC	F/EF-111	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, wastewater lagoons, discharge areas	D
1992 to present	Cannon AFB Fighter Training ACC Currently 80 F-16 aircraft on station	F-16	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, wastewater lagoons, discharge areas	E, F

Notes:

ACC = Air Combat Command
AFB = Air Force Base
POL = petroleum, oils, and lubricants
TAC = Tactical Air Command

- **Industrial:** Land use areas for maintenance, storage, and supply functions not directly related to aircraft.
- **Administrative:** Land use areas reserved for administrative functions.
- **Community (Commercial):** Land use areas designated for commercial facilities such as Commissary and Base Exchange, Credit Union, Collocated Club, etc.
- **Community (Service):** Land use areas designated for service facilities such as the Chapel, Child Development Centers, Library, Post Office, and Education Center.
- **Medical:** Land use areas reserved for medical functions such as the Clinic, Mental Health Clinic, and Medical War Reserve Materiel Storage Facility.
- **Housing (Unaccompanied):** Dormitories for unmarried enlisted personnel.
- **Housing (Accompanied):** Accompanied and unaccompanied personnel temporary and permanent housing areas.
- **Outdoor Recreation:** Land use areas designated for outdoor recreation.
- **Open Space:** Conservation areas, wetlands, undeveloped land, and required buffer space (i.e., safety clearances, security areas, utility easements, and environmentally sensitive areas).
- **Water:** Surface water such as the Golf Course ponds and North Playa Lake.

Current land use at Cannon AFB is shown on Figure 1-6. Currently, open space, airfields, and airfield pavements comprise the greatest percentage of total land area at the Base. Other minor land uses at the Base include housing, outdoor recreation, aircraft operation and maintenance, commercial, administrative, community services, and medical facilities. Planned future land uses at the Base are summarized in Figure 1-7 and discussed in detail in the current Cannon AFB Base General Plan.

1.5 KEY REGULATORY ENVIRONMENTAL ACTIONS

Key regulatory environmental actions are outlined in Table 1-4.

TABLE 1-4

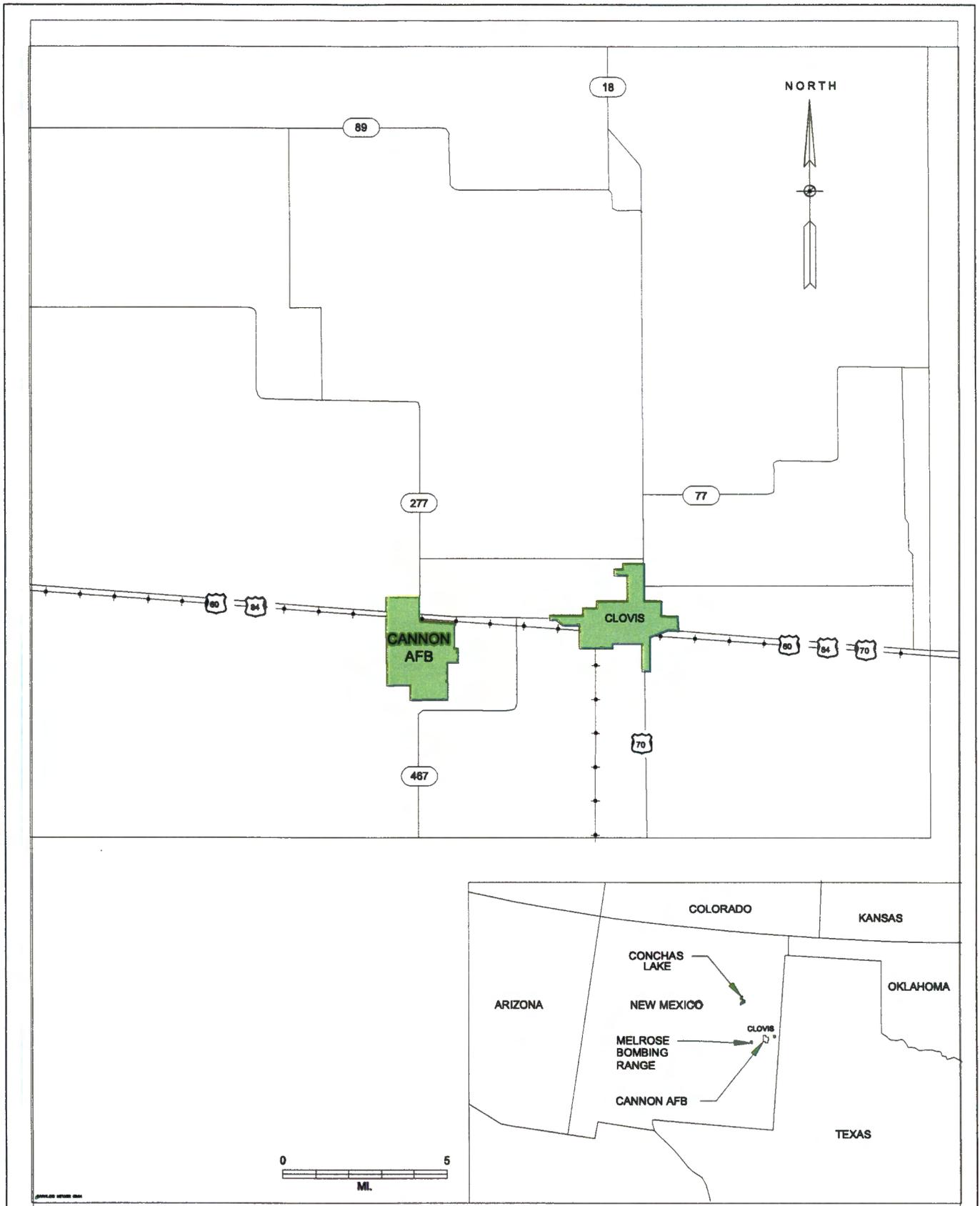
KEY REGULATORY ACTIONS IMPACTING CANNON AFB

Management Action Plan
Cannon AFB, New Mexico

Date	Action	Details
1983	Phase I Records Search	Identified 19 SWMU as ERP sites.
1988	RCRA Facility Assessment	RFA completed, identifying 128 SWMUs. 73 were designated for further investigation.
17 December 1989	RCRA Part B Permit	Cannon AFB RCRA Operating Permit
30 December 1994	Subpart X Permit	Melrose AFR Operating Permit
July 1999	RCRA Part B Permit	Applied for Renewal of Part B Permit
7 September 2000	RCRA Part B Permit	Requested Class 3 Permit Modification to remove 65 SWMUs, 6 AOCs and 1 Misc Unit from RCRA Part B Permit

Notes:

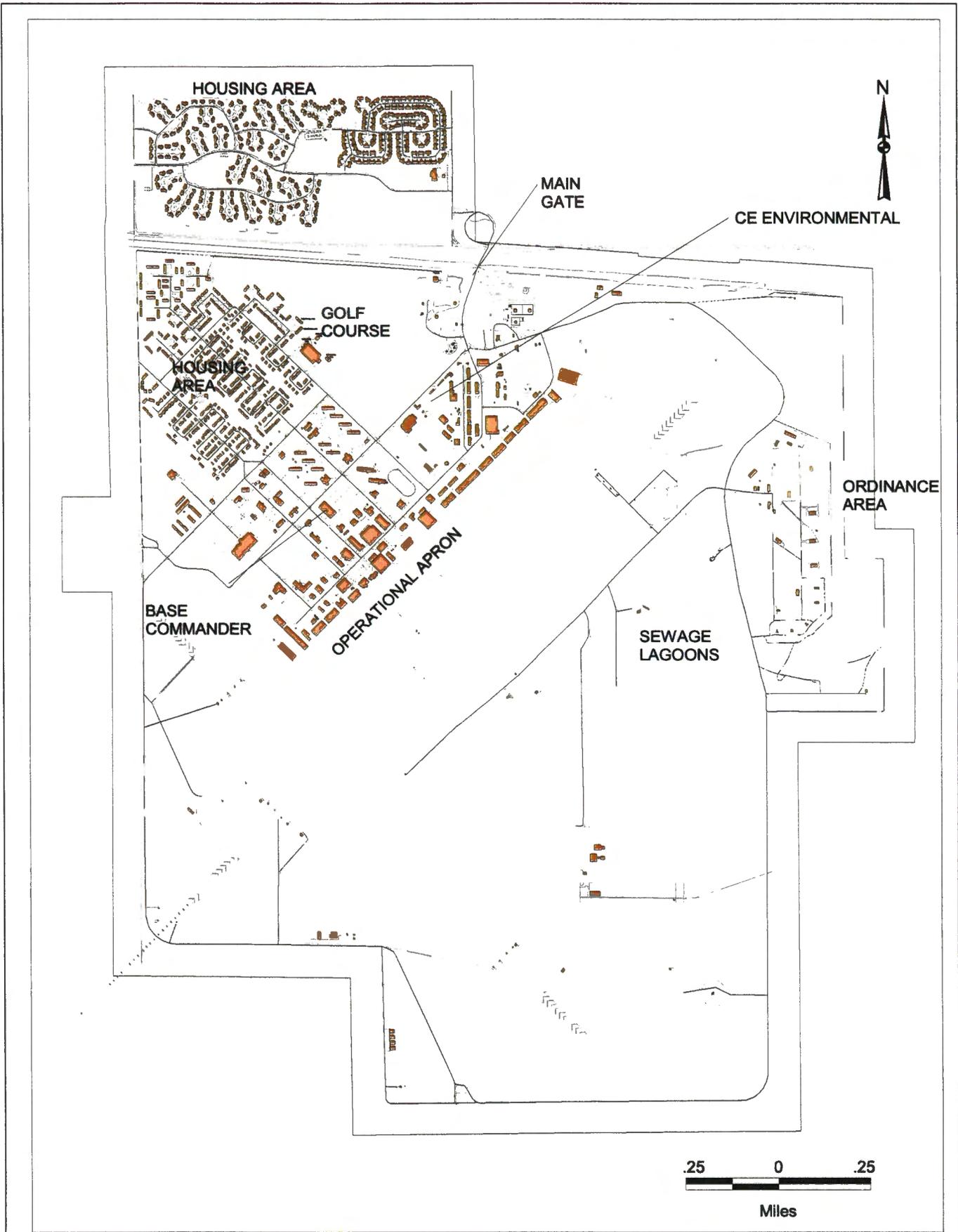
N/A = Not available



Cannon AFB.
New Mexico

LOCATION PLAN

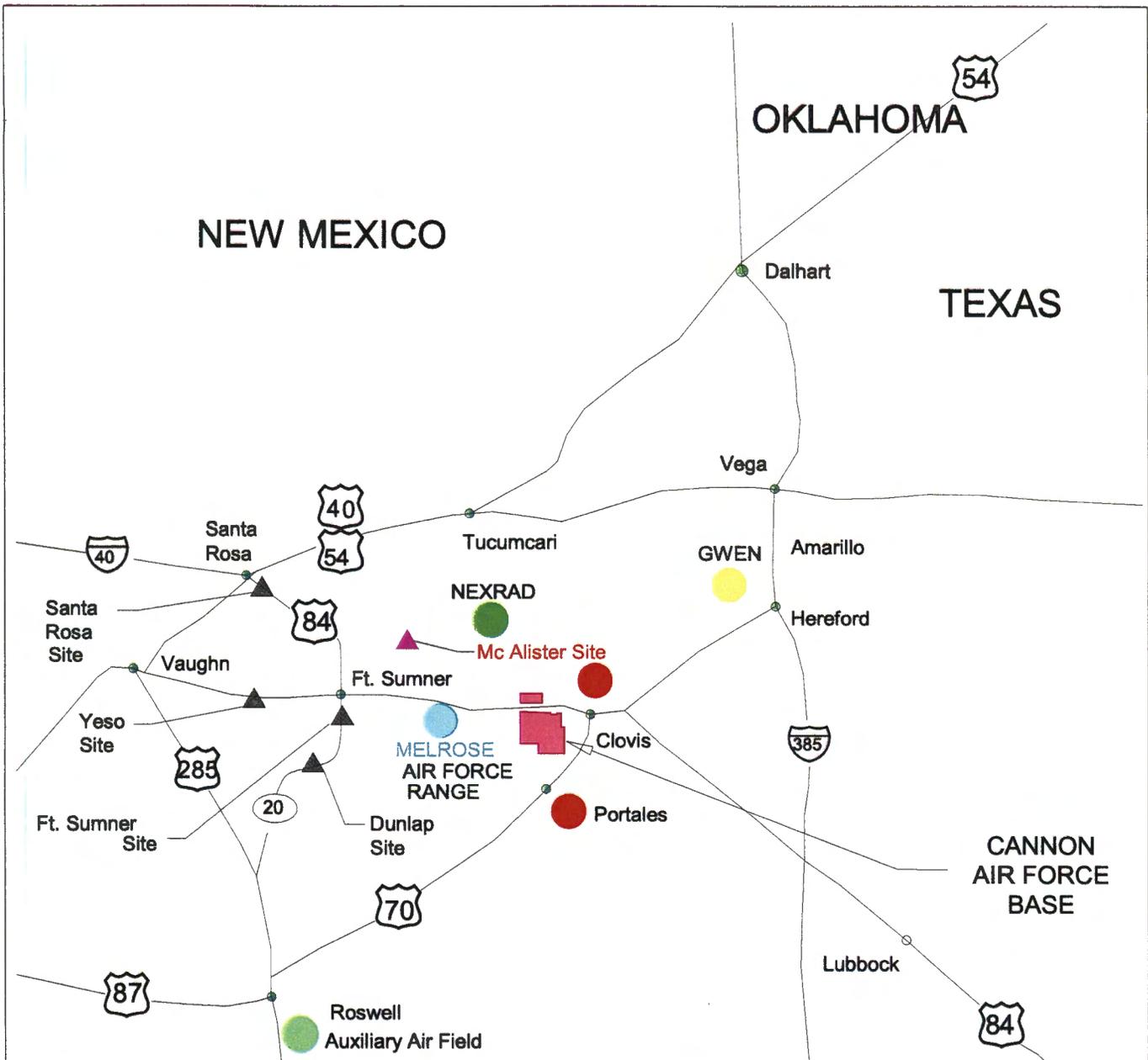
Figure 1-1



Cannon AFB
New Mexico

BASE LAYOUT

Figure 1-2



FACILITY TYPE



Housing Area

- * Clovis Housing Area (Cannon Place)
- * Portales Housing Area (Cannon Meadows)



Radar Site

- * NEXRAD (Field, NM)
- * Roswell Air Auxiliary Field



Minimize Sites

- * Dunlap Site
- * Santa Rosa Site
- * Ft. Sumner Site
- * McAlister Site
- * Yeso Site



Melrose Air Force Range



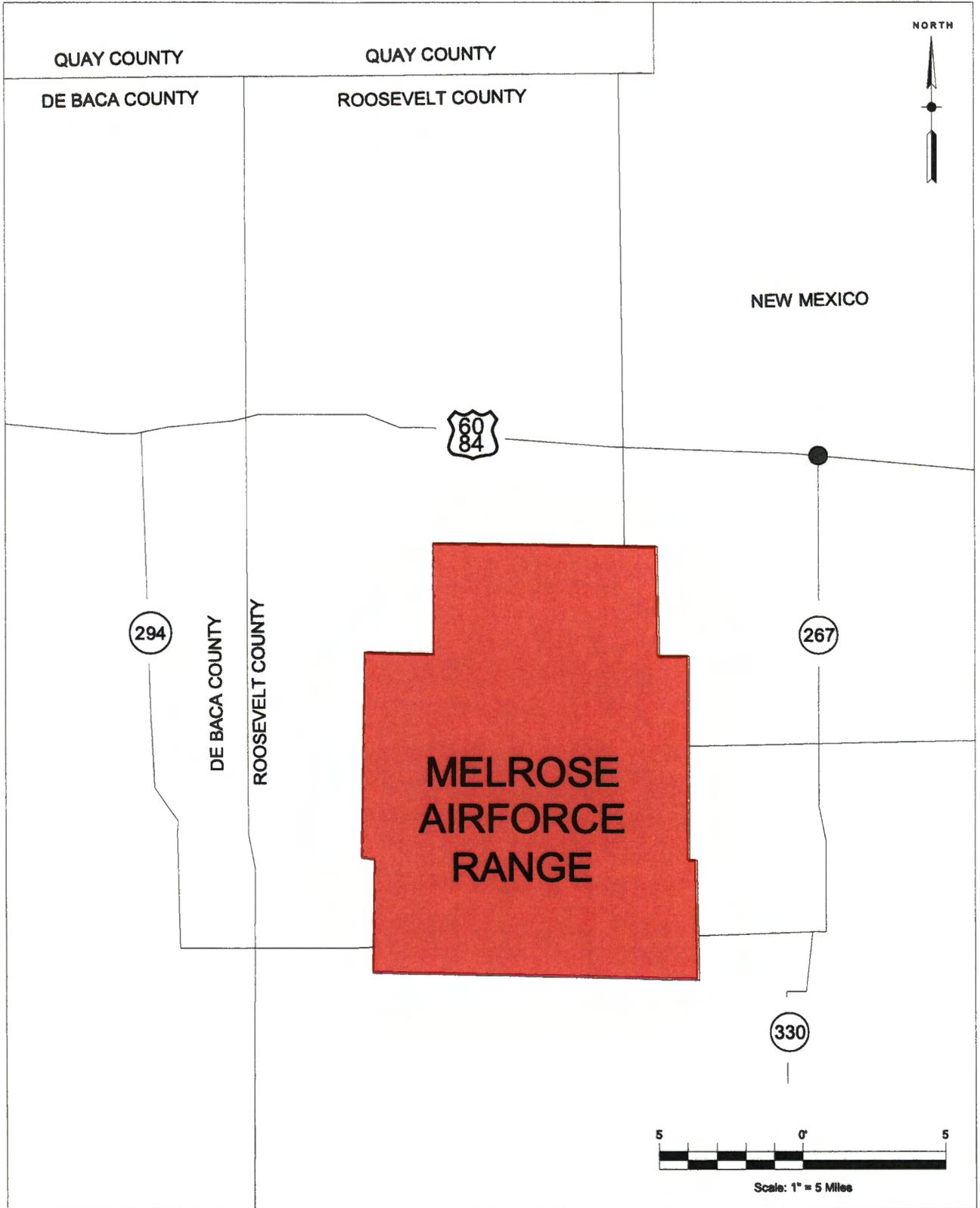
GWEN Communications Site (Hereford, TX)

N:\6120014\102\NEW\FIG1-3

Cannon AFB.
New Mexico

OFF BASE PROPERTY

Figure 1-3

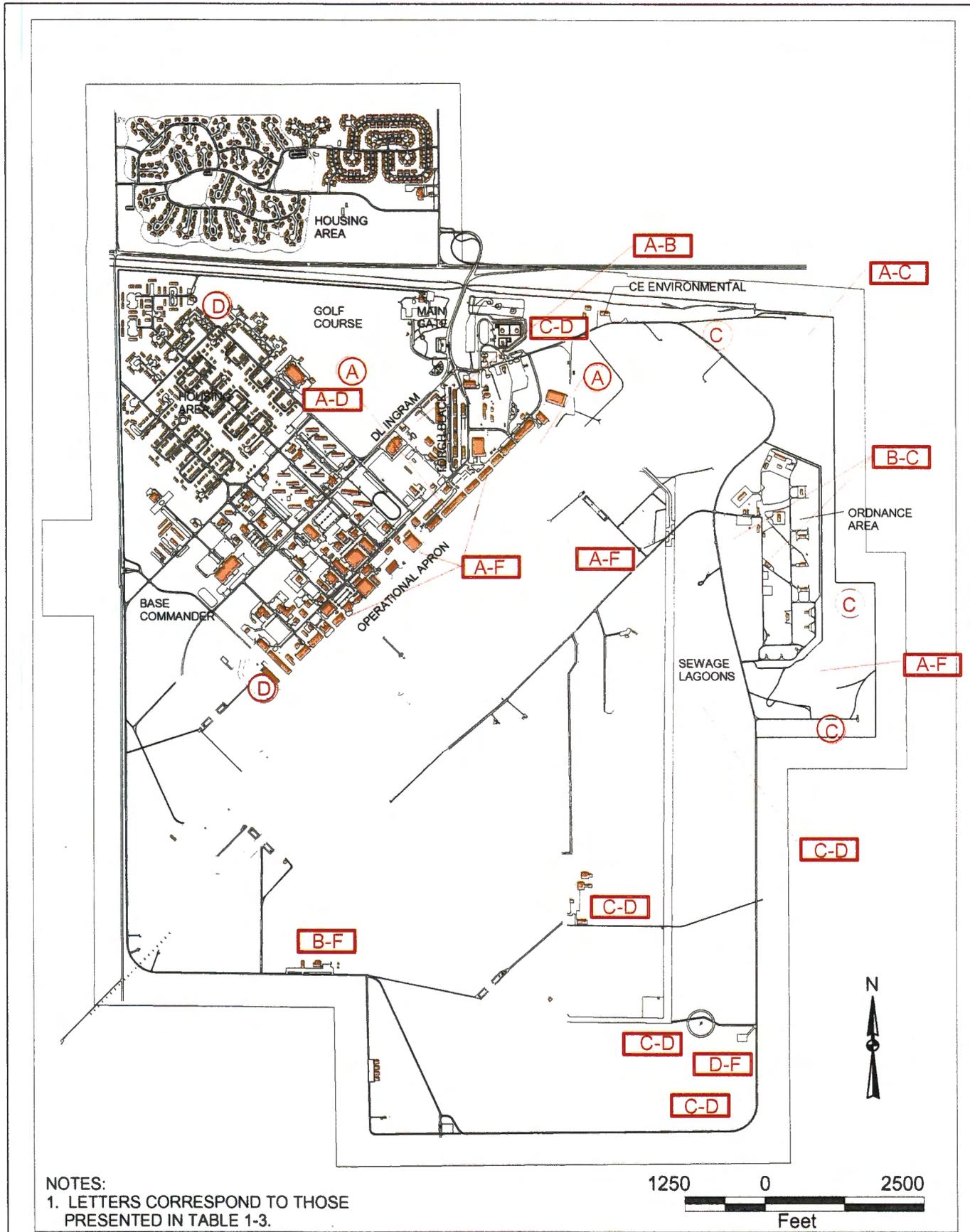


N:\61200141\02\NEW\MELROSE1.DWG\10-19-95KC

Melrose Air Force Range
New Mexico

MELROSE AIR FORCE RANGE

Figure 1-4

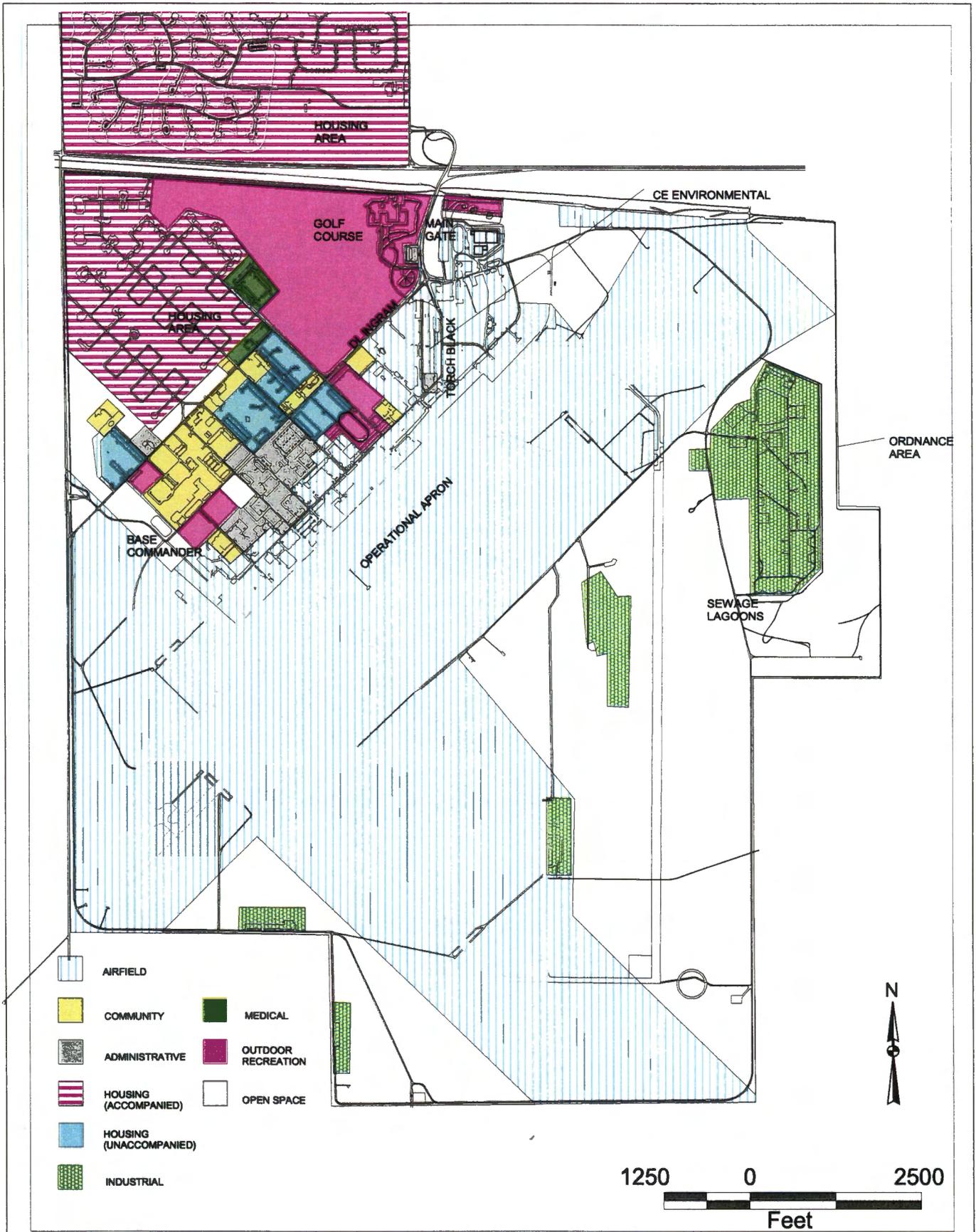


NOTES:
 1. LETTERS CORRESPOND TO THOSE PRESENTED IN TABLE 1-3.

Cannon AFB, New Mexico

LOCATION OF PAST HAZARDOUS SUBSTANCES AND PETROLEUM ACTIVITIES

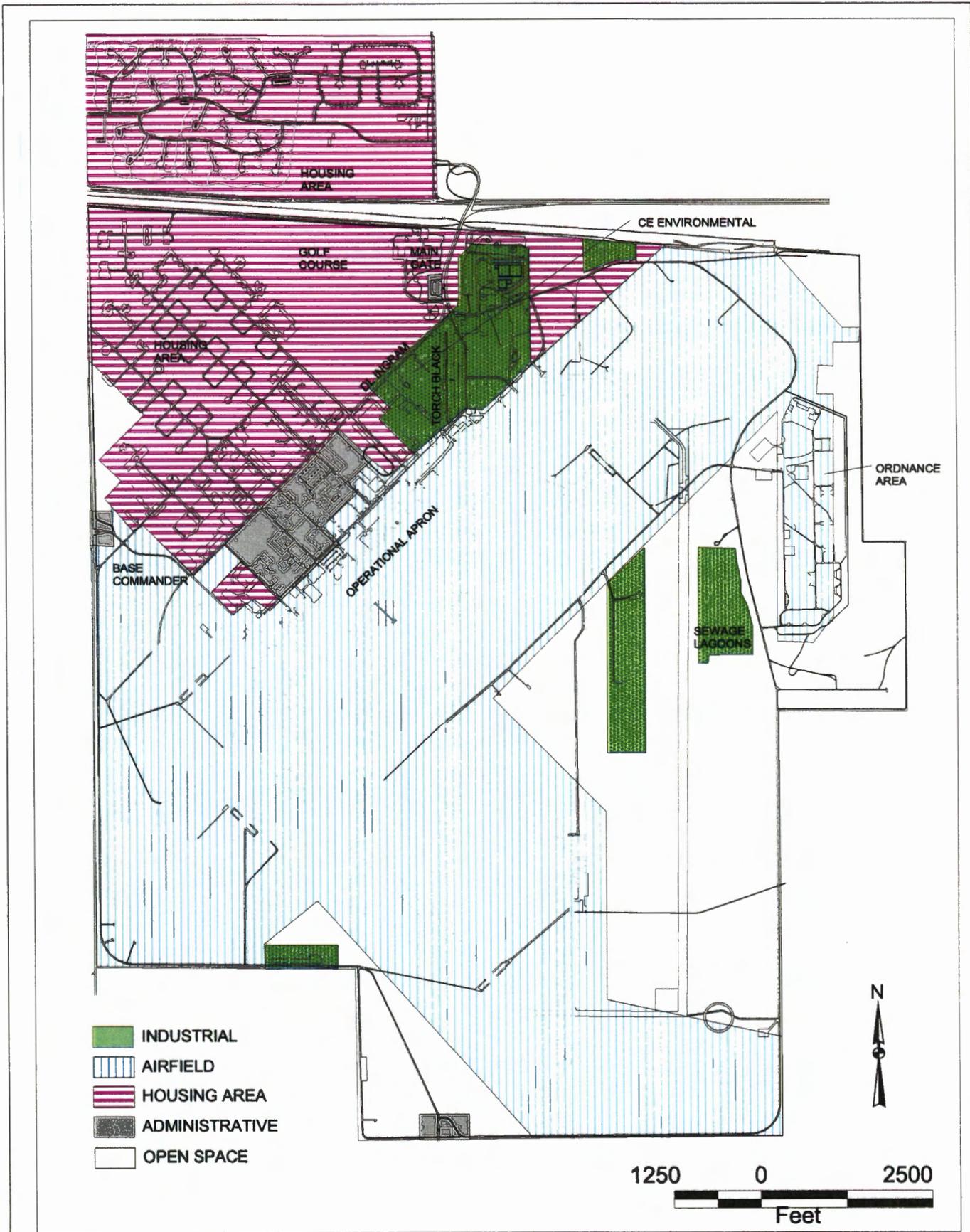
Figure 1-5



Cannon AFB,
New Mexico

PRESENT LAND USE

Figure 1-6



2. INSTALLATION-WIDE ENVIRONMENTAL PROGRAM STATUS

This chapter summarizes the past accomplishments and the current status of the ERP and restoration-related compliance programs at Cannon AFB. It also provides a summary of community involvement in these programs.

2.1 RESTORATION PROGRAM STATUS

2.1.1 Summary of Regulatory Agreements

To ensure compliance with applicable state and federal hazardous substance regulations promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DoD developed the ERP. The ERP was intended to be the primary mechanism for response actions at USAF installations under the provisions of CERCLA. The ERP at Cannon AFB began with the Phase I Records Search and was followed by the Phase II Confirmation/Quantification study conducted in 1986. Subsequent to these studies, the approach was changed to ensure consistency with the CERCLA response action process. As a result, terminology and procedures reflect the four-phase strategy outlined in the National Oil and Hazardous Substances Pollution Contingency Plan.

In response to the 1986 submittal of a RCRA Part B permit application for hazardous waste storage at the on-base Defense Reutilization and Marketing Office facility, EPA Region VI conducted a Resource Conservation and Recovery Act Facility Assessment, which listed 128 SWMUs and 52 Areas of Concern (AOCs). From this original list, 74 SWMUs and 3 AOCs warranted further study (the other 54 SWMUs and 49 AOCs were dropped) and were subsequently included in the Hazardous and Solid Waste Amendment of the RCRA Part B permit issued to the Base on 14 November 1989.

Because of the corrective action precedent established by the amendment, the procedures of the CERCLA ERP approach, including investigations and/or Remedial Actions for all Cannon AFB ERP sites identified as SWMUs, were changed to meet the applicable requirements of HSWA under the RCAP. Remedial activities for ERP/SWMU sites now follow these provisions, and, in fact, all sites are now being closed out under RCRA. ERP data collected prior to issuance of the permit were used for site screening purposes only. These data were replaced by the RFA/RFI data; in some cases, this meant resubmitting data gathered during a CERCLA RI using RCRA terminology. An exception to this process is the Disposal Pit (DP-33), a more recently identified site (1992) that does not meet the criteria of an SWMU because of its pre-HSWA activities. The 1994 interim removal action at DP-33 followed the provisions set forth by CERCLA.

The HSWA permit originally listed 74 SWMUs and 3 AOCs. Currently, there are a total of 83 SWMUs and AOCs at Cannon AFB, with another 8 SWMUs and AOCs at the Melrose Air Force Range. Of these, 32 SWMUs and AOCs were also identified as ERP sites. RFI and corrective actions for ERP, SWMU and AOC sites are funded under either the ECP account or ERA. The programming described in this MAP includes only the RFIs and corrective actions on the ERP/SWMUs and AOCs that are being funded under ERA. Funding for RFI activities at the remaining ERP sites and SWMUs/AOCs has been identified under the ECP account and will be addressed under the Cannon AFB Corrective Action Management Plan (CAMP).

In an effort to prioritize investigations, EPA Region VI divided the 74 SWMUs and 3 AOCs into 3 sections: Appendix I, Appendix II, and Appendix III. The RFIs scheduled for each RCRA Permit Appendix were originally referred to as Phase 1 for Appendix I (highest priority), Phase 2 for Appendix II, and Phase 3 for Appendix III (lowest priority).

Studies on the Cannon AFB SWMUs listed in the EPA Appendix I were scheduled first, those for Appendix II scheduled second, and the ones for Appendix III scheduled last. In general, these schedules were followed, although priority did not in all cases prove to be true, as there were some exceptions where Military Construction Program projects were programmed. These two sites (both ERA-funded) included Landfill 25 (LF-25) and JP-4 Fuel Spill (SS-18) on the south ramp. Both were listed in Appendix II but were studied under the schedule established for Appendix I SWMUs. A breakdown of ERA-funded SWMUs and AOCs assigned to each appendix is shown in Table 2-3A.

2.1.2 Restoration Sites and Areas of Concern

All ERA-eligible ERP sites are shown in Figure 2-1 and information for these sites, including site number, name, materials disposed of, dates of discovery and operation, status, and relative risk, is summarized in Table 2-1. Detailed descriptions and the current status of each site are provided in Appendix B1.

The Old Entomology Rinse Area (SD-17) required a Phase II investigation that was completed in 1994. The majority of Appendix I SWMUs have boundary markers installed around them. Monitoring wells for Landfill 3 (LF-03) and Landfill 4 (LF-04) were installed in 1994 and 1995. During a 1994 interim removal project at Engine Test Cell (SD-11), contamination warranting further investigation was uncovered. An RFI was subsequently conducted and the site is now undergoing CMS. NFA was proposed and the site was removed from the permit.

Phase I RFIs have been completed on all SWMUs listed in Appendices II and III. The Baseline Risk Assessments from the Phase I RFIs for both Appendix II and Appendix III recommend No Further Action (NFA) on these sites. EPA Region VI did not accept all the Phase I NFA recommendations, and follow-up Phase II RFIs for some Appendix II and III sites were conducted during 1994 and 1995. In addition, a project initiated during 1996 and 1997 removed 19 oil/water separators using environmental compliance funds. All replacement units use state-of-the-art double wall separators.

At the time of the RFA in 1987, 32 SWMUs and AOCs were determined to be ERP sites. Another four AOCs and one ERP site (Disposal Pit, DP-33) have been added since that time. DP-33 did not meet the definition of an SWMU and therefore was not added to the HSWA permit (and thus ERA eligible). AOCs 36, D, E (SD-34), and F (DP-35) were added between 1993 and 1995. Ten ERP sites were removed from the ERP investigation list because they were either ineligible for ERA funding, were duplicate sites, did not exist, or had been addressed under other compliance programs [e.g., underground storage tanks (USTs)]. The UST sites were removed from the ERP list because the all of the USTs were physically removed and the excavations were tested following NMED UST regulations. The remaining sites dropped from the ERA arena are either NFA or are being investigated or monitored under the ECP.

Site-specific information is located in Appendix D1.

TABLE 2-1

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
LF-01	74	SWMU/ERP	Landfill No. 1	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1943 to 1946	1983	RCRA Facility Investigation Appendix I CL	NR	RCRA
LF-02	82	SWMU/ERP	Landfill No. 2	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1946 to 1947 1952 to 1959	1983	R RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
LF-03	105	SWMU/ERP	Landfill No. 3	Solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1959 to 1967	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
LF-04	104	SWMU/ERP	Landfill No. 4	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1967 to 1968	1983	Compliance Order, RCRA Facility Investigation Appendix I CL	NR	RCRA
LF-05	113	SWMU/ERP	Landfill No. 5	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1968 to 1988	1983	RCRA Facility Investigation Appendix I CL	NR	RCRA

Site-specific information is located in Appendix D1.

TABLE 2-1 (Continued)

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
FT-06	78	SWMU/ERP	Fire Department Training Area No. 1	Waste oils and solvents, recovered fuels	1959 to 1968	1983	RCRA Facility Investigation Appendix I CL	NR	RCRA
FT-07	106	SWMU/ERP	Fire Department Training Area No. 2	Waste fuels, oils, and solvents burned	1968 to 1974	1983	RCRA Facility Investigation Appendix I CL	NR	RCRA
FT-08	107	SWMU/ERP	Fire Department Training Area No. 3	Waste fuels, oils, and solvents burned	1968 to 1974	1983	RCRA Facility Investigation Appendix I CL	NR	RCRA
OT-10	AOC C	SWMU/ERP	Blown Capacitors Site	Approximately 6 gal of oil thought to contain PCB	1978	1983	Removal action completed in 1988 RCRA Facility Investigation Appendix III CL	NR	RCRA/ TSCA
SD-11a	86	SWMU/ERP	Engine Test Cell	Fuel from aircraft engine cleaning operations (Building 5114)	1965 to 1988	1983	RCRA Facility Investigation Appendix I CMS	NR	RCRA

Site-specific information is located in Appendix D1.

TABLE 2-1 (Continued)

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
SD-11b	87	SWMU/ERP	Overflow Pit	Overflow from Engine Test Cell, SWMU No. 86	1982 to 1985	1983	RCRA Facility Investigation Appendix I CMS	NR	RCRA
SD-11c	88	SWMU/ERP	Leach Field	Washdown wastewater from Oil/Water Separator SWMU No. 90 (attached to Engine Test Cell, SWMU No. 86)	1965 to 1985	1983	RCRA Facility Investigation Appendix I CMS	NR	RCRA
SD-11d	89	SWMU/ERP	Evaporation Pond	Engine Test Cell wastewater/fuel	1985 to present	1983	RCRA Facility Investigation Appendix I CMS	NR	RCRA
SD-11e	90	SWMU/ERP	Oil/Water Separator No. 5114	Engine Test Cell, SWMU No. 86, wastewater/fuel	1965 to 1988	1983	RCRA Facility Investigation Appendix I CMS	NR	RCRA
SD-12	85	SWMU/ERP	Stormwater Collection Point	Received stormwater runoff from flightline	1943 to present	1983	RCRA Facility Investigation Appendix I (completed) Removed from Part B permit September 1990 CL	NR	RCRA

Site-specific information is located in Appendix D1.

TABLE 2-1 (Continued)

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
SD-13	75	SWMU/ERP	Sanitary Sewage Lift Station Overflow Pit	Emergency sewage storage pit. In February 1983, an estimated 100,000 to 150,000 gal of raw sewage were stored in the pit for one week. This site has been converted into a Golf Course pond.	Unknown to present	1983	RCRA Facility Investigation Appendix I (completed) Removed from Part B permit September 1990 CL	NR	RCRA
WP-14	76	SWMU	Sludge Weathering Pit	Sludge from JP-4 bulk storage fuel tanks	1960 to 1980	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
SD-15	34	SWMU	AGE Drainage Ditch	Solvents, fuels, greases	Late 1960s to present	1987	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
DP-16	81	SWMU/ERP	Solvent Disposal Site	Trichloroethylene	1983(?)	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
SD-17	96	SWMU/ERP	Old Entomology Rinse Area	Pesticides	1968(?) to 1983	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA

Site-specific information is located in Appendix D1.

TABLE 2-1 (Continued)

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
SS-18	AOC B	SWMU/ERP	JP-4 Fuel Spill	Approximately 400 gal of JP-4	1980	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
SS-19	AOC A	SWMU/ERP	MOGAS Spill	Approximately 2000 to 3000 gal of leaded gasoline	Early 1960s	1983	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
SD-20	95	SWMU/ERP	NE Stormwater Drainage Area	Stormwater runoff from flightline and effluent from flightline oil/water separators	1943 to present	1987	RCRA Facility Investigation Appendix I (completed) CL	NR	RCRA
LF-25	97	SWMU/ERP	Concrete Rubble Pile	Building demolition material, asphalt rubble	Late 1950s to early 1960s	1987	RCRA Facility Investigation Appendix III (completed) CL	NR	RCRA
ST-26a	48a	SWMU/ERP	Underground Waste Oil Tank	Waste oils, solvents, paint thinners, fuels	1965 to 1984 Removed 1988	1987	RCRA Facility Investigation Appendix II (completed) CL	NR	RCRA
ST-26b	48b	SWMU/ERP	Aboveground Overflow Capacity Tank	Waste oils, solvents, paint thinners, fuels	1965 to 1984 Removed 1988	1992	RCRA Facility Investigation Appendix II (completed) CL	NR	RCRA

Site-specific information is located in Appendix D1.

TABLE 2-1 (Continued)

CANNON AFB ERP SITE SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

WIMS -ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
ST-27	83	SWMU/ERP	Sump	Washdown from flight apron	Unknown to present	1987	RCRA Facility Investigation Appendix II (completed)CL	NR	RCRA
DP-33	(Non-SWMU/AOC)	ERP	Disposal Pit	55-gal drums discovered; 60 to 100 drums	Late 1940s to Early 1950s	1992	IRA: FY1994 RI/FS: FY1994 CL	NR	CERCLA
SD-34	AOC E	SWMU/ERP	Rubble Pile	Airfield Pavement	Late 1950s to Early 1960s	1995	CL	NR	RCRA
DP-35	AOC F	SWMU/ERP	Boresight mound	Large caliber munitions (Spent)	1957-1971	1995	CL	NR	RCRA
	AOC 36	ERP	Disposal pit	Solvents from aircraft maintenance	Early 1950s	1996	CL	NR	RCRA
LF-36	Former AOC G	SWMU/ERP	Potential Old landfill	Currently unknown	1957-1959	1997	CL	NR	RCRA
LF-37	Former AOC H	SWMU/ERP	Potential Old landfill	Currently unknown	1957-1959	1997	CL	NR	RCRA

Relative Risk Codes:

H = High L = Low M = Medium

NE = Not Evaluated; site is under study and not yet rated.

CL = Closed

NR = Not Required; site is closed with Remedial Action Operation or Monitoring is remaining.

RC = Response Complete; site is closed with no RA-O and/or LTM remaining.

TABLE 2-1A

ECP SWMUs FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site Identification	Current Status
Appendix I Sites	
SWMU 98	Proposed NFA
SWMU 101	Groundwater monitoring ongoing, closure expected
SWMU 102	Groundwater monitoring ongoing
SWMU 109	Currently undergoing CMS
SWMU 111	Currently undergoing CMS
SWMU 112	Currently undergoing CMS
Appendix II Sites	
SWMU 1	IRA complete and proposed NFA
SWMU 2	Proposed NFA
SWMU 3	Proposed NFA, awaiting NMED response
SWMU 4	Proposed NFA, awaiting NMED response
SWMU 5	Proposed NFA, awaiting NMED response
SWMU 6	Proposed NFA, awaiting NMED response
SWMU 7	IRA complete and proposed NFA
SWMU 8	IRA complete and proposed NFA
SWMU 9	IRA complete and proposed NFA
SWMU 10	NFA by NMED UST Program
SWMU 11	IRA complete and proposed NFA
SWMU 16	Proposed NFA
SWMU 32	IRA complete and proposed NFA
SWMU 33	IRA complete and proposed NFA
SWMU 38	IRA complete and proposed NFA
SWMU 39	IRA complete and proposed NFA
SWMU 49	NFA by NMED UST Program
SWMU 50	NFA by NMED UST Program

TABLE 2-1A (Continued)
ECP SWMUs FOR CANNON AFB

**Management Action Plan
 Cannon AFB, New Mexico**

Site Identification	Current Status
Appendix II Sites	
SWMU 71	NFA by NMED UST Program
SWMU 79	NFA by NMED UST Program
SWMU 79	NFA by NMED UST Program
SWMU 110	Currently undergoing CMS
SWMU 124	NFA by NMED UST Program
SWMU 125	NFA by NMED UST Program
SWMU 126	NFA by NMED UST Program
Appendix III Sites	
SWMU 31	Proposed NFA awaiting NMED response
SWMU 46	IRA complete and proposed NFA
SWMU 47	IRA complete and proposed NFA
SWMU 51	IRA complete and proposed NFA
SWMU 55	Proposed NFA awaiting NMED response
SWMU 57	IRA complete and proposed NFA
SWMU 61	IRA complete and proposed NFA
SWMU 62	IRA complete and proposed NFA
SWMU 63	IRA complete and proposed NFA
SWMU 70	Bioventing project on-going
SWMU 72	Proposed NFA, awaiting NMED response
SWMU 77	Proposed NFA awaiting NMED response
SWMU 91	NFA by NMED UST Program
SWMU 92	IRA complete and proposed NFA
SWMU 93	Proposed NFA awaiting NMED response
SWMU 94	IRA complete and proposed NFA
SWMU 97	IRA completed and proposed NFA
SWMU 103	Further study expected

TABLE 2-1A (Continued)
ECP SWMUs FOR CANNON AFB

Management Action Plan
Cannon AFB, New Mexico

Site Identification	Current Status
Appendix III Sites	
SWMU 112	Undergoing CMS
SWMU 127	Proposed NFA awaiting NMED response
SWMU 128	Proposed NFA

Notes:

CMS = Corrective Measures Study
LTM = Long-Term Monitoring
NMED = New Mexico Environmental Department
SWMU = Solid Waste Management Unit
UST = Underground Storage Tank

IRA = Investment Recovery Association
NFA = No Further Action
RFI = RCRA Facility Investigation
TBD = To be determined

TABLE 2-1B

ECP-FUNDED SWMUs AND AOCs FOR MELROSE AFB

**Management Action Plan
Cannon AFB, New Mexico**

Melrose AFB SWMUs and AOCs	
Site Identification	Current Status
SWMU 114	NMED seeking second phase investigation
SWMU 115	NMED seeking second phase investigation
SWMU 117	NMED seeking second phase investigation
SWMU 118	Dropping Subpart X Permit, expect closure
Northwest Munitions Disposal Area	NMED seeking second phase investigation
WWII Cantonment Disposal Area	NMED seeking second phase investigation
Helicopter Pad ^a	NMED seeking second phase investigation
Domestic Waste Burial Site ^a	NMED seeking second phase investigation

Notes:

^aThese sites are unnumbered potential AOCs that are undergoing RFI.

NA = Not applicable

RFI = RCRA Facility Investigation

SWMU = Solid Waste Management Unit

TABLE 2-2

SUMMARY OF CANNON AFB AOCs

Management Action Plan
Cannon AFB, New Mexico

WIMS-ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Entered ERP	Status	Relative Risk Evaluation	Regulatory Mechanism
SS-19	AOC A	SWMU/ERP	MOGAS Fuel Spill Site	Approx 2000-3000 gallons of leaded gasoline	Early 1960s	1983	Closed	NR	RCRA
SS-18	AOC B	SWMU/ERP	JP-4 Fuel Spill Site	Approx 400 gal of JP-4	1980	1983	Closed	NR	RCRA
OT-10	AOC C	SWMU/ERP	Blown Capacitors Site	Approx 6 gallons, thought to contain PCBs	1978	1983	Closed	NR	RCRA/TSCA
*	AOC D	SWMU/ERP	Nonfriable asbestos burial pit	Asbestos siding material	Unknown	1993	NFA		RCRA
SD-34	AOC E	SWMU/ERP	Rubble pile	Airfield pavement	Late 1930s	1995	Closed	NR	RCRA
DP-35	AOC F	SWMU/ERP	Boresight mound	Large caliber munitions (Spent)	1957-1971	1995	CL	NR	RCRA
LF-36	Former AOC G	SWMU/ERP	Potential Old landfill	Currently unknown	1957-1959	1997	CL	NR	RCRA
LF-37	Former AOC H	SWMU/ERP	Potential Old landfill	Currently unknown	1957-1959	1997	CL	NR	RCRA
*	AOC 36	SWMU/ERP	Disposal Pit	Solvents from aircraft maintenance	Early 1950s	1996	PA	NR	RCRA

Notes:

Site has not been assigned WIMS-ES identification number.

AOC = Area of Concern

NFA = No Further Action

CL = Closed

Removal actions were performed in 1994 at Cannon AFB to remove known contamination at two sites: the Engine Test Cell (SD-11) and the Disposal Pit (DP-33). An ERA-funded Air Force Center for Environmental Excellence pilot bioventing system at Oil/Water Separator No. 326 and Leach Field (SWMU 70), which is not an ERP site, began in 1994 and continues to operate. Removal actions for ERA sites are summarized in Table 2-3.

Cannon AFB submitted a Class III Permit Modification to NMED in September 2000 to remove 61 SWMUs, 5 AOCs, and DP-33 from the RCRA Part B Permit. This included 30 ERP sites, which Cannon believes are ready for No Further Action. Major investigations completed at Cannon AFB since the beginning of the ERP/RCAP are included in Appendix A. Table A-1 lists technical documents and their respective ERP Information Management System (ERPIMS) data loading summary status. Table A-2 lists historical ERP deliverables for Cannon AFB. Table A-3 identifies the site deliverables for the Cannon AFB ERP.

2.2 Status of Community Involvement

Community relations activities occurring at Cannon AFB to date are as follows:

- Publication and release for public comment of the RCRA hazardous waste permit application.
- Establishment of an information repository. A public repository for environmental information was established at the Clovis Public Library. The repository contains fact sheets, technical summaries, site reports, the Cannon AFB Community Relations Plan (CRP), and other information used to support USAF decision-making.
- Maintenance of a mailing list of all interested parties in the community. The Cannon AFB Environmental Restoration Office has developed an extensive mailing list for RAB activities and distribution of materials to parties interested in Base environmental restoration activities. This list contains names of state and local elected officials, congressional representatives, chambers of commerce, community organizations, other citizens' groups, and various federal and USAF organizations. Fact sheets and other public information documents identify a Cannon AFB contact for parties wanting more information. The mailing list is continually reviewed and updated to add those people requesting information and to reflect changes in elected offices. It also lists local radio stations; local, regional, and national newspapers; and other daily and weekly publications for media release distribution.
- The CRP was drafted in 1993 and updated in 1995. To develop the CRP update, Cannon AFB interviewed community members to solicit perceptions of the Base and its environmental programs, as well as to assess the knowledge of and access to environmental information. Public involvement strategies are based on the interview results.
- Cannon AFB established its RAB in 1995. RABs provide expanded opportunities for ongoing community input and participation in ERP activities and are an important mechanism for two-way communication of ERP-related information between base representatives and members of the community. Many stakeholder groups were identified during the community interviews for the CRP. The RAB was established in 1995 and continues to meet every three to four months.

Table 2-4 lists the status of community involvement activities that are intended to enhance public awareness and participation in restoration efforts at Cannon AFB.

TABLE 2-3

HISTORICAL REMEDIAL AND REMOVAL ACTION STATUS FOR CANNON AFB

Management Action Plan
Cannon AFB, New Mexico

Site Number	Action	Purpose	Time Frame
AOC C (OT-10)	Excavation of approximately 10 ³ yards of soil contaminated with PCB-containing oil	To remove soil potentially contaminated with PCBs	1988
SD-11 (SWMUs 86-90)	Removed oil/water separator system and surrounding soils contaminated with petroleum hydrocarbons	To remove contaminant source (oil/water separator)	July/August 1994
DP-33 Disposal Pit	Removed 28 buried drums containing POL products or glycol	To remove contaminant source	May 1994
LF-25	Removal of surface debris and asbestos containing material	To remove potential surface hazard	Fall 2000

Notes:

AFB = Air Force Base

AOCs = Areas of Concern

FY = Fiscal Year

NPDES = National Pollutant Discharge Elimination System

TABLE 2-3A

ERA FUNDED SWMUS AND AOCs AT CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Appendix I	Appendix II	Appendix III
SD-15 (SWMU 34)	ST-26 (SWMUs 48a, 48b)	SD-11 (SWMU 90)
LF-01 (SWMU 74)	ST-27 (SWMU 83)	LF-25 (SWMU 97)
SD-13 (SWMU 75)		OT-10 (AOC C)
WP-14 (SWMU 76)		SS-18 (AOC B)
FT-06 (SWMU 78)		SS-19 (AOC A)
DP-16 (SWMU 81)		AOC D
LF-02 (SWMU 82)		SD-34 (AOC E)
SD-12 (SWMU 85)		DP-35 (AOC F)
SD-11 (SWMUs 86, 87, 88, 89)		LF-36 (AOC G)
SD-20 (SWMU 95)		LF-37 (AOC H)
SD-17 (SWMU 96)		
LF-04 (SWMU 104)		
LF-03 (SWMU 105)		
FT-07 (SWMU 106)		
FT-08 (SWMU 107)		
LF-05 (SWMU 113)		

TABLE 2-4

OVERVIEW OF COMMUNITY INVOLVEMENT ACTIVITIES AT CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Activity^a	Priority	Status
Community Relations Plan	Required	Revised August 1995
Mailing List	Required	Generated August 1995 (updated FY 2000)
Clipping File	Desirable	Established
Contract File	Desirable	Not established
Newsletter	Desirable	Active semi-annually, last out April 1997
Information Repository	Required	Updated and available on CD-ROM
Fact Sheets	Required	Three issued in August 1995
Technical Assistant Grant	Optional	None (not necessary)
Technical Review Committee/RAB	Required	Established August 1995
Media Contacts	Desirable	Public Affairs office maintains
Community Relations Schedule	Desirable	Public Affairs office maintains
Public Forum	Desirable	None performed to date
Administrative Record	Required	Available on CD-ROM

Notes:

^aMany of the elements presented in this table pertain to the CERCLA process only and are therefore not applicable to the RCAP at Cannon AFB.

3. INSTALLATION-WIDE ENVIRONMENTAL PROGRAM STRATEGY

This chapter describes the basewide strategies for completing the environmental restoration of ERP sites and SWMUs and maintaining the compliance programs at Cannon AFB.

3.1 RESTORATION PROGRAM STRATEGY

3.1.1 Zone Designations

The HSWA component of the RCRA hazardous waste permit stipulates that the 74 SWMUs, 8 AOCs, and 1 CERCLA site (DP-33) listed in the RFA are to be investigated by Cannon AFB for environmental releases. DP-33 has received official closure from NMED. EPA Region VI placed these SWMUs into three groups representing a prioritization of sites, and included them as Appendices I, II, and III to the RCRA permit. A portion of these SWMUs and AOCs are being funded through ERA and are the focus of this MAP. The remaining sites are detailed in the Corrective Action Management Plan (CAMP). New SWMUs and AOCs, when found, are investigated under the RCRA Corrective Action Program (RCAP), as specified under HSWA, and their funding is provided under ECP. AOC I was identified in 1998 and demolished in 1999 using EC funds.

3.1.2 OU or Site Strategy

There have been limited removal actions at Cannon AFB for ERA-funded sites. The oil/water separator at the Engine Test Cell (SD-11) was removed during July/August 1994, and the contaminated soil was disposed of off-base. An interim removal action for Disposal Pit DP-33 was completed in 1994. An ERA-funded pilot bioventing study for Oil/Water Separator No. 326 and the Leachfield (SWMU 70) was begun in 1994 and is still in operation under the management of Cannon AFB. Cannon AFB does not have Operable Units; Table 3-1 is provided for MAP format consistency only.

3.1.3 Ongoing and Planned Removal Actions

Table 3-2 summarizes the removal actions planned as part of the Cannon AFB environmental restoration program.

3.1.4 Remedy Selection Approach

Remedies for each ERP site or SWMU will continue to be selected in accordance with statutory and RCAP guidance protocol. The Cannon AFB Project Team will continue to involve all relevant public and private parties in the remedy selection process through the RAB and will provide access to information repositories. Particular attention will be given to the following during the evaluation of alternatives.

- **Land use/risk assessment.** Where future uses are known, risk assessment protocols will incorporate future groundwater, surface water, and land use considerations in developing exposure scenarios.

TABLE 3-1

OPERABLE UNIT DESCRIPTIONS FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

OU Name/Number	Description	Projects Planned
N/A		None

Notes:

N/A = Not Applicable

TABLE 3-2

PLANNED REMEDIAL, REMOVAL, AND INTERIM ACTIONS AT CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site	Action	Purpose	Time Frame
LF 3, 4 & 25	LTM	Groundwater monitoring	2002
LF 3, 4 & 25	LTM	Groundwater monitoring	2003
LF 3, 4 & 25	LTM	Groundwater monitoring	2004
LF 3, 4 & 25	LTM	Groundwater monitoring	2005
Melrose Range	SI		2005
LF 3, 4 & 25	LTM	Groundwater monitoring	2006
Melrose Range	RI		2006
LF 3, 4 & 25	LTM	Groundwater monitoring	2007
Melrose Range	FS		2007
LF 3, 4 & 25	LTM	Groundwater monitoring	2008
Melrose Range	RD		2008
Melrose Range	RA-C		2009
Melrose Range	PCO-C		2010
Melrose Range	PCO-C		2011

Notes:

FY = Fiscal Year

MilCon = Military Construction

O&M = Operations and Maintenance

RA = Remedial Action

- **Alternative concentration limits.** During the development of conceptual site models (CSMs), these limits will be considered as groundwater protection standards to be applied in determining points for compliance if groundwater contamination is detected.
- **Applicable remedies.** Focused CSMs will be developed and innovative technologies will be considered for those sites requiring specific action. Presumptive Remedy Engineering Evaluation/Cost Analysis, an HQ ACC initiative, can help minimize the amount of investigation and design required prior to corrective action selection for some sites.

3.1.5 Remedy Selection Approach for Petroleum-Contaminated Soils

Cannon AFB has numerous sites where soils are contaminated with POLs. Regulations pertaining to POL contamination have been promulgated by the State of New Mexico, including the UST regulations. Treatment options for petroleum-contaminated soils are as follows:

- **No Further Action:** Total petroleum hydrocarbons (TPH) less than 100 mg/kg or water table greater than 100 ft deep: Leave the contaminated soil in place, as it should pose no risk given the low annual rainfall and local depth to groundwater. The less than 100 mg/kg TPH rule is given in the NMED UST regulations.
- **TPH less than 5000 mg/kg meeting special criteria:** NMED promulgated a position paper in July 2000 allowing NFA for levels up to 5000 mg/kg TPH provided special criteria were met for depth to groundwater, wellhead protection, and distance to surface water.
- **TPH greater than 100 mg/kg but less than 1000 mg/kg and site not meeting special criteria:** Disposal in a permitted landfill. Most municipal landfills would be permitted to receive such waste, but it would depend on the policy of the landfill operators if they would accept it. Clovis Municipal Landfill was permitted to take such waste, but the Clovis Landfill management personnel no longer allow it. Bioventing and/or on-base landfarming in lieu of excavation and off-base disposal will be considered.
- **TPH greater than 1000 mg/kg and site not meeting special criteria:** Treatment at a permitted landfarm facility. The closest landfarm to Cannon AFB is found in Hobbs, New Mexico. Cannon AFB has the room for such a facility but requires a groundwater discharge permit modification to accomplish it.
- **Any TPH levels: In situ treatment by bioventing or other bioremediation techniques:** An ongoing AFCEE pilot project is testing the suitability of this approach at Cannon AFB at Oil/Water Separator No. 326 Leachfield. Because the groundwater is relatively deep at Cannon AFB, the in-situ option could be negotiated with NMED on almost any site if the AFCEE project data confirm suitability. Preliminary data gathered from the six-month sampling milestones of the AFCEE bioventing pilot test indicated degradation of contaminants; however, subsequent LTO results showed limited success, probably due to the low soil moisture content in the area, therefore bioventing is not a suitable technology except where soil moisture is unusually high or artificially increased.

- **Institutional controls to limit exposure :** (e.g., fencing, deed restrictions) should be considered as part of the remedy selection.

Two other technology options are available. One is low temperature thermal treatment, but it could prove costly and require extensive air permitting. Bioventing is a treatment technology that is currently being implemented under a pilot project at the Base. Its advantages include cost-effectiveness, ease of installation and operation, and minimal site impact. The viability of bioventing can be limited depending on soil conditions, and it is best applied where contamination is deep and soil moisture is adequate. The system at Cannon AFB has proven marginally effective based on degradation rates and reduction of contaminant levels in soil vapor. It appears that artificially increasing soil moisture may be necessary to obtain satisfactory degradation rates.

4 ENVIRONMENTAL PROGRAM MASTER SCHEDULE

This chapter presents the Cannon AFB master schedules for activities anticipated in the Base environmental restoration and ongoing activities of the restoration-related compliance program. These master schedules are simplified versions of detailed schedules developed to support site-specific environmental restoration activities. Appendix D1 provides supporting documentation for the ERP master schedule and presents detailed schedules and cost estimate breakdowns by site.

4.1 ENVIRONMENTAL RESTORATION SCHEDULE

Table 4-1 and Figure 4-1 summarize the schedule and estimated costs for planned restoration activities. Sites that are classified as NFA are not included, while those falling under ECP funding are addressed in the Cannon AFB CAMP. Table D1-1 (Appendix D1) presents an annual cost summary for the Cannon AFB ERP/SWMU sites scheduled for investigation and RA under ERA funding. The Base's ability to meet the milestones shown in the master schedule depends upon:

- The availability and timeliness of funding;
- The successful completion of conceptual models of sources, contaminant migration, and receptors in ERP/SWMU sites under investigation;
- The timely preparation of draft RFI reports and BRAs; and
- Agreement on appropriate risk-based cleanup levels for each site.

4.2 PROJECT TEAM, ELC, AND RESTORATION ADVISORY BOARD MEETING SCHEDULES

The RAB meets on an as-needed basis, generally quarterly. The Cannon AFB ELC meets on a quarterly basis.

TABLE 4-1

ERP LINE ITEMS THROUGH CLOSEOUT

**Management Action Plan
Cannon AFB, New Mexico**

FY	Site	Phase	Cost (\$K)
2002	LF-3, LF-4 LF-25	LTM	44.0
2003	LF-3, LF-4 LF-25	LTM	50
2004	LF-3, LF-4 LF-25	LTM	50
2005	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		SI	1,755
		TOTAL	1,805
2006	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		RI	400
		TOTAL	450
2007	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		FS	375
		TOTAL	425
2008	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		RD	250
		TOTAL	300
2009	MELROSE RANGE	RA-C	5,000
2010	MELROSE RANGE	PCO-C	50
2011	MELROSE RANGE	PCO-C	50

CANNON AFB ERP SUMMARY SCHEDULE

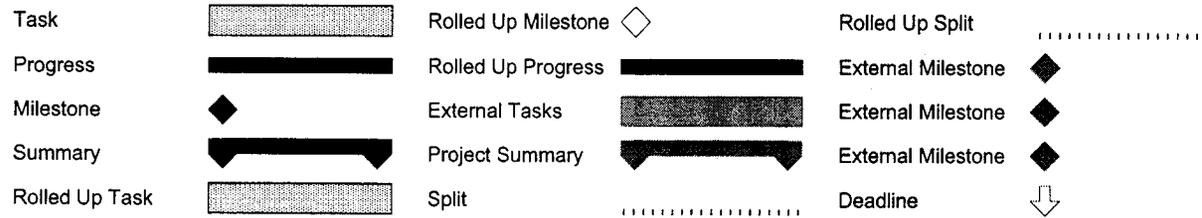
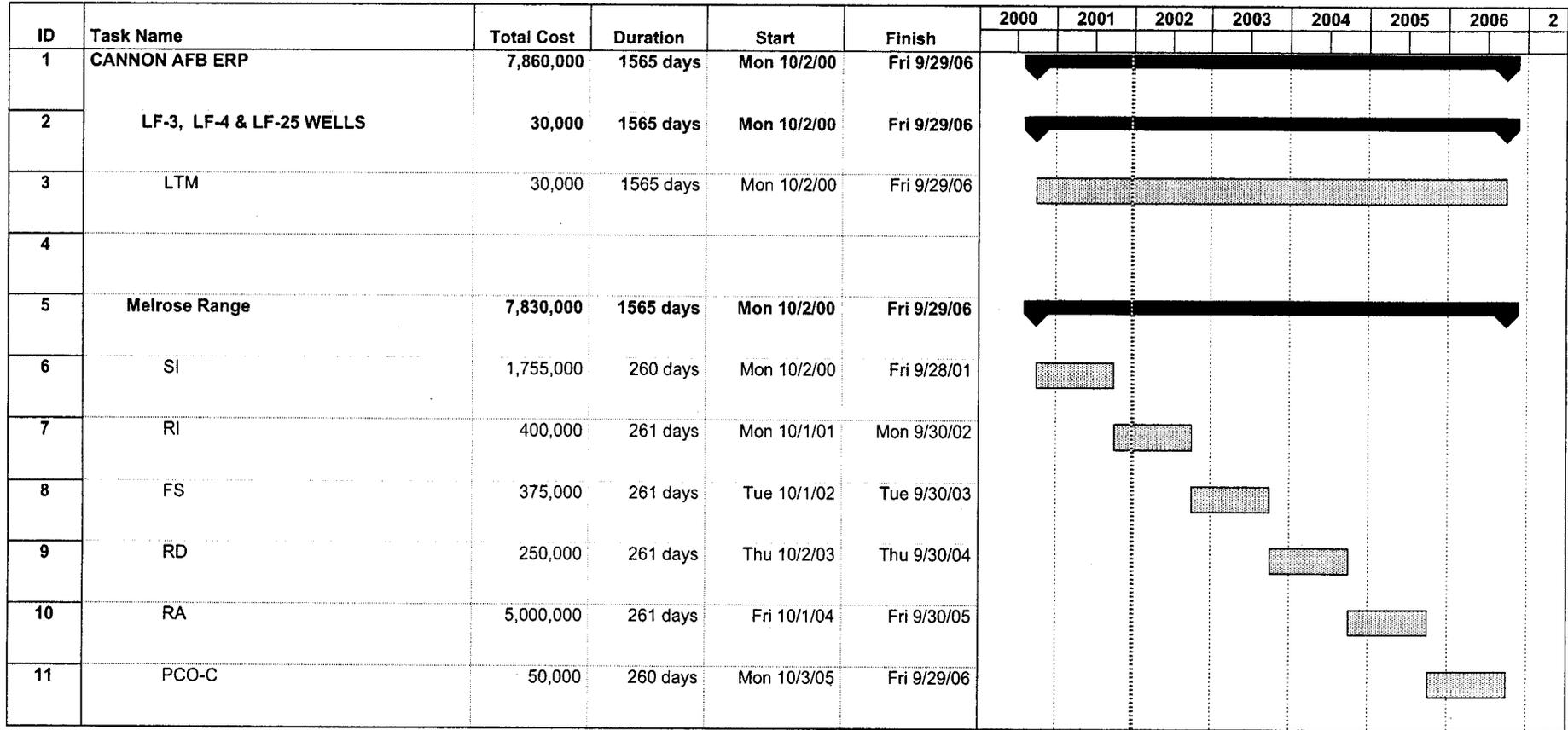


Figure 4-1 Projected Schedule for Cannon AFB ERP

5. TECHNICAL AND OTHER ISSUES TO BE RESOLVED

This chapter summarizes key technical and administrative issues to be resolved by the Cannon AFB Project Team and presents action items and strategies for resolving those issues. Specific issues include data quality; data integration and management; conceptual models/data gaps; natural (background) levels of elements and compounds in soil, groundwater, surface water, and sediments; risk assessment protocols; future land use designation; cleanup levels; relative risk evaluation; and contracting strategies.

5.1 DATA QUALITY

Since 1994, contracts for environmental restoration work awarded by the Corps of Engineers-Omaha District have required contractors to supply ERPIMS-formatted data as part of the project deliverable. Before ERPIMS-formatted data were required, the Cannon AFB ERP office received printed documents, with the data delivered electronically in word processing formats on 3 ½-in. floppy disks. Although the data generated during the RFI were collected following standard Data Management Plans and Quality Control Plans, some historical data were not loaded into the ERPIMS or were not delivered to Cannon AFB in the required electronic format. Therefore, not all of the historical data is included in the ERPIMS.

5.2 DATA INTEGRATION AND MANAGEMENT

This section summarizes issues to be resolved for managing the information gathered and used in the Cannon AFB environmental restoration and compliance programs.

5.2.1 Project Team Action Items

The following actions will help ensure that an effective information management program is in place for the Base environmental restoration programs.

- Improve access to and management of environmental restoration data generated at Cannon AFB.
- Improve data analysis capabilities and ensure that the Base has the tools necessary for information management (such as computer hardware and software) that will expedite the information management process. Cannon AFB has acquired a Geographic Information System (GIS) that will assist the restoration program in evaluating and managing base property.
- Cannon's GIS is used jointly by Real Property, Community Planners, and CEVR in evaluating and managing real property.

5.2.2 Rationale

As the number of agencies and contractors involved with the environmental restoration work at Cannon AFB increases, it is important that all parties involved with remedial projects share data for decision-making. The establishment and maintenance of an electronic data base that contains sampling, analytical, and non-ERP (e.g., topographic and site condition maps) data will provide the ability for all parties to access and share generated data.

5.2.3 Status/Strategy

As discussed in Appendix E1, Cannon AFB has been actively collecting restoration and restoration-related data since 1983 and has completed the development of an Environmental Data Management and Decision Support (EDMDS) application (Radian, 1995). The purpose of the EDMDS application is to assemble relevant environmental data from all existing sources into one reporting product. The following data sources were used to develop the EDMDS application:

- Digital Line Graph and Digital Elevation Model files and topographic quadrangles from the U.S. Geological Survey
- Electronic format CAD drawings and the C-1, D-1, G-1, G-6, and G-8 Tabs from the BCP
- Hard copy drawings of the C-1, C-1.4, D-1, D-6, G-1, G-2, G-3, G-5, G-8, M-3, and the "Master Plan Location Plan, Oil/Water Separator and Lift Stations" also from the BCP
- The 1993 Cannon MAP prepared by Radian Corporation and other source documents referenced in the MAP, including the 1983 IRP Phase I Records Search prepared by CH2M Hill
- A comprehensive environmental records search performed in accordance with American Society for Testing and Materials guidelines
- Historical aerial photographs of Cannon AFB from 1951 to 1994 (Radian, 1995)

Data gaps exist in EDMDS, including analytical data from historical and ongoing site investigations and environmental information on natural and cultural resources at Cannon AFB. Analytical data from historical and ongoing investigations not loaded into ERPIMS are unavailable to EDMDS. As manpower allows, Cannon AFB will load all appropriate analytical data into ERPIMS by accomplishing the following:

- Establishing priorities and deadlines for loading historical data and modify existing contracts to do the actual data preparation and loading.
- Making necessary contract modifications to ensure that data from ongoing efforts are submitted electronically in accordance with the *ERPIMS '98 Data Loading Handbook* (USAF, 1997).
- Establishing standard procedures for reviewing electronic data submitted by contractors. Preliminary procedures that would be implemented for proper electronic data review include:

- Review of the ERPIMS data quality reports within two weeks of submission by the Cannon AFB RPM, Technical Project Manager, and contractor.
- Review of trends in contamination versus time for key contaminants within one month of receipt of the electronic submission.
- Use of data analysis tools to rapidly create, maintain, and document conceptual models that illustrate target areas, sources, pathways, and receptors within one month of receipt of the electronic submission.

As the ERPIMS data loading tasks are completed, the information will be made available to the EDMDS application. As more is learned about the natural and cultural resources at Cannon AFB, this information will be made available to the EDMDS application as well.

5.3 CONCEPTUAL MODELS/DATA GAPS

This section summarizes unresolved issues pertaining to the development of conceptual models for ERP/SWMU sites requiring additional investigations and/or corrective action; the determination of data needs; and the collection of data needed to complete the Cannon AFB environmental restoration program. Currently, there are a few data gaps because EPA did not accept the historical data. Acceptable data for the evaluation of each site at the Base are being generated, as required by the RCRA Part B permit.

5.3.1 Project Team Action Items

The Cannon AFB Project Team will continue to perform the following actions to develop any additional conceptual models and ensure that data gaps are identified and filled as needed to complete the Cannon AFB environmental restoration program.

- Evaluate data submitted for each ERP/SWMU site at Cannon AFB to identify data gaps.
- Reach a consensus on field sampling or other efforts needed to fill data gaps, if necessary.
- Review all work plans submitted for approval prior to each phase of the investigation and remediation process so that data gaps resulting from deficiencies in the project scopes of work can be prevented.

5.3.2 Rationale

The effective identification and resolution of data gaps will accelerate the completion of RFI efforts and the development of conceptual site models (CSMs) for risk assessment. These CSMs were developed for the *Rational National Standards Initiative, Air Combat Command, Pathways, Parameters, and Equations Report* (Radian, 1995), and are presented in the separate MAP 100 SI volume. The CSMs contain information pertaining to the waste sources, contaminants, migration pathways, and natural receptors at each site and provide a conceptual understanding of the site so that potential risks to human health and the environment can be evaluated. Risk-based cleanup levels and potential remedial technologies can be selected and evaluated by identifying the following:

- Known and suspected sources of contamination,
- Types of contaminants,
- Affected media,
- Known and potential routes of migration,
- Known or potential human and environmental receptors,
- Locations where sampling is needed, and
- ARARs.

As data gaps are filled and the objectives of the RFI are met, areas with no suspected contamination and target areas for further investigation and/or remediation can be defined and the CSMs can be updated.

5.3.3 Status/Strategy

The status and strategies for identifying and filling data gaps are as follows:

- The Project Team reviews all draft documents, including work plans, RFI documents, and subsequent investigative data documents, to ensure that data gaps do not exist. If data gaps are identified, action can be taken to rectify problems before documents become final.
- The Project Team meets, when necessary, with federal and state regulators to reach a consensus on a Scope of Work (SOW) to fill any data gaps identified during the current ERP/ RCAP investigation process.

5.4 BACKGROUND LEVELS

This section summarizes issues regarding the determination of background (natural) concentrations of elements and compounds that occur naturally in the Cannon AFB environment.

5.4.1 Project Team Action Items

ERP work conducted before the issuance of the RCRA Part B permit determined the background concentrations of elements in the Base's environment that will be used in Baseline Risk Assessment computations (as required for Cannon AFB environmental restoration). Some background levels, however, exceed the state and federal maximum contaminant levels (MCLs).

5.4.2 Rationale

Background concentration values of elements in soil, groundwater, surface water, and sediments must be determined before risk assessments can be conducted. The values must represent what is *naturally* occurring, and EPA and state regulators must concur with the value determinations.

5.4.3 Status/Strategies

The following status and strategies are used to determine background concentration values.

- Background concentrations have been determined as a result of historical ERP investigations. Cannon AFB has developed a document titled *Concentrations of Naturally Occurring Chemical Constituents in Soil and Groundwater at Cannon AFB, Clovis, New Mexico* (March 1994). An additional background study was carried out in 1997 producing a document titled *Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon AFB, New Mexico* (Sept 1997, Woodward Clyde, Inc.). These documents are used when assessing the levels of naturally occurring elements at any given site on Cannon AFB.

5.5 RISK ASSESSMENT PROTOCOLS, FUTURE LAND USE, AND CLEANUP STANDARDS

Details can be found in the MAP RNSI Volume on current efforts at Cannon AFB to establish new policies for completing risk assessment; ensuring that future land use projections are accurate, implemented, and maintained; and establishing appropriate cleanup goals for remediation. The Air Force RNSI plays a significant role in combining these factors for development of satisfactory basewide and site-specific environmental restoration plans and policies.

5.6 RELATIVE RISK EVALUATION

In FY 1994, the Relative Risk Site Evaluation (RRSE) replaced the Defense Priority Model as a method for evaluating and prioritizing sites. This hazard ranking method was introduced as DoD policy in the Management Guidance for Execution of FY94/95 and Development of FY 1996 Defense Environmental Restoration Program. The RRSE concept, in conjunction with information contained in regulatory agreements, is used to determine the general sequence in which active hazardous and petroleum waste ERP sites and AOCs are addressed. The RRSE is not a substitute for a BRA; it is used to ensure that sites with higher risk (relative to other sites and AOCs) are generally considered first in the priority-setting process. The sequencing of sites and AOCs is reviewed on an annual basis.

During an RRSE, available information is used to categorize ERP sites and AOCs into high, medium, and low relative risk groups, based on an evaluation of the contaminants, migration pathways, and receptors associated with groundwater, surface water/sediment, and surface soil at a site or an AOC. A "high" risk category means that contaminants are present, migration pathways are complete and there is a current or future threat to receptors. A "medium" risk category means that contaminants are present, pathways are complete, but there is no threat to receptors for 5 to 10 years. A "low" risk category is when contaminants are present and/or of a low hazard, migration pathways are incomplete, and not receptors are threatened currently or in the future. Sites or AOCs with insufficient information are assigned a "Not Evaluated" designation until information is available. Community representatives and other interested parties are encouraged to provide input to Cannon AFB for the RRSE.

5.7 CONTRACTING STRATEGY

The following initiatives will be considered by the Project Team for expediting response actions at the Base:

- **Target Source Areas:** Target source areas for early RAs.
- **Identify ARARs:** Early in the project, develop a list of ARARs by obtaining lists of ARARs from the state and other agencies and examine the Records of Decision (RODs) for similar sites in the same state to identify which ARARs are likely to apply.
- **Risk-Based Cleanup:** Pursue negotiation with the regulators to agree on risk-based cleanup levels based on future land usage.
- **Single Regulatory Source:** Put all RAs/corrective actions at the Base/facility under one regulatory authority for threshold decisions (RCRA or CERCLA).
- **RCRA Permit:** Pursue modification of the RCRA permit to allow adequate time for obtaining required funding and contracting the work to be done.
- **Agreements:** Make use of Interagency Agreements, and Defense and State Memoranda of Agreement, as appropriate, to implement agreements and expedite cleanup.
- **Document Review:** Negotiate terms with the regulatory reviewers to streamline the review process by agreeing to a definitive time cycle (such as 12 months) from the submittal of a draft Corrective Measure Study to concurrence of the Corrective Measure Implementation.
- **Concurrent Review:** Develop a complete list of reviewers early and pursue parallel review tracks to eliminate delays.
- **Team Approach:** Build a strong team consisting of the Base, Major Command, and service agent RPMs, contractors, and state and federal regulatory personnel that has the authority, responsibility, and accountability for implementing innovative solutions to remediate and close sites in a timely, cost-effective manner.
- **Joint Preparation:** Expedite the document preparation and review/approval process by forming a working team with EPA and the state when preparing required documents such as DDs and HSWA permit modifications.
- **Community Involvement:** Involve the community during the remedial process to encourage support at the time of site closure. By informing the community during the process, the likelihood of opposing comments during the public comment period would be lessened.
- **Generic Procedures:** Develop generic procedures and SOWs for common problems or common types of contaminated sites (such as fuel contamination in soil). The procedures should be flexible enough for site-specific modifications to be made.

- **Innovative Contracting:** Maximize flexibility of contracting procedures; investigate use of level-of-effort, direct-cost reimbursement, and award incentives; and utilize other flexible contracting methods.
- **Single Contract:** Utilize a single contract throughout the entire process or, if separate contracts, maintain the same Architecture-Engineering contractor throughout the RI/Feasibility Study process.
- **Innovative Technologies:** Pursue collaborative projects using innovative technologies being researched at AFCEE and the Air Force Civil Engineering Service Agency or those suggested by the contractor.

APPENDIX A

**INSTALLATION ENVIRONMENTAL RESTORATION
DELIVERABLES**

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TABLE A-1

CANNON AFB TECHNICAL DOCUMENTS/DATA LOADING SUMMARY

**Management Action Plan
Cannon AFB, New Mexico**

Date*	Project Title	Sites	Contractor	ERPIMS Status
1983	Records Search	LF-1, FT-2, LF-2, LF-3, LF-4, LF-5, FT-6, FT-8, FT-9, OT-10, SD-11, SD-12, SD-13, DP-16, SD-17, SS-18, SS-19	CH2M Hill	No loading required
1986	IRP Phase II Confirmation/ Quantification Stage I	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, FT-9, SD-11, SD-12, SD-13, SD-15, DP-16, SD-17, SS-18	Radian Corporation	Loading complete
1987	Preliminary Review/VSI Report RCRA Facility Assessment	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, FT-9, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, SD-21, SD-22, OP-25	A.T. Kearney	Loading complete
1990	Remedial Investigation	FT-9, SD-11, SD-12, SD-20	Walk, Hadel, and Associates, Inc.	Loading complete
1990	Decision Documents	LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, OT-23, OT-24	EA Engineering Science and Technology, Inc.	No loading required
1991	Environmental Assessment	LF-25	USACE, Tulsa District	No loading required
1992	RCRA Facility Investigation	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, PI-7, FT-8, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SD-20, SD-21	Woodward-Clyde Consultants	Loading complete
1992	RFI Work Plan, Appendix II	OT-10, SS-18, SS-19, SD-22, DP-25	Woodward-Clyde Consultants	No loading required
1993	RFI Work Plan, Appendix III	Appendix III SWMUs	Woodward-Clyde Consultants	No loading required
1992	Multi-Sites RI Report	LF-01, LF-02, LF-03, LF-04	Woodward-Clyde Consultants	Loading complete
1992	RI Report for 18 SWMUs	Appendix I SWMUs	Woodward-Clyde Consultants	Loading complete
1993	RFI at Landfill Nos. 1 and 2	LF-01, LF-02	Woodward-Clyde Consultants	Loading complete
1993	Phase I RFI Work Plan	LF-05	Woodward-Clyde Consultants	No loading required
1993	Phase I RFI	Appendix II SWMUs	LRL Sciences	Loading pending
1994	RFI Final Report	LF-03	Radian Corporation	Loading complete

TABLE A-1 (Continued)
CANNON AFB TECHNICAL DOCUMENTS/DATA LOADING SUMMARY

Management Action Plan
Cannon AFB, New Mexico

Date*	Project Title	Sites	Contractor	ERPIMS Status
1994	Phase I RFI Appendix III	Appendix III SWMUs	Woodward-Clyde Consultants	Loading complete
1994	RFI Final Report	LF-04	Radian Corporation	Loading complete
1995	Bioventing Pilot Test Work Plan for SWMU No. 70	Appendix I SWMUs	Parsons Environmental Science	No loading required
1994	Phase II Supplemental RFI Report, Appendix I	SWMU to Oil/Water Separator No. 326	Woodward-Clyde Consultants	Loading complete
1995	RFI Work Plan for SD-11, Phase I SWMU 86-90	SD-11	Woodward-Clyde Consultants	No loading required
1995	Post-Closure Case Plan	LF-05 (6113)	Woodward-Clyde Consultants	No loading required
1995	RFI Work Plan for LF-05	LF-05	Parsons Environmental Science	No loading required
1995	RFI Work Plan for LF-01	LF-01	Woodward-Clyde	No loading required
1997	Phase I RFI Final Report Landfill No. 1-SWMU 74	LF-01 SWMU No. 74	Woodward-Clyde	Loading complete
1997	Final SI Report AOC D	Area of Concern "D"	IMS	Loading pending
1997	Final RFI Report FTA-4	Fire Training area No. 4 SWMUs 109, 110, 111, 112	Harza	Loading pending
1997	Final Annual Summary Report	LTM Landfills 3 and 4 SWMU 105 and 104	Foothills	Loading pending
1998	Final RFI Report Landfill #5	LF-5, SWMU 113	Woodward-Clyde	Loading in progress
1998	Final CMS Workplan SD-11	SD-11 SWMUs 86-90	Woodward-Clyde	No loading required
1998	Final 3 rd Qtr Monitoring Rpt Well "R" Final Semiannual Report Wells N & O	LF-3,4,25 SWMU 105, 104 97	Foothills	Loading pending
1998	Revised Workplan AOCs E, F, G, H, SI	AOC's E, F, G, H	Woodward-Clyde	No loading required
1999	Site Inspection Report for AOCs E, F, G & H	AOC's E, F, G, H	Woodward-Clyde	Loading complete

Notes:

*Date contract began.

Data collected prior to RCRA Facility Assessment is not usable. Data collected subsequently must be validated and loading will be required.

AFB = Air Force Base

RCRA = Resource Conservation and Recovery Act

RI = Remedial Investigation

SWMU = solid waste management unit

ERP = Environmental Resources Program

RFI = RCRA Facility Investigation

SI = Site Investigation

VSI = Visual Site Investigation

TABLE A-2

HISTORICAL DELIVERABLES FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Year	Phase	Project Title	Report No.	Sites Examined	Deliverable Date/ By Whom	AR/IR File #
1983	PA	Records Search	1	LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, OT-10, SD-11, SD-12, SD-13, DP-16, SD-17, SS-18, SS-19, SD-20, WP-21, ST-22, OT-23, OT-24, LF-25, ST-26, ST-27, ST-28, ST-29, ST-30, ST-31, ST-32	1983/CH2M Hill	279
1986	RI	IRP Phase I Confirmation/Quantification Stage I	2	LF-01, FT-02, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, SD-11, SD-12, SD-13, SD-15, DP-16, SD-17, SS-18	1986/Radian Corporation	46-47
1987	RFA	Preliminary Review/VSI Report RCRA Facility Assessment	3	LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, SD-21, SD-22, OP-25	1987/A.T. Kearney	331
1990	RI	Remedial Investigation	4	FT-09, SD-11, SD-12, SD-20	1990/Walk, Hadel, and Associates, Inc.	128-130
1990	DD	Decision Documents	5	LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, OT-23, OT-24	1990/EA Engineering Science and Technology, Inc.	106-108, 247-269
1991	EA	Environmental Assessment	6	LF-25	USACE, Tulsa District	294

TABLE A-2 (Continued)

HISTORICAL DELIVERABLES FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Year	Phase	Project Title	Report No.	Sites Examined	Deliverable Date/ By Whom	AR/IR File #
1991	RFI	RCRA Facility Investigation	7	LF-05, FT-06, FT-07, FT-08, SD-11, WP-14, SD-15, DP-16, SD-17	Woodward-Clyde Consultants	
1992	RFI	RFI Work Plan Appendix II	8	OT-10, SS-18, SS-19, SD-22, DP-25	Woodward-Clyde Consultants	204
1992	RFI	RFI Work Plan Appendix III	9	Appendix III SWMUs (SD-11, LF-25, AOC A, AOC B, and AOC C)	Woodward-Clyde Consultants	205
1992	RI	RI Multi-Sites	10	LF-01, LF-02, LF-03, LF-04	Woodward-Clyde Consultants	158-160
1992	RI	Remedial Investigation Report for 18 SWMUs	11	Appendix I SWMUs (LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SD-20, SD-21)	Woodward-Clyde Consultants	235-240
1993	RFI	RFI at Landfills Nos. 1 and 2	12	LF-01, LF-02	Woodward-Clyde Consultants	210-212
1993	RFI	Phase I RFI Work Plan	13	LF-25	Woodward-Clyde Consultants	403-404
1993	RFI	Phase I RFI	14	Appendix II SWMUs (ST-26, ST-27, ST-28, ST-29, ST-30, ST-31, ST-32)	LRL Sciences	410-415
1994	RFI	RFI Final Report	15	LF-03	Radian Corporation	419-420
1994	RFI	Phase I RFI Appendix III	16	Appendix II SWMUs (SD-11, LF-25, AOC A, AOC B, AOC C)	Woodward-Clyde Consultants	

TABLE A-2 (Continued)

HISTORICAL DELIVERABLES FOR CANNON AFB

Management Action Plan
Cannon AFB, New Mexico

Year	Phase	Project Title	Report No.	Sites Examined	Deliverable Date/ By Whom	AR/IR File #
1994	RFI	RFI Final Report	17	LF-04	Radian Corporation	424-425
1994	CMS/I RA	Bioventing Pilot Test Work Plan for SWMU 70	18	SWMU 70	Parsons Environmental Science	
1995	RFI	Phase II Supplemental RFI Report, Appendix I	19	Appendix I SWMUs	Woodward-Clyde Consultants	456
1995	RFI	Final RFI Work Plan for SD-11 Phase I, SWMUs 86-90	20	SD-11	Woodward-Clyde Consultants	487
1995	RFI	Draft RFI Work Plan for LF-05	21	LF-05	Woodward-Clyde Consultants	481-482
1995	CMI	Post-Closure Care Plan, LF-05 (Cell 3)	22	LF-05	Parsons Environmental Science	497
1995	RFI	Draft RFI Phase II (Still w/NMED), LF-3, 4 wells	23	LF-03	Woodward-Clyde	
1997	RFI	Phase I RFI Landfill No 1	24	LF-01, SWMU 104	Woodward-Clyde	483-491
1997	SI	Final SI Report AOC "D"	25	Area of Concern "D"	IMS	371
1997	RFI	RFI Report FTA-4 SWMU	26	Fire Training Area No 4 FTA-4	Harza	351
1997	LTM	Final Annual Summary Report 1996	27	LF-3,4 SWMUs 105&104	Foothills	375
1998	RFI	Final RFI Report Landfill No. 5	28	LF-5, SWMU 113	Woodward-Clyde	547
1998	CMS	Final CMS Workplan Site SD-11	29	SWMUs 86-90	Woodward-Clyde	544

TABLE A-2 (Continued)

HISTORICAL DELIVERABLES FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Year	Phase	Project Title	Report No.	Sites Examined	Deliverable Date/ By Whom	AR/IR File #
1998	LTM	Final Third Qtr Monitoring Report Well "R" Final Semiannual Monitoring Report Wells N and O	30	LF 3, 4, 25	Foothills	398
1998	SI	CERCLA SITE-INSPECTION WORKPLAN, AOC E, F, G, H	31	AOCs E, F, G, H	Woodward-Clyde	399
1999	SI	Site Inspection Report for AOCs E, F, G & H	32	AOCs E, F, G, H	URS Greiner/ Woodward Clyde	543

Notes:

AOC = Area Of Concern

CMS = Corrective Measures Study

EA = Environmental Assessment

ERP = Environmental Resources Program

RCRA = Resource Conservation and Recovery Act

RFI = RCRA Facility Investigation

SWMU = Solid Waste Management Unit

VSI = Visual Site Investigation

CMI = Corrective Measures Implementation

DD = Decision Document

IRA = Interim Remedial Action

PA = Preliminary Assessment

RFA = RCRA Facility Assessment

RI = Remedial Investigation

USACE = U.S. Army Corps of Engineers

TABLE A-3

HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site Number	RFA/PA/SI /EA	RFI/CMS RI/FS	CMD/CMI RD/RA	IRA	NFRAP	LTM/RA-O	Comments
LF-01	1,2,3	7,10,12,19,23					
LF-02	1,2,3	7,10,12,19					
LF-03	1,2,3	7,10,15,19					
LF-04	1,2,3	7,10,17,19					
LF-05	1,2,3	8,10,13,19,22	21				
FT-06	1,2,3	8,10,19					
FT-07	1,2,3	8,10,19					
FT-08	1,2,3	8,10,19					
OT-10	1,3	9,					
SD-11	1,2,3	4,8,10,11, 16,19					
SD-12	1,2,3	4,10,19,20					
SD-13	1,2,3	10,19					
WP-14	1,3	8,10,19					
SD-15	1,2,3	8,10,19					
DP-16	1,2,3	8,10,19					

TABLE A-3 (Continued)

HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site Number	RFA/PA/SI /EA	RFI/CMS RI/FS	CMD/CMIRD/RA	IRA	NFRAP	LTM/RA-O	Comments
SD-17	1,2,3	8,10,19					
SS-18	1,2,3	9,					
SS-19	1,3	9,					
SS-20	1,3	4,10,19					
LF-25	1,3,6	9,11,16,					
ST-26	1,3	14,					
ST-27	1,3	14,					
DP-33							
FTA-4	1,2,3,5	10,26					
SD-17	1,2,3	8,10,19					
SS-18	1,2,3	9					
SS-19	1,3	9					
SS-20	1,3	4,10,19					
LF-25	1,3,6	9,11,16				30	
ST-26	1,3	14					
ST-27	1,3	14					
DP-33							

TABLE A-3 (Continued)

HISTORICAL DELIVERABLES ORGANIZED BY SITE/AOC FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site Number	RFA/PA/SI /EA	RFI/CMS RI/FS	CMD/CMI RD/RA	IRA	NFRAP	LTM/RA-O	Comments
AOC A		11,16					
AOC B		11,16					
AOC C		11,16					
AOC D	25						
AOC 36							
AOC E	31,32						
AOC F	31,32						
AOC G, H	31,32						

Notes:

CMI = Corrective Measures Implementation

EA = Environmental Assessment

LTM = Long-Term Monitoring

PA = Preliminary Assessment

RCRA = Resource Conservation and Recovery Act

RFI = RCRA Facility Investigation

USACE = U.S. Army Corps of Engineers

CMS = Corrective Measures Study

FS = Feasibility Study

LTO = Long-Term Operation

RA = Remedial Action

RD = Remedial Design

RI = Remedial Investigation

CMD = Corrective Measures Design

ICA = Interim Corrective Action

NFRAP = No Further Remedial Action Planned

RA-O = Remedial Action-Construction

RFA = RCRA Facility Assessment

SI = Site Inspection

APPENDIX B

SUMMARIES FOR CLEANUP

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B-1 RECORDS OF DECISION AND DECISION DOCUMENTS FOR REMEDIAL RESPONSE ACTIONSB-1

This appendix provides a summary of remedy selection records*, including Decision Documents (DDs) in which the selection of remedial actions are described. These summaries list those sites requiring remediation, and include the name of the signed DD for non-NPL sites.

TABLE B-1

**RECORDS OF DECISION AND DECISION DOCUMENTS
FOR REMEDIAL RESPONSE ACTIONS***

**Management Action Plan
Cannon AFB, New Mexico**

AFRIMS Site ID	Site Name	Selected Alternative	Date Written	Date Signed	State Concurrence (yes or no)

*Decision Documents are not recognized by NMED and are not used by any of the sites at Cannon, therefore none are listed. This table is provided for MAP format consistency only.

APPENDIX C

NO FURTHER RESPONSE ACTION PLANNED (NFRAP)

SUMMARIES

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C-1 NO FURTHER RESPONSE ACTIONS PLANNED DOCUMENT STATUS.....C-2

This appendix provides the No Further Response Action Planned (NFRAP) Decision Document (DD) summaries indexed by site or operation unit (OU), as appropriate. NFRAP decisions will include those made after the Preliminary Assessment (PA), where no contamination was found; the Site Investigation (SI), where the contaminant concentrations did not exceed Applicable or Relevant and Appropriate Requirements (ARARs); the Remedial Investigation/ Feasibility Study (RI/FS), where the levels of contamination did not pose risk to human health or the environment; the Remedial Action (RA), where removal, treatment, containment, or other appropriate method was determined to be satisfactory; and long- term maintenance (LTM), where monitoring has confirmed that there is no longer a threat to human health or the environment from contamination left in place.

TABLE C-1

NO FURTHER RESPONSE ACTIONS PLANNED DOCUMENT STATUS*

**Management Action Plan
Cannon AFB, New Mexico**

AFRIMS Site ID	Site Name	Date Written	Date Signed	State Concurrence (yes or no)

*Note: NMED does not recognize NFRAP documents and none are used at Cannon. This table is provided for MAPs consistency only.

APPENDIX D1

**FISCAL YEAR FUNDING REQUIREMENTS/COSTS
AND SITE DESCRIPTIONS**

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D1-1 INTRODUCTION

This appendix to the Cannon AFB MAP estimates the time and cost necessary to complete the ERP and restoration-related compliance work at the Base. Information and estimates presented on costs, schedules, investigations, and RAs do not necessarily represent those that have been or will be approved by the USAF and/or state and federal regulatory agencies. It was necessary to make certain assumptions and interpretations to develop the estimates. As additional information is made available, estimates could be dramatically altered. This would then be reflected in future updates to the MAP.

The estimated future funding requirements (current, fiscal year, and beyond) for the ERP at Cannon AFB are summarized by fiscal year in Table D1-1. These future cost estimates are also summarized by phase starting with the current fiscal year and are presented in Table D1-2.

TABLE D1-1*

ESTIMATED FISCAL YEAR COST SUMMARY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)**

Risk	Site ID	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16+	Total
NR	LF003	11	10	10	10	10	10	10	0	0	0	0	0	0	0	0	71
NR	LF004	11	10	10	10	10	10	10	0	0	0	0	0	0	0	0	71
NR	LF025	22	30	30	30	30	30	30	0	0	0	0	0	0	0	0	202
	RAB, Mgt, Mpr	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
	Totals	117	50	50	50	50	50	50	0	417							

**Melrose Range, New Mexico
(in thousands of dollars)**

Risk	Site ID	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16+	Total
NR	AOC A	0	0	0	1755	400	375	250	5000	50	50	0	0	0	0	0	7880
	RAB, Mgt, Mpr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals	0	0	0	1755	400	375	250	5000	50	50	0	0	0	0	0	7880

Notes:

*As of 10/20/01

TABLE D1-2

COST SUMMARY BY PHASE FOR CANNON AFB ERP SITES

Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)

Fiscal Year	PA	PA/SI	SI	PCO-S	RI	RI/FS	FS	RD	PCO-C	IRA-C	RA-AOC	RA-C	IRA-O	RA-O	LTM	MGT	MPR	RAB	ROD/DD	UXO-RA	Total
FY02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	6	66	1	0	0	117
FY03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
FY04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
FY05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
FY06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
FY07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
FY08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	50
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	344	6	66	1	-	-	417

Melrose Range, New Mexico
(in thousands of dollars)

Fiscal Year	PA	PA/SI	SI	PCO-S	RI	RI/FS	FS	RD	PCO-C	IRA-C	RA-AOC	RA-C	IRA-O	RA-O	LTM	MGT	MPR	RAB	ROD/DD	UXO-RA	Total
FY05	0	0	0	0	0	0	0	0	0	0	1755	0	0	0	0	0	0	0	0	0	1755
FY06	0	0	0	0	0	0	0	0	0	0	400	0	0	0	0	0	0	0	0	0	400
FY07	0	0	0	0	0	0	0	0	0	0	375	0	0	0	0	0	0	0	0	0	375
FY08	0	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	0	0	0	0	250
FY09	0	0	0	0	0	0	0	0	0	0	5000	0	0	0	0	0	0	0	0	0	5000
FY10	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	50
FY11	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	50
Total	-	-	-	-	-	-	-	-	-	-	7,880	-	-	-	-	-	-	-	-	-	7,880

TABLE D1-3

PAST FUNDING COST SUMMARY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)**

Fiscal Year	FS	FUD	IRA-C	IRA-O	LTM	MGT	MPR	OHW	PA	PA/SI	PRP	RAB	RA-C	RA-O	RD	RI	RI/FS	SI	Total	
FY84	0	0	0	0	0	0	0	0	387	0	0	0	0	0	0	0	0	0	0	387
FY86	248	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	248
FY87	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	727	0	0	0	754
FY88	28	0	0	0	0	0	0	0	0	0	0	0	177	0	0	0	0	0	0	205
FY89	0	0	0	0	0	0	0	0	0	0	0	0	357	0	0	0	0	0	0	357
FY90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FY91	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	1242	0	123	1398	
FY92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3652	0	0	3652	
FY93	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	1377	0	0	1407	
FY94	0	0	298	0	180	0	0	0	0	0	0	0	0	0	0	19	0	0	497	
FY95	0	0	0	0	0	0	0	0	172	0	0	0	0	0	0	155	0	0	327	
FY96	0	0	0	0	184	0	0	0	0	0	0	0	0	0	0	0	0	0	184	
FY97	0	0	0	0	271	2	55	0	0	412	0	0	0	0	0	0	0	0	740	
FY98	182	0	0	0	45	5	39	0	0	0	0	0	0	0	0	0	0	0	271	
FY99	0	0	0	0	51	4	60	0	0	0	0	0	0	0	0	0	0	0	115	
FY00	0	0	1290	0	49	2	63	0	0	0	0	1	0	0	0	0	0	0	1405	
FY01	0	0	0	0	93	5	47	0	0	0	0	0	0	0	0	0	0	0	145	
Total	485	0	1588	0	906	18	264	0	589	412	0	1	534	0	0	7172	0	123	12092	

TABLE D1-4

COST SUMMARY BY PHASE FOR CANNON AFB ERP SITES THROUGH FY 01

**Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)**

Site ID	PA	PA/SI	SI	RI	RI/FS	FS	RA-C	RA-O	RD	IRA-C	IRA-O	FUD	LTM	MGT	MPR	OHW	PRP	RAB	Total
Not Site Specific	417	0	0	2852	0	0	191	0	0	298	0	0	33	18	264	0	0	1	4074
LF001	172	0	0	55	0	0	0	0	0	0	0	0	13	0	0	0	0	0	240
LF002	0	0	0	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
LF003	0	0	0	58	0	0	0	0	0	0	0	0	241	0	0	0	0	0	299
LF004	0	0	0	58	0	0	0	0	0	0	0	0	313	0	0	0	0	0	371
LF005	0	0	0	1472	0	25	343	0	0	0	0	0	9	0	0	0	0	0	1849
FT006	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
FT007	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
FT008	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
SD011	0	0	0	351	0	183	0	0	0	0	0	0	0	0	0	0	0	0	534
SD012	0	0	0	55	0	1	0	0	0	0	0	0	0	0	0	0	0	0	56
SD013	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55
WP014	0	0	0	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138
SD015	0	0	0	138	0	20	0	0	0	0	0	0	0	0	0	0	0	0	158
DP016	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
SD017	0	0	0	138	0	255	0	0	0	0	0	0	0	0	0	0	0	0	393
SS018	0	0	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	123
SD020	0	0	0	141	0	1	0	0	0	0	0	0	0	0	0	0	0	0	142
LF025	0	0	0	819	0	0	0	0	0	1290	0	0	297	0	0	0	0	0	2406
SD034	0	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
DP035	0	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
LF036	0	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
LF037	0	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103
Total	589	412	123	7172	0	485	534	0	0	1588	0	0	906	18	264	0	0	1	12092

TABLE D1-5

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF001	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
LF001	1995	CZQZ19957001	PA/SI AOC D	\$ 171,899.00
LF001	1997	CZQZ19977006	LTM LF01 LF03 LF04 LF25	\$ 3,800.00
LF001	1998	CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	\$ 9,034.60

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF002	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
LF002	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF003	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
LF003	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00
LF003	1994	CZQZ19947001	LTM MULTI SITES (LF3,4,25)	\$ 60,391.33
LF003	1996	CZQZ19967006	LTM LF3, LF4 & LF25	\$ 37,169.00
LF003	1997	CZQZ19967006-1	LTM LF03, LF04 & LF25	\$ 1,645.00
LF003	1997	CZQZ19977006	LTM LF01 LF03 LF04 LF25	\$ 86,910.00
LF003	1998	CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	\$ 9,034.60
LF003	1999	CZQZ19997006	LTM LF-03, LF-04, & LF-25	\$ 17,163.00
LF003	2000	CZQZ20007002	LTM LF-03, LF-04 & LF-25	\$ 12,314.50
LF003	2001	CZQZ20017006	LTM LF-03, LF-04, & LF-25	\$ 17,200.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF004	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
LF004	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00
LF004	1994	CZQZ19947001	LTM MULTI SITES (LF3,4,25)	\$ 60,391.33
LF004	1996	CZQZ19967006	LTM LF3, LF4 & LF25	\$ 37,149.00
LF004	1996	CZQZ19967007	LTM DECISION DOCUMENTS 17 SITES	\$ 72,010.00
LF004	1997	CZQZ19977006	LTM LF01 LF03 LF04 LF25	\$ 86,910.00
LF004	1997	CZQZ19967006-1	LTM LF03, LF04 & LF25	\$ 1,645.00
LF004	1998	CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	\$ 9,034.60
LF004	1999	CZQZ19997006	LTM LF-03, LF-04, & LF-25	\$ 17,163.00
LF004	2000	CZQZ20007002	LTM LF-03, LF-04 & LF-25	\$ 12,314.50
LF004	2001	CZQZ20017006	LTM LF-03, LF-04, & LF-25	\$ 17,200.00

TABLE D1-5 (Continued)
FUNDING HISTORY FOR CANNON AFB ERP SITES
Management Action Plan
Cannon AFB, New Mexico

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF005	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
LF005	1988	CZQZ19885002	INSTALL WELLS AT LF	\$ 25,000.00
LF005	1989	CZQZ19895001	LANDFILL CAP, LF-5	\$ 343,000.00
LF005	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
LF005	1993	CZQZ19927007	RI LF5	\$ 1,278,700.00
LF005	1998	CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	\$ 9,034.60

TABLE D1-5 (Continued)
FUNDING HISTORY FOR CANNON AFB ERP SITES
Management Action Plan
Cannon AFB, New Mexico

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
FT006	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
FT006	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
FT006	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
FT007	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
FT007	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
FT007	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
FT008	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
FT008	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
FT008	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD011	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
SD011	1988	CZQZ19885001	FS FOR MULTIPLE SITES	\$ 1,333.33
SD011	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
SD011	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00
SD011	1995	CZQZ19957103	RI SD-11	\$ 155,196.00
SD011	1998	CZQZ19987003	FS SD-11	\$ 182,491.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD012	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
SD012	1988	CZQZ19885001	FS FOR MULTIPLE SITES	\$ 1,333.33

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated	
SD013	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$	55,015.38

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
WP014	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD015	1987	CZQZ19875001	FS OF AGE DRAINAGE DITCH	\$ 19,500.00
SD015	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
DP016	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
DP016	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
DP016	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD017	1986	CZQZ19865002	RAP, CLEANUP ENT RINSE AREA	\$ 248,300.00
SD017	1987	CZQZ19875003	CLEANUP ENT RINSE AREA(MOD)	\$ 7,400.00
SD017	1987	CZQZ19875002	FS MOD	\$ 12,500.00
SD017	1987	CZQZ19875004	INVESTIGATE MULTI SITES	\$ 55,015.38
SD017	1993	CZQZ19937017	RI SD17	\$ 67,900.00
SD017	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SS018	1991	CZQZ19917005	SI JP4 FUEL SPILL SITE SS-18	\$ 122,600.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD020	1988	CZQZ19885001	FS FOR MULTIPLE SITES	\$ 1,333.33
SD020	1991	CZQZ19917003	RI MULTI SITES	\$ 138,366.67
SD020	1993	CZQZ19937002	RI MULTI-SITES	\$ 3,020.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF025	1992	CZQZ19927004	RI/FS SITE LF-25	\$ 818,800.00
LF025	1994	CZQZ19947001	LTM MULTI SITES (LF3,4,25)	\$ 60,391.33
LF025	1996	CZQZ19967006	LTM LF3, LF4 & LF25	\$ 38,100.00
LF025	1997	CZQZ19967006-1	LTM LF03, LF04 & LF25	\$ 1,645.00
LF025	1997	CZQZ19977006	LTM LF01 LF03 LF04 LF25	\$ 86,910.00
LF025	1998	CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	\$ 9,034.60
LF025	1999	CZQZ19997006	LTM LF-03, LF-04, & LF-25	\$ 17,161.00
LF025	2000	CZQZ20007002	LTM LF-03, LF-04 & LF-25	\$ 24,629.00
LF025	2000	CZQZ20007025	IRA-C LF-25 Asbestos Removal	\$ 1,289,818.00
LF025	2001	CZQZ20017006	LTM LF-03, LF-04, & LF-25	\$ 58,716.00

TABLE D1-5 (Continued)
FUNDING HISTORY FOR CANNON AFB ERP SITES
Management Action Plan
Cannon AFB, New Mexico

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
SD034	1997	CZQZ19967002	PA/SI AOC-E, F,G, and H	\$ 102,919.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
DP035	1997	CZQZ19967002	PA/SI AOC-E, F,G, and H	\$ 102,919.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF036	1997	CZQZ19967002	PA/SI AOC-E, F, G, and H	\$ 102,919.00

TABLE D1-5 (Continued)

FUNDING HISTORY FOR CANNON AFB ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

(Amount Obligated Reflects the Total Cost of the Project)

Site ID	FY	Project No	Project Description	Amount Obligated
LF037	1997	CZQZ19967002	PA/SI AOC-E, F,G, and H	\$ 102,920.00

D1-2 CANNON AFB SITE DESCRIPTIONS

The surface soils at Cannon AFB are unconsolidated alluvium deposits of Pleistocene age. The soils overlie a 25- to 60-ft-thick layer of caliche that is generally encountered 2- to 4-ft bgs. The caliche is underlain by unconsolidated silts, sands, and gravels up to depths of 400 ft bgs. Groundwater occurs at approximately 280 ft bgs and is part of the Ogallala Aquifer. The geology at each site on-base varies only slightly with respect to the thickness of the soil and caliche layers. The land use for the region surrounding the Base is mainly agricultural and is primarily rural.

To the knowledge and belief of Cannon AFB Environmental Management personnel, all active ERP sites meet the requirements of ERA eligibility in accordance with USAF ERA eligibility and programming guidance. All sites fall into one or more of the following eligibility categories:

- Investigations to identify, confirm, and determine the risk to human health and the environment, in addition to FSSs, RA plans and designs, and removal actions or RAs;
- RAs to protect or restore natural resources damaged by contamination from past hazardous waste disposal activities; and
- Responses to releases from in-service tanks discovered during initial integrity testing per 40 CFR 280, where testing was conducted before 22 December 1993.

These field investigations for ERP/SWMU/AOC sites at Cannon AFB have consisted of surface and subsurface soil drilling and sampling, surface and groundwater sample collection, and sediment sampling of the Wastewater Treatment System Lagoons. Samples were analyzed for various chemical parameters based on the history of use for each SWMU. The following analyses were performed depending on the SWMU location of the sample.

- Total organic lead
- PCB/pesticides
- Metals
- Semivolatile organic compounds (SVOCs)
- TPH
- Lead and chromium
- Total organic carbon
- Appendix IX analytes
- Target compound list volatile organic compounds (VOCs)

The laboratory methods followed Contract Laboratory Program (CLP) guidelines or SW-846 methodologies when no CLP methodology existed.

The following are brief descriptions of ERP/SWMU/AOC sites at Cannon AFB. These descriptions have been updated based on the most recent investigation reports and regulatory requirements. Any costs listed in each phase for each site are totals through September 30, 2001 and are extracted from AFRIMS.

D1-2.1 LF-01 LANDFILL NO. 1, APPENDIX I SITE SWMU 74

Landfill No. 1 is an inactive landfill of approximately 4 acres on the golf course in the northwest corner of the Base. The landfill was reportedly operated from 1942 to 1946. It is located on the newly discovered burn pits, which were unearthed when workers were installing sprinkler lines for hole No. 14 in the new section of the golf course. Potential contaminants include spent solvents, oil and grease, paint thinners, herbicides, and pesticides. A soil boring drilled during the ERP Phase II study encountered debris both in the topsoil and in the subsurface at 22 ft.

Five borings were drilled during the ERP Phase II study in what was believed to be the landfill. The 15 soil samples collected from the borings were analyzed for priority pollutant metals, VOCs, and oil and grease. Elevated levels of oil and grease (from 100 to 850 mg/kg) were detected in samples from two of the boreholes, and slightly elevated selenium concentrations of 2.1 to 2.7 mg/kg were detected in the samples collected from one borehole. Background concentrations of selenium vary from 0.61 to 0.68 mg/kg. This site was investigated during the Appendix I, Phase I RFI investigation by Woodward-Clyde Consultants and funding left over from that investigation was used to investigate the area around the newly discovered burn pits. This site was found to be clean and was recommended for NFA. A Class 3 Permit Modification was submitted in Sept 2000 to remove the site from the permit.

D1-2.2 LF-02 LANDFILL NO. 2, APPENDIX I SITE SWMU 82

Landfill No. 2 was a cut and burn landfill covering approximately 4 acres that was active from 1946 to 1947 and 1951 to 1959. The landfill received domestic and industrial waste including solvents, paint, thinners, waste oils, and peroxide containers. The landfill is on the far northeast corner of the installation boundary. The area is marked by a slightly hummocky ground surface and is covered with prairie grasses. There is no evidence of stressed vegetation.

Four borings were drilled to a depth of 10 ft and one boring was drilled to 53.5 ft during the ERP Phase II study conducted during 1994. The 11 soil samples collected from the borings were analyzed for priority pollutant metals, VOCs, and oil and grease. No contaminants were detected above background levels in the samples. This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the location under the Appendix I, Phase II investigation. The site was submitted for NFA and removal from the RCRA permit in 2000.

D1-2.3 LF-03 LANDFILL NO. 3, APPENDIX I SITE SWMU 105

Landfill No. 3 is an inactive cut and burn landfill that was in operation from 1959 to 1967. The 9-acre landfill is on the eastern boundary of the Base. The ground surface is slightly hummocky and is covered with prairie grasses. The landfill received domestic and industrial wastes including solvents, paint, thinners, waste oils, and peroxide containers. There is no evidence of stressed vegetation.

A total of 27 soil samples were collected from 9 soil borings placed in the landfill during the ERP Phase II study. The samples were analyzed for priority pollutant metals (total); total iron, nickel, and zinc; oil and grease; and VOCs. No VOCs were detected, and metal concentrations were within the range of background values. Oil and grease values varied from <10 to 83 mg/kg.

This site was also investigated along with Landfill No. 4 during the Appendix I, Phase I study by Radian. This Phase I RFI report also recommended NFA; however, EPA Region VI wanted boundary markers and one downgradient monitoring well installed. The boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A downgradient monitoring well (MW-0) was installed under project CZQZ 94-7001 in October 1994 and a long-term monitoring program was established. No significant contamination was found. This site was included in a Sept 2000 Class 3 Permit Modification Request for removal from the permit.

D1-2.4 LF-04 LANDFILL NO. 4, APPENDIX I SITE, SWMU 104

Landfill No. 4 is an inactive 7-acre cut and burn landfill that was operated from 1967 to 1968. The landfill is immediately north of Playa Lake on the eastern boundary of the Base. The landfill received domestic and industrial wastes including solvents, paint, thinners, waste oils, and peroxide containers. The area is covered with prairie grasses. There is no sign of stressed vegetation.

A total of 21 soil samples were collected from 7 soil borings placed within the landfill during the ERP Phase II study. The samples were analyzed for priority pollutant metals, oil and grease, and VOCs. No VOCs were detected, and the metal concentrations were within the range of background values. Oil and grease was detected in quantities between 18 and 45 mg/kg.

This site was also investigated along with Landfill No. 3 during the Appendix I, Phase I study by Radian. The Phase I RFI report also recommended NFA; however, EPA Region VI wanted boundary markers and one downgradient monitoring well installed. The boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A downgradient monitoring well (MW-N) was installed under project CZQZ 94-7001 in December 1994 and a long-term monitoring program established. A Class 3 Permit Modification Request for removal of this site from the permit was submitted in Sept 2000.

D1-2.5 LF-05 LANDFILL NO. 5, APPENDIX I SITE SWMU 113

Landfill No. 5 is a 33-acre landfill on the southeast corner of the Base. The landfill was active from 1968 to 1988 and operated as a cut and burn landfill from 1968 to 1972. Thereafter, the wastes were buried. The landfill received domestic and industrial wastes and debris from 1984 to 1988, at which time it was deactivated. NMED issued a NFA on the site with the exception of Cell 3 in 1999.

One upgradient (MW-Q) and nine downgradient (MW-B, C, D, I, J, L, M, S, T, and U) groundwater monitoring wells were installed around the perimeter of the landfill. The wells are sampled semi-annually and analyzed for Appendix IV constituents. No groundwater contamination has been detected to date. A new upgradient monitoring well was installed in early 1996 because the well screen in MW-A was not intersecting the water table.

A RCRA landfill cap was constructed over Cell 3 in 1988. This cell allegedly received RCRA-characteristic wastes, such as spent paint strippers, thinners, and solvents, for approximately six weeks following the landfill disposal restrictions on these wastes that became effective on 1 November 1980. The RFI Phase I Work Plan that was submitted to NMED in February 1994 was approved and fieldwork completed in 1995. The RFI report was finished in 1996. NMED granted an NFA in 1999 to the landfill with the exception of Cell 3. Cell 3 was incorporated into LF-05 in 2000, and a Class 3 Permit Modification Request for removal of the site from the permit was submitted in Sept 2000.

**D1-2.6 FT-06 FIRE DEPARTMENT TRAINING AREA NO. 1, APPENDIX I SITE
SWMU 78**

Fire Department Training Area No. 1 is in the northeast corner of the Base. The facility is an unlined surface approximately 100 ft in diameter and was in use from 1959 to 1968. Approximately 300 gal of waste oils, solvents, and fuels were poured on the ground surface twice monthly to create fires. The area is defined by abundant aluminum slag and slightly stressed vegetation.

Two 50 ft soil borings were drilled in the unit in 1985 during the ERP Phase II investigation. The soil samples were analyzed for oil and grease, lead, and VOCs. Oil and grease analyses ranged from 140 to 2800 mg/kg. Lead was detected in quantities up to 28 mg/kg, which is only slightly above the Base's lead background levels of 2 to 20 mg/kg. No VOCs were detected.

This unit was investigated during the Appendix I, Phase I RFI investigation and NFA was recommended; the EPA agreed but required that boundary markers be installed. These boundary markers were installed under the Appendix I, Phase II Investigation. A Class 3 Permit Modification Request for removal of this site from the permit was submitted in Sept 2000.

**D1-2.7 FT-07 FIRE DEPARTMENT TRAINING AREA NO. 2, APPENDIX I SITE
SWMU 106**

Fire Department Training Area No. 2 is a 100-ft-diameter unlined surface area in the southeast area of the Base. The facility was active from 1968 to 1974. Approximately 300 gal of fuel was poured on the ground monthly to create fires. The vegetation in the area appears mildly stressed. One deep soil boring was drilled in the area during the ERP Phase II study. Oil and grease concentrations ranged from 80 to 3400 mg/kg; the lead concentrations of 3.1 to 3.9 mg/kg are well within the background levels of 2 to 20 mg/kg. No VOCs were detected.

This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A Class 3 Permit Modification Request for removal of this site from the permit was submitted in Sept 2000.

**D1-2.8 FT-08 FIRE DEPARTMENT TRAINING AREA NO. 3, APPENDIX I SITE
SWMU 107**

This unit is a circular area approximately 100 ft in diameter in the southeast area of the Base. The unit was active from 1968 to 1974. Approximately 300 gal of fuel was poured on the ground monthly to create fires. The area is unremarkable in appearance. One 61.5 ft soil boring was drilled in the facility during the ERP Phase II investigation. Oil and grease concentrations from the three soil samples collected from the boring ranged from 1700 to 3800 mg/kg, and lead values varied from 1.7 to 3.7 mg/kg. No VOCs were detected.

This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. Cannon AFB submitted a Class 3 Permit Modification Request in 2000 for removal of this site from the permit.

D1-2.9 OT-10 BLOWN CAPACITORS SITE, APPENDIX III SITE AOC C

Three pole-mounted capacitors exploded in 1978 in the northwest area of the Base. Approximately 6 gal of oil thought to contain PCBs were released to the ground surface. Approximately 100 yd³ of soil was excavated and drummed immediately following the incident. The drummed soil was disposed of off-base in a permitted disposal facility. No visible evidence of the spill was observed during an April 1992 site visit.

This site had not been investigated in the past. Because the definition of an SWMU does not include accidental spills, it is anticipated that EPA Region VI will concur that the site was improperly identified as an SWMU in the RFA report. This report has, therefore, declared NFA for this site. Cannon AFB submitted a Class 3 Permit Modification Request in 2000 for removal of this site from the permit.

D1-2.10 SD-11 ENGINE TEST CELL, SWMU 86, APPENDIX I SITE; OVERFLOW PIT, SWMU 87, APPENDIX I SITE; LEACH FIELD, SWMU 88, APPENDIX I SITE; EVAPORATION POND, SWMU 89, APPENDIX I SITE; OIL/WATER SEPARATOR NO. 5114, SWMU 90, APPENDIX III SITE

Although these five sites were listed in two different appendices, they were all studied during the Appendix I, Phase I RFI investigation. The Engine Test Cell, SD-11, was the main component of the entire system, and all effluent from that test cell drained through or into the other four SWMUs. The remains of this test cell are located in the central area of the Base in the Engine Test Cell Area. The unit was active from 1965 to 1988. The building structure was removed, and only the concrete foundation and underground utilities remain. Potential contaminants from the test cell include JP-4 fuel, oils, and greases, and solvents mixed with washdown water generated from aircraft engine cleaning operations. The test cell area was covered with prairie grass until the unit became temporarily active, which resulted in the grass being killed off due to jet blast. The unit remained active until a new hush-house was constructed. Despite the fact that the oil/water separator was removed in July and August 1994, not all contamination could be removed due to the depth at which it occurred. Contaminated soil was removed to the greatest extent possible and the site backfilled with clean soil.

Several components of the test cell have been identified as SWMUs. The effluent from the test cell was initially discharged to the Oil/Water Separator (SWMU 90) and the associated Leach Field (SWMU 88). A 6- to 8-ft diameter Overflow Pit (SWMU 87) was added in 1982 to relieve overloading in the oil/water caused by reduced hydraulic capacity of the leach field. A second larger oil/water separator was added in 1985. The discharge was directed to a lined Evaporation Pond (SWMU 89) that was constructed in 1985 in the area of the former leach field. The evaporation pond is connected to other oil/water separators and is therefore still active. The entire engine test cell area covers approximately 1.5 acres.

A borehole was drilled in the former leachfield and in the overflow pit during the ERP Phase II investigation. A total of 6 soil samples were collected to a depth of 47.5 ft. Lead was detected in concentrations ranging from 1.5 to 4.8 mg/kg. Cannon AFB background levels for lead range from 2 to 20 mg/kg. No oil and grease or VOCs were detected.

Five boreholes were drilled to depths of 30 to 60 ft in the area of the evaporation pond and oil/water separators during the 1989 ERP Phase IV investigation. A total of 45 soil samples were analyzed for VOCs, base/neutral extractables, and total metals using EPA SW-846 methods. Very low levels (below 1 ppm) of phenol, 2,2-methylene bis (6-(1,1-dimethylethyl)-4-ethyl-), or Antioxidant 425 were found. Silver was the only metal found to exceed background levels; however, the distribution of silver was uniform and was, therefore, considered to be naturally occurring.

The immediate area around the concrete foundation of the Engine Test Cell (SWMU 86) was investigated during the Appendix I, Phase I study. Because not all contaminated soil could be removed due to the depth of the contamination, a Phase III RFI study was conducted and completed in October 1995. The study found oil and grease to a depth of 60 ft below surface at the site. Low to moderate levels of TPH (<1000 mg/kg) were detected in surface soils, while moderate to high concentrations

(>1000 mg/kg) of TPH were detected in soils below the zone of backfill; however the Phase III RFI recommended NFA. In October 1999, SWMUs 87, 88, 89, and 90 were considered by EPA Region VI to be sufficiently characterized to warrant NFA. A Class 3 Permit Modification Request for removal of this site from the permit was submitted in Sept 2000.

D1-2.11 SD-12 STORMWATER COLLECTION POINT, APPENDIX I SITE SWMU 85

This unit is commonly called the South-Playa Lake. It is a naturally occurring 9-acre playa in the south-central area of the Base. The playa is approximately 15 ft at its deepest point. It receives stormwater runoff from portions of the flightline area. Solvents, fuels, oils, and greases are the potential contaminants. The playa has also been a repository for rubble from the destruction of runways. The area is covered with prairie grasses and is designated as a wetland.

Three 5-ft soil borings were drilled in the playa during the ERP Phase II study. One soil sample was collected from each boring at 3 to 4 ft. Oil and grease was detected in one sample at 40 mg/kg. No VOCs were detected, and metals remained within the range of background values. Eight 5- to 70-ft boreholes were drilled in the area during the ERP Phase IV investigation. Soil samples collected in 2.5- to 5-ft intervals showed no VOCs or acid/base/neutral extractables. Metals were within the range of naturally occurring background levels.

This unit was originally scheduled for investigation during the Appendix I, Phase I RFI; however, in October 1990, EPA Region VI concluded that the Stormwater Collection Point warrants NFA.

Two items of interest regarding Playa Lake were brought to light after the recommendation of NFA:

- Low levels of pesticides were discovered in Water Well Number 6, which is downgradient of Playa Lake. Water well Number 6 has been scheduled to be plugged and abandoned by the water plant.
- There was an unverified verbal testimony that several barrels were removed from around this area in the 1970s. This could not be subsequently confirmed, and no further investigation has taken place.

No other evidence of potential contamination was subsequently found. A Class 3 Permit Modification Request for removal of the unit from the permit was submitted in Sept 2000.

D1-2.12 SD-13 SANITARY SEWAGE LIFT STATION OVERFLOW PIT, APPENDIX I SITE SWMU 75

This unit served as an emergency overflow containment area for a lift station in the northwest area of the Base. Since the original ERP investigation, this area has been reworked twice to improve drainage around the old golf course and to create new water hazards for the new section of the golf course. Therefore, there are no remnants of this pit. The pit was approximately 100 ft wide, 600 ft long, and 2 to 3 ft deep (~6700 yd³). The pit was used once in February 1983 when 100,000 to 150,000 gal of raw domestic sewage were bypassed to the pit when the lift pumps failed. The only hazardous wastes would have been from the domestic sewage. The pumps were repaired in approximately one week, and the sewage was cycled through the lift station.

Four soil samples were collected from the pit following the pump malfunction. Six additional samples were collected in 1988 before additional excavation of the pit. No hazardous constituents were detected in any of the samples. One sample tested hazardous by the EPA ignitability criterion, but Base personnel later determined the analysis to be in error.

In October 1990, EPA Region VI concluded that the Sanitary Sewage Lift Station Overflow Pit warranted NFA because this site was an accidental spill and therefore did not qualify as an SWMU. Accidental spills are not included in the definition of an SWMU as defined in the following excerpt from the EPA RFA Guidance (3): "The definition does not include accidental spills from production areas and units in which wastes have not been managed (e.g., product storage areas)." A Class 3 Permit Modification Request for removal of the unit from the permit was submitted in Sept 2000.

D1-2.13 WP-14 SLUDGE WEATHERING PIT, APPENDIX I SITE SWMU 76

The Sludge Weathering Pit is a shallow (approximately 10 ft²) depression near the 20,000-barrel POL tank number 396 and is adjacent to the north installation boundary fence. The pit, last used in 1980, was used to weather sludge from leaded gas storage tanks. The sludge was landfilled after it was judged to be sufficiently weathered. A soil sample collected in 1981 was analyzed for lead and oil and grease. The lead analysis was negative, and 0.012 mg/kg of oil and grease was detected.

This unit was investigated during the Appendix I, Phase I RFI investigation and NFA was recommended. EPA agreed but required that boundary markers be installed. These boundary markers were installed under the Appendix I, Phase II investigation. A Class 3 Permit Modification Request for NFA and removal of this site from the permit was submitted in Sept 2000.

D1-2.14 SD-15 AGE DRAINAGE DITCH, APPENDIX I SITE SWMU 34

The Aerospace Ground Equipment (AGE) Drainage Ditch is a man-made depression in the maintenance operation area that remained after railroad tracks were removed in the late 1960s. The ditch was originally 1200 ft long, 12 ft wide (1/3 acre), and approximately 1 ft deep. It originated on the northwest corner of Building 184 and ran northeast, parallel to the flightline sides of Building 186, 191, 192, and 193. In 1991, approximately 400 ft of the ditch in the area of Building 192 was filled and covered with concrete associated with nearby construction. The ditch receives stormwater runoff from several flightline operations and from roads, such as the concrete AGE Maintenance Shop Pad (SWMU 31), Torch Boulevard, and the parking area near Building 189. Water carried by the ditch flows into an open field and evaporates. Potential contaminants carried by surface water runoff include oil and grease, fuels, and solvents.

The Phase II RFI Work Plan was approved by EPA Region VI in March 1992. The Phase III RFI Work Plan was submitted in June 1992 to EPA Region VI. Two sampling investigations conducted on the AGE Drainage Ditch in 1987 and 1988 identified oil and grease contamination. The drainage ditch soil was tilled in October 1988 to aerate the soil. Further investigations of the ditch were performed during the RFI Phase I study, and a 1991 RI recommended NFA. A Class 3 Permit Modification Request for NFA and removal of this site from the permit was submitted in Sept 2000.

D1-2.15 DP-16 SOLVENT DISPOSAL SITE, APPENDIX I SITE SWMU 81

This site was first identified in the 1983 ERP Phase 1 Records Search as consisting of two empty drums labeled "trichloroethylene" lying on the ground. The drums were positioned to drain into a shallow pit. The site was about 300 ft east of Fire Training Area No. 1 and 100 ft south of the north installation fence. The site could not be located during the preparation of the RFA in 1987 or during the site visit for the Appendix I, Phase I RFI Work Plan. A 10,000 ft² area of the suspected site was gridded and sampled for total VOCs during the RFI Phase 1 study.

This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A Class 3 Permit Modification Request for NFA and removal of this site from the permit was submitted in Sept 2000.

D1-2.16 SD-17 OLD ENTOMOLOGY RINSE AREA, APPENDIX I SITE SWMU 96

The Old Entomology Rinse Area was behind pesticide storage Building 2160, approximately 200 ft north of the sewage lagoons. Building 2160 was abandoned in October 1983 and demolished in September 1984. Pesticide and herbicide application equipment was rinsed in a sink behind Building 2160. The sink drained to a shallow depression on the ground surface. Potential contaminants include dieldrin, toxaphene, 2,4-D, and dichlorodiphenyltrichloroethane.

An ERP Phase IV-AA investigation was conducted at the site in 1986. The Appendix I, Phase I Work Plan stated that the Phase IV-AA investigation resulted in a finding that no RA was necessary at this site. An existing groundwater monitoring well approximately 600 ft downgradient of the site was sampled during the RFI Phase I investigation. Although NFA was recommended, a 100-ft borehole was drilled during the Appendix I, Phase II investigation for further confirmation. An additional RFI Phase II in 1995 also recommended NFA. A Class 3 Permit Modification Request for NFA and removal of the unit from the permit was submitted in Sept 2000.

D1-2.17 SS-18 JP-4 FUEL SPILL, APPENDIX III SITE AOC B

The JP-4 Fuel Spill site was on the south apron southwest of Building 120. Building 120 was moved to another location and a new facility constructed over the site. Approximately 400 gal of JP-4 fuel spilled onto the apron from a broken fuel coupling on an aircraft fuel tank in 1980. Although the site was scheduled to be investigated during the Appendix III, Phase I RFI investigation, 13 soil borings were drilled in the area in February 1992 in anticipation of the construction of the new hangar. The borings were drilled to 20 ft, and one soil sample was collected from each boring at depths varying from 1 to 20 ft. The samples were analyzed for TPH, total recoverable petroleum hydrocarbon (TRPH), TPH extractables, and total VOCs. TPH was recorded in three samples; the highest recording was 0.120 ppm. TRPH was also found in three samples with the highest being 7500 ppm. TPH extractables were found in two samples at 8.4 and 65 ppm. VOCs were not detected in the samples.

Although none of the 1992 borings were located in the actual area of the spill, it was determined that further investigation of this site would not be necessary. A Class 3 Permit Modification Request for NFA and removal of the unit from the permit was submitted in Sept 2000.

D1-2.18 SS-19 MOGAS SPILL, APPENDIX III SITE AOC A

This is the site of two spills of motor gasoline (MOGAS) from overturned fuel trucks. The site is approximately 400 x 200 ft. Both spills occurred in the early 1960s at the present location of Argentina Avenue southeast of the gymnasium (Building 444). The total quantity of both spills is estimated to have been 2000 to 3000 gal. The physical features of the site were changed in 1977 during the construction of Building 444. A portion of the spill site is now under Argentina Avenue.

Two boreholes were drilled to a total depth of 60 ft each at the site during the ERP Phase II investigation. None of the soil samples collected from the borings contained oil or grease above detection limits; however, lead was detected in one surface soil sample at 35 mg/kg, and 1,2-dichloroethylene (DCE), a solvent, was detected at 237 ug/kg. The 1,2-DCE is not a component of automotive gasoline.

The ERP Phase II investigation results do not warrant further action on this site. Also, sites of accidental spills are not defined by the EPA as an SWMU. Based on this, a Class 3 Permit Modification Request for NFA and removal of the unit from the permit was submitted in Sept 2000.

D1-2.19 SD-20 NE STORMWATER DRAINAGE AREA, APPENDIX I SITE SWMU 95

This area is a natural depression extending approximately 40 ft from the northeast end of Runway 4/22 to an open field. The 3.5-acre area received water from several oil/water separators along the flightline and runoff water from runways and stormwater drains in the east area of the Base. Water entering this SWMU may contain oil and grease, fuels, solvents, and alkaline-based aircraft cleaning compounds. The area is covered with prairie grasses and grasses associated with wetlands. The vegetation at this site is thicker and remains greener throughout the summer due to the volume of runoff water that it receives.

In 1989, an ERP RI was conducted at the site (4). Eleven soil borings were drilled to a depth of 61.5 ft. Long-chain organics were detected in the first 3 ft of a borehole drilled at the mouth of one of two culverts that empty into the ditch. JP-4 fuel constituents that were detected included a single occurrence of ethylbenzene (0.37 mg/kg), and total xylene (0.70 mg/kg) was detected in a downgradient borehole at 0 to 1 ft, however it was determined that the detection of organics was due to errors in the analysis.

Because organics were not confirmed in any downgradient samples, the investigation concluded that there is no significant lateral or vertical contaminant migration. This site was investigated during the Appendix I, Phase I RFI study and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The Base will submit a request for NFA and removal from the RCRA permit in order to close out this site in FY 04.

D1-2.20 LF-25 CONCRETE RUBBLE PILE, APPENDIX I SITE SWMU 97

This unit occupies approximately 30 acres adjacent to the perimeter road on the east area of the Base. The Rubble Pile dates to the mid-1950s as determined from historical aerial photographs. The rubble consists primarily of construction debris, bricks, concrete blocks, and asphalt road and runway material. Most of the material originated from demolished World War II era facilities.

An Environmental Assessment was performed on the Rubble Pile by the Corps of Engineers in February 1991. Material from nine backhoe trenches dug in the rubble was sampled for asbestos, PCBs, extractable organics, VOCs, herbicides, pesticides, and metals. None of the above parameters were detected in the rubble material. At least two cut and burn landfill trenches were discovered under the rubble. The trenches were an unexpected discovery; apparently, a portion of the land where the Rubble Pile now exists was once used as a landfill. Newspaper dating from 1943 was recovered from one of the trenches. Detectable levels of barium and cadmium were found in one trench; however, the levels were well below background. Benzidine was also found at extremely low levels.

The Rubble Pile was scheduled for investigation during the Appendix III, Phase I RFI investigation. However, because munitions personnel wanted to construct a facility over the northern half of this rubble pile, the site was investigated along with the Appendix I, Phase I RFI for Landfill No. 3 and No. 4. Because of piles of uncovered non-friable asbestos debris and the unknowns buried under the rubble, Cannon AFB ERP/RFI personnel recommended that this site be left alone; however, an abatement project was undertaken at the site in FY 00 and the asbestos was removed.

The Phase I RFI Report recommended NFA, but the EPA directed Cannon to reopen monitoring Well K and use it as a downgradient monitoring well. Well K was originally installed to monitor SWMU 96, which is the Old Entomology Rinse Area. Well K went dry and a new Well R was subsequently drilled on the eastern edge of the landfill in 1998. Well R is sampled twice yearly. The mounds of asbestos siding material were removed and the landfill covered with topsoil in the FY 00 project. This site will be submitted for NFA in FY 04.

**D1-2.21 ST-26 UNDERGROUND WASTE OIL TANK (SD-22 AND ST-26), APPENDIX II
SWMU 48A AND ABOVEGROUND OVERFLOW CAPACITY TANK,
APPENDIX II SWMU 48B**

Due to the multiple uses of this location, multiple SWMU numbers were inadvertently assigned to the same UST locations. This site was originally constructed as the base military gas station during World War II. The records are scanty for this location but original drawings do show that two USTs were originally planned to be installed. However, when the location was used as a solvent disposal site only one UST is mentioned. It could not be determined whether the second tank was removed or was ever installed. (For further details, consult the Cannon AFB UST files on UST 4028).

When a new military gas station was constructed around 1965, the facility was partially demolished and at least one UST of 20,000 gal was left in place and used for waste solvent disposal. The location around the 20,000-gal UST was identified as Facility 4028. The Aboveground Overflow Capacity Tank (SWMU 48b) was an adjacent 2000-gal tank that was brought in to provide overflow protection for the underground tank.

These tanks were on the northeast lot at the corner of Torch Boulevard and Argentia Boulevard. They were active as solvent disposal tanks from approximately 1965 to 1984. Prior to 1965, the 20,000-gal tank was used as a fuel tank for the base gas station. Both tanks were removed in 1988, but apparently no soil tests were taken for the USTs.

Materials stored in the tanks included waste oils, spent solvents, paint thinners, and recovered fuels. The 20,000-gal tank would have contained fuel products prior to 1965. Soil staining around the fill pipe was observed during the 1987 RFA field visit. The site was defined in 1992 by the observation of broken areas of asphalt on the ground surface. The Appendix II investigation, completed in conjunction with the Appendix III, Phase II RFI recommended NFA. This site is now covered by asphalt and no RA is anticipated. A CMS was performed in 1999 and recommended for NFA. A Class 3 Permit Modification Request will be submitted to remove this site from the permit in FY 04.

D1-2.22 ST-27 SUMP, APPENDIX II SITE SWMU 83

This sump was located just off the southern edge of the south ramp. The location for this old sump is now surrounded by concrete pavement or concrete pads on the north, east, and south. It is a 22- x 22- ft dirt and grass covered area between the telephone pole to the north and the new hazardous waste storage area to the south. The hazardous waste storage area is in the small facility covered by a canopy and surrounded by a chain link fence. To the east is the new concrete ramp constructed around the new three-bay small aircraft maintenance dock and to the north is the old concrete ramp. The area was deliberately left uncovered to facilitate future investigations; otherwise the hazardous waste storage facility would have been constructed over it.

This sump was still in existence when the ERP and RFI programs started and was described as being located 120 ft west of Building 120. Building 120 along with Buildings 113, 114, 118, and 119 were moved to a new location on-base and the new small aircraft maintenance dock constructed over the old sites. The sump was self-contained and measured approximately 6 ft x 8 in. x 5 in. and was constructed in a 12- x 14-ft concrete pad. During the construction of the small aircraft maintenance dock, the only thing found remaining was a French drain that was apparently constructed in the bottom of the sump. This French drain consisted of a gravel filled pit 1 ft wide and at least 5 ft long. The total length was not uncovered and the depth is unknown. The gravel was completely covered with black oily wastes and is now covered with up to 2 ft of clean soil. This oily gravel could be relocated by digging trenches east to west across the grassy area. The purpose of the sump, potential contaminants, and the date of construction are unknown; however, it apparently received drainage off the south ramp.

This unit was investigated during the Appendix II, Phase I investigation. NFA was recommended; however, EPA directed a Phase II investigation, which was completed in conjunction with the Appendix III, Phase II investigation under Project CZQZ 94-0135. A Class 3 Permit Modification Request was submitted in Sept 00 to remove this unit from the permit.

D1-2.23 DP-33 DISPOSAL PIT

This Disposal Pit was discovered in July 1992 just east of the Civil Engineering Container Storage Area, which is SWMU 77. The site was discovered when a bulldozer operator ripped through the top of a barrel containing oily wastes. An Interim Removal Action was initiated, which resulted in the removal of 28 barrels during May through June 1994. Most of these barrels were crushed and empty. A few barrels contained oily wastes and one barrel appeared to contain antifreeze products. The site was cleaned up in the Interim Removal Action and closure/NFA granted in 1997. A Class 3 Permit Modification Request was submitted in Sept 00 to remove this unit from the permit.

D1-2.24 AOC D NON-FRIABLE ASBESTOS BURIAL PITS

These are three disposal pits containing asbestos siding material discovered during the expansion of the golf course. The sites were uncovered by a bulldozer operator while pushing topsoil into mounds in order to construct tee boxes and bunkers. A 6- to 12-in. layer of soil was pushed back over the debris piles.

During the Phase I RFI for Landfill No. 1, a borehole was drilled within 20 ft of one of these pits but did not encounter any of them. It is believed that these pits were excavated for clean fill material or for building material disposal, or both, and not for landfill disposal. The general area was investigated during a Phase RFI investigation for Landfill No. 1, but no landfill type debris could be located. Investigation of the specific area was conducted in 1996. NMED has granted NFA for the site. A Class 3 Permit Modification Request was submitted in Sept 00 to remove this unit from the permit.

D1-2.25 AOC 36 DISPOSAL PIT (NEW AOC ADDED TO ERP LIST)

This is a possible disposal pit found near the current MWR Outdoor Recreation Center. This facility was originally the MWR auto hobby shop. When a new auto hobby shop was constructed, this building was turned into the Outdoor Recreation Center. The operations at the Outdoor Recreation Center should not have created this problem. This pit could be a remnant of the old Auto Hobby Shop or a disposal site for fluids coming from an aircraft engine maintenance shop in the early 1950s. The site was proposed for NFA in September 2000.

D1-2.26 SD-34 RUBBLE PILE, FORMERLY AOC E

AOC E was discovered after a 1995 training exercise accidentally started a brush fire that destroyed the vegetation covering the area. The fire exposed a rubble pile along the west side of the abandoned runway, which had not previously been detected. Research by Cannon AFB Environmental Flight staff has determined that the deposition of materials occurred in the late 1950s or early 1960s, verifiable by aerial photos and interviews with long-time Cannon AFB personnel. The rubble may have accumulated as a result of a project that demolished an old World War II runway. A Phase I RFI was conducted in 1998 resulting in a recommendation for NFA. The site will have NFA documentation submitted in FY 04.

D1-2.27 DP-35 BORESIGHT MOUND, FORMERLY AOC F

AOC F is the location of the targeting area for aircraft boresight maintenance operations conducted during the 1950s and 1960s. The site can be described as a large earthen berm with limited amounts of expended small caliber practice munitions and construction materials around the perimeter. No evidence of serious contamination was illustrated in the 1998 PA/SI. NFA was recommended for the site in September 2000.

D1-2.28 LF-36 POTENTIAL OLD LANDFILL, FORMERLY AOC G

AOC G is located in the northwestern part of the base in what is presently the housing area. AOC G was discovered in 1997 while viewing an aerial photograph from 1959 in which it appears as a disturbed feature on the land. It was suspected that it may have been a landfill. The 1998 PA/SI revealed no evidence of contamination of the site and has recommended NFA. A Class 3 Permit Modification Request for NFA for the site was submitted in September 2000.

D1-2.29 LF-37 POTENTIAL OLD LANDFILL, FORMERLY AOC H

AOC H is located in the northwestern part of the base in what is presently the housing area. AOC H was discovered in 1997 while viewing an aerial photograph from 1959 in which it appears as a disturbed feature on the land. It was suspected that it might have been a landfill. The 1998 PA/SI revealed no evidence of contamination at the site. A Class 3 Permit Modification Request for NFA for the site was submitted in September 2000.

APPENDIX D2

ESTIMATED ERP COSTS BY PROJECT NUMBER

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D2-1 CURRENT AND ANTICIPATED ERA PROGRAM FUNDING FOR CANNON AFB ERP SITES D2-1

TABLE D2-1

**CURRENT AND ANTICIPATED ERA PROGRAM FUNDING
FOR CANNON AFB ERP SITES
(Melrose Range not included)**

**Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)**

Current Fiscal Year 2002 Projects

Project Number	Project Description	Validated
CZQZ20027006	LTM LF-03, LF-04, & LF-25	
Totals		49*

*CWE is \$44k

Fiscal Year 2003 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20037006	LTM LF-03, LF-04, & LF-25	50

Fiscal Year 2004 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20047006	LTM LF-03, LF-04, & LF-25	50

Fiscal Year 2005 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20057006	LTM LF-03, LF-04, & LF-25	50

Fiscal Year 2006 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20067006	LTM LF-03, LF-04, & LF-25	50

Fiscal Year 2007 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20077006	LTM LF-03, LF-04, & LF-25	50

Fiscal Year 2008 Projects

Project Number	Project Description	Current Working Estimate
CZQZ20087006	LTM LF-03, LF-04, & LF-25	50

APPENDIX D3

ACTIVE PROJECT SUMMARIES

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TABLE D3-1

CANNON AFB PROJECT INDEX

**Management Action Plan
Cannon AFB, New Mexico**

Project Number	Project Description	Page
CZQZ19987003	FS SD-11	D3-2

Project Number	Project Description	Page
CZQZ19987006	LTM LF-03, LF-04, LF-05, & LF-25	D3-3

Project Number	Project Description	Page
CZQZ20007025	IRA-C LF-25 Asbestos Removal	D3-4

Project Number	Project Description	Page
CZQZ20017006	LTM LF-03, LF-04, & LF-25	D3-5

FS for SD-11

PROJECT NO.: CZQZ19987003

CONTRACTOR:

CONTRACT #:

D.O.:

PROJECT COST: \$182,491

AWARD DATE:

P.O.P.:

DESCRIPTION: This project involves a FS for SD-11.

LTM for LF-03, LF-04, LF-05, LF-25

PROJECT NO.: CZQZ19987006

CONTRACTOR: Foothills Engineering Consultants, Inc.

CONTRACT #: DACW45-94-D-0031

D.O.:

PROJECT COST: \$45,173

AWARD DATE: 12/15/98

P.O.P.:

DESCRIPTION: This project involves long-term monitoring of LF-03, LF-04, LF-05 and LF-25.

IRA-C for LF-25

PROJECT NO.: CZQZ20007025

CONTRACTOR:

CONTRACT #:

D.O.:

PROJECT COST: \$1,289,818

AWARD DATE: 03/31/00

P.O.P.:

DESCRIPTION: This project involves asbestos removal.

LTM for LF-03, LF-04, LF-25

PROJECT NO.: CZQZ20017006

CONTRACTOR:

CONTRACT #:

D.O.:

PROJECT COST: \$93,116

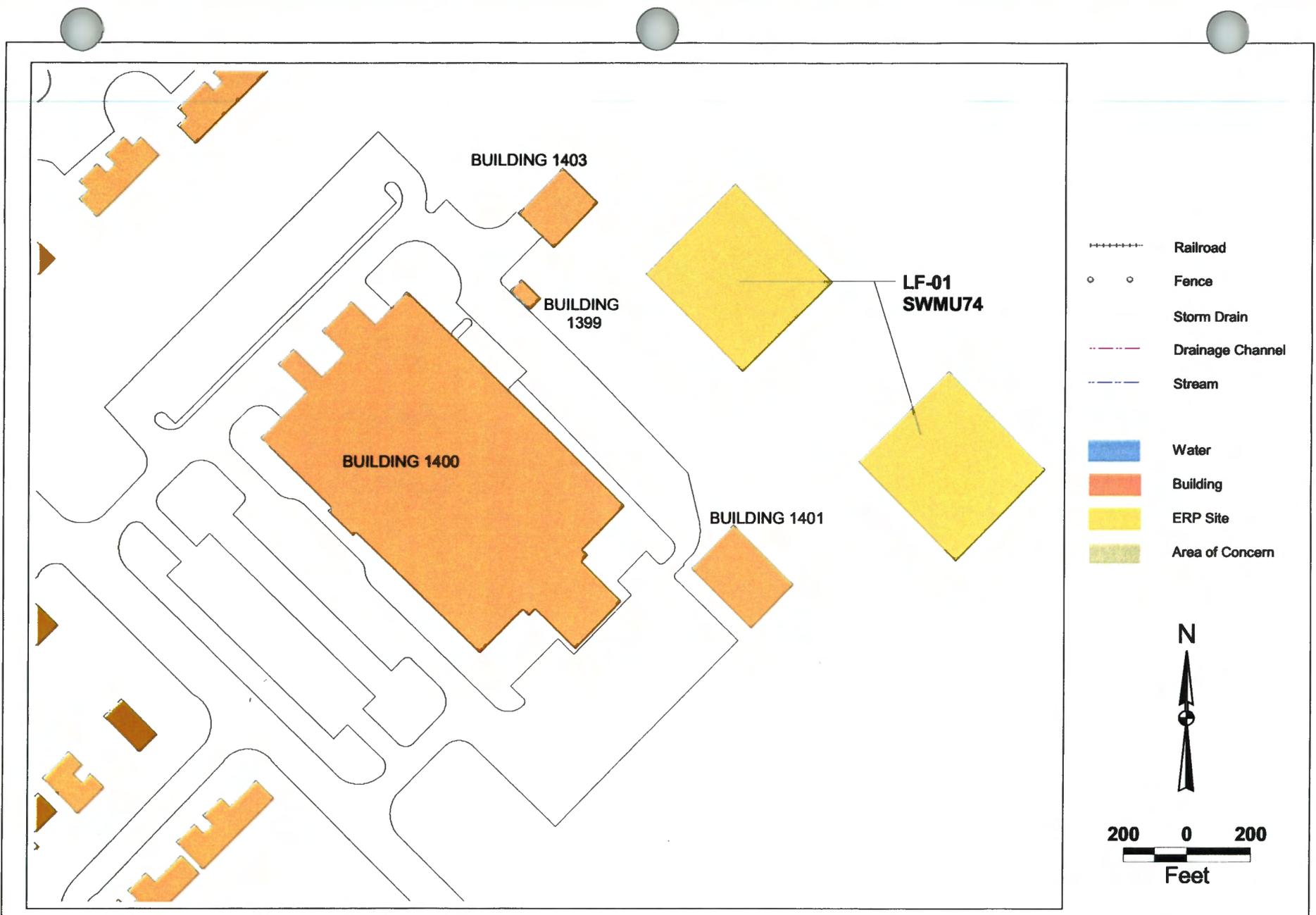
AWARD DATE: 01/31/01

P.O.P.:

DESCRIPTION: This project involves long-term monitoring of LF-03, LF-04, and LF-25.

APPENDIX D4

INSTALLATION ERP SITE MAPS



Cannon AFB.
New Mexico

LF-01 SITE MAP
LANDFILL NO. 1

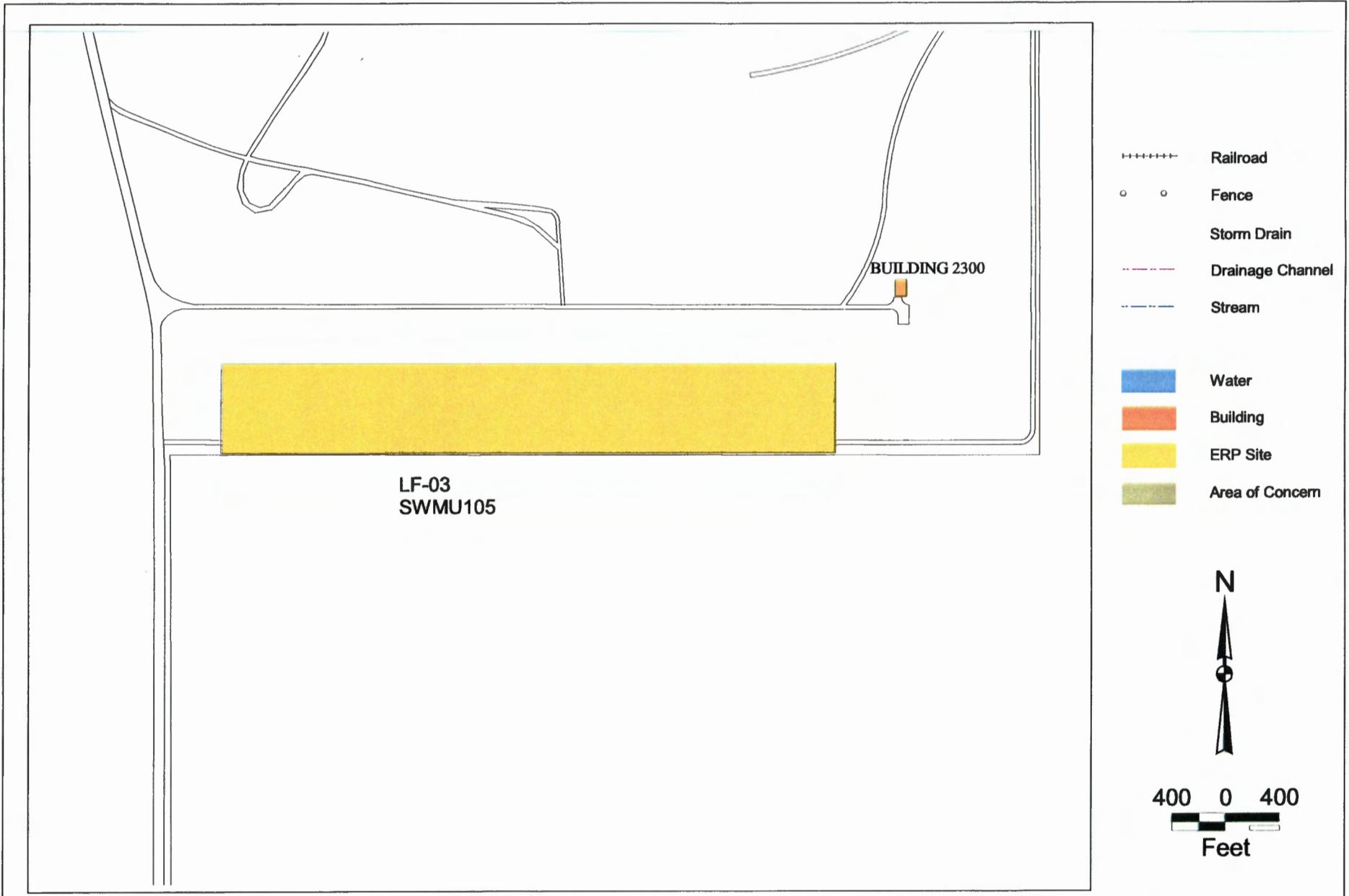
Figure D4-1



Cannon AFB.
New Mexico

LF-02 SITE MAP
LANDFILL NO. 2

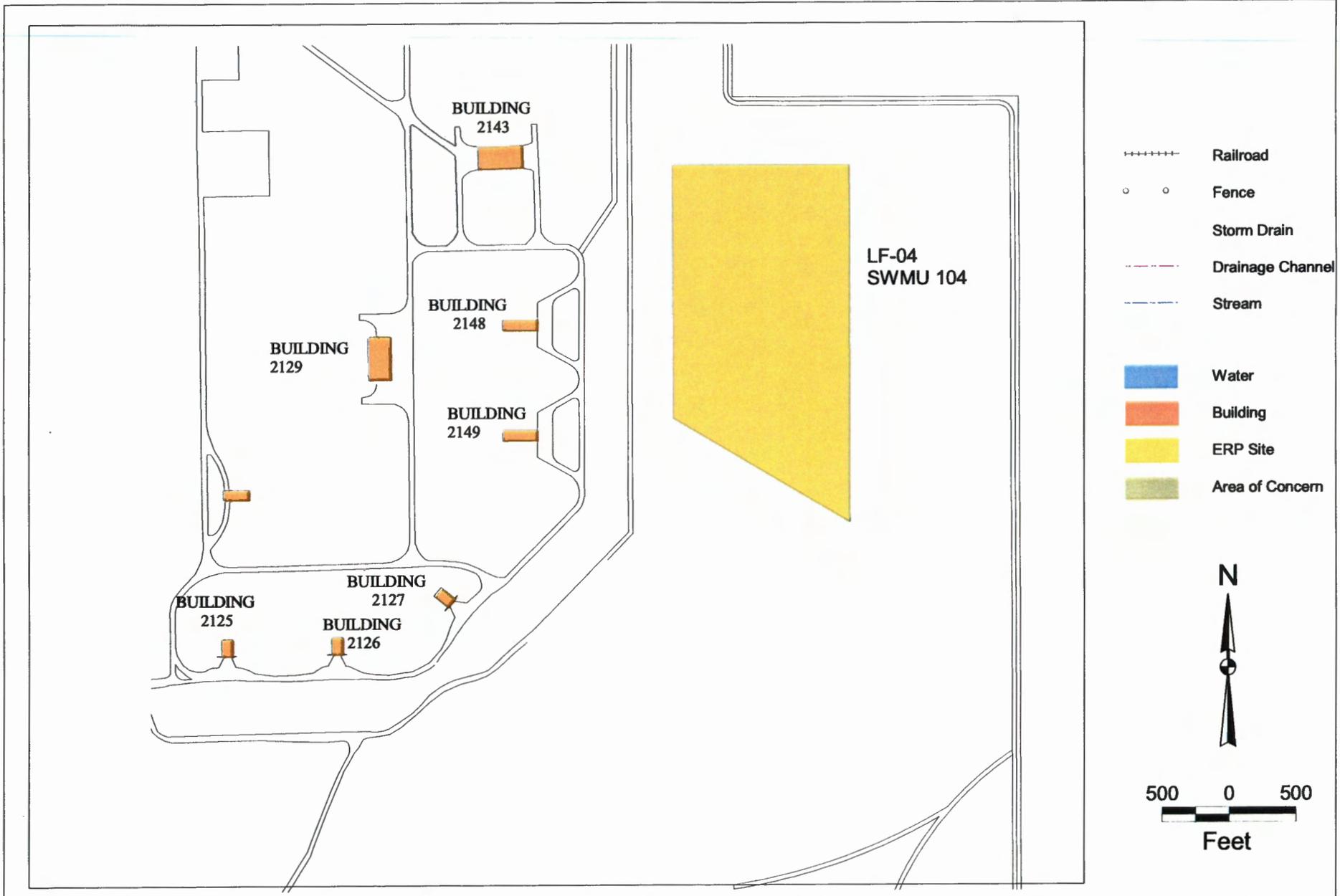
Figure D4-2



Cannon AFB.
New Mexico

LF-03 SITE MAP
LANDFILL NO. 3

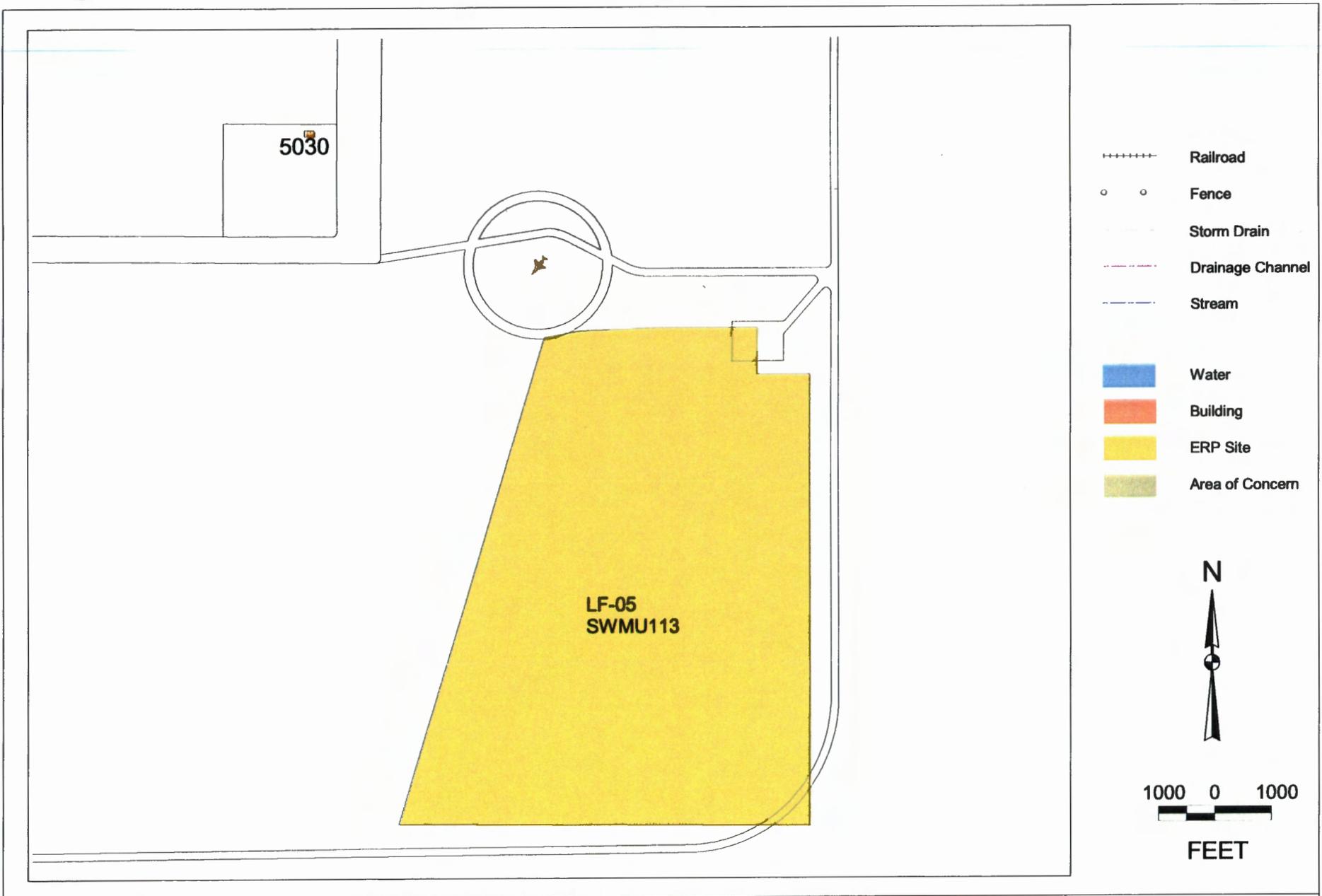
Figure D4-3



Cannon AFB.
New Mexico

LF-04 SITE MAP
LANDFILL NO. 4

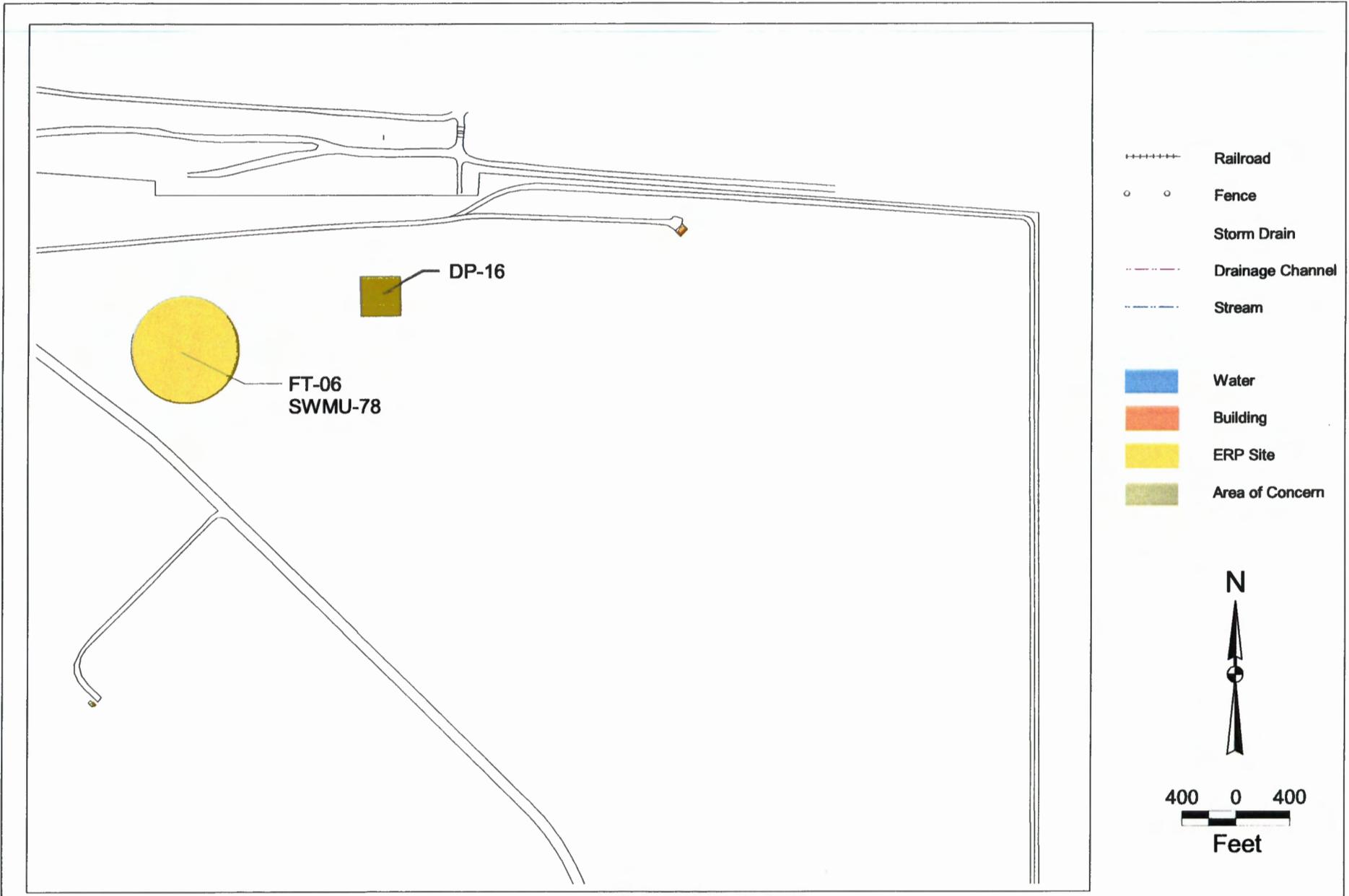
Figure D4-4



Cannon AFB.
New Mexico

LF-05 SITE MAP
LANDFILL NO. 5

Figure D4-5



Cannon AFB.
New Mexico

FT-06 SITE MAP
FIRE DEPARTMENT TRAINING AREA NO. 1

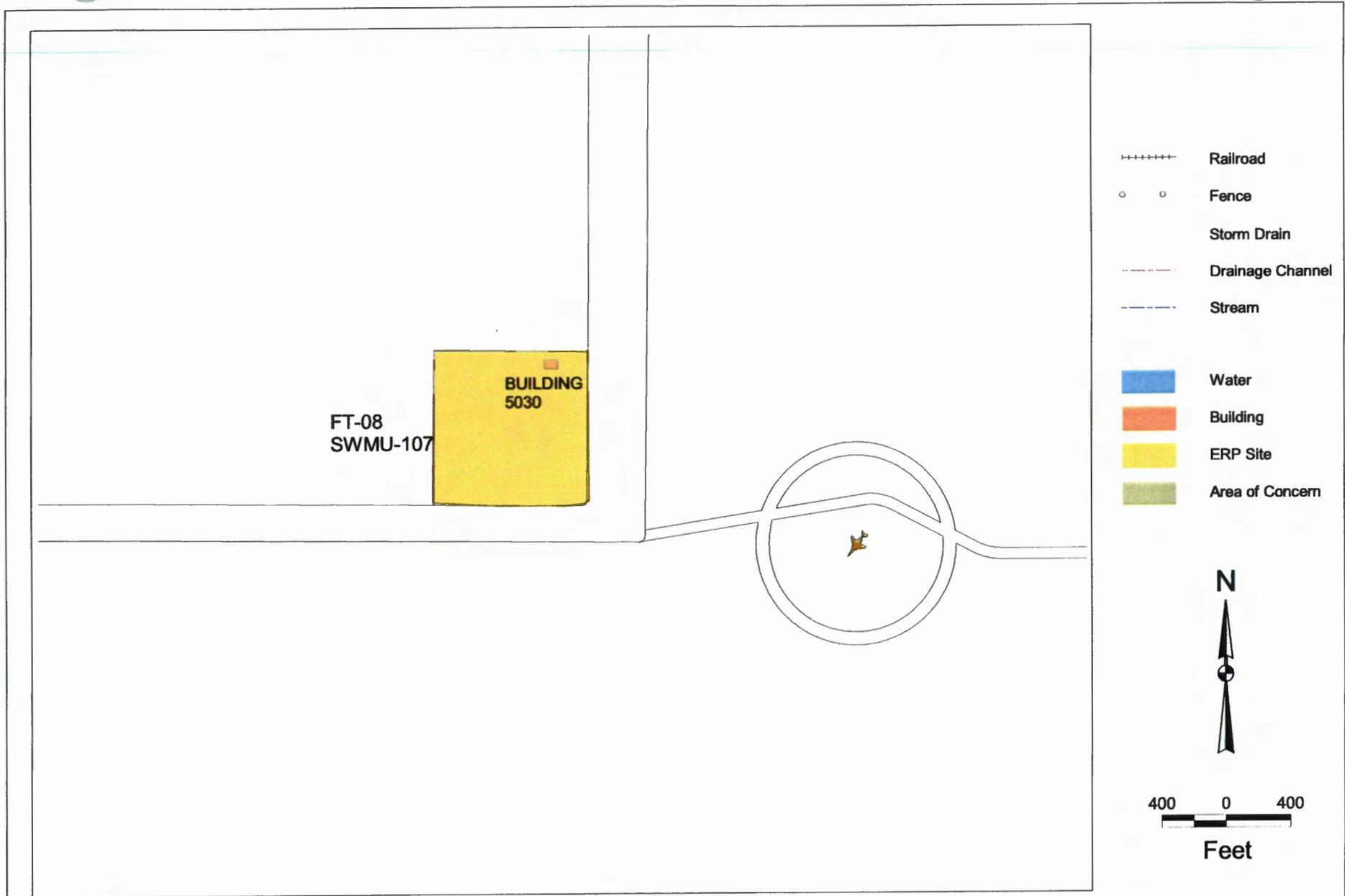
Figure D4-6



Cannon AFB.
New Mexico

FT-07 SITE MAP
FIRE DEPARTMENT TRAINING AREA NO. 2

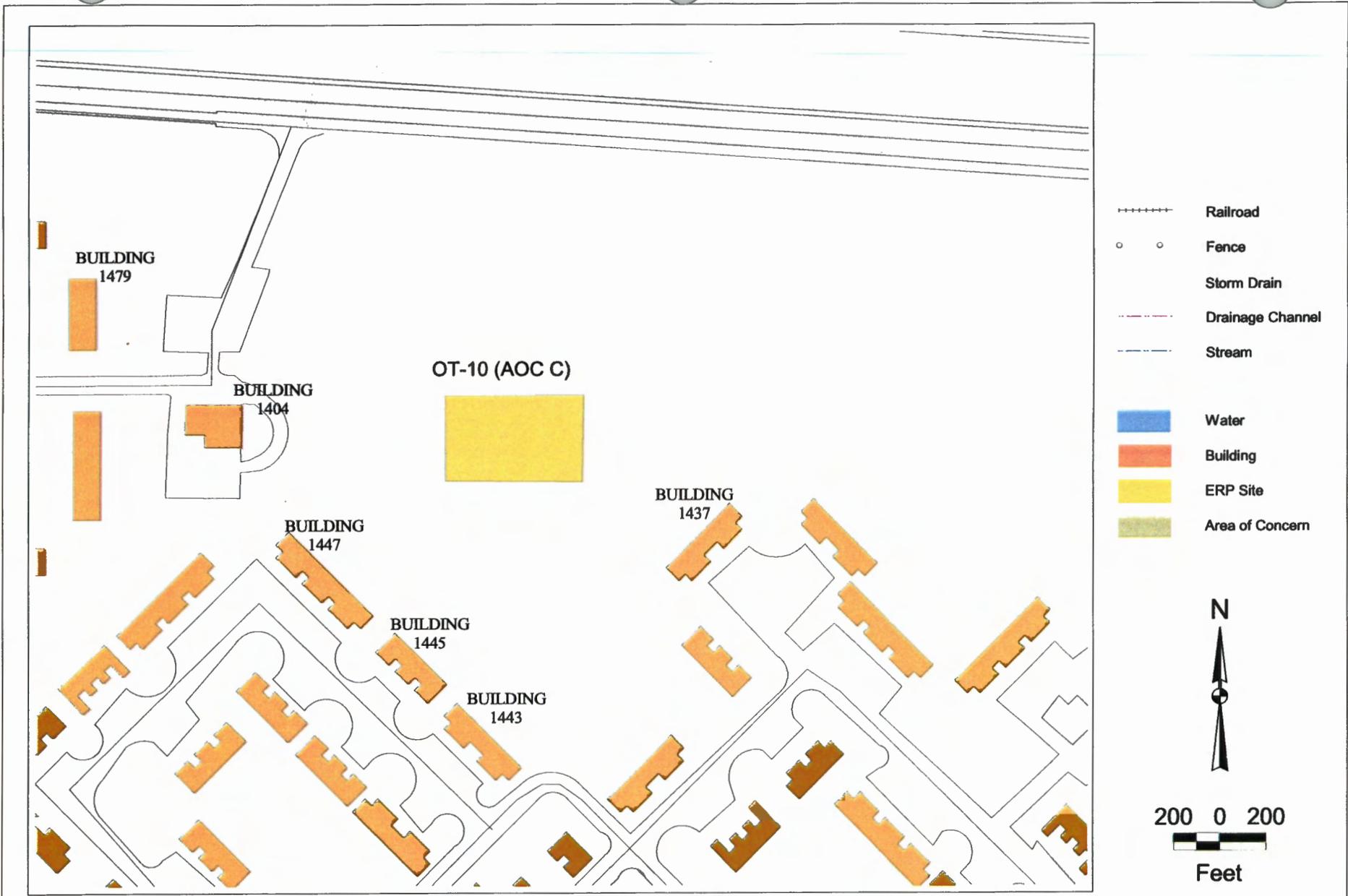
Figure D4-7



Cannon AFB.
New Mexico

FT-08 SITE MAP
FIRE DEPARTMENT TRAINING AREA NO. 3

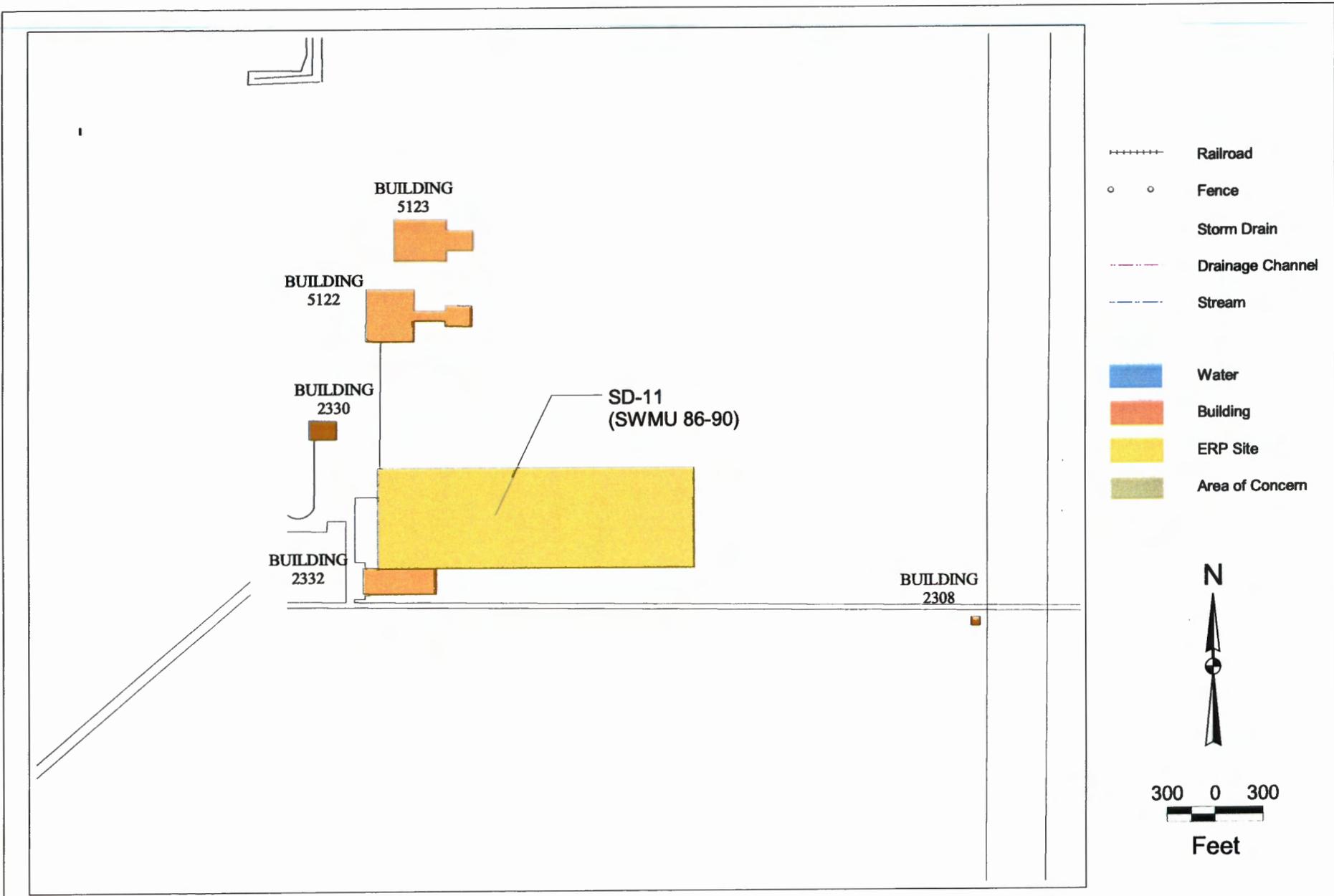
Figure D4-8



Cannon AFB.
New Mexico

**OT-10 SITE MAP
BLOWN CAPACITORS SITE**

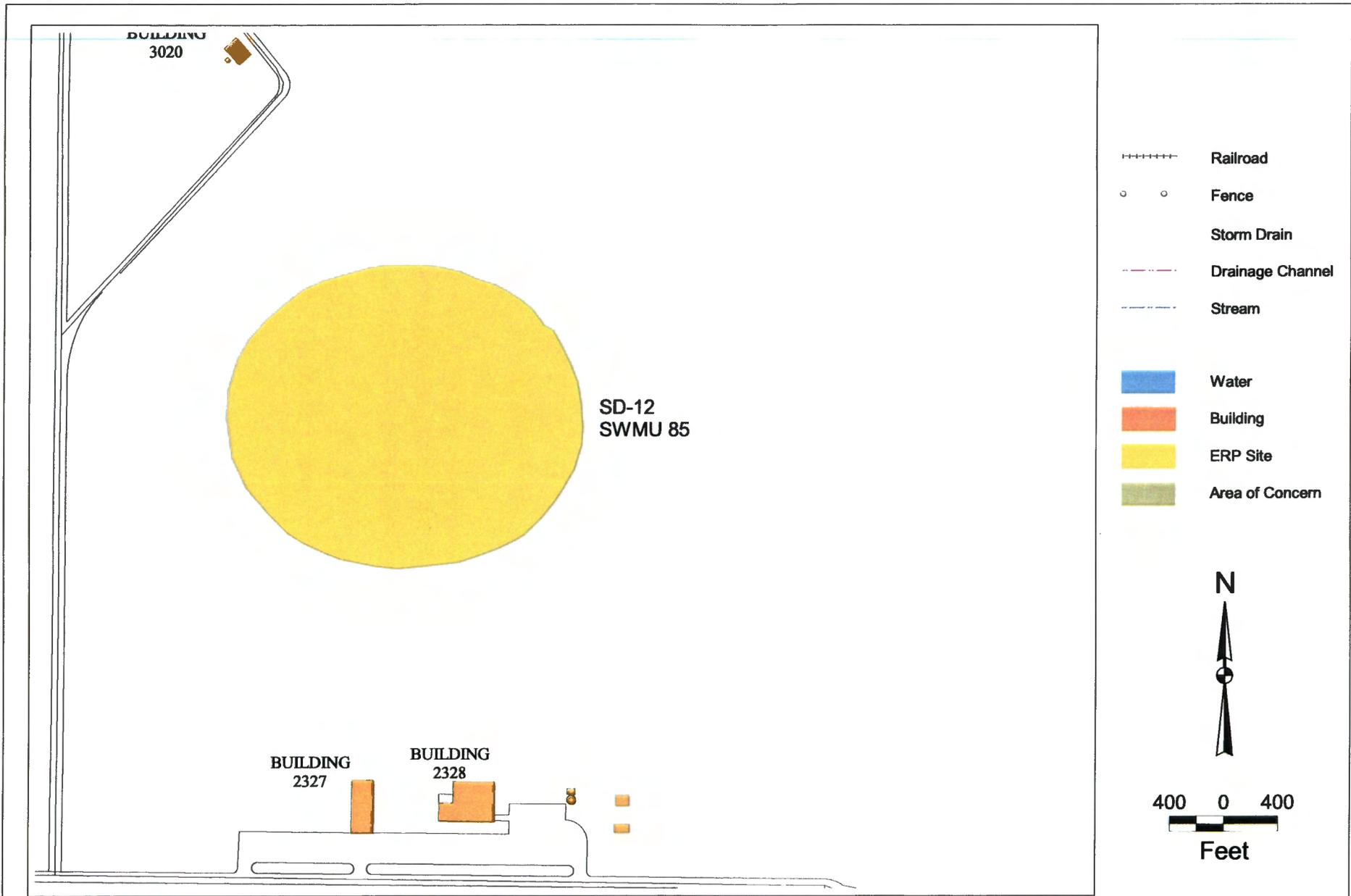
Figure D4-9



Cannon AFB.
New Mexico

SD-11 SITE MAP

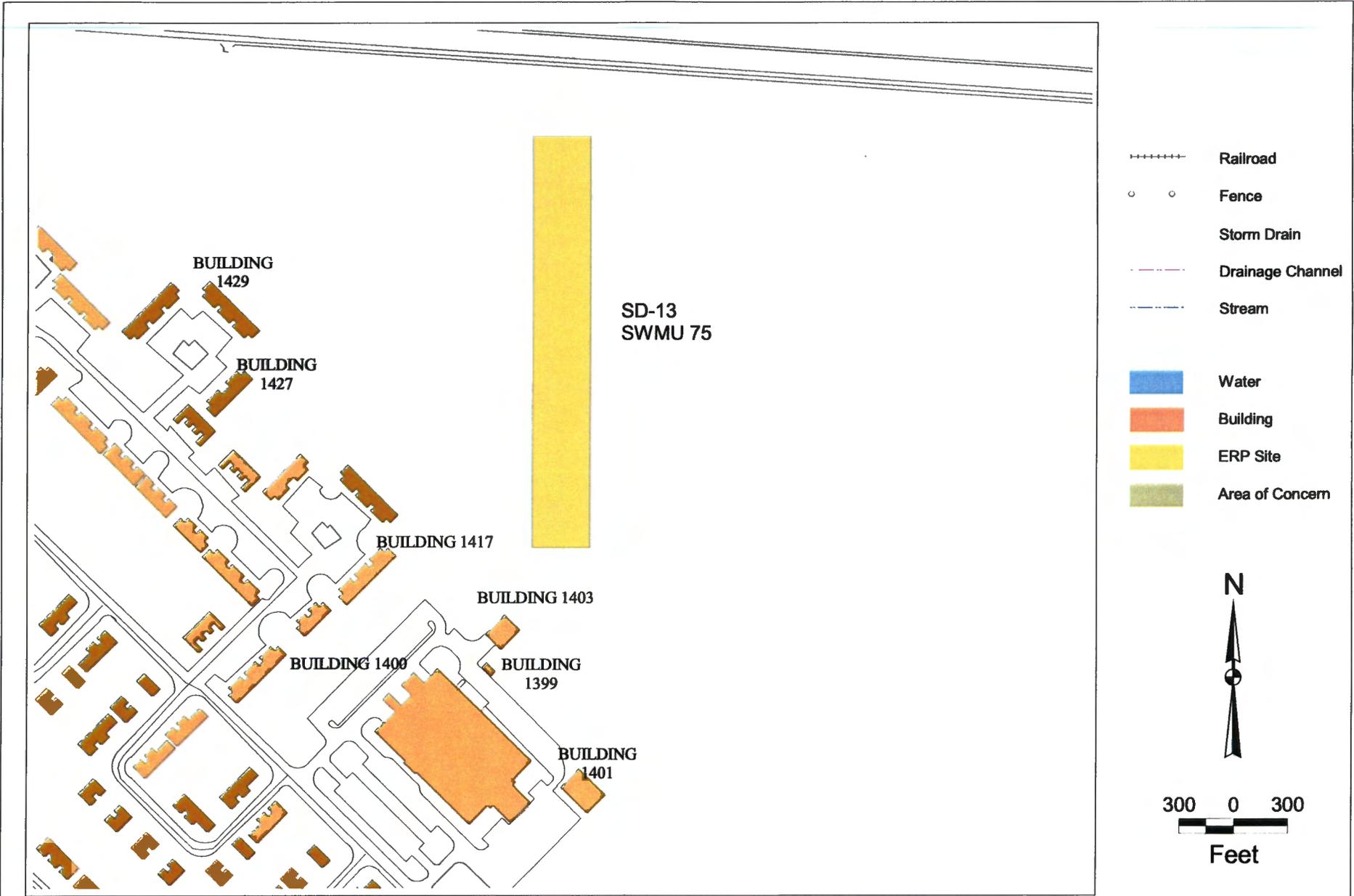
Figure D4-10



Cannon AFB.
New Mexico

SD-12 SITE MAP
STORMWATER COLLECTION POINT

Figure D4-11



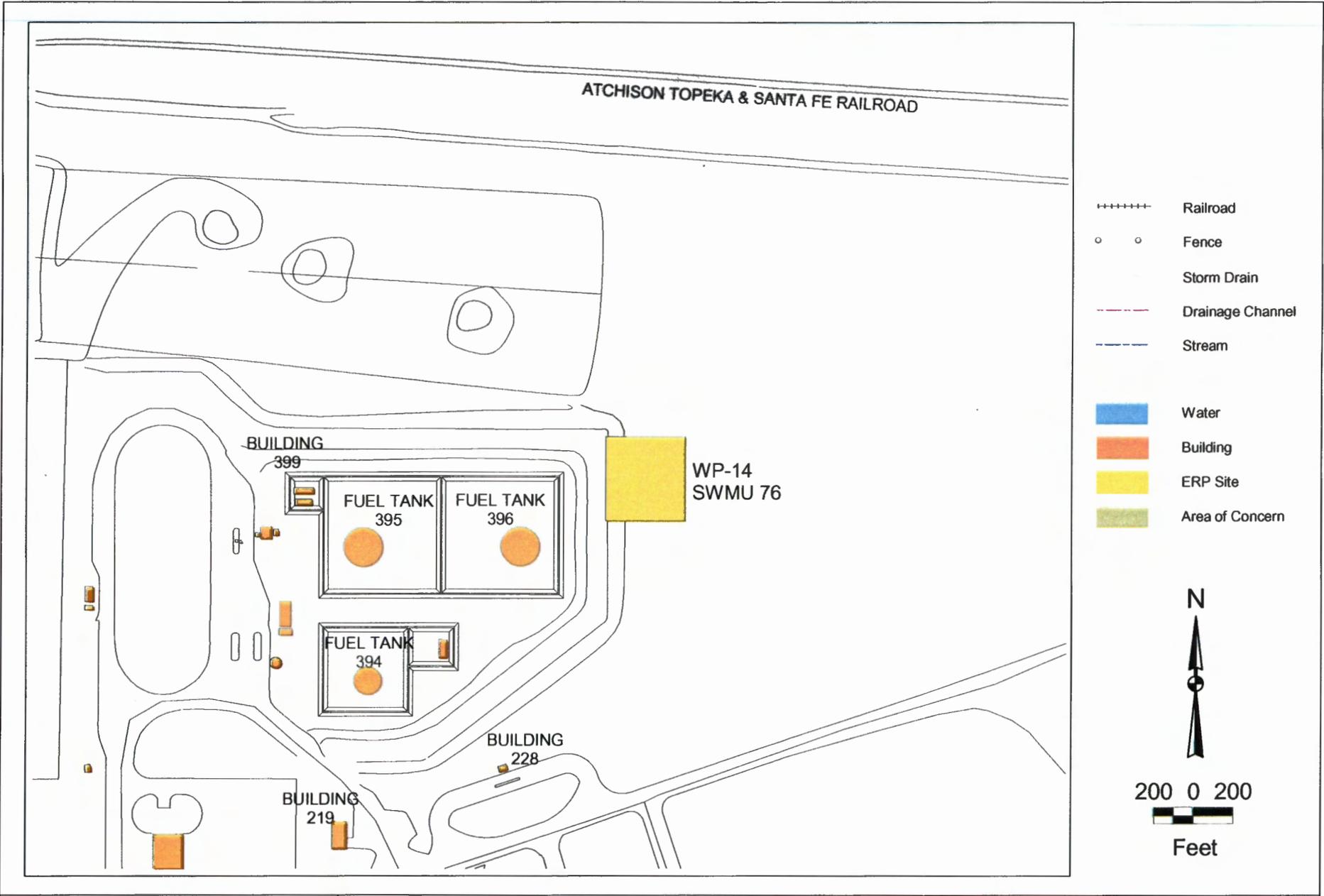
- +++++ Railroad
- o o Fence
- Storm Drain
- .-.- Drainage Channel
- .-.- Stream
- Water
- Building
- ERP Site
- Area of Concern



Cannon AFB.
New Mexico

SD-13 SITE MAP
SANITARY SEWAGE LIFT STATION OVERFLOW PIT

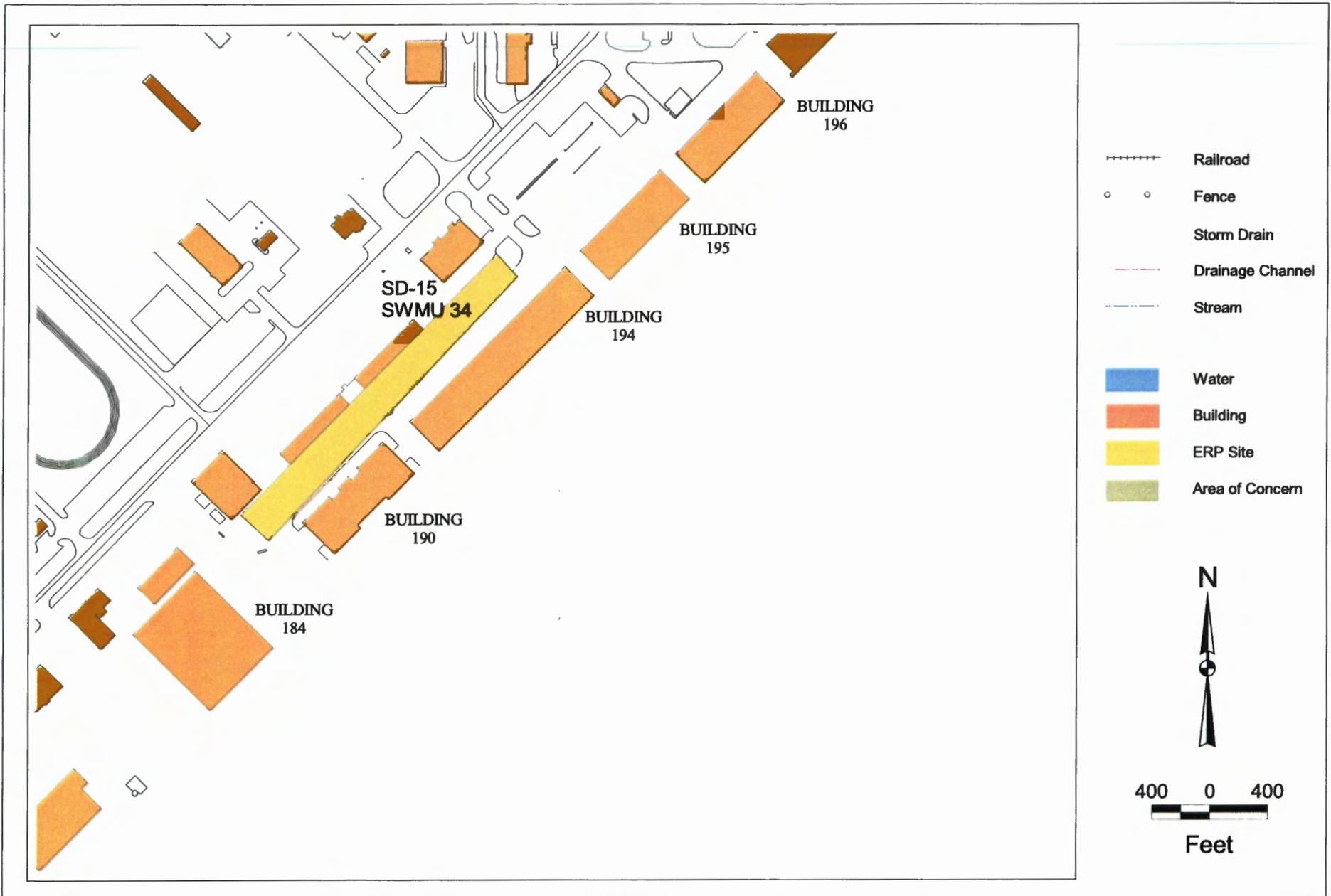
Figure D4-12



Cannon AFB.
New Mexico

WP-14 SITE MAP
SLUDGE WEATHERING PIT

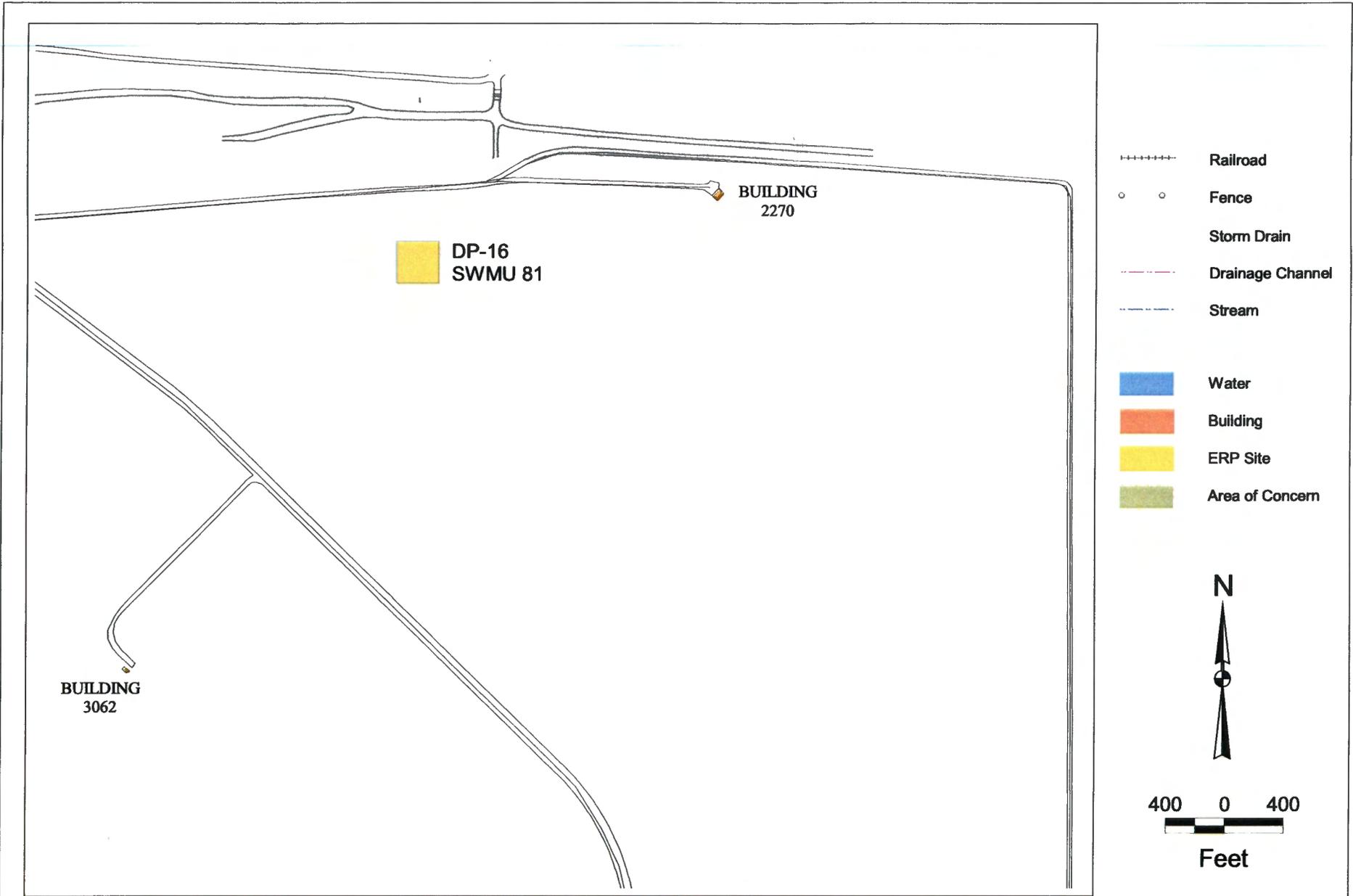
Figure D4-13



Cannon AFB.
New Mexico

**SD-15 SITE MAP
AGE DRAINAGE DITCH**

Figure D4-14



- +++++ Railroad
- o o Fence
- Storm Drain
- - - Drainage Channel
- - - Stream
- Water
- Building
- ERP Site
- Area of Concern

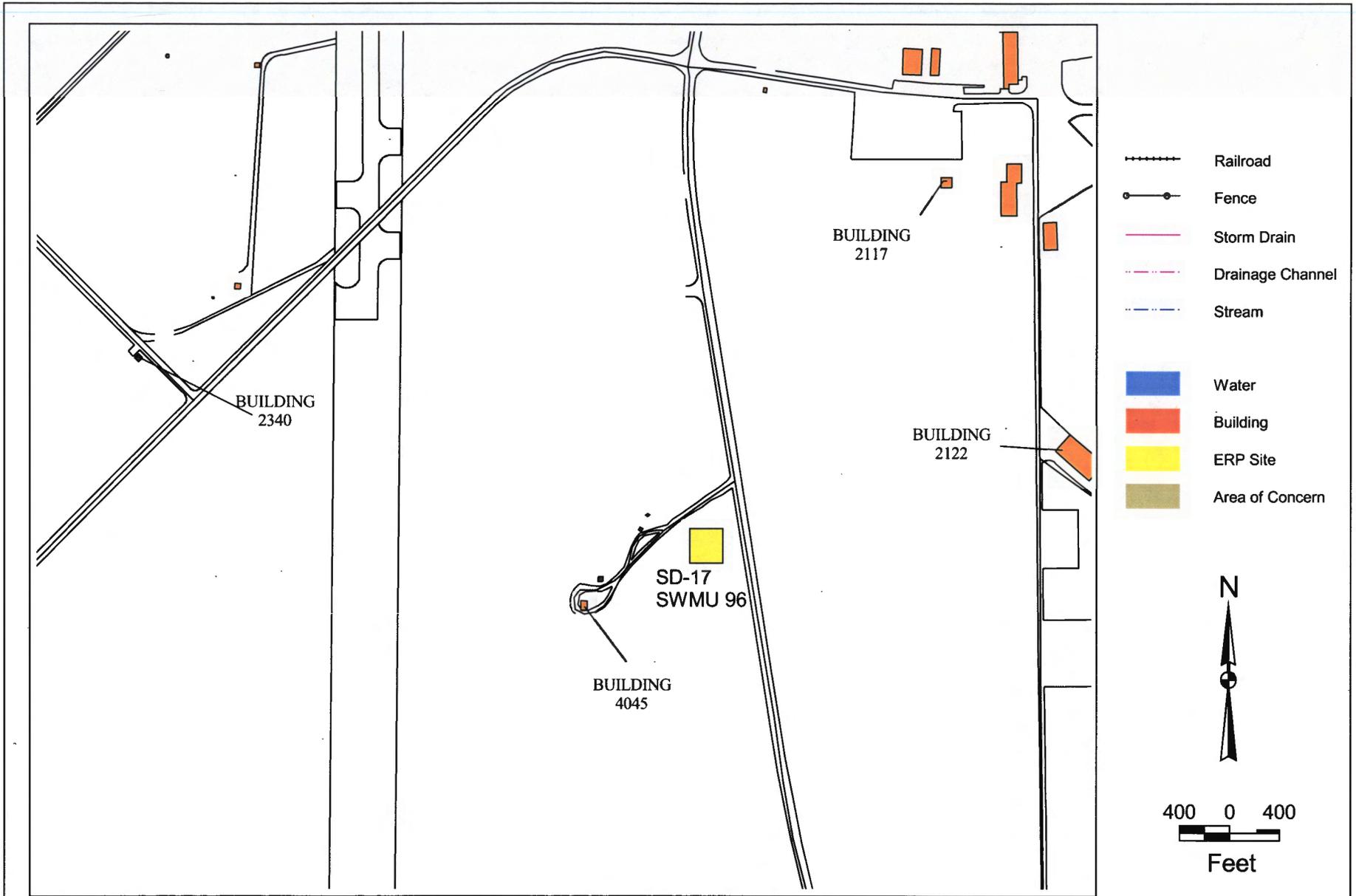


400 0 400
 Feet

Cannon AFB.
 New Mexico

DP-16 SITE MAP
 SOLVENT DISPOSAL SITE

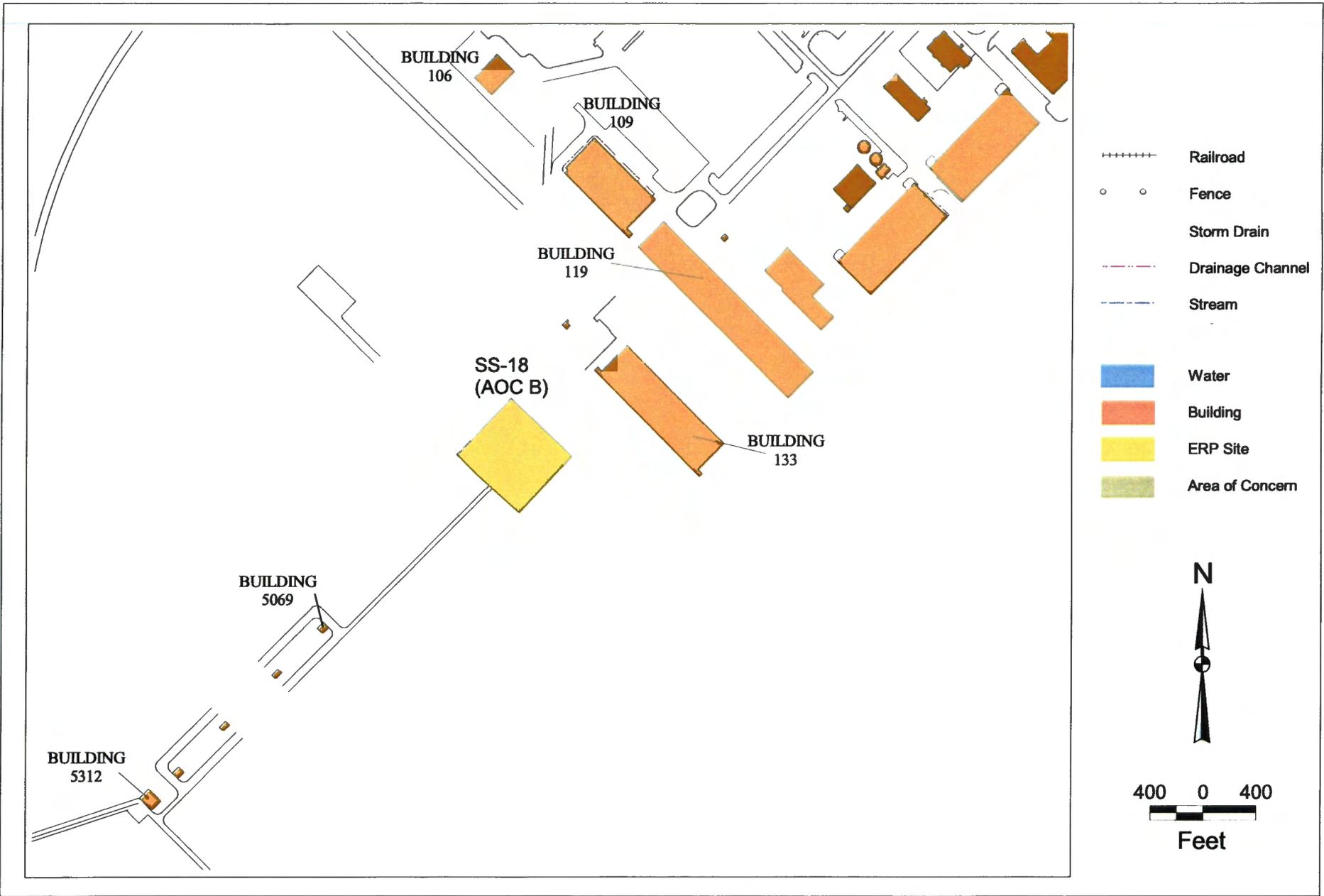
Figure D4-15



Cannon AFB.
New Mexico

SD-17 SITE MAP
OLD ENTOMOLOGY RINSE AREA

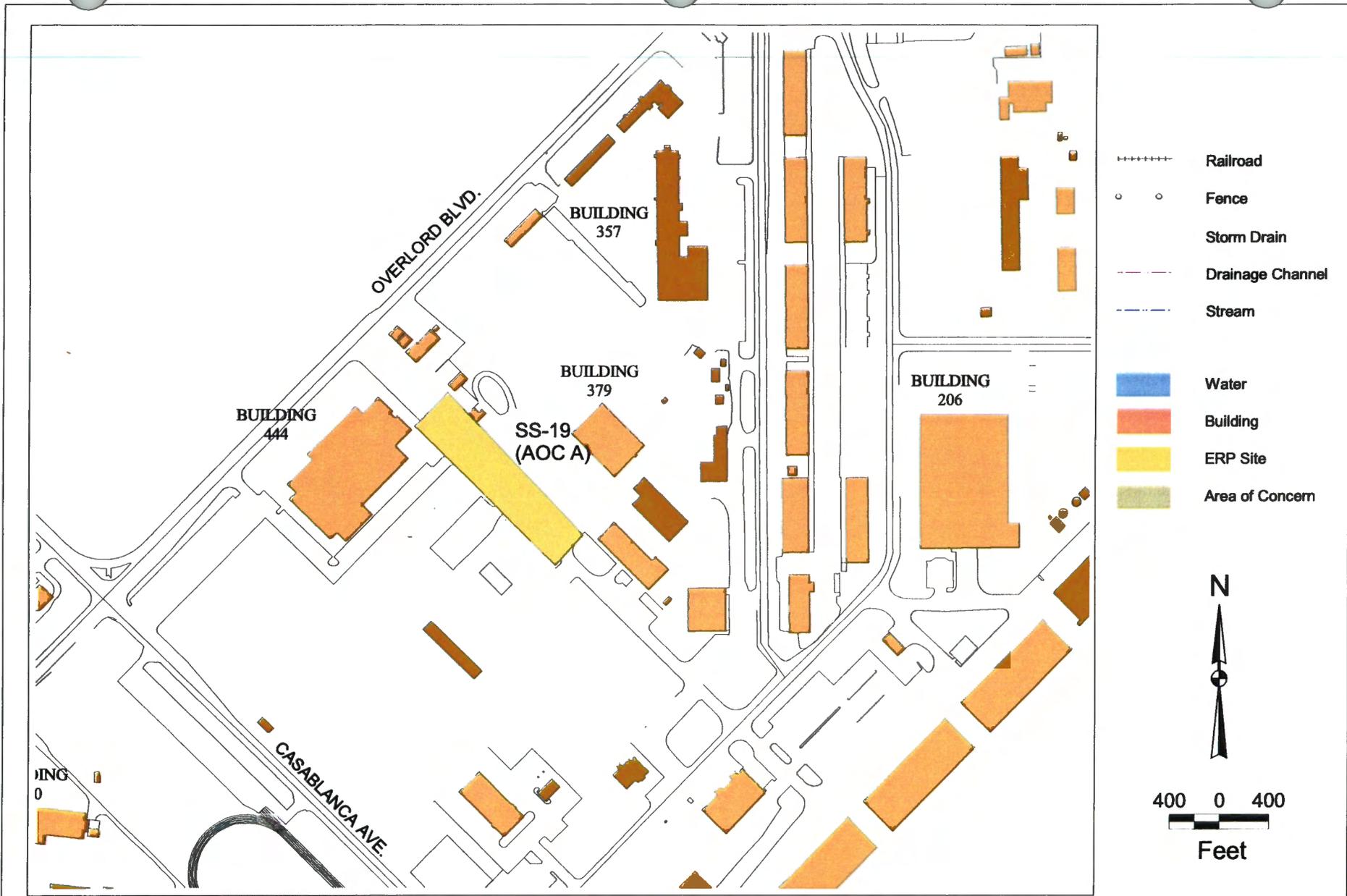
Figure D4-16



Cannon AFB.
New Mexico

SS-18 SITE MAP
JP-4 JET FUEL SPILL

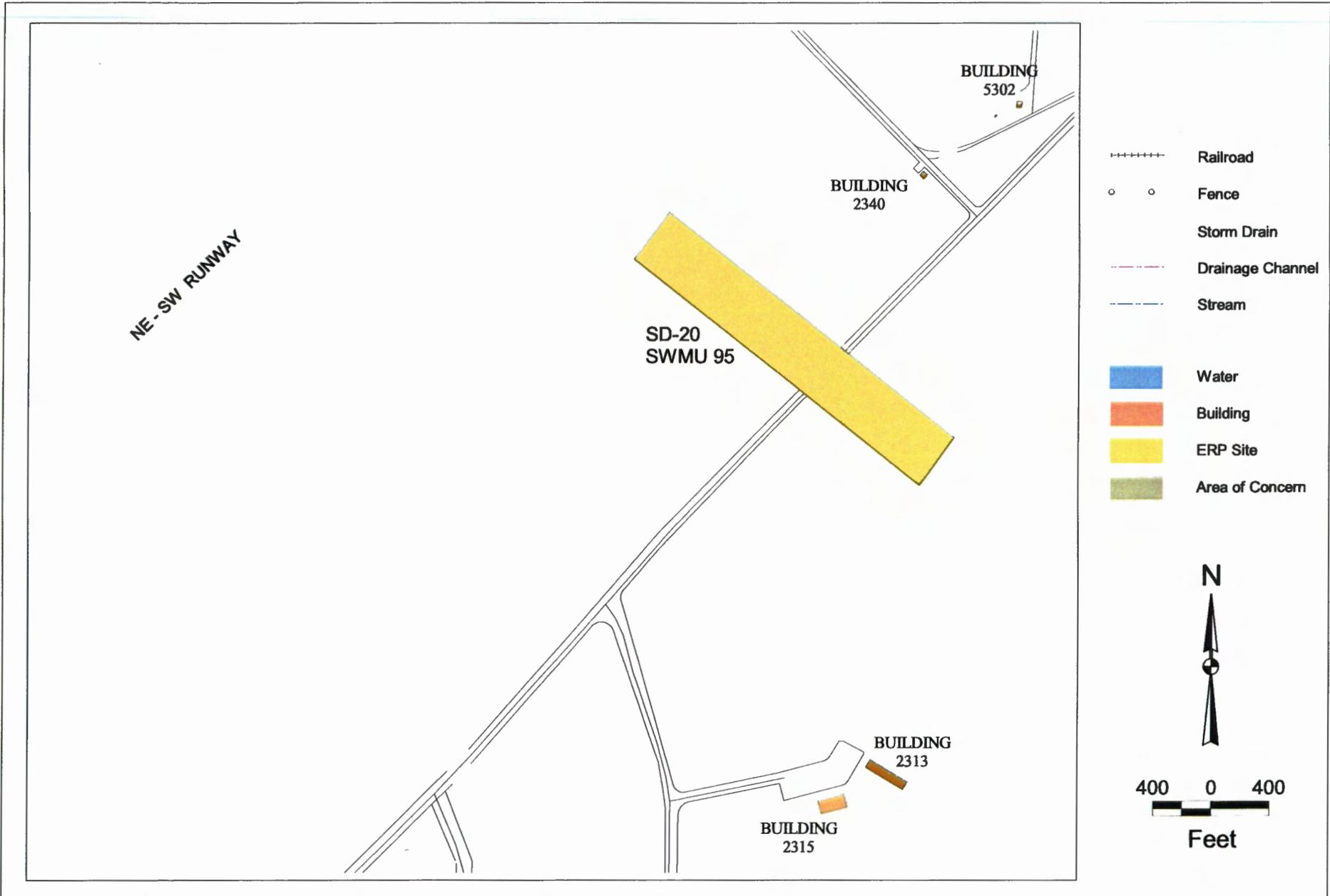
Figure D4-17



Cannon AFB.
New Mexico

**SS-19 SITE MAP
MOGAS SPILL**

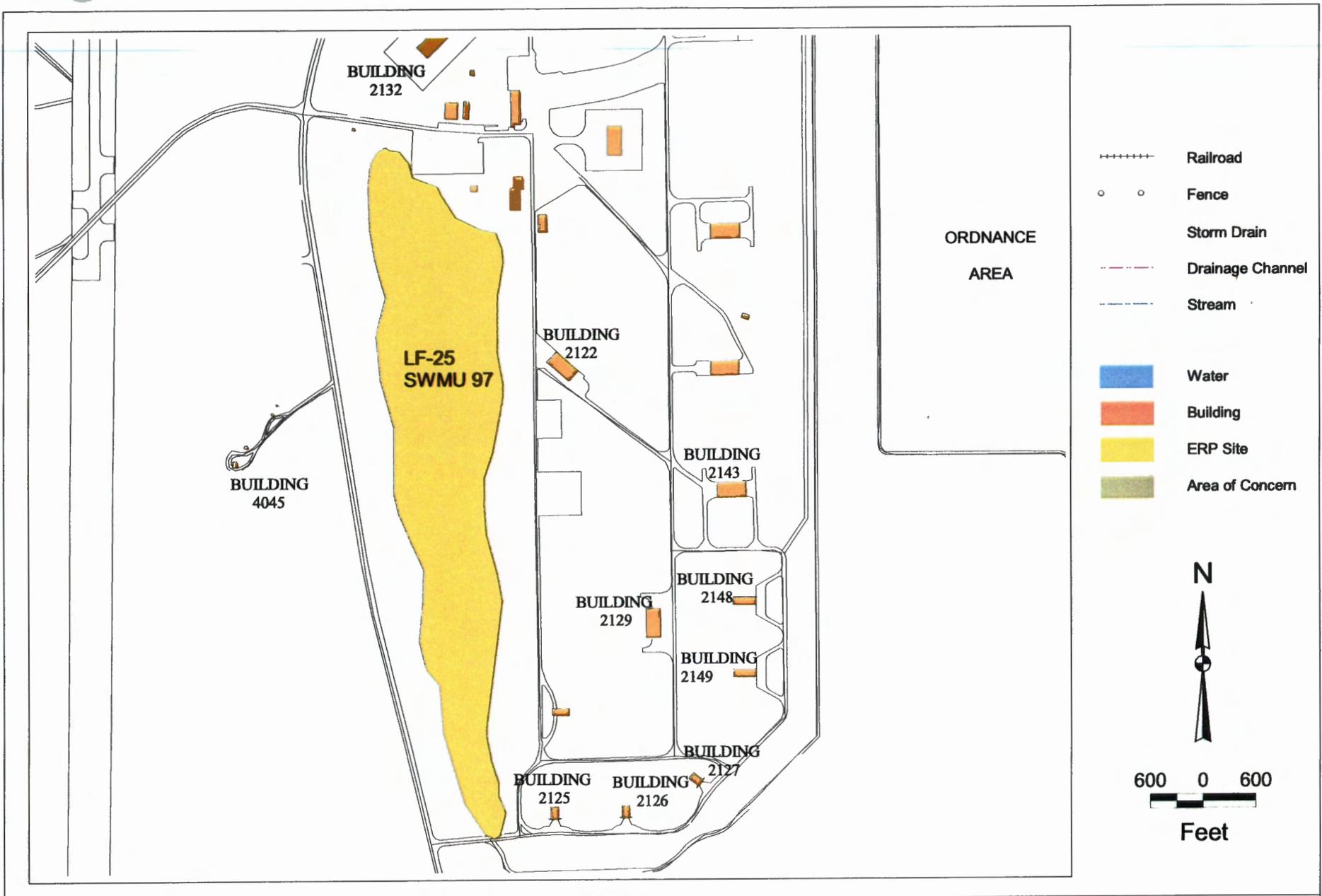
Figure D4-18



Cannon AFB.
New Mexico

**SD-20 SITE MAP
NE STORMWATER DRAINAGE AREA**

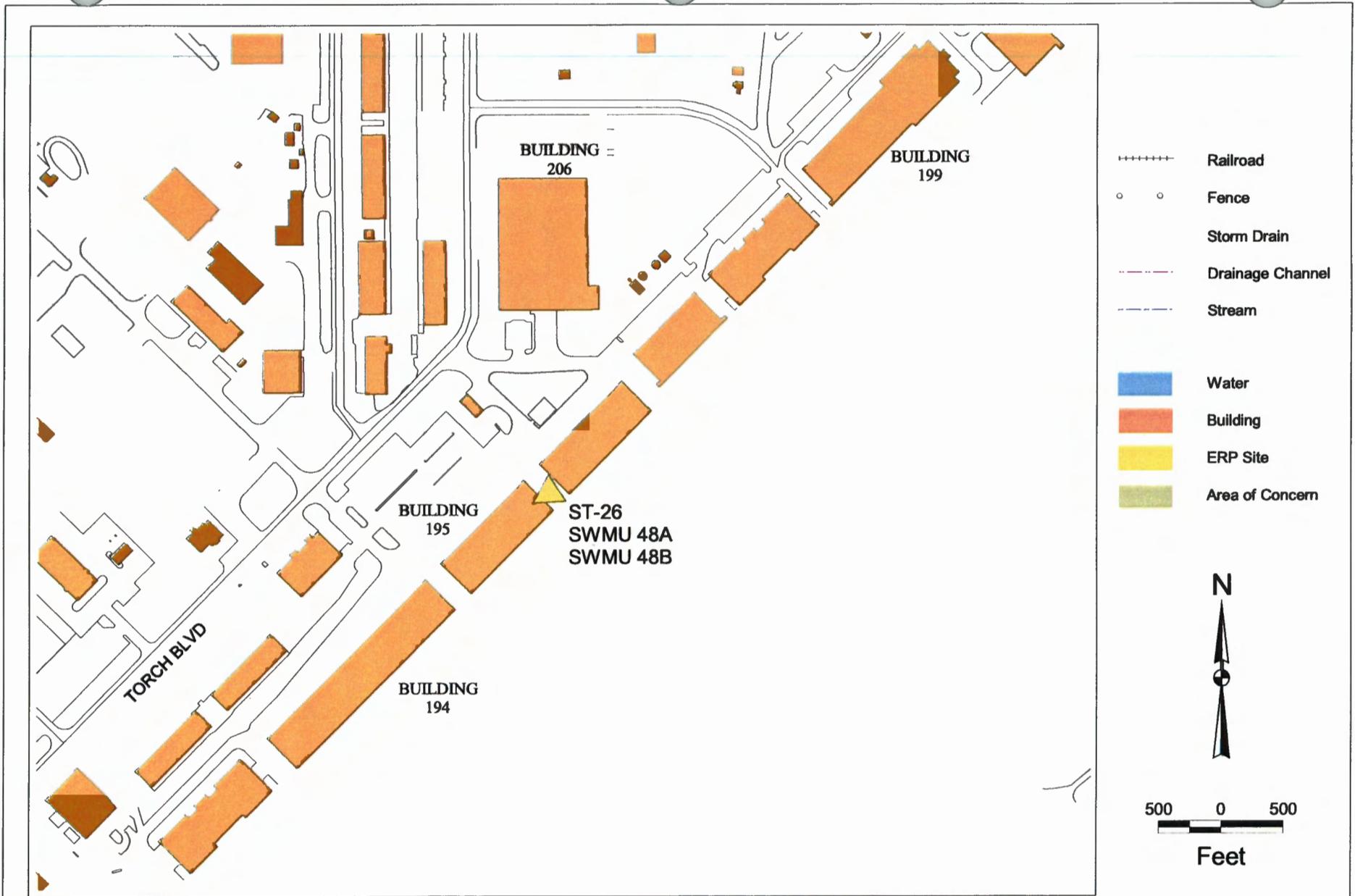
Figure D4-19



Cannon AFB.
New Mexico

**LF-25 SITE MAP
CONCRETE RUBBLE PILE**

Figure D4-20



Cannon AFB.
New Mexico

ST-26 SITE MAP
 UNDERGROUND WASTE OIL TANK
 AND ABOVEGROUND OVERFLOW CAPACITY TANK

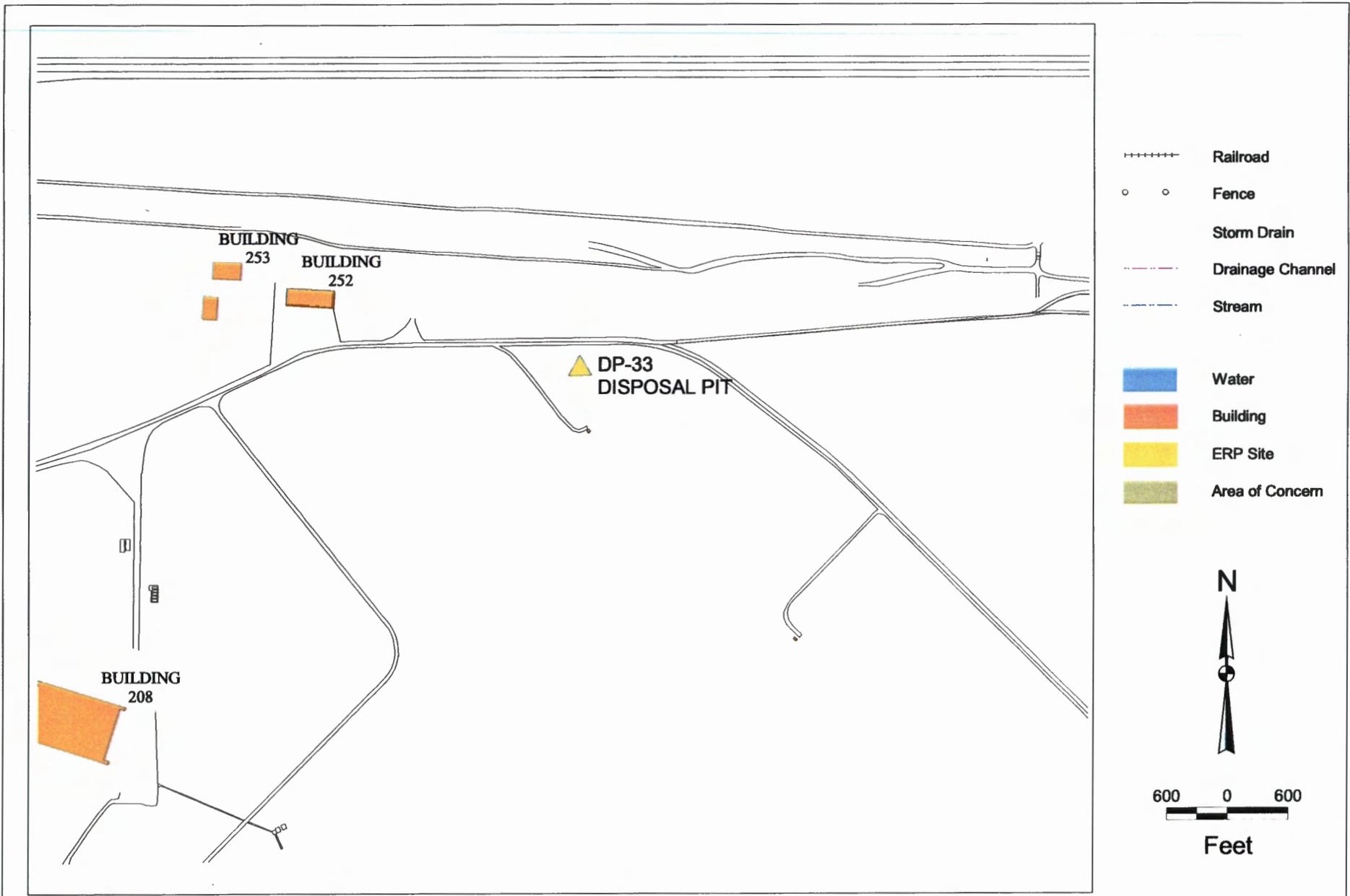
Figure D4-21



Cannon AFB.
New Mexico

ST-27 SITE MAP
SUMP

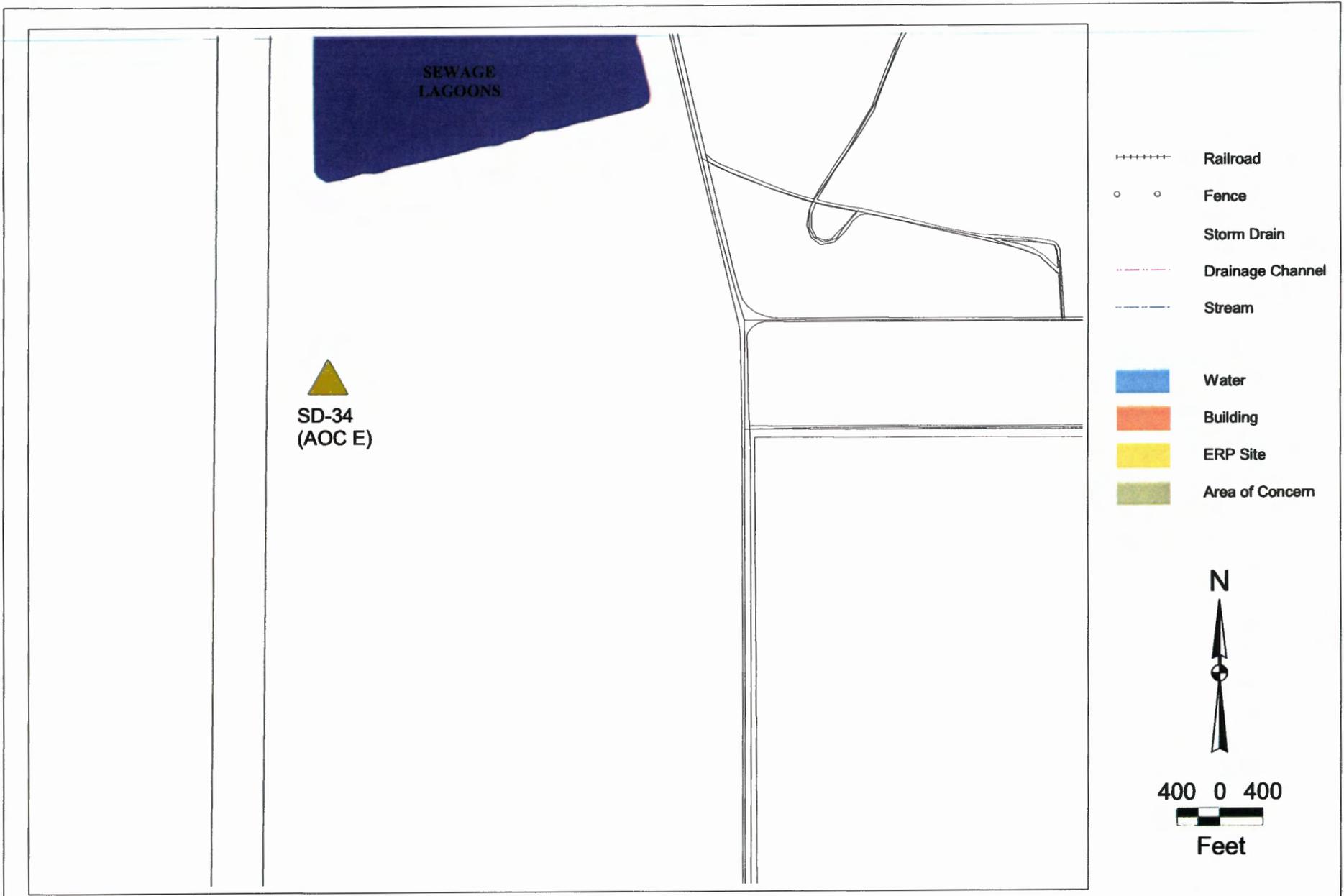
Figure D4-22



Cannon AFB
New Mexico

DP-33 SITE MAP
DISPOSAL PIT

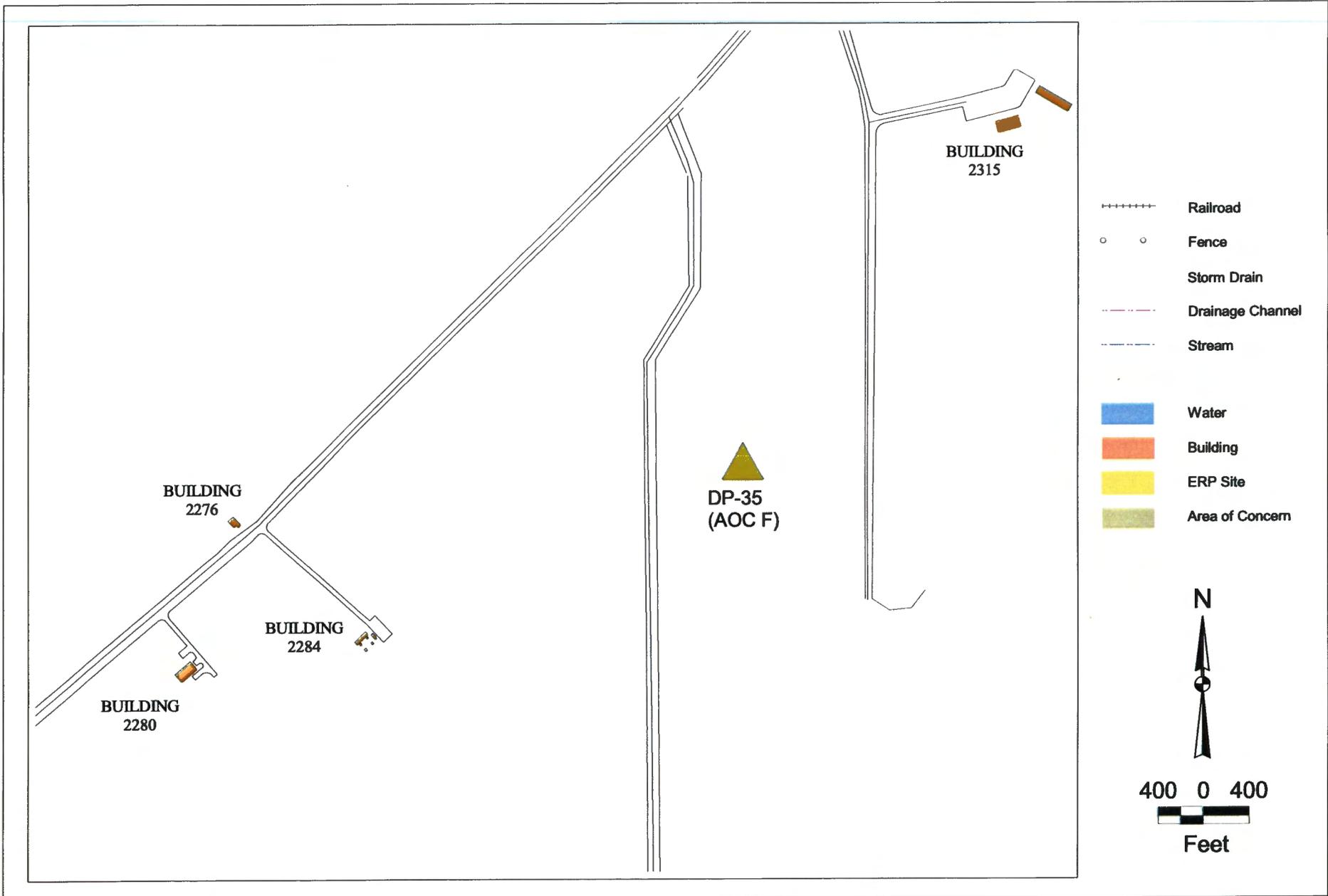
Figure D4-23



Cannon AFB.
New Mexico

SD-34 SITE MAP
RUBBLE PILE (AOC E)

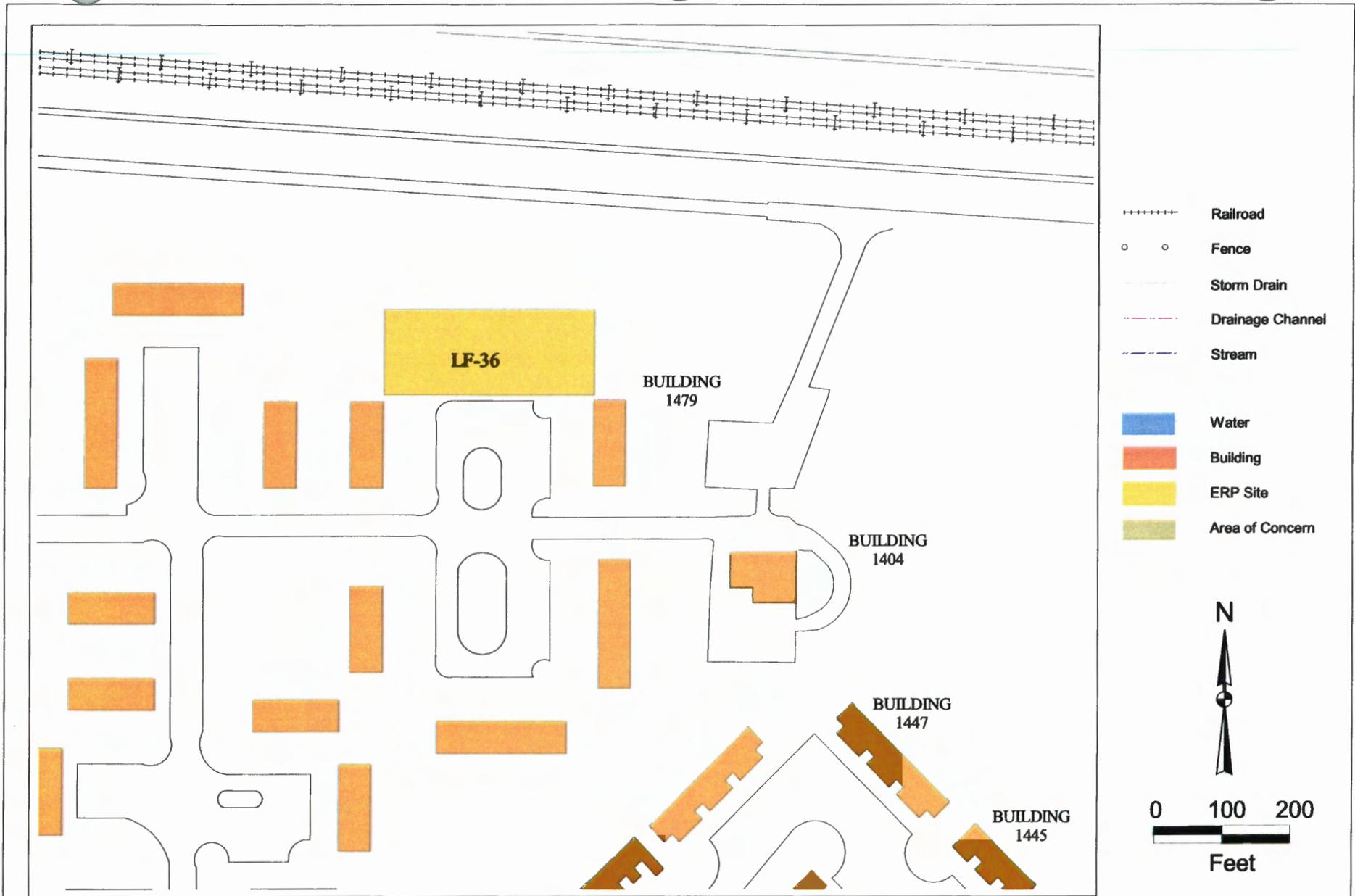
Figure D4-24



Cannon AFB.
New Mexico

DP-35 SITE MAP
BORESIGHT MOUND (AOC F)

Figure D4-25



Cannon AFB,
New Mexico

LF-36 SITE MAP
POTENTIAL OLD LANDFILL (FORMER AOC G)

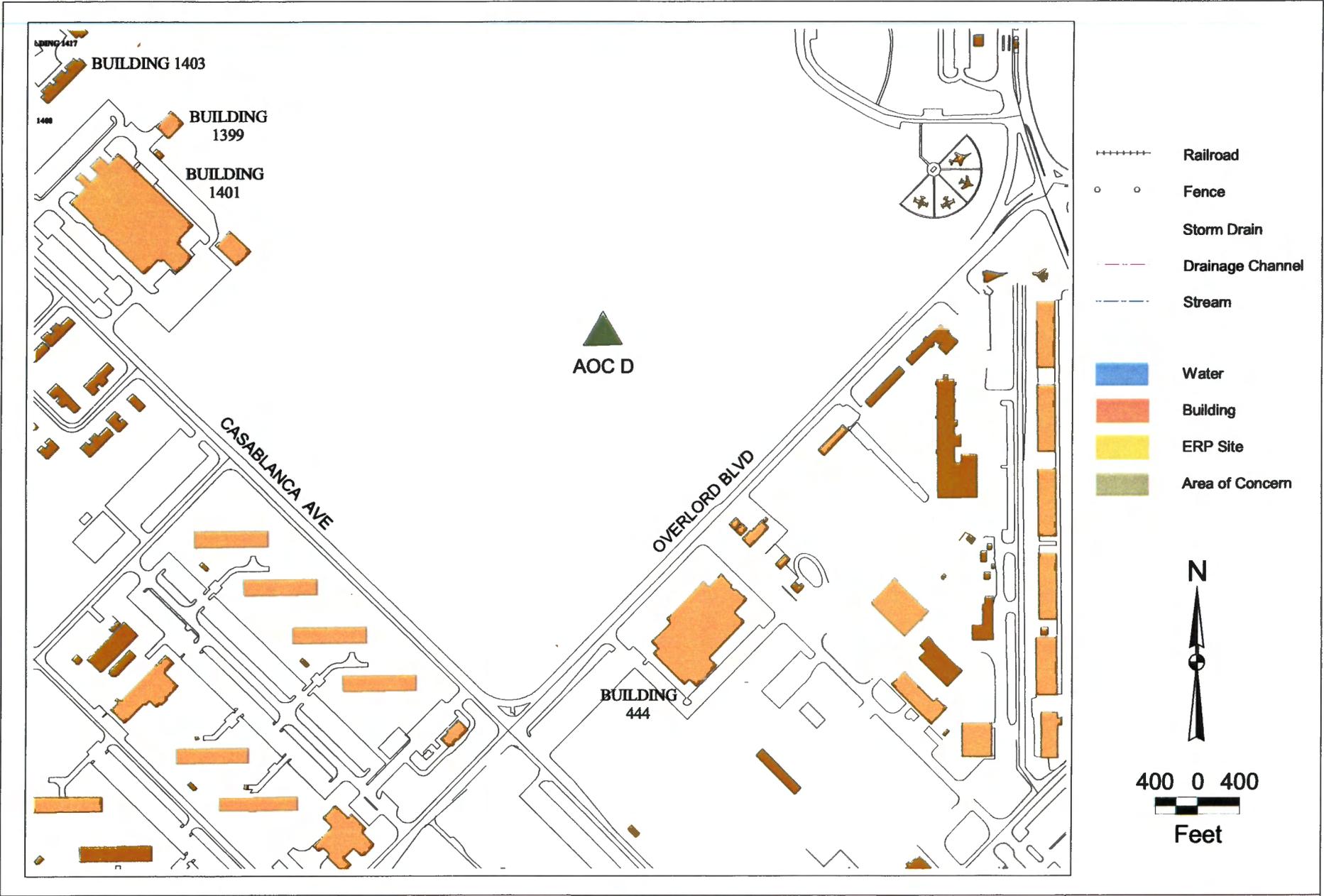
Figure D4-26



Cannon AFB,
New Mexico

LF-37 SITE MAP
POTENTIAL OLD LANDFILL (FORMER AOC H)

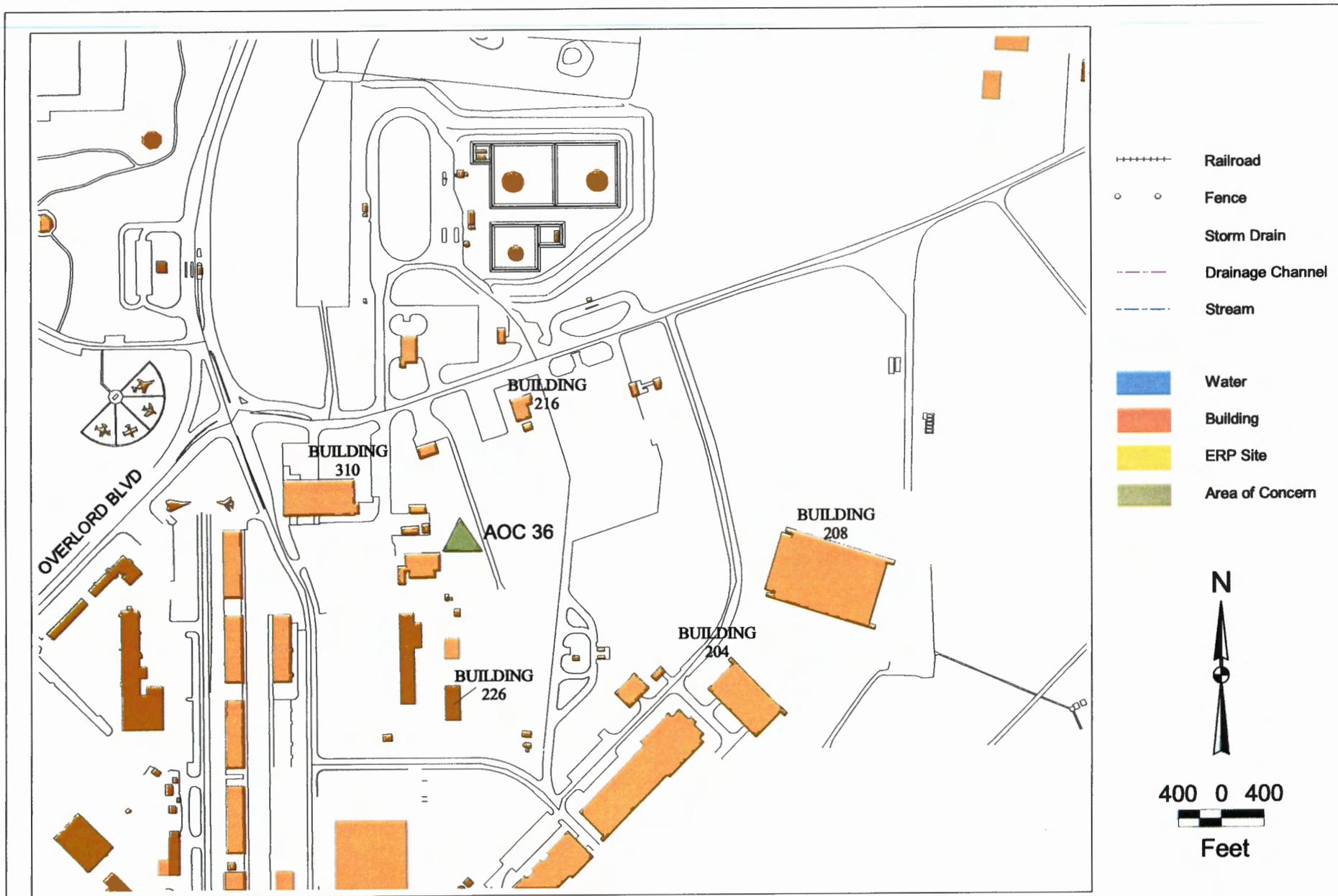
Figure D4-27



Cannon AFB.
New Mexico

AOC D SITE MAP
ASBESTOS BURIAL PIT ON GOLF COURSE

Figure D4-28



Cannon AFB.
New Mexico

**AOC 36 SITE MAP
DISPOSAL PIT**

Figure D4-29

APPENDIX D5

ERP SITE TIMELINES WITH COSTS BY TASKS

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TABLE D5-1

ERP LINE ITEMS THROUGH CLOSEOUT

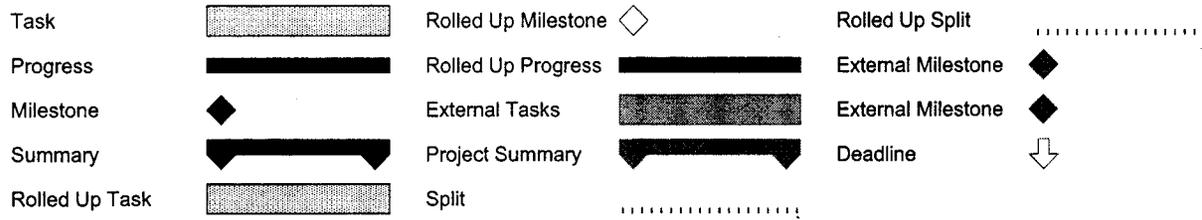
**Management Action Plan
Cannon AFB, New Mexico**

FY	Site	Phase	Cost (\$K)
2002	LF-3, LF-4 LF-25	LTM	44.0*
2003	LF-3, LF-4 LF-25	LTM	50
2004	LF-3, LF-4 LF-25	LTM	50
2005	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		SI	1,755
		TOTAL	1,805
2006	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		RI	400
		TOTAL	450
2007	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		FS	375
		TOTAL	425
2008	LF-3, LF-4 LF-25 MELROSE RANGE	LTM	50
		RD	250
		TOTAL	300
2009	MELROSE RANGE	RA-C	5,000
2010	MELROSE RANGE	PCO-C	50
2011	MELROSE RANGE	PCO-C	50

*\$49.3k validated

CANNON AFB ERP SUMMARY SCHEDULE

ID	Task Name	Total Cost	Duration	Start	Finish	2000	2001	2002	2003	2004	2005	2006	2
						1	CANNON AFB ERP	7,860,000	1565 days	Mon 10/2/00	Fri 9/29/06	[Gantt bar for Task 1]	
2	LF-3, LF-4 & LF-25 WELLS	30,000	1565 days	Mon 10/2/00	Fri 9/29/06	[Gantt bar for Task 2]							
3	LTM	30,000	1565 days	Mon 10/2/00	Fri 9/29/06	[Gantt bar for Task 3]							
4													
5	Melrose Range	7,830,000	1565 days	Mon 10/2/00	Fri 9/29/06	[Gantt bar for Task 5]							
6	SI	1,755,000	260 days	Mon 10/2/00	Fri 9/28/01	[Gantt bar for Task 6]							
7	RI	400,000	261 days	Mon 10/1/01	Mon 9/30/02	[Gantt bar for Task 7]							
8	FS	375,000	261 days	Tue 10/1/02	Tue 9/30/03	[Gantt bar for Task 8]							
9	RD	250,000	261 days	Thu 10/2/03	Thu 9/30/04	[Gantt bar for Task 9]							
10	RA	5,000,000	261 days	Fri 10/1/04	Fri 9/30/05	[Gantt bar for Task 10]							
11	PCO-C	50,000	260 days	Mon 10/3/05	Fri 9/29/06	[Gantt bar for Task 11]							



APPENDIX D6

AIR STAFF TABLES

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TABLE D6-1

ERP STATUS SUMMARY AND PROGRESSION

**Management Action Plan
Cannon AFB, New Mexico**

ERP Stage	Stage Description	FY02	FY03
Analysis	Preliminary Assessment, Site Investigation, Remedial Investigation, and/or Feasibility Study in progress or complete; DD has not been signed.	0	0
IRA Initiated	IRA initiated to address an immediate problem; the IRA may contribute to, or be continued as part of, the final RA. A DD has not yet been signed.	0	0
RD/RA Initiated and/or Underway	A DD has been signed. RD is underway or complete for the selected RA, and the RA may be under construction.	0	0
Only RAO Remaining	The selected RA has been implemented, and RAO of the remedy is in progress. Closeout documentation has been submitted and possibly approved for the site.	1	0
Response Complete	The RA is complete, and no further RAO is required.	0	0
Transfer to Compliance (ERP Complete)	Site transferred to existing Cannon AFB compliance programs for action under other applicable laws, regulations, and policies. Projects eliminated from ERA funding.	26	27
Site Total	This number should equal the total number of ERP sites at the base.	27	27

Notes:

DD = Decision Document
 ERA = Environmental Restoration Account
 FY = Fiscal Year
 RAO = Remedial Action-Operation

TABLE D6-2

COMMITMENT TO PROGRESS

Management Action Plan
Cannon AFB, New Mexico

CONTAMINATION TO BE REMOVED							
	Soil (KCY)	Cont (gal)	Fuel (Kgal)	Water (Kgal)	Cont (gal)	USTs (each)	Drums (each)
POL Products	0	0	0	0	0	0	0
Solvents	0	0	0	0	0		
Heavy Metals	0	0	0	0	0		
CONTAMINATION REMOVED							
	Soil (KCY)	Cont (gal)	Fuel (Kgal)	Water (Kgal)	Cont (gal)	USTs (each)	Drums (each)
POL Products	12	0	1	0	0	42	75
Solvents	0	0	0	0	0		
Heavy Metals	0	0	0	0	0		

Notes:

Does not include asbestos removal

cy = Cubic yard

gal = Gallon

lbs = Pounds

APPENDIX D7

RELATIVE RISK INFORMATION

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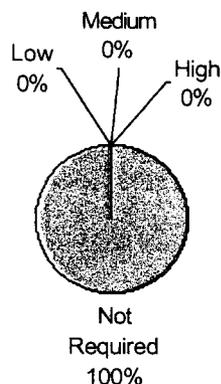
D7-1 CURRENT ERP RELATIVE RISK STATUS FOR CANNON AFB	D7-1
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FIGURE D7-1

CURRENT ERP RELATIVE RISK STATUS FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Site ID	Risk	Site ID	Risk
LF001	NR	DP016	NR
LF002	NR	SD017	NR
LF003	NR	SS018	NR
LF004	NR	SS019	NR
LF005	NR	SD020	NR
FT006	NR	LF025	NR
FT007	NR	ST026	NR
FT008	NR	OT027	NR
OT010	NR	DP033	NR
SD011	NR	SD034	NR
SD012	NR	DP035	NR
SD013	NR	LF036	NR
WP014	NR	LF037	NR
SD015	NR		



D7-1 SCREENING LEVELS PROPOSED FOR SITE REMEDIATION BASED ON FUTURE LAND USE OPTIONS

The Base has developed a future land use plan and a long-range facilities development plan. Physical constraints, restrictions imposed by airfield or explosive safety criteria, and compatibility with the development of communities surrounding the Base are considered during base comprehensive planning. The range of reasonable future uses for a specific site was determined by surrounding land uses and projections for likely development in the area of the site, and is consistent with the BCP. Each potential future land use option was evaluated to provide a thorough framework to allow decisions to be made by the Air Force, regulators, and the community, thereby creating uniform expectations for the future use of each site and for corresponding cleanup levels that will provide a safe environment for future inhabitants of the property. Table D7-1 summarized the likely future use of each site at Cannon AFB.

Under the RNSI approach, other than residential, sites that are remediated to meet designated land use criteria will be deed restricted, or another similar mechanism will be used to ensure that the land use does not change without prior evaluation of land use criteria. This will assure that the actual future use of the property is limited to the future land use previously agreed upon by the Air Force, the regulatory agencies, and community planners. If the land use should be reassigned, then the land use criteria would be reopened and reviewed by the Base and regulatory agencies at that time.

There are a limited number of land uses that need to be considered at any given AFB. Under the RNSI approach, anticipated future land uses of sites have been categorized as residential, open space, commercial, and industrial. Restrictions on land and natural resources for each of these categories were adapted from *Future Use Considerations in the Cleanup of Air Force Installations* (USAF 1992), and listed in the MAP RNSI Volume. A description of each of the four land use categories is presented below.

D7-1.1 RESIDENTIAL LAND USE

Residential land use is assumed when there are or may be occupied residences on or immediately adjacent to the site. The residential category includes family housing for permanent party or transient personnel and associated support facilities, as well as all other forms of lodging for unmarried or unaccompanied personnel. Examples of residential structures are presented in the MAP RNSI Volume. Potentially significant exposure pathways for residential land use include: 1) ingestion, inhalation, and dermal contact with groundwater; 2) ingestion and dermal contact with soil; 3) inhalation of ambient air; 4) ingestion and dermal contact with surface water; and 5) ingestion, inhalation, and dermal contact with soils during intrusive actions. Exposure assumptions selected to calculate screening levels for residential land reuse are noted in the general PPE report presented in the MAP RNSI Volume.

D7-1.1.1 Open Space Land Use

The open space category includes undeveloped lands that are barren or where the naturally occurring vegetation includes grasses, shrubs, or trees that are to be retained as buffer zone easements or clear zones. It also includes those areas to be retained for conservation or grazing purposes and outdoor sports fields and courts. The MAP RNSI Volume presents some specific examples of open space land use options. Potentially significant exposure pathways for open space land use include: 1) ingestion and dermal contact with soil; 2) inhalation of ambient air; and 3) ingestion and dermal contact with water. Exposure assumptions selected to calculate screening levels for open space land reuse are noted in the general PPE report presented in the MAP RNSI Volume.

D7-1.2 COMMERCIAL LAND USE

Commercial land use includes any structure of a commercial or institutional nature to which the general public, including children, the elderly, and other potentially sensitive populations, may have access. This category includes all office functions not directly associated with the flying mission, those facilities which provide for the sale of goods and services, those facilities which support morale and welfare, and physical and mental health facilities. The MAP RNSI Volume presents some examples of facilities and operations included under the commercial land use category. Potentially significant exposure pathways for commercial land use include: 1) ingestion of and dermal contact with soil; 2) inhalation of ambient air; and 3) ingestion, inhalation, and dermal contact with soils during intrusive actions. Exposure assumptions selected to calculate screening levels for commercial land reuse are noted in the general PPE report presented in the MAP RNSI Volume.

D7-1.3 INDUSTRIAL LAND USE

Industrial land use options include areas of developed land used for manufacturing or industrial purposes. This category includes pavements and facilities which directly support the flying mission, those facilities required to operate and maintain aircraft in support of the flying mission, and maintenance and storage functions not directly related to the flying mission. Examples of facilities and operations included under the industrial land use category are presented in the MAP RNSI Volume. Potentially significant exposure pathways for industrial land use include: 1) dermal contact or inhalation of constituents that volatilize from groundwater and surface water; 2) ingestion and dermal contact with soil; 3) inhalation of ambient air; and 4) ingestion, inhalation, and dermal contact with soils disturbed during intrusive actions. Exposure assumptions selected to calculate screening levels for industrial land reuse are noted in the general PPE report presented in the MAP RNSI Volume.

TABLE D7-1

FUTURE LAND USE SUMMARY FOR CONSIDERATION IN DEVELOPING REMEDY SELECTIONS FOR ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

Site ID	SWMU No.	Potential Risks	Contaminants			Current Use	Adjacent Uses	Likely Future Use	RNSI Land Use Designation	
			Ground-water	Soil	Surface/Sediments				Current	Future
LF-01	74	NR	NS	MCP, low level oil & grease, TPH, and metals	NS	Golf course	Golf course	Golf course	Open Space	Open Space
LF-02	82	Ingestion of groundwater, dermal contact with soil during excavation	NS	Metals	Metals	Inactive	Runway	Limited access	Open Space	Open Space
LF-03	105	NR	ND	Low level oil & grease, TPH, and pesticides	ND	Inactive	Inactive ERP sites	Restricted access	Open Space	Open Space
LF-04	104	NR	ND	Low level oil & grease, 4,4-DDD, 4,4-DDE, and 4,4-DDT	ND	Inactive	Playa Lake	Restricted access	Open Space	Open Space
LF-05	113	Dermal contact/inhalation during excavation	Lead	VOCs, low level TRPH	Metals	Inactive	ERP sites	Restricted access	Open Space	Open Space
LF-36	Former AOC G					Residential	Open Space	Residential	Residential	Residential

TABLE D7-1 (Continued)

FUTURE LAND USE SUMMARY FOR CONSIDERATION IN DEVELOPING REMEDY SELECTIONS FOR ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

Site ID	SWMU No.	Potential Risks	Contaminants			Current Use	Adjacent Uses	Likely Future Use	RNSI Land Use Designation	
			Ground-water	Soil	Surface/Sediments				Current	Future
LF-37	Former AOC H					Residential	Open Space	Residential	Residential	Residential
FT-06	78	NR	NS	Lead, zinc, TPH, oil & grease, 4,4-DDT, 4,4-DDE	Lead, zinc, TPH, 4,4-DDD, 4,4-DDE	Inactive	Runway	Limited access	Open Space	Open Space
FT-07	106	NR	NS	Low level oil & grease, TPH, lead, chromium	Copper	Inactive	Inactive ERP sites	Restricted access	Open Space	Open Space
FT-8	107	NR	NS	Low level TPH, VOCs	Lead	Inactive	Inactive ERP sites	Restricted access	Open Space	Open Space
OT-10	AOC C	NR	NS	PCBs, (soil has been removed)	PCBs (soil has been removed)	Inactive	Main Base Building 1437	Main Base	Industrial	Industrial
SD-11	86 through 90	Dermal contact/inhalation from soil contaminants	NS	TPH, acetone, toluene	TPH	Inactive	Flightline	Inactive	Industrial	Industrial
SD-12	85	NR	Low level pesticides	Low level oil & grease	NS	Inactive, prairie grass	Runway	Limited access	Open Space	Open Space

TABLE D7-1 (Continued)

FUTURE LAND USE SUMMARY FOR CONSIDERATION IN DEVELOPING REMEDY SELECTIONS FOR ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

Site ID	SWMU No.	Potential Risks	Contaminants			Current Use	Adjacent Uses	Likely Future Use	RNSI Land Use Designation	
			Ground-water	Soil	Surface/Sediments				Current	Future
SD-13	75	NR	NS	ND	NS	Golf course	Golf course	Golf course	Open Space	Open Space
WP-14	76	NR	NS	Ethylbenzene, xylenes	NS	Inactive	Fuel Farm	Restricted access	Industrial	Industrial
SD-15	34	Ingestion of groundwater and dermal contact/inhalation of soil	NS	PAH, TRPH, lead, zinc	PAH, TRPH, lead, zinc	Stormwater	Runoff from AGE maintenance roads	Industrial	Industrial	Industrial
DP-16	81	NR	NS	Acetone	NS	Inactive	Runway	Limited access	Open Space	Open Space
SD-17	96	Ingestion of groundwater, dermal contact, inhalation from soil contaminants	Low level metals	4,4-DDD, 4,4-DDE, 4,4-DDT, chlordane	4,4-DDD, 4,4-DDE, 4,4-DDT, chlordane	Inactive	Sewage lagoons, ERP sites	Restricted access	Open Space	Open Space
SD-18	AOC B	NR	NS	TRPH	ND	Hangar-Building 120	Flightline	Hangar-Building 120	Industrial	Industrial
SS-19	AOC A	NR	NS	ND	Lead, DCE	Main Base, Argentia Ave.	Gymnasium	Main Base, Argentia Ave.	Industrial	Industrial

TABLE D7-1 (Continued)

FUTURE LAND USE SUMMARY FOR CONSIDERATION IN DEVELOPING REMEDY SELECTIONS FOR ERP SITES

**Management Action Plan
Cannon AFB, New Mexico**

			Contaminants						RNSI Land Use Designation	
Site ID	SWM UNo.	Potential Risks	Ground-water	Soil	Surface/Sediments	Current Use	Adjacent Uses	Likely Future Use	Current	Future
SD-20	95	Dermal contact with soil during excavation	ND	ND	Arsenic, cadmium, chromium, cobalt, copper, iron, lead, nickel, zinc	Stormwater drainage	Runway	Stormwater drainage	Open Space	Open Space
DP-25	97	Contact and inhalation during excavation	ND	ND	ND	Inactive	Inactive	Restricted access	Open Space	Open Space
DP-33		NR	NS	ND	ND	Inactive	Storage Yard	Storage Area	Industrial	Industrial
AOC D		Contact and inhalation during excavation	NS	Asbestos	Asbestos	Golf course	Gold course	Golf course	Open Space	Open Space
AOC 36		NR	NS	ND	ND	Parking Lot	Rec Area	Parking Lot	Open Space	Open Space
AOC E		Unknown	NE	NE	NE	Open Space	Open Space	Open Space	Open Space	Open Space
AOC F		Unknown	NE	NE	NE	Inactive	Small arms range	Inactive	Open Space	Open Space

AGE = Aerospace Ground Equipment

DDE = Dichlorodiphenylethane

ND = no contaminants detected and/or contaminants detected below background or unacceptable risk levels

NR = negligible risk

PCB = polychlorinated biphenyl

TRPH = total recoverable petroleum hydrocarbon

AOC = Area of Concern

DDT = Dichlorodiphenyltrichloroethane

NS = not sampled

NS = not sampled

SWMU = Solid Waste Management Unit

VOC = volatile organic compound

DCE = dichloroethylene

ERP = Environmental Resources Program

NE = not yet evaluated

PAH = polynuclear aromatic hydrocarbons

TPH = total petroleum hydrocarbons

APPENDIX D8

SITE STATUS SUMMARY SHEETS

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		5/1/1993	5/1/1993		
RC		19-May-98	17-Oct-97		
SC		1-Oct-98	17-Oct-97		
PA	Complete	1-Aug-82	1-Aug-82	1-Mar-83	1-Mar-83
SI	Complete	1-Mar-83	1-Mar-83	2-Sep-83	2-Sep-83
RI	Complete	1-Jun-87	1-Jun-87	1-May-88	1-May-88
FS	Complete	1-Jun-92	1-Jun-92	1-May-93	1-May-93
ROD/DD	Complete	1-May-93	1-May-93	19-Jun-98	17-Oct-97
LTM	Complete	31-Dec-94	31-Dec-94	1-Sep-98	17-Oct-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		4/1/1992	4/1/1992		
RC		14-Feb-97	1-Sep-96		
SC		1-Mar-98	1-Mar-98		
PA	Complete	1-Mar-82	1-May-82	31-Jan-83	31-Jan-83
SI	Complete	28-Jun-83	28-Aug-83	1-Feb-84	1-Apr-84
RI	Complete	1-Jun-84	1-Jun-84	15-May-85	15-May-85
FS	Complete	31-Jan-87	31-Jan-87	31-Dec-87	31-Dec-87
ROD/DD	Complete	31-Dec-87	31-Dec-87	14-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		2/1/1994	2/1/1994		
RC		1-Feb-94	1-Feb-94		
SC		1-Jun-09			
PA	Complete	1-Jan-83	1-Jan-83	1-Aug-83	1-Aug-83
SI	Complete	1-Jan-83	1-Jan-83	1-Aug-83	1-Aug-83
RI	Complete	1-Oct-91	1-Jun-92	1-Dec-93	1-Feb-94
LTM	Underway	1-Jun-94	1-Jun-94	30-Sep-08	

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: LF004
Description: SITE 4 LANDFILL NO 4

ERP Status: Active
Relative Risk: Not Evaluated
Legal Driver: Longterm Operation/Monitoring for in-place systems for installations without agreements
NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		2/1/1994	2/1/1994		
RC		1-Feb-94	1-Feb-94		
SC		30-Jun-09			
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Oct-91	1-Oct-91	1-Dec-92	1-Feb-94
LTM	Underway	1-Jun-94	1-Jun-94	30-Sep-08	

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: LF005
 Description: SITE 5 LANDFILL NO 5-'89 CAP
 ERP Status: Active
 Relative Risk: Not Evaluated
 Legal Driver: Longterm Operation/Monitoring for in-place systems for installations without agreements
 NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		10/1/1996	10/1/1996		
RC		1-Jun-99	14-Feb-99		
SC		1-Jun-99	16-Mar-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Mar-93	1-May-95	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Oct-96
ROD/DD	Complete	1-Dec-96	1-Oct-96	14-Feb-99	14-Feb-99

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: FT006
Description: SITE 6 FDTA NO 1

ERP Status: Active
Relative Risk: Not Evaluated
Legal Driver: No Legal Driver
NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		14-Feb-97	1-Mar-97		
SC		1-Mar-97	1-Mar-97		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	14-Feb-97	1-Mar-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		15-Feb-97	15-Feb-97		
SC		1-Mar-97	1-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Sep-93	1-Sep-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: FT008
Description: SITE 8 FDTA NO 3

ERP Status: Active
Relative Risk: Not Evaluated
Legal Driver: No Legal Driver
NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Feb-97	15-Feb-97		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:
 Description:
 ERP Status:
 Relative Risk:
 Legal Driver:
 NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Feb-97	15-Feb-97		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

SD013

Description:

SITE 13 SAN SEWAGE LIFT STA O/F

ERP Status:

Active

Relative Risk:

Not Evaluated

Legal Driver:

No Legal Driver

NPL Status:

Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		9/1/1986	9/1/1986		
RC		1-Feb-97	14-Feb-97		
SC		1-Mar-97	1-Mar-97		
ROD/DD	Complete		9-Jan-97	1-Feb-97	14-Feb-97
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		9/1/1986	9/1/1986		
RC		1-Feb-97	14-Feb-97		
SC		1-Mar-97	1-Mar-97		
ROD/DD	Complete		9-Jan-97	1-Feb-97	14-Feb-97
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:
 Description:

ERP Status:
 Relative Risk:
 Legal Driver:
 NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:
 Description:

ERP Status:
 Relative Risk:
 Legal Driver:
 NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		9/1/1986	9/1/1986		
RC		1-Feb-97	14-Feb-97		
SC		1-Mar-97	1-Mar-97		
ROD/DD	Complete		9-Jan-97	1-Feb-97	14-Feb-97
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: SS019
Description: SITE 19 MOGAS SPILL

ERP Status: Active
Relative Risk: Not Evaluated
Legal Driver: No Legal Driver
NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site: LF025
 Description: LF-25 RUBBLE PILE
 ERP Status: Active
 Relative Risk: Not Evaluated
 Legal Driver: Longterm Operation/Monitoring for in-place systems for installations without agreements
 NPL Status: Not Listed

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		8/30/2001	8/30/2001		
RC		1-Sep-01	30-Aug-01		
SC		31-Aug-09			
PA	Complete	1-Dec-90	1-Dec-90	1-Feb-91	1-Feb-91
SI	Complete	1-Dec-90	1-Dec-90	1-Feb-91	1-Feb-91
FS	Complete	1-Aug-92	1-Aug-92	1-Jun-94	1-Jun-94
RI	Complete	1-Aug-92	1-Aug-92	1-Jun-94	1-Jun-94
LTM	Underway	1-Jun-94	1-Jun-94	30-Sep-08	
IRA-C	Complete	30-Sep-99	31-Dec-99	31-Dec-01	30-Aug-01

Technology: Waste removal - solids (non-soil)

Additional Remarks:

Record Last Modified: 8/13/1999 14:08

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		9/1/1986	9/1/1986		
RC		1-Feb-97	14-Feb-97		
SC		1-Mar-97	1-Mar-97		
ROD/DD	Complete		9-Jan-97	1-Feb-97	14-Feb-97
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		12/1/1996	12/1/1996		
RC		1-Dec-96	1-Dec-96		
SC		1-Mar-97	30-Jun-99		
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86
RI	Complete	1-Sep-92	1-Sep-92	1-Mar-93	1-Mar-93
FS	Complete	1-Jun-96	1-Jun-96	1-Dec-96	1-Dec-96
ROD/DD	Complete	1-Dec-96	1-Dec-96	1-Feb-97	14-Feb-97

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		9/1/1986	9/1/1986		
RC		1-Feb-97	14-Feb-97		
SC		1-Mar-97	1-Mar-97		
ROD/DD	Complete		9-Jan-97	1-Feb-97	14-Feb-97
PA	Complete	1-Aug-82	1-Aug-82	1-Aug-83	1-Aug-83
SI	Complete	1-Sep-85	1-Sep-85	1-Sep-86	1-Sep-86

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		3/16/1999	3/16/1999		
RC		16-Mar-99	16-Mar-99		
SC		31-Jul-02			
PA	Complete	1-Dec-97	25-Sep-97	1-Feb-99	16-Mar-99
SI	Complete	1-Dec-97	25-Sep-97	1-Feb-99	16-Mar-99

Technology:

Additional Remarks:

Record Last Modified: 12/1/1998 15:10

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		3/16/1999	3/16/1999		
RC		16-Mar-99	16-Mar-99		
SC		31-Jul-02			
PA	Complete	1-Dec-97	25-Sep-97	1-Dec-98	16-Mar-99
SI	Complete	1-Dec-97	25-Sep-97	1-Dec-98	16-Mar-99

Technology:

Additional Remarks:

Record Last Modified:

**ENVIRONMENTAL RESTORATION PROGRAM
SITE STATUS AND SCHEDULE
Management Action Plan
Cannon AFB, New Mexico**

ERP Site:

Description:

ERP Status:

Relative Risk:

Legal Driver:

NPL Status:

Pollutant Type:

Phase	Status	START DATE		COMPLETION DATE	
		Estimated	Actual	Estimated	Actual
RIP		3/16/1999	3/16/1999		
RC		16-Mar-99	16-Mar-99		
SC		31-Jul-02			
PA	Complete	1-Dec-97	25-Sep-97	1-Dec-98	16-Mar-99
SI	Complete	1-Dec-97	25-Sep-97	1-Dec-98	16-Mar-99

Technology:

Additional Remarks:

Record Last Modified:

APPENDIX D9

ACC BRIEFING CHARTS

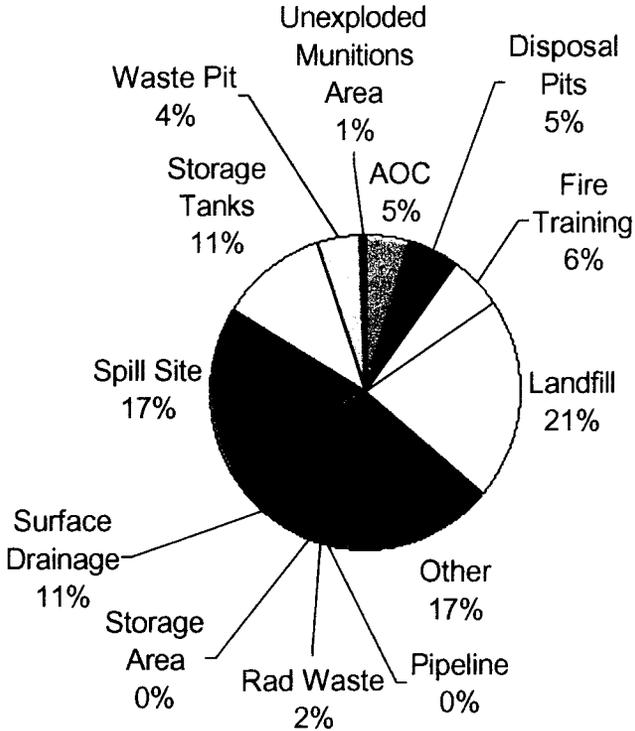
TABLE OF CONTENTS

LIST OF BRIEFING CHARTS

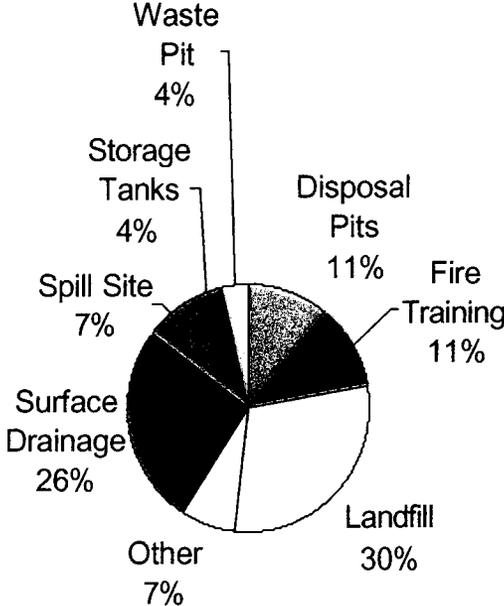
CURRENT SITUATION SITE TYPES & SITE RISK BREAKDOWN
ACC SITE LEVEL COST-TO-COMPLETE FOR FY 2002 & FUTURE FUNDING REQUIREMENTS BY PHASE,
CANNON AFB, NEW MEXICO

Current Situation Site Types

**ACC Total Sites (709)
and AOCs (45)**



**Canon AFB Sites (27)
and AOCs (0)**

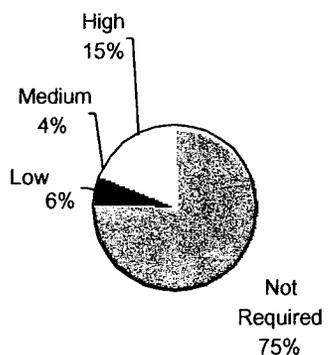


Current Situation

Site Risk Breakdown

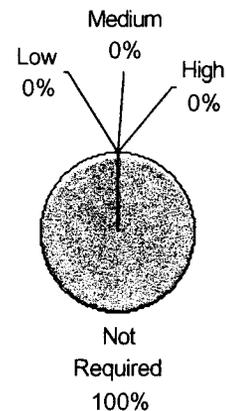
ACC Risk Percentage Across Installations

Sites: 709



Canon AFB Risk Percentages

Sites: 27



**ACC SITE LEVEL COST-TO-COMPLETE FOR FY 2002
Cannon AFB, New Mexico**

SiteID	SiteName	Investigations	RI/FS	RC/RA/O	LTM	Totals
LF003	SITE 3 LANDFILL NO 3	0	0	0	11000	11000
LF004	SITE 4 LANDFILL NO 4	0	0	0	11000	11000
LF025	LF-25 RUBBLE PILE	0	0	0	22000	22000

Totals	0	0	0	44000	44000
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**Future Funding Requirements by Phase
Cannon AFB, New Mexico
(in thousands of dollars)
(Melrose Range not included)**

Fiscal Year	Investigation	LTO/LTM (OM)			Totals
		R/ES	RC/RA-C	LTM	
FY02	0	0	0	44	44
FY03	0	0	0	50	50
FY04	0	0	0	50	50
FY05	0	0	0	50	50
FY06	0	0	0	50	50
FY07	0	0	0	50	50
FY08	0	0	0	50	50
Totals	0	0	0	344	344

Complete Year: 2008 (not including Melrose Range)

MAJCOM: ACC

Base: Cannon

APPENDIX E1

CONDITION OF PROPERTY

E1. CONDITION OF PROPERTY

This chapter summarizes the status of the ongoing base-wide discovery and assessment activities at Cannon AFB and all properties owned by the Base. These activities are the basis for determining whether environmental restoration is required. As areas of the Base are evaluated, an overall understanding of the environmental condition of property at the Base is developed. This chapter provides the most current map of the environmental condition of property at Cannon AFB. Additionally, off-base property, current and future land use plans, and adjacent property land use are presented in this chapter.

E1.1 INSTALLATION-WIDE SOURCE DISCOVERY AND ASSESSMENT STATUS

Cannon AFB is conducting environmental restoration under the Environmental Restoration Program (ERP). The USAF initiated the program at the Base in 1983 with the Records Search, which was part of the ERP Phase I approach. Chapter 2 presents a chronology of these activities. The purpose of the program is to identify, confirm, and correct problems associated with past (generally prior to 1980) releases of hazardous substances or petroleum products into the environment. The program is usually divided into two phases: assessment (study) and remediation (cleanup). The phases are explained in more detail in Chapter 2.

Source discovery and assessment data gathering activities have been included in every step of the program to date. These steps include the following activities:

- Reviews of past and current hazardous substance and petroleum product activities, including historical records and historical aerial photographs.
- Interviews with current and former base employees and other individuals with personal knowledge of the Base, particularly CEV personnel, and outside agency contacts.
- A Phase I Records Search conducted during 1983. An ERP Phase II Confirmation/Quantification study was conducted in 1986. Subsequent RFIs followed the RCRA Facility Assessment (RFA) conducted in July 1987 and RCRA Corrective Action Program (RCAP) procedures.

These discovery, assessment, and investigation activities have resulted in the identification of numerous potential sources of contamination at the Base. These sites and the status of investigations and cleanups at these sites are further addressed in Chapter 2. Generally, the sources include landfills, sludge disposal pits, fire training areas, fuel spills and fuels leaks from tanks and pipelines, drainage areas, oil/water separators, wastewater discharge areas, and other disposal areas.

The main contaminants found at these sites include the following:

- Petroleum hydrocarbons (from sources such as jet fuel, motor gasoline, and diesel) and fuel contaminants such as benzene, toluene, ethylbenzene, and xylenes
- Polynuclear aromatic hydrocarbons
- Chlorinated solvents such as trichloroethene and tetrachloroethane

- Pesticides and herbicides
- Heavy metals such as lead, chromium, and zinc

E1.2 ENVIRONMENTAL CONDITION OF PROPERTY

According to the USAF and EPA, the environmental condition of property is defined as one of the following seven area types.

Areas where no storage, release, or disposal (including migration) has occurred. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where results of investigations show no hazardous substances or petroleum products were stored, released into the environment or site structures, or disposed of on the site property (USAF, June 1995).”

Areas where only storage has occurred. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where results of investigations show only that storage of hazardous substances or petroleum products has occurred (USAF, June 1995).”

Areas of contamination below action levels. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where environmental evidence demonstrates that hazardous substance or petroleum products have been stored, released, or disposed of, but are present in quantities that require no response action to protect human health and the environment. Such quantities of hazardous substances or petroleum products can be below defensible detection limits, or can be above detection limits but below action levels. Below action levels means, in the absence of installation-specific risk-based criteria, that the concentration of any hazardous substance or petroleum constituent in any medium does not exceed chemical-specific applicable or relevant and appropriate requirements (ARARs). Designation of this area type also means that risk assessment estimates completed for contamination do not:

- Exceed 10^{-6} for any carcinogenic hazardous substance or petroleum constituent detected in any medium;
- Result in a hazard quotient above 1 for any noncarcinogenic hazardous substance or petroleum constituent detected in any medium;
- Exceed 10^{-6} for all carcinogenic hazardous substances and petroleum constituents, taken together, in any exposure pathway;
- Result in a hazard index above 1 for all noncarcinogenic hazardous substances or petroleum constituents, taken together, in any exposure pathway;
- Exceed 10^{-4} for all carcinogenic hazardous substances and petroleum constituents accumulated across all pathways; or
- Result in a hazard index above 1 for all noncarcinogenic hazardous substances and petroleum constituents accumulated across all pathways (USAF, June 1995).”

Areas where Remedial Action has been taken. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where all RAs necessary to protect human health and the environment have been taken (USAF, June 1995).” This means that the construction and installation of the approved remedial design has been completed and demonstrated to be operating properly and successfully remediating the site.

Areas of known contamination with removal and/or RA underway. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is confirmed based on the results of sampling and analysis...this area type contains contamination above action levels (USAF, June 1995).” RAs are partially or entirely in place, but they have not been demonstrated.

Areas of known contamination where required response actions have not yet been implemented. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is confirmed based on the results of sampling and analysis...this area type contains contamination above action levels (USAF, June 1995).” RAs have not been selected or implemented.

Areas that are unevaluated or that require further evaluation. This area type is defined by the USAF and EPA as a “geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is suspected...(USAF, June 1995).”

In order to define the environmental condition of property in terms of the seven area types discussed above, the following data must be collected, examined, interpreted, and consolidated: records searches of base and adjacent properties, base chain of title documents, aerial photographs, visual inspections of base and adjacent properties, interviews with current and former base employees, and site investigations. As discussed earlier, Cannon AFB has been actively collecting these data since 1983 and has recently completed the development of an Environmental Data Management and Decision Support (EDMDS) application (Radian, 1995). The purpose of the EDMDS application is to assemble relevant environmental data from all existing sources into one reporting product. Among other things, this application allows Cannon AFB to easily and accurately identify and report the current environmental condition of on-base property.

The following data sources were used to develop the EDMDS application and subsequently used to develop the current Environmental Condition of Property Map shown in Figure E1-1 (Radian EDMDS, 1995):

- Digital Line Graph and Digital Elevation Model files and the 1:24,000 topographic quadrangles from the U.S. Geological Survey
- Electronic format CAD drawings and the C-1, D-1, G-1, G-6, and G-8 Tabs from the Base Comprehensive Plan (BCP)
- Hard copy drawings of the C-1, C-1.4, D-1, D-6, G-1, G-2, G-3, G-5, G-8, M-3, and the “Master Plan Location Plan, Oil/Water Separator and Lift Stations” also from the BCP
- The 1993 Cannon MAP prepared by Radian and other source documents referenced in the MAP, including the 1983 ERP Phase I Records Search, the 1986 Phase II study, and RFI reports
- A comprehensive environmental records search performed in accordance with the American Society for Testing and Materials guidelines

- Historical aerial photographs of Cannon AFB from 1951 to 1994 (Radian EDMDS, 1995)

Figure E1-1 presents the current composite results of the integration of the available information listed above. To date, the seven area categories have been delineated as shown on the figure and as described below. Chapter 5 addresses the data gaps and uncertainties associated with Cannon AFB's current understanding of the environmental condition of property. The total base area, including a 500-ft buffer area around the perimeter of the base boundary, covers 4526 acres (Radian, 1995). The Base covers 3782 acres and the 500-ft buffer contains 764 acres. The respective areas corresponding to each environmental condition of property category are:

Category 1: 4476 acres or 98% of the base area + buffer.

Category 2: 3 acres or less than 1% of the base area + buffer.

Category 3: 41 acres or 1% of the base area + buffer.

Category 4: ½ acre or less than 1% of the base area + buffer.

Category 5: 5 acres or less than 1% of the base area + buffer.

Category 6: No areas are designated Category 6.

Category 7: No areas are designated Category 7, all areas have been evaluated.

E1.2.1 Areas Where No Storage, Release, or Disposal Has Occurred (Category 1)

This area category includes those where no hazardous substances or petroleum products have been stored, released, or disposed of. It encompasses approximately 4476 acres - approximately 98% - of the Base and the base buffer.

E1.2.2 Areas Where Only Storage Has Occurred (Category 2)

This area category includes locations where hazardous substances or petroleum products have been stored; no release or disposal is suspected to have occurred at these areas. It encompasses approximately 3 acres - less than 1% - of the Base and the base buffer.

E1.2.3 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred But Require No Remedial Action (Category 3)

This area category includes areas where disposal, releases or migration of releases of hazardous substances or petroleum products has occurred, but where the resulting contamination presented no threat to human health and the environment, and therefore no remedial action was required. It encompasses approximately 41 acres - less than 1% - of the Base and the base buffer.

E1.2.4 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred and All Remedial Actions Have Been Taken (Category 4)

This area category includes locations where disposal, releases or migration of releases of hazardous substances or petroleum products has resulted in contamination above action levels, and all remedial actions (RAs) have subsequently been taken. These areas encompass approximately ½ acre - less than 1% - of the Base and the base buffer.

E1.2.5 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred and Remedial Action is Underway But Not Final (Category 5)

This area category includes areas where hazardous substance or petroleum product contamination above action levels has occurred and the necessary RAs to protect human health and the environment are underway. These areas encompass approximately 5 acres - less than 1% - of the Base and the base buffer.

E1.2.6 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred But Required Response Actions Have Not Been Taken (Category 6)

This area category includes areas where hazardous substance or petroleum product contamination above action levels has occurred, but no RAs have been undertaken. At this time, no areas of the Base or the base buffer fall in this category.

E1.2.7 Unevaluated Areas or Areas Requiring Additional Evaluation (Category 7)

This area category covers those areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products is suspected to have occurred, but which have not been fully evaluated. All areas of the Base and the base buffer recommended by Radian for investigation have been evaluated; therefore no areas remain in this category.

E1.3 OFF-BASE PROPERTY

The following describe the off-base property currently under the control of Cannon AFB. The locations of these properties are shown on Figures 1-3 and 1-4 and summarized in Table E1-1. The Base maintains the following satellite facilities:

- **Melrose Bombing Range (87,925 acres):** Base-owned, public domain, and restricted easement property located approximately 25 miles west of the Base (Figure 1-4). Used since 1952 as a bombing and air-to-ground gunnery range, the range consists of a composite day-and-night simulated special and conventional weapon delivery range and day-only tactical range. Live ordnance use was discontinued in 1969. Cannon AFB was issued a RCRA Subpart X permit by NMED and EPA Region VI for treatment of unserviceable munitions by open burn/open detonation, however no open burn/detonation had taken place or was expected to take place; therefore the Subpart X permit was surrendered.
- **Clovis Housing Area (Cannon Place) (40 acres):** Includes 200 units, a community center, and maintenance facility in Clovis, New Mexico (Figure 1-3).
- **Portales Housing Area (Cannon Meadows) (30 acres):** Includes approximately 150 units in Portales, New Mexico (Figure 1-3).
- **NEXRAD Clovis Weather Site (0.5 acres):** Near Field, New Mexico. Contains radar equipment (Figure 1-3).
- **Ground Wave Emergency Network (GWEN) Hereford Communication Site (10 acres):** Used for the GWEN transmitter (Figure 1-3).
- **Minimute Sites at Dunlap, Yeso, Ft. Sumner, Santa Rosa, and McAlister (5.7 acres each):** (Figure 1-3)

TABLE E1-1

OFF-BASE PROPERTIES FOR CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

Name	Acres	Location	Date Acquired	Dates of Operation	Number of Restoration sites
Melrose Bombing Range	87,925	25 miles west of the main base	1952	1952 to Present	OB/OD operations conducted under RCRA Subpart X permit
Clovis Housing Area (Cannon Place)	40	Clovis, New Mexico	Leased 1992	1992 to Present	Housing
Portales Housing Area (Cannon Meadows)	30	Portales, New Mexico	Leased 1993	1992 to Present	Housing
NEXRAD Clovis Weather Site	1.0	Field, New Mexico	1992	1992 to Present	
Hereford Communications Site - GWEN	10	West of Hereford, Texas, on Texas Highway 1058	1991	1991 to Present	Active transmitter
Dunlap Mini Mute Site	5.7	49 miles north of Roswell, New Mexico, on NM Highway 20	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Yeso Mini Mute Site	5.7	1 mile east of Yeso, New Mexico, on U.S. Highway 60	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Ft. Sumner Mini Mute Site	5.7	6 miles south of Ft. Sumner, New Mexico, on NM Highway 20	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Santa Rosa Mini Mute Site	5.7	13 miles southeast of Santa Rosa, New Mexico, on U.S. Highway 84	24 March 1995	1995 to Present	Mini Mute Threat Emitter
Jordan Mini Mute Site	5.7	5 miles west of Jordan, NM, 1 mile south on County road	Feb 1996	1996 to present	Mini Mute Threat Emitter
McAlister Mini Mute Site	5.7	3 miles west of McAlister, New Mexico, on County Road	24 March 1995	1995 to Present	Mini Mute Threat Emitter

Notes:
OB/OD = Open Burn/Open Detonation

E1.4 CURRENT ASSOCIATE GROUPS AND CONTRACTORS AT CANNON AFB

As summarized in Table E1-2, Cannon AFB is currently host to several tenant units (associate groups). Table E1-3 lists current on-base contractors. These lists were developed with information available from Real Property at the Civil Engineer Squadron. It is not believed that these tenant units or contractors are involved in any restoration or restoration-related activities at Cannon AFB.

TABLE E1-2
ON-BASE TENANT UNITS FOR CANNON AFB
Management Action Plan
Cannon AFB, New Mexico

Organization	Building #/ Phone ext.
Army and Air Force Exchange Service	77/2141
AFAA Area Audit Office	600/2991
American Red Cross	1400/2023
Army Corps of Engineers	250/4350
Area Defense Council	327/2915
Air Force Office of Special Investigations	60/2511
DET 2 ACC TRSS (DET 2, 444 Operations Squadron)	181/2514
Defense Commissary Agency	77/4330
Defense Reutilization and Marketing Office	215/4551
Defense Investigative Service	600/4304
DET 7, 79 TEG	785/4049
Bank of America	71/2500
Cannon Federal Credit Union	77/791-3353
HSHM - Vet C (Veterinary Service from William Beaumont)	2378/4098

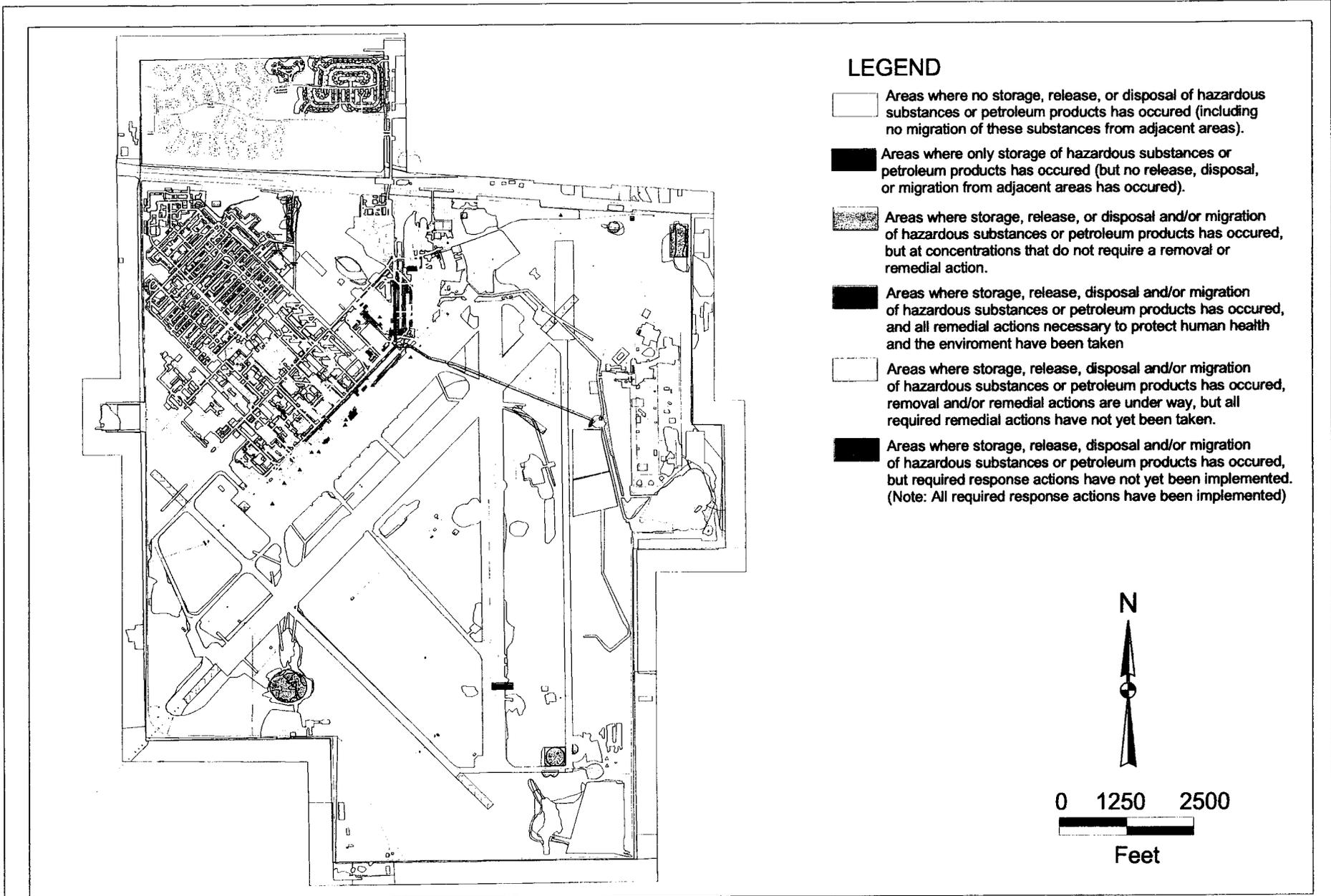
Source: 27 CES/CERR

TABLE E1-3

**CONTRACTORS FOR CANNON AFB WITH POTENTIAL TO CAUSE
CONTAMINATION**

**Management Action Plan
Cannon AFB, New Mexico**

Contractor	Contact Point	Building Number/ Telephone Extension	Comments
U.S. West		10 and 745/none	
M&S Incorporated	Mr. O'Leary	150/4501	
ENMRSH (Dining Hall)	Mr. O'Leary	150/4501	
Southwest Lawn Service (Grounds Maintenance)	Ms. Linda Kyle	150/4803	
AAI-ESI (Simulators)		790/2568	
Carroll Automotive (COPAR contract at Transportation)		335/5622	
Burger King (through AAFES)		1230/2772	
American Federation of Government Employees Local 2308		327/3258	
Unisys		772/4338	
SIMCO (Janitorial Contract) Bldg Services & Child Development Center	Ms Kitchens LGCV Mr Hollan CE	150/4243	
National General Supply (COCESS contractor with CE)		323/7070	
Sanders		679/6571	
Litton		679/6571	
General Dynamics		622/4813	
Reflectone		181/2837	
Lockheed		164/2790	
Ahntek Corp. (at Melrose AFR)		150/4803	



Cannon AFB,
New Mexico

ENVIRONMENTAL CONDITION MAP

Figure E1-1

APPENDIX E2

RESTORATION-RELATED COMPLIANCE PROGRAM

E2. RESTORATION-RELATED COMPLIANCE PROGRAM STATUS

Pollution prevention, natural/cultural resources, and compliance activities at Cannon AFB are conducted in coordination with environmental restoration activities. Compliance activities address USTs, hazardous materials management, polychlorinated biphenyls (PCBs), water discharges, closure of active hazardous waste management units, air quality management, asbestos, and radon. The status of the Cannon AFB compliance program is summarized in Table E2-1.

E2.1 UNDERGROUND STORAGE TANKS

The Cannon AFB UST program is regulated by the NMED UST regulations. As of December 1997, all USTs and oil water separators have been removed. All replacement tanks are state-of-the-art storage tanks installed above ground or in underground vaults.

E2.2 SOLID WASTE MANAGEMENT, PCBS, OTHER

The Base has been PCB-free since 1991, when all known transformers containing PCBs were removed and disposed of off-base. The Base is has obtained a Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit and a Clean Air Act Synthetic Minor Air permit. The NPDES permit will set discharge standards for the sewage lagoons. A New Mexico discharge plan was granted approval in 1994. It requires monitoring of the Wastewater Playa Lake (SWMU 103) that receives discharge from the Wastewater Treatment System Lagoons and Effluent Discharge (SWMUs 101 and 102) and groundwater monitoring. A management plan was developed in 1995 for maintenance of oil/water separators and sand traps. The plan has been supplied to EPA in response to the needs of EPA Appendix II and Appendix III sites.

**TABLE E2-1
CANNON AFB COMPLIANCE PROGRAM STATUS
Management Action Plan
Cannon AFB, New Mexico**

Project	Base Point of Contact	Status	Regulatory Program
USTs	Gene Smith	All removed (last 3 in 1997)	New Mexico UST Program
Stormwater Discharges (under the Clean Water Act)	John Rebman	NPDES permit is complete	NMED Water Quality Program
Air Emissions (under the Clean Air Act)	Don White	Permit pending	NMED Air Quality Program
Hazardous Materials/Waste Management	Vera Wood	Hazardous wastes are stored at 63 satellite and one 90-day accumulation point, transported to the storage facility on-base, and disposed of by a licensed contractor	New Mexico RCRA Program
Subpart X Permit will be surrendered and the site closed.	Vera Wood	<ul style="list-style-type: none"> • RCRA Subpart X permit for treatment of military ordnance at the open burn/open detonation unit (Melrose AFR). Permit will be surrendered. 	
Active RCRA Units ^a	Vera Wood	Active RCRA units include: <ul style="list-style-type: none"> • 1 DRMO accumulation points and 63 satellite accumulation points • 83 SWMUs and AOCs (HSWA) • DRMO hazardous waste storage facility 	New Mexico RCRA Program And EPA Region VI
PCBS		All PCB filled transformers removed	
Asbestos/Lead Paint		Ongoing	TSCA
Radon		Monitoring Performed by Biochemical Flight	

^aTo date sanitary sewer lagoons have not been determined to contain hazardous waste by either Extraction Procedure Toxicity or Toxicity Characteristic. Therefore, they are not recognized as RCRA units at this time.

AFR = Air Force Range
 DRMO = Defense Reutilization and Marketing Office
 HSWA = Hazardous and Solid Waste Amendments
 NPDES = National Pollutant Discharge Elimination System
 SWMU = Solid Waste Management Unit

AOC = Area of Concern
 EPA = U.S. Environmental Protection Agency
 NMED = New Mexico Environmental Department
 RCRA = Resource Conservation and Recovery Act
 UST = underground storage tank

TABLE E2-2

SWMU's, RCRA AOC's, AND PRI AOC's AT CANNON AFB

**Management Action Plan
Cannon AFB, New Mexico**

PRI AOC, RCRA AOC, SWMU	STATUS
Landfill 1 (LF-01)	Limited Phase I RFI on the burn trenches discovered on the golf course (1995-1996); final work plan completed August 1995. NFA received from NMED in 1998.
Landfill 3 (LF-03)	Groundwater monitoring in downgradient well; draft RFI report completed in March 1995. Approval of Phase I RFI report by NMED in 1996. Continued groundwater monitoring.
Landfill 4 (LF-04)	Groundwater monitoring in downgradient well; draft RFI report completed in March 1995. Approval of Phase I RFI report by NMED in 1996. Continued groundwater monitoring.
Landfill 5 (LF-05)	Phase I RFI to be directed by NMED (1995-1997); final work plan completed July 1995. Approval of Phase I RFI report by NMED in 1996. NFA received from NMED in 1998. Cell 3 was merged into LF-05 in 2000.
Engine Test Cell (SD-11)	RFI of contamination discovered during removal of the oil/water separator system (1995-1996). Class III Modification pending.
Old Entomology Rinse Area (SD-17)	Class III Modification pending.
AOC D	Class III Modification pending.
AOC E (SD-34)	Class III Modification pending.
AOC F (DP-35)	Class III Modification pending.
AOC G (LF-36)	Class III Modification pending.
AOC H (LF-37)	Class III Modification pending.
AOC 36	Will be proposed for NFA in FY 04.

Notes:

PA/SI = Preliminary Assessment/Site Inspection

E2.3 RESTORATION-RELATED COMPLIANCE STRATEGY

The following are strategies for compliance activities at Cannon AFB.

E2.3.1 Underground Storage Tanks

All non-compliant USTs have been removed following NMED UST regulations. All replacement USTs are state-of-the-art aboveground storage tanks or are installed in underground vaults.

E2.3.2 Solid Wastes, PCBs, Other.

Cannon AFB was declared PCB-free in 1991.

- **NPDES Permit:** Cannon AFB has obtained an NPDES permit.
- **Air Permit:** Cannon AFB has obtained a Synthetic Minor Air permit.
- **Petroleum-contaminated Soils:** Petroleum-contaminated soils are being dealt with on a site-by-site basis. Restoration sites will be approved as part of the RCAP. Nonrestoration sites (e.g., plane crashes) require approval on a case-by-case basis.

TABLE E2-3
ESTIMATED FY COST SUMMARY FOR CANNON AFB COMPLIANCE SITES*

Management Action Plan
Cannon AFB, New Mexico
(in thousands of dollars)

Program Area/Project Description	FY01	FY02	FY03

*Funding requirements for these programs do not fall under ERP and therefore are not provided. This table is provided for MAP consistency only and will be deleted from future MAP updates.

NPDES = National Pollutant Discharge Elimination System
 RCRA = Resource Conservation and Recovery Act

APPENDIX E3

RESERVED FOR CANNON AFB

New Mexico Cleanup Standards

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**TABLE E3-1
NEW MEXICO DRINKING WATER STANDARDS**

Contaminant	Maximum Contaminant Level (mg/L)
Inorganic Contaminants	
Antimony	0.006
Asbestos	7 million fibers/liter (longer than 10 Fm)
Arsenic	0.05
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide	0.2
Fluoride	4.0
Mercury	0.002
Nickel	0.1
Nitrate (as N)	10
Nitrite (as N)	1
Total Nitrate and Nitrite (as N)	10
Selenium	0.05
Thallium	0.002
Organic Contaminants	
Apply to community and non-transient, non-community water systems	
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dibromochloropropane	0.0002
2,4-D	0.07
Ethylene dibromide	0.00005
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Polychlorinated biphenyls	0.0005
Pentachlorophenol	0.001
Toxaphene	0.003
2,4,5-TP	0.05
Benzo(a)pyrene	0.0002
Dalapon	0.2
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006

Contaminant	Maximum Contaminant Level (mg/L)
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Glphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Oxamyl (Vydate)	0.2
Picloram	0.5
Simazine	0.004
1,3,7,8-TCDD (Dioxin)	0.00000003
Vinly Chloride	0.002
Benzene	0.005
Carbon Tetrachloride	0.005
1,2-Dichloroethane	0.005
Trichloroethylene	0.005
para-Dichlorobenzene	0.075
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
cis-1,2-Dichloroethylene	0.07
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetracloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Xylenes (total)	10
Dichloromethane	0.005
1,2,4-Trichlorobenzene	0.07
1,1,2-Trichloroethane	0.005
Apply to water systems which serve 10,000 or more individuals and add a disinfectant to the water	
Total Trihalomethanes	0.10

Source: New Mexico Drinking Water Regulations, New Mexico Environmental Department, Santa Fe, New Mexico, January 1, 1995

**TABLE E3-2
NEW MEXICO SURFACE WATER QUALITY STANDARDS**

Contaminant	Standard ^a
Domestic Water Supplies	
Dissolved Arsenic	0.05 mg/L
Dissolved Barium	1.0 mg/L
Dissolved Cadmium	0.010 mg/L
Dissolved Chromium	0.05 mg/L
Dissolved Lead	0.05 mg/L
Total Mercury	0.002 mg/L
Dissolved Nitrate	10.0 mg/L
Dissolved Selenium	0.05 mg/L
Dissolved Silver	0.05 mg/L
Dissolved Cyanide	0.2 mg/L
Dissolved Uranium	5.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L
Irrigation	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.10 mg/L
Dissolved boron	0.75 mg/L
Dissolved Cadmium	0.01 mg/L
Dissolved Chromium	0.10 mg/L
Dissolved Cobalt	0.05 mg/L
Dissolved Copper	0.20 mg/L
Dissolved Lead	5.0 mg/L
Dissolved Molybdenum	1.0 mg/L
Dissolved Selenium	0.13 mg/L
Dissolved Selenium in presence of >500 mg/L SO ₄	0.25 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	2.0 mg/L
Fisheries	
Acute Standards ^b	
Dissolved Aluminum	750 µg/L
Dissolved Beryllium	130 µg/L
Total Mercury	2.4 µg/L
Total Recoverable Selenium	20.0 µg/L
Dissolved Silver ^{c,d}	$e^{(1.72[\ln(\text{hardness})]-6.52)}$ µg/L
Cyanide, amenable to chlorination	22.0 µg/L
Total chlordane	2.4 µg/L

Contaminant	Standard ^a
Dissolved Cadmium	$e^{(1.128[\ln(\text{hardness})]-3.828)}$ µg/L
Dissolved Chromium ^{f,d}	$e^{(0.819[\ln(\text{hardness})]+3.688)}$ µg/L
Dissolved Copper	$e^{(0.9422[\ln(\text{hardness})]-1.464)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(\text{hardness})]-1.46)}$ µg/L
Dissolved Nickel	$e^{(0.8460[\ln(\text{hardness})]+3.3612)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(\text{hardness})]+0.8604)}$ µg/L
Total Chlorine residual	19 µg/L
Chronic Standards^e	
Dissolved Aluminum	87.0 µg/L
Dissolved Beryllium	5.3 µg/L
Total Mercury	0.012 µg/L
Total Recoverable Selenium	2.0 µg/L
Cyanide, amenable to chlorination	5.2 µg/L
Total Chlordane	0.0043 µg/L
Dissolved Cadmium ^f	$e^{(0.7852[\ln(\text{hardness})]-3.49)}$ µg/L
Dissolved Chromium ^d	$e^{(0.819[\ln(\text{hardness})]+1.561)}$ µg/L
Dissolved Copper	$e^{(0.8545[\ln(\text{hardness})]-1.465)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(\text{hardness})]-4.705)}$ µg/L
Dissolved Nickel	$e^{(0.846[\ln(\text{hardness})]+1.1654)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(\text{hardness})]+0.7614)}$ µg/L
Total chlorine residual	11.0 µg/L
Livestock Watering	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.2 mg/L
Dissolved Boron	5.0 mg/L
Dissolved Cadmium	0.05 mg/L
Dissolved Chromium ^d	1.0 mg/L
Dissolved Cobalt	1.0 mg/L
Dissolved Copper	0.5 mg/L
Dissolved Lead	0.1 mg/L
Total Mercury	0.01 mg/L
Dissolved Selenium	0.05 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	25.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L

Source: Standards for Interstate and Intrastate Streams, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, January 23, 1995.

^a When a classified water of the State has more than a single designated use, the applicable numeric standards shall be the most stringent of those established for such classified

water.

- ^b The acute standards shall be applied to any single grab sample. Acute standards shall not be exceeded.
- ^c For numeric standards dependent on hardness, hardness (as mg CaCO₃/L) shall be determined as needed from available verifiable data sources including, but not limited to, the U.S. Environmental Protection Agency's STORET water quality database.
- ^d The standards for chromium shall be applied to an analysis which measures both the trivalent and hexavalent ions.
- ^e The chronic standards shall be applied to the arithmetic mean of four samples collected on each of four consecutive days. Chronic standards shall not be exceeded more than once every three years.

**TABLE E3-3
NEW MEXICO GROUNDWATER STANDARDS**

Contaminant	Standard^a
Human Health Standards	
Arsenic	0.1
Barium	1.0
Cadmium	0.01
Chromium	0.05
Cyanide	0.2
Fluoride	1.6
Lead	0.05
Total Mercury	0.002
Nitrate	10.0
Selenium	0.05
Silver	0.05
Uranium	5.0
Radium-226 and -228	30.0 pCi/L
Benzene	0.01
Polychlorinated biphenyls	0.001
Toluene	0.75
Carbon Tetrachloride	0.01
1,2-dichloroethane	0.01
1,1-dichloroethylene	0.005
1,1,2,2-tetrachloroethylene	0.02
1,1,2-trichloroethylene	0.1
Ethylbenzene	0.75
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
1,1,1-Trichloroethane	0.06
1,1,2-Trichloroethane	0.01
1,1,2,2-tetrachloroethane	0.01
Vinyl chloride	0.001
PAHs: total naphthalene plus monomethylnaphthalenes	0.03

Contaminant	Standard ^a
Benzo(a)pyrene	0.0007
Other Standards for Domestic Water Supply	
Chloride	250.0
Copper	1.0
Iron	1.0
Manganese	0.2
Phenols	0.005
Sulfate	600.0
Total Dissolved Solids	1000.0
Zinc	10.
pH	between 6 and 9
Standards for Irrigation Use	
Aluminum	5.0
Boron	0.75
Cobalt	0.05
Molybdenum	1.0
Nickel	0.2

Source: Water Quality Control Commission Regulations, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, November 18, 1993.

^a All standards are in mg/L unless otherwise noted

**TABLE E3-4
NEW MEXICO UST STANDARDS FOR SOIL AND GROUNDWATER**

Contaminant	Action Level
Water	µg/L
Benzene	10
Ethylbenzene	750
Toluene	750
Xylenes	620
EDB	0.1
EDC	10
MTBE	100
Naphthalene	30
1,1,2 TCE	100
PCE	20
Benzo(a)pyrene	0.7
Lead	50
Iron	100
Manganese	200
Soil	mg/kg
Benzene	10
Total BTEX	100 (field) 50 (lab)
TPH	100

Source: UST Soil/Water Sampling and Disposal Guidelines, Underground Storage Tank Bureau, State of New Mexico Environmental Department, March 6, 1995.

TPH - Total Petroleum Hydrocarbons