SANDIA REPORT
SAND2017-8033
Unlimited Release
Printed August 2017

OPERATIONAL AREA ENVIRONMENTAL EVALUATIONS

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OPERATIONAL AREA ENVIRONMENTAL EVALUATIONS (OAEE)

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Abstract

The Operational Area Environmental Evaluation update provides a description of activities that have the potential to adversely affect natural and cultural resources, including soil, air, water, biological, ecological, and historical resources. The environmental sensitivity of an area is evaluated and summarized, which may facilitate informed management decisions as to where development may be prohibited, restricted, or subject to additional requirements.

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Acknowledgments

We thank the following individuals who provided their time and expertise to assist in ensuring the accuracy of the content of the Sandia National Laboratories, New Mexico (SNL/NM) 2017 OAEE:

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µCi	microCurie(s)
µS	microsecond(s)
7uPCX	Seven Percent Critical Experiment
AANC	Airworthiness Assurance Nondestructive Inspection Validation Center
ABC/AQCB	Albuquerque Bernalillo County Air Quality Control Board
ABCWUA	Albuquerque Bernalillo County Water Utility Authority
ACF	Aerial Cable Facility
ACRR	Annular Core Research Reactor
AGMR	Annual Groundwater Monitoring Report
AHCF	Auxiliary Hot Cell Facility
AML	Advanced Materials Laboratory
AMPL	Advanced Manufacturing Processes Laboratory
amsl	above mean sea level
AQC	Air Quality Compliance
AQCR	Air Quality Control Region
ASER	Annual Site Environmental Report
bgs	below ground surface
Bldg.	Building
BUCCX	Burnup Credit Critical Experiment
CAA	Clean Air Act
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CCF	Corporate Computing Facility
CD	compact disc
CFR	Code of Federal Regulations
Ci	Curie(s)
CINT	Center for Integrated Nanotechnologies
CO	carbon monoxide
COA	City of Albuquerque
COC	constituent of concern
COD	chemical oxygen demand
CPMS	Criteria Pollutant Monitoring Station
CRTF	Central Receiver Test Facility
CSP	concentrated solar power
CSRI	Computer Science Research Institute
CTF	Coyote Test Field
CWL	Chemical Waste Landfill
CY	Calendar Year
CYBL	Cylindrical Boiling Facility
DOD	Department of Defense
DOE	Department of Energy
DSO	Disassembly and Sanitization Operation
DVD	digital video disc
EAL	Explosives Applications Laboratories

ACRONYMS AND ABBREVIATIONS

ECF	Explosive Components Facility
EFM	Electric Field Meter
EGIS	Environmental Geographic Information System
ELM	Environmental Life-Cycle Management
EMF	Explosives Machining Facility
EMS	Environmental Management System
EM	energetic material
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPCRA	Environment Planning and Community Right to Know
ER	Environmental Restoration
ERDMS	Environmental Restoration Data Management System
ES&H	Environment, Safety, and Health
ET	evapotranspirative
FAA	Federal Aviation Administration
FACT	Facility for Acceptance, Calibration, and Testing
FARM	Facility for Antenna and Radar Cross-Section Measurements
FEMA	Federal Emergency Management Agency
FLAME	Fire Laboratory for Accreditation of Modeling by Experiment
FMOC	Facilities Management and Operations Center
FSID	Facilities and Safety Information Document
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
ft/sec	feet per second
g	acceleration of gravity
GC	gas chromatograph
GHz	gigahertz
GIF	Gamma Irradiation Facility
GWPP	Groundwater Protection Program
HC-3	Hazard Category 3
HCF	Hot Cell Facility
HE	high explosive(s)
HEPA	high-efficiency particulate air
HERMES III	High Energy Radiation Megavolt Electron Source III
HPC	High Performance Computing
HWHU	Hazardous Waste Handling Unit, formerly Hazardous Waste Management Facility [HWMF])
HWMF	Hazardous Waste Management Facility
HWPC	hazardous waste permitting and compliance
HVEE	High-Voltage Engineering Europa
Hz	hertz
IBL	Ion Beam Laboratory
IC	institutional control
ICF	inertial confinement fusion
ICP-MS	Inductively Coupled Plasma Mass Spectrometer

ACRONYMS AND ABBREVIATIONS

IHAC	Industrial Hygiene Analytical Chemistry
IMRL	Integrated Materials Research Laboratory
in./sec	inch(es) per second
IPB	International Programs Building
IPDP	Isotope Production and Distribution Program
IPOC	Innovation Parkway Office Center
ISMS	Integrated Safety Management System
ISO	International Organization for Standardization
IVA	inductive voltage adder
JCEL	Joint Computational Engineering Laboratory
kA	kiloampere(s)
KAFB	Kirtland Air Force Base
keV	kiloelectronvolt(s)
kg	kilogram(s)
kV	kilovolt(s)
kW	kilowatt(s)
lb(s)	pound(s)
LCBS	Lurance Canyon Burn Site
LE	landfill excavation
LECS	Liquid Effluent Control System
LIHE	Light Initiated High Explosive
LLW	low-level waste
LNG	Liquefied Natural Gas
LTR	Lead Transfer Request
LTS	Long-Term Stewardship
MET	Meteorological (Program)
MeV	megaelectron volt
MicroFab	Microsystems Fabrication Facility
mm	millimeter(s)
MO	Mobile Office
MOU	Memorandum of Understanding
MP	monitoring point(s)
mph	mile(s) per hour
MSB	Manzano Storage Bunkers
MTRU	mixed transuranic
MV	megavolt(s)
MW	megawatt(s)
MWL	Mixed Waste Landfill
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NESL	Nuclear Energy Systems Laboratory
NEWC	Nuclear Energy and Work Complex
NHPA	National Historic Preservation Act
nm	nanometer(s)
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department

ACRONYMS AND ABBREVIATIONS

NMSLO	New Mexico State Land Office
NNSA	National Nuclear Security Administration
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
NSTTF	National Solar Thermal Test Facility
NVCS	National Vegetation Classification System
O_3	ozone
OA	operational area
OAEE	Operational Area Environmental Evaluation
P2	Pollution Prevention
P-10	10 percent methane in argon
Pb	lead
PCA	Priority Conservation Area
PCB	polychlorinated biphenyl
PETL	Processing and Environmental Technology Laboratory
PGRADS	Potential Gradient Alarm and Detection System
PGWS	perched groundwater system
PM	particulate matter
PM_{10}	particulate matter with diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with diameter equal to or less than 2.5 microns
PPE	personal protective equipment
PSEL	Photovoltaic Systems Evaluation Laboratory
PV	Photovoltaic
PVC	polyvinyl chloride
R&D	research and development
RCRA	Resource Conservation and Recovery Act
RF	radio-frequency
RHEPP I	Repetitive High Energy Pulsed-Power Unit I
RITS	Radiographic Integrated Test Stand
RMA	Radioactive Material Area
RMWMF	Radioactive and Mixed Waste Management Facility
RPSD	Radiation Protection Sample Diagnostics
RS	Reapplication Services
RSTF	Rocket Sled Test Facility
RVR	Robotic Vehicle Range
Sandia	Sandia Corporation
SARA	Superfund Amendments and Reauthorization
SASN	silver acetylide-silver nitrate
SCA	Standard Conservation Area
SCO_2	super-critical carbon dioxide
SEM	Security Engineered Machinery
SF_6	sulfur hexafluoride
SHI	Safety and Health Instrumentation
SHPO	State Historic Preservation Officer

ACRONYMS AND ABBREVIATIONS

SiFab	Silicon Fabrication Facility
SLS	Sandia Lightning Simulator
SNL/NM	Sandia National Laboratories/New Mexico
SNM	special nuclear materials
SO_2	sulfur dioxide
SPHINX	Short-Pulse High Intensity Nanosecond X-Radiator
SPP	Strategic Partnerships Projects (formerly WFO)
SPR-CX	Sandia Pulsed Reactor Critical Experiments
SSC	Sandia Synergy Center
SFO	Sandia Field Office
STAR	Shock Thermodynamics Applied Research
START	Sandia Tomography and Radionuclide Transport
SU-1	Special Use-1
SUWCO	Sewer Use and Wastewater Control Ordinance
SVOC	semivolatile organic compound
SWEIS	Site-Wide Environmental Impact Statement
SWMU	Solid Waste Management Unit
T	Trailer
TA	Technical Area
TAG	Tijeras Arroyo Groundwater
TAL	Target Analyte List
TBF	Terminal Ballistics Facility
TCE	trichloroethene (trichloroethylene)
TLD	thermoluminescent dosimetery/dosimeter(s)
TPH	total petroleum hydrocarbons
TRU	transuranic
TSCA	Toxic Substances Control Act
TSS	total suspended solids
TTC	Thermal Test Complex
TTD	Technology, Training, and Demonstration
TTF	Thermal Treatment Facility
UNM	University of New Mexico
US	United States
USAF	U.S. Air Force
USFS	U.S. Forest Service
VCM	voluntary corrective measure
VE	vapor extraction
VOC	volatile organic compound
W/cm^2	watt(s) per square centimeter
WFO	Work-for-Others
XTF	Crosswind Fire Test Facility
yd^3	cubic yard(s)

1. INTRODUCTION

1.1 Site Context

Sandia National Laboratories/New Mexico (SNL/NM) is a multi-program national security laboratory. Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration. The DOE/NNSA/Sandia Field Office (SFO) administers the contract and oversees contractor operations at the site. SNL/NM operations are conducted on approximately 8,800 acres of federal land on Kirtland Air Force Base (KAFB), southeast of Albuquerque (Figure 1-1).

Land on KAFB is owned by the following entities: the U.S. Air Force (USAF), DOE, U.S. Bureau of Land Management, and U.S. Forest Service (USFS). Figure 1-2 shows the legal land ownership of the KAFB area including DOE owned and permitted property. There is additional land (adjacent to KAFB) leased to DOE for SNL/NM use from the New Mexico State Land Office (NMSLO). SNL/NM operations are also conducted on private and non-federal land elsewhere in the Albuquerque area.

SNL/NM is comprised of Technical Areas (TAs) I through V on DOE-owned land and numerous facilities on non-DOE-owned lands. The western portion of KAFB is under the administrative jurisdiction of the USAF, with areas permitted for DOE/Sandia use. The boundaries designating Coyote Test Field (CTF-West and CTF-East) are arbitrary, for the purposes of describing operations at land-use permitted sites and activities outside of the TAs, but within the boundaries of KAFB. Although these are large areas, Sandia only conducts operations on permitted land.

This report describes the area setting and general conditions, presents SNL/NM environmental programs implemented by Sandia, and provides environmental information for each specific operational area (OA).

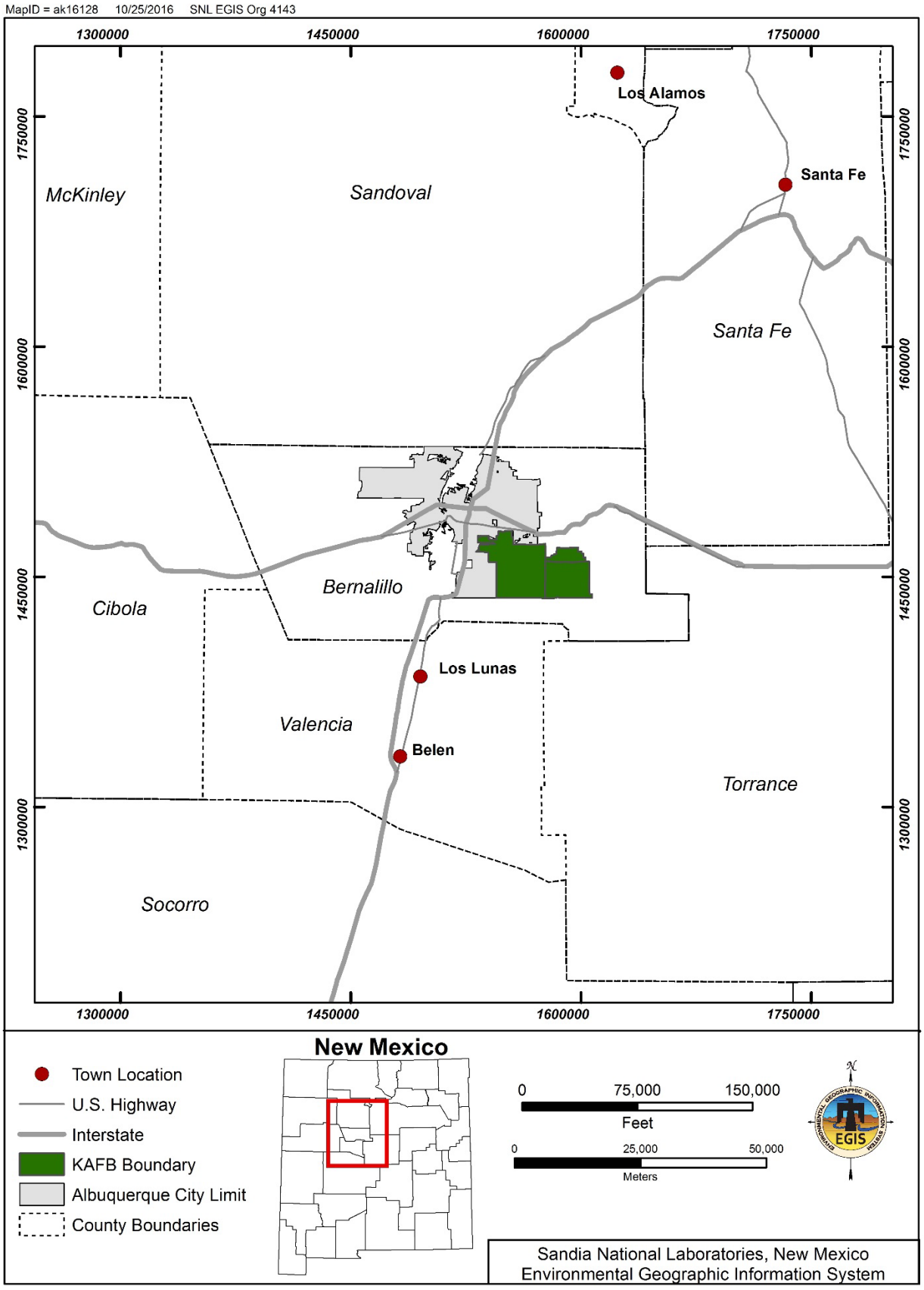

Figure 1-1. SNL/NM, KAFB, and Surrounding Region

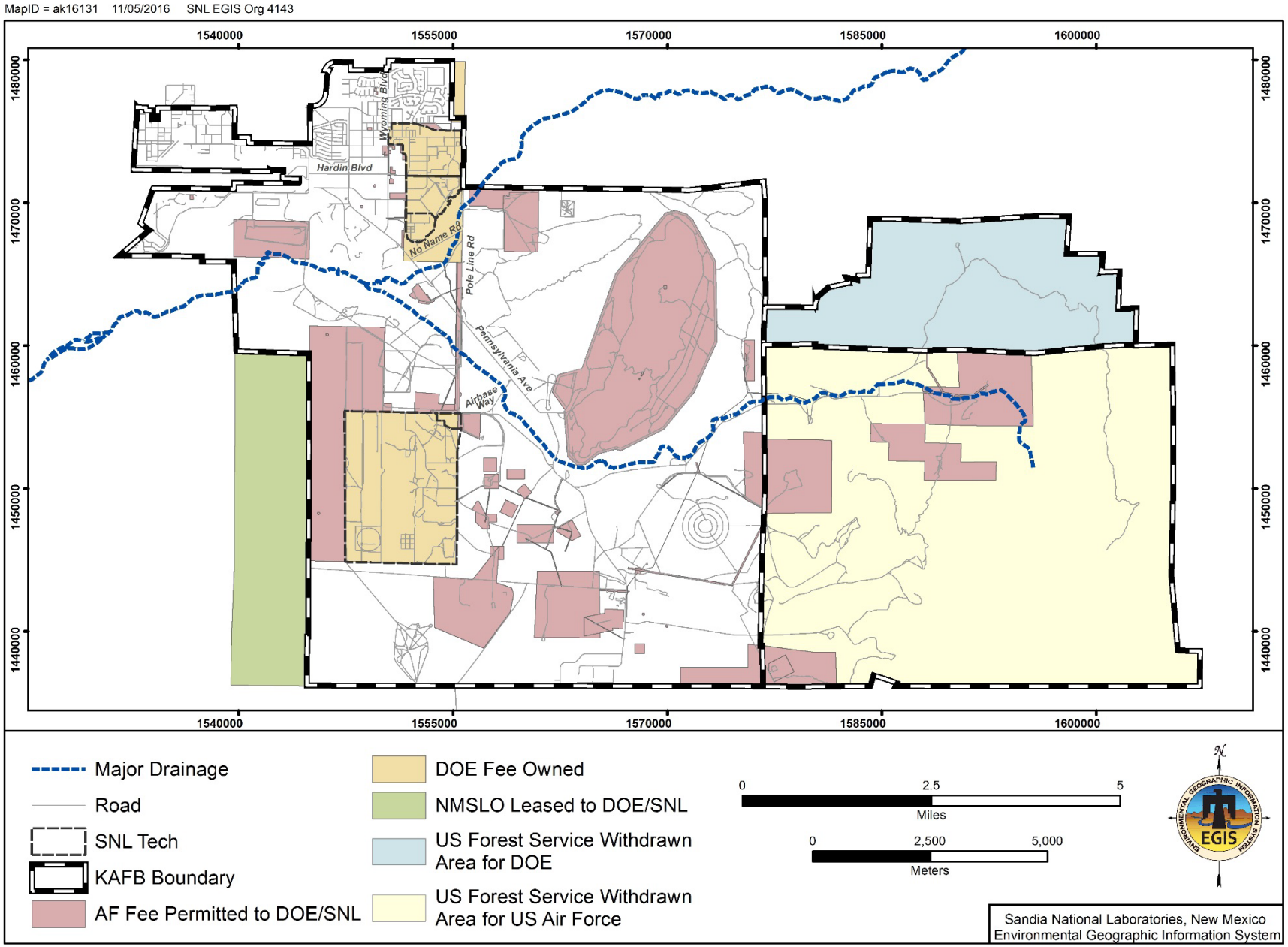

Figure 1-2. Legal Land Ownership and DOE/SNL/NM Permits and Leases

The nine OAEE designated areas are shown in Figure 1-3 and consist of the five DOE-owned TAs (TA-I through TA-V), outdoor test areas within Coyote Test Field (CTF)-East and CTF-West, the Eubank Corridor, and the Off-Site Facilities. The TAs and CTF-East and -West are located within the geographic boundary of KAFB, while the Eubank Corridor is located outside the KAFB boundary north of the KAFB Eubank gate. The Off-Site Facilities are outside the KAFB boundary, but within the Albuquerque area.

1.2 Document Scope

The purpose of the OAEE for the nine designated areas at SNL/NM (including several locations referred to as "off-site") is to provide a description of the environmental sensitivity of areas where development and land use may be prohibited, restricted, or subject to additional requirements. The OAEE is intended for use by SNL/NM personnel and management staff to support decisions concerning their designated areas. The information managed through the Environment, Safety & Health Center and the Facilities Management and Operations Center is the primary data source for the OAEE.

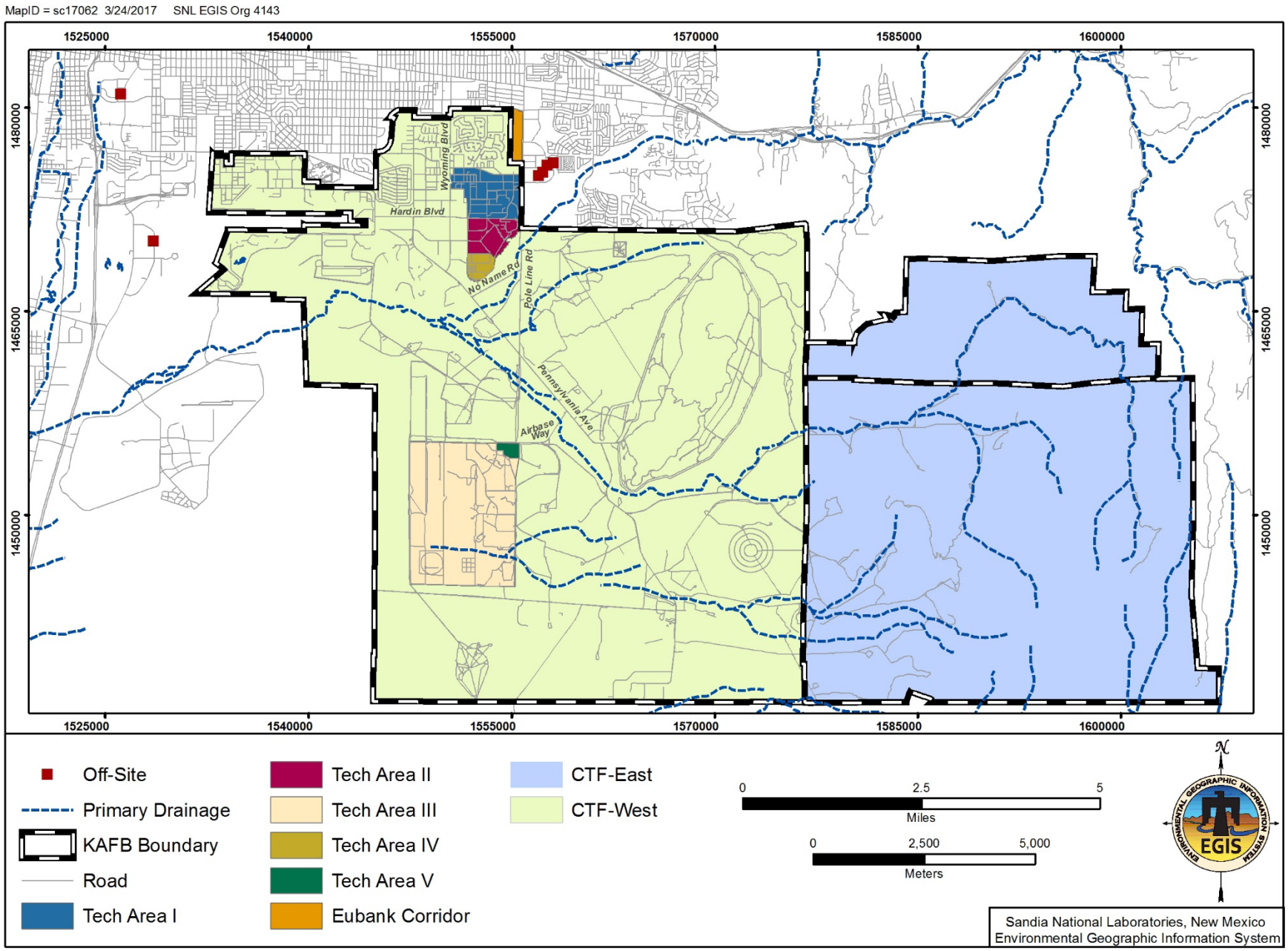

Figure 1-3. Operational Areas at SNL/NM

2. AREA SETTING

The geographic, geologic, hydrologic, and climatic setting is described briefly in this section. Air quality and general soil, vegetation, and terrestrial wildlife types are also discussed. Most of the information in this section is discussed in detail in the Annual Site Evaluation Report (ASER) (SNL/NM 2016a).

The ASER can be accessed at the following link,:

http://www.sandia.gov/news/publications/environmental_reports/

2.1 Geography and Geology

Figure 2-1 provides a generalized surface geology map that shows the exposed stratigraphic units of the Kirtland Air Force Base and the area of the Cibola National Forest that has been withdrawn from the public domain for the exclusive use of KAFB and the DOE (SNL/NM 2004).

2.2 Hydrology

The regional hydrogeologic conditions within the basin are defined by the surface water and groundwater features and the geologic units present. The dominant surface water feature is the Rio Grande, which flows through the basin generally north to south. The groundwater-bearing units of the basin are the unconsolidated deposits of the Santa Fe Group, which comprise the main aquifer.

2.2.1 Groundwater Hydrogeology

The Annual Groundwater Monitoring Report (AGMR) provides aquifer and groundwater hydrogeology details and is available as an appendix of the ASER (SNL/NM 2016a).

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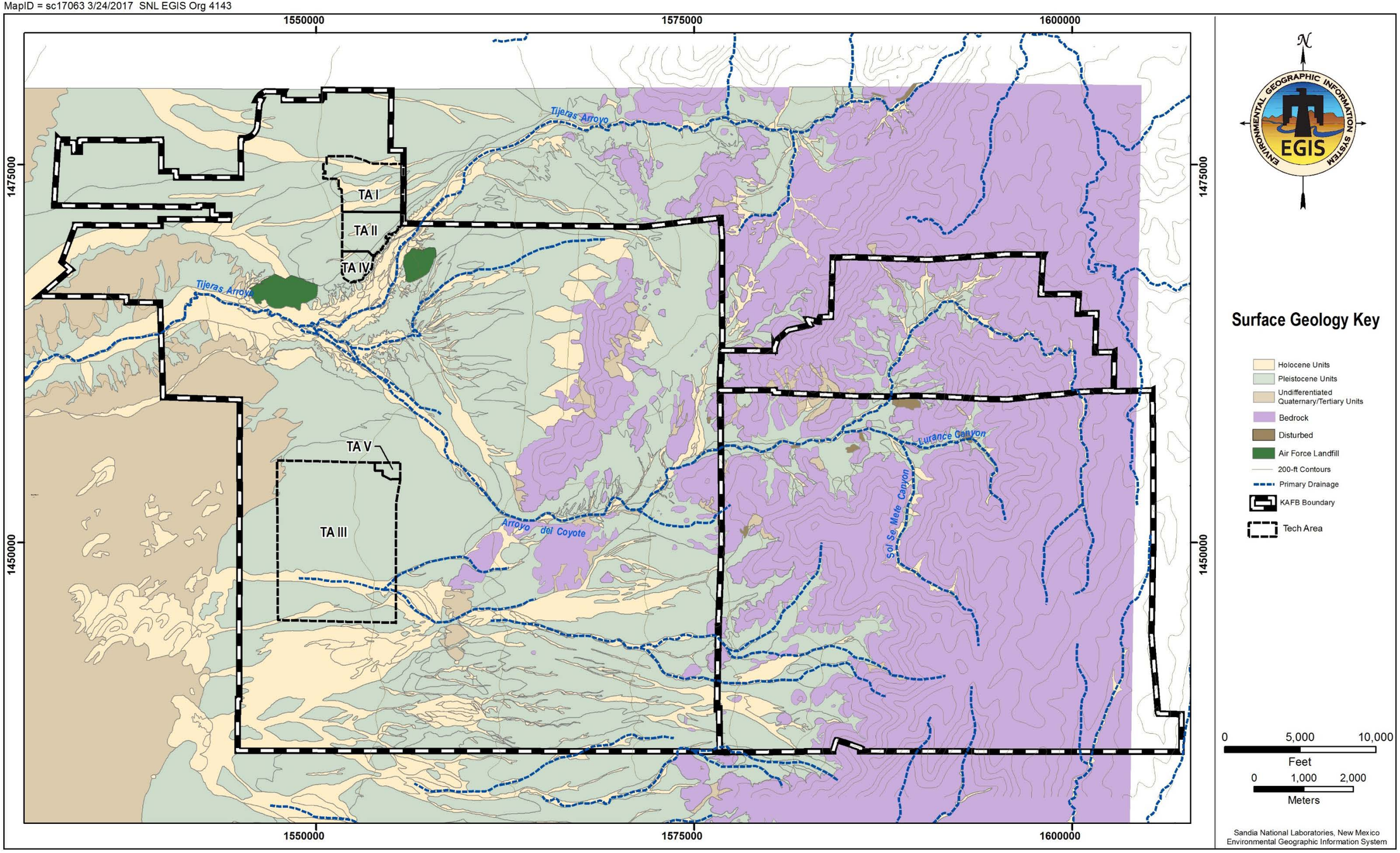

Figure 2-1. Generalized Surface Geology of the Surveyed Areas of KAFB

2.2.2 Surface Hydrology at KAFB

Figure 2-2 shows major surface drainages, the 100- and 500-year floodplains, and the Middle Rio Grande Watershed-Based Municipal Separate Storm Sewer System (MS4) Permit boundaries (SNL/NM 2004). Figure 2-2 also shows the wildlife guzzlers maintained by SNL/NM personnel.

2.3 Soil Types

Figure 2-3 provides a generalized map of surface soil types.

2.4 Climatology and Meteorology

A brief summary of climatology and meteorology follows.

The Albuquerque area has temperatures characteristic of high-altitude, dry continental climates. Data derived from the Albuquerque International Airport (for a period between 1914 and 2009) indicate an average monthly maximum temperature range from 47.2 to 91.7 degrees Fahrenheit (°F) and an average monthly minimum range from 23.5 to 64.7 °F (Western Regional Climate Center). Daytime relative humidity can be between 10 and 20 percent in the spring and early summer, with an average humidity near 30 percent. Winter relative humidity averages near 50 percent. (SNL/NM 2009).

Precipitation varies across the region, with a general increase in annual precipitation as elevation increases. Many locations in the the mountains receive twice the annual rainfall of the Albuquerque area. Most precipitation falls between July and October, mainly in the form of brief, heavy rain showers. Average annual precipitation at the Albuquerque International Airport is approximately 8.65 inches for the nearly 100-year record. The monsoon season dynamics that fuel the heavy rain showers frequently produce lightning in the vicinity of Albuquerque. Tornadoes are uncommon in the Albuquerque area.

The mountains, canyons, and Rio Grande Valley significantly influence wind patterns in the Albuquerque Basin, and interact to form a complex condition. The 13-mile escarpment that forms the west face of the Sandia Mountains greatly influences flow, creating diurnal upslope and downslope wind patterns in the Albuquerque area (SNL/NM 2004a). Mountain vegetation and elevations also create differences in ambient temperature and rainfall compared to the valley region. Wind speeds and directions are highly variable across the region. Diurnal and seasonal wind patterns occur across the basin, as well as upslope flows during the daytime, and downslope flows during the night. These topographically induced wind flows within the Albuquerque area can be enhanced or negated by synoptic weather systems (SNL/NM 2016a). The strongest winds occur in the spring when monthly wind speeds average 10.3 miles per hour (mph), with gusts commonly reaching 50 mph (SNL/NM 2016a).

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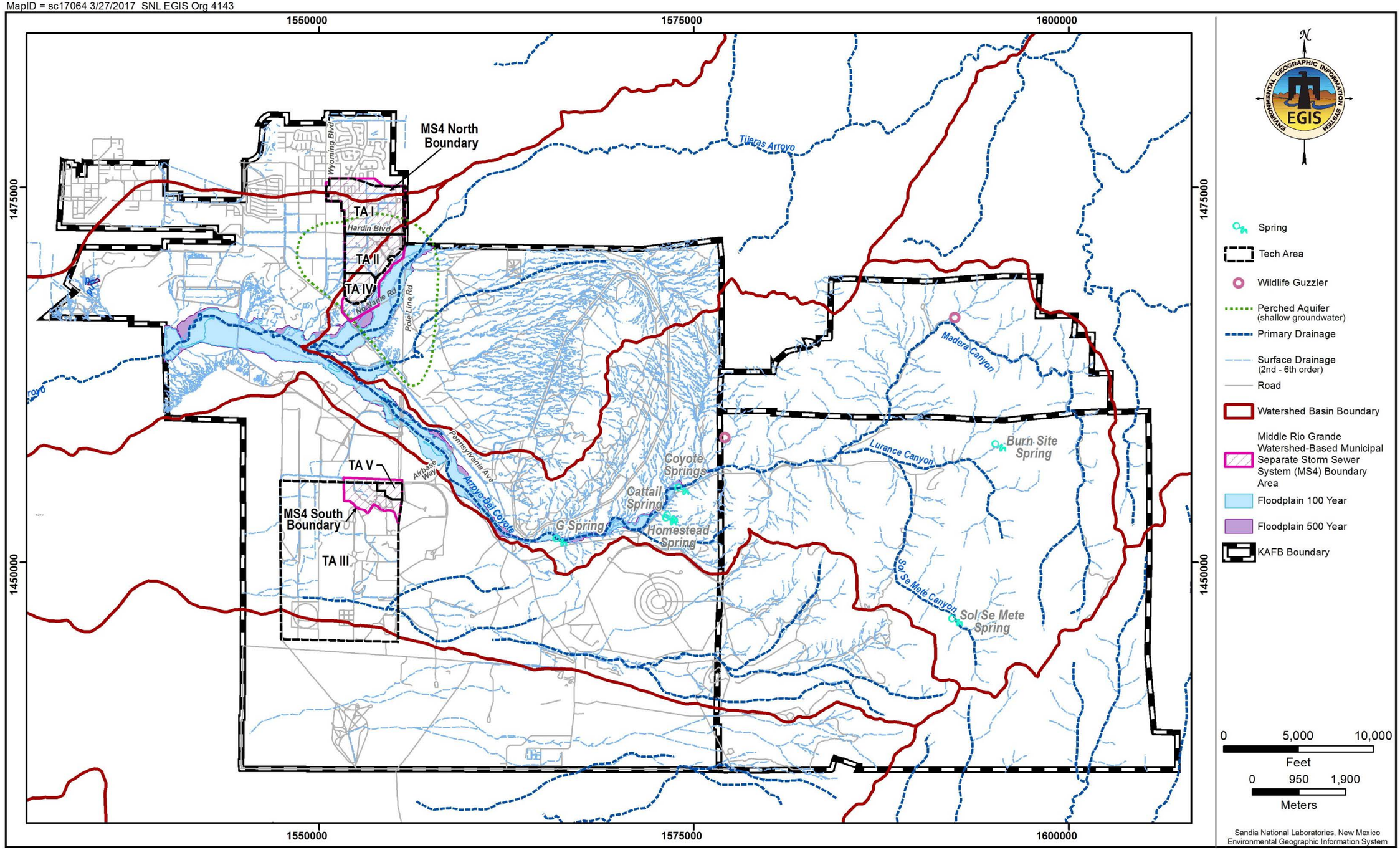

Figure 2-2. Surface Water and Shallow Groundwater Features at KAFB, with MS4 Boundaries Superimposed

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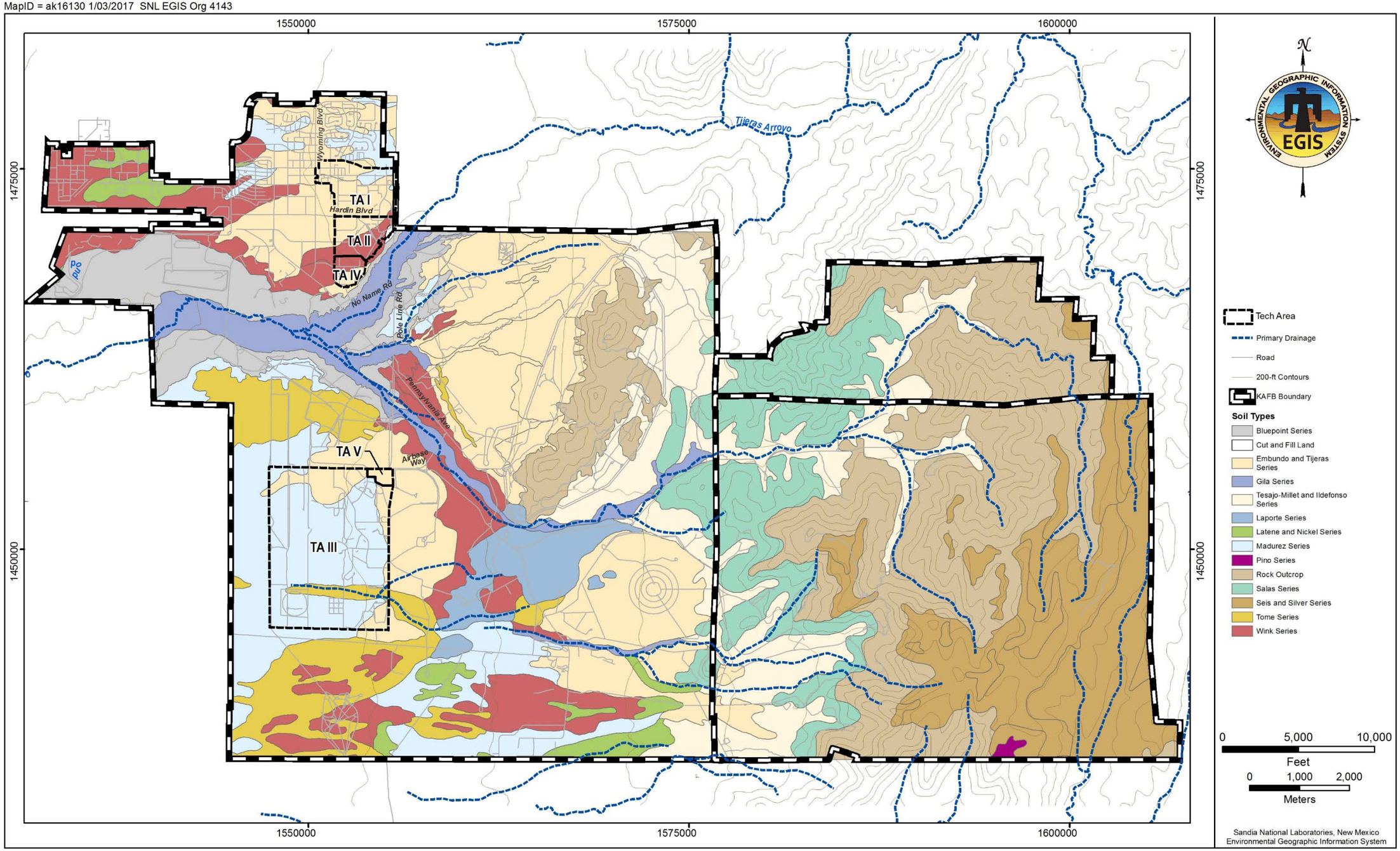

Figure 2-3. General Surface Soil Types at KAFB

2.5 Air Quality

Sources of air pollutants in the area include motor vehicles, the seasonal use of wood-burning stoves and fireplaces, and open burning activities. The dry climate, unpaved roads, and wood-burning activities are primary sources of airborne particulate matter. The high elevation of this region results in incomplete and less efficient fuel burning and increased carbon monoxide emissions. Wood and open burning activities also contribute to carbon monoxide pollution. However, motor vehicles have been, and continue to be, the primary source of carbon monoxide in Bernalillo County.

SNL/NM is in the Albuquerque Middle Rio Grande Intrastate Air Quality Control Region (AQCR), referred to as Region 152. The EPA has classified AQCR 152 as the following:

- Sulfur Dioxides – Better than national standards
- Ozone – Unclassifiable/attainment
- Total Suspended Particulate Matter – Not meeting primary standards or better than national standards
- Nitrogen Dioxide – Unclassifiable/attainment
- Carbon Monoxide – Unclassifiable/attainment
- Lead – Unclassifiable/attainment

The City of Albuquerque Air Quality Program monitors the ambient air in the Albuquerque area to determine the air quality in neighborhoods, background locations, and expected maximum impact locations, and to estimate impacts from mobile vehicles (DOE 1999). Monitoring stations throughout the area measure criteria pollutants, including carbon monoxide, nitrogen dioxide, dust particles, and ozone.

2.6 Regional Ecology

Two major physiographic provinces influence the flora and fauna of the region: (1) mesa and plains, and (2) mountains (SNL/NM 2016a). The topography of the KAFB and SNL/NM area ranges from mid-elevation grasslands to high-elevation coniferous forests. With much of the area undeveloped, there is great diversity in plant and animal communities within the KAFB and SNL/NM area. At least 267 plant species, 206 bird species, 34 reptile/amphibian species, 25 small mammal species, 2 ungulate species (KAFB 2007), 13 bat species (KAFB 2009), and 13 predator species (KAFB 2006) have been documented on KAFB. Figure 2-4 shows vegetation classifications for the KAFB and SNL/NM area. Individual OA sections in this OAEE list the most common species of birds, mammals, reptiles, amphibians, and plants that have been identified within each area.

A significant portion of central New Mexico, including the middle Rio Grande and much of the KAFB and SNL/NM area, is comprised of the mesa and plains physiography. Major landforms include valleys, arroyos, lowlands, outwash plains, and alluvial fans and terraces. Grama and galleta grasses, four-wing saltbush, and sand sage cover lower elevations, with piñon pine, juniper species, and some Ponderosa Pine characterizing the higher elevations.

The SNL/NM and KAFB grasslands can be best described as fragments of historic grasslands. The fragmentation is due to the regional scarcity of the habitat and the relative isolation from other substantial grassland areas. Grasslands are bordered by urban Albuquerque to the north and west, forest lands to the east, and cattle grazing scrublands to the south. SNL/NM and KAFB grasslands provide necessary habitat to support many species of birds, reptiles, amphibians, and mammals that depend on grassland habitats.

In the higher mountain landscape, the vegetation varies greatly on the basis of elevation and aspect and is composed of open meadows and forest stands of varying ages and species (SNL/NM 2010a). Forests tend to be patchy due to topography, weather, fire, insect outbreaks, and disease.

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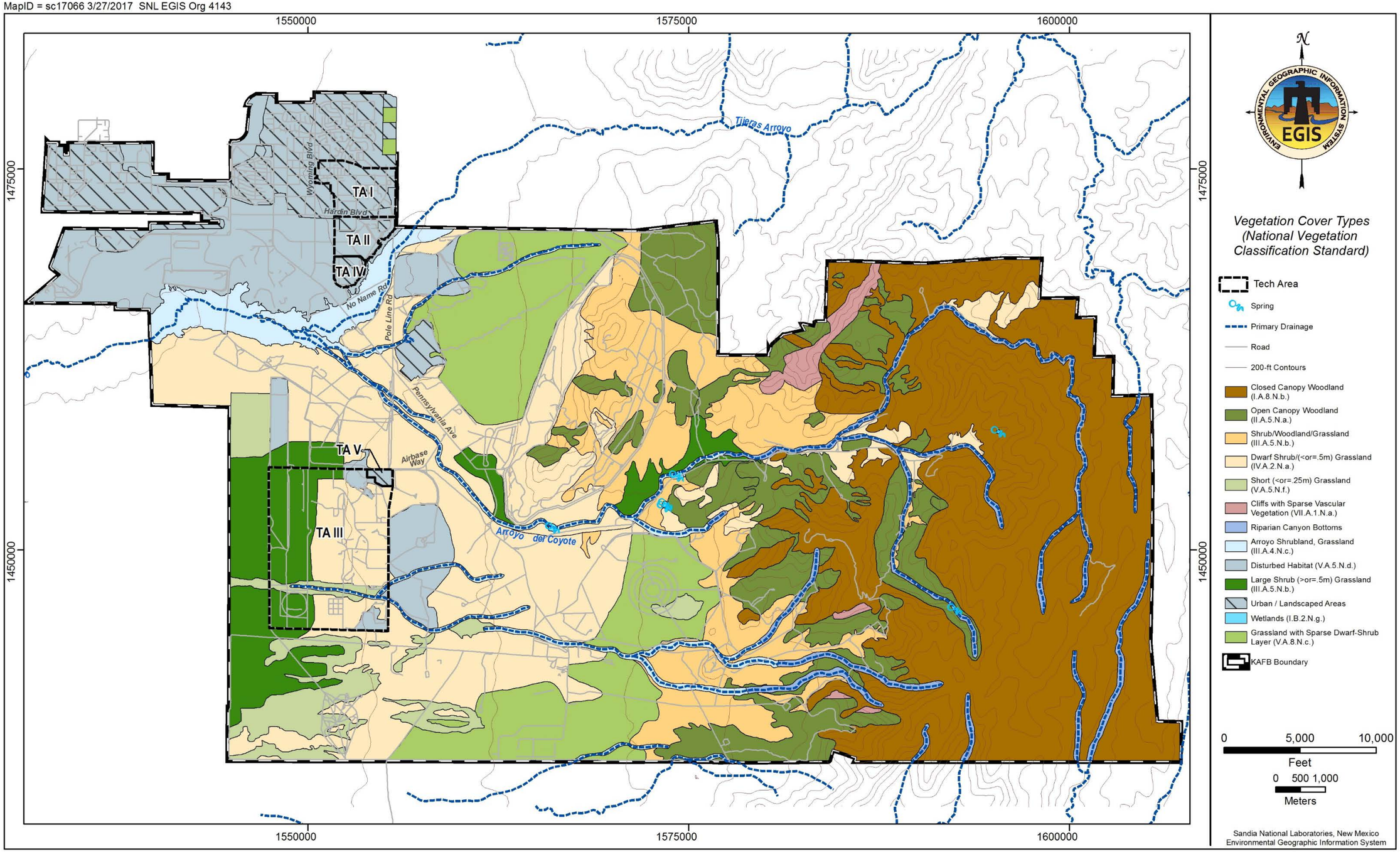

Figure 2-4. Vegetation Classification for KAFB

3. ENVIRONMENTAL PROGRAMS INFORMATION

As required by the Management and Operating (M&O) Contract, Sandia has implemented an EMS, that is ISO 14001 certified, as part of its Integrated Safety Management System (ISMS). ISMS is one of the constituent elements of the Sandia Management Model (SMM) and provides the context for implementing the EMS. The *Environmental Management System Manual* provides a detailed description of the EMS and its implementation, including the relationship of the ISMS core safety management functions to environmental protection (SNL/NM 2016b).

Environmental programs are part of the Sandia EMS, the framework by which Sandia manages, and continually improves, its environmental compliance and sustainability practices. The EMS identifies the environmental consequences of SNL activities, products, and services and develops objectives and measurable targets to mitigate potential impacts to the environment.

The following sections provide brief descriptions of OAEE-pertinent SNL/NM environmental programs. A complete listing and more detailed description of SNL/NM environmental programs are available in the ASER for SNL/NM (SNL/NM 2016a) and the Sandia ES&H policy (SNL/NM 2016c).

3.1 Air Quality Compliance

The Sandia National Laboratories (SNL) Air Quality Compliance (AQC) Program is responsible for maintaining compliance and supporting SNL organizations with applicable air quality procedures and policies in support of SNL's EMS. AQC personnel assess potential impacts of air pollution sources at Sandia National Labs/New Mexico (SNL/NM) and other sites not within the scope of the OAEE (Tonopah Test Range [TTR] and Kauai Test Facility [KTF]) (SNL/NM 2016d,e).

3.1.1 Core Areas and Key Activities

The AQC Program includes seven distinct subject areas, each with respective drivers:

- Stationary Sources
- Fugitive Dust
- Open Burn
- National Emission Standard for Hazardous Air Pollutants, Subpart H –Radionuclides Other than Radon from Department of Energy Facilities (Radiological NESHAP)
- Greenhouse Gases
- Ozone Depleting Substances
- Ambient Air Surveillance

Each OAEE section provides a map and information that includes air monitoring station locations, as applicable, air quality permit types (e.g., stationary source registration, fugitive dust

control), and facilities associated with the different AQC permits. Results for AQC monitoring programs are provided in the ASER (SNL/NM 2016a).

3.2 Ecology

The purpose of the SNL/NM Ecology Program is to assist SNL/NM and the U.S. Department of Energy (DOE)/ National Nuclear Security Administration (NNSA) in maintaining ecological compliance, as well as preserving and protecting the ecological resources at Sandia Corporation (Sandia) sites (SNL/NM 2015a). The Ecology Program works in conjunction with Facilities Management and Operations Center (FMOC) to maintain regulatory compliance by providing a control that requires the Ecology Program to review all work orders potentially impacting species associated with the Endangered Species Act (ESA) and the Migratory Bird Treaty Act (MBTA). Additionally, the Ecology Program works with the Environment, Safety and Health (ES&H) Coordinators to ensure proper compliance and awareness strategies. The primary objectives of the Ecology Program include the following:

- Maintain regulatory compliance related to ecology,
- Preserve and protect ecological resources,
- Reduce the impact of activities by identifying potential ecological concerns associated with proposed projects,
- Provide expertise in biological identification of species of concern, and
- Maintain a good working relationship with stakeholders and the regulatory community.

3.2.1 Core Areas, Key Activities, and Data Collection

Brief descriptions of Ecology Program core areas and key activities (including data collection) follow.

- Collect:
  - Ecological resource inventory data to support site operations while preserving ecological resources and maintaining regulatory compliance.
  - Plant and animal species data to further the understanding of on-site ecological resources (individual OA sections provide a listing of plant and animal species present).
  - Biota contaminant data as needed in support of site projects and regulatory compliance.
- Assist SNL/NM organizations in complying with regulations and laws.
- Educate the SNL/NM community regarding ecological resource conservation.
- Support Line organizations with biological surveys in support of site projects.

Data are collected on mammal, reptile, amphibian, bird, insects, and plant species that currently inhabit SNL/NM, and include information on presence, abundance, species diversity, and land-use patterns.

3.2.1.1 Terrestrial Wildlife

Wildlife communities at KAFB are typical of those found in wildlands of central New Mexico. The composition of each wildlife community is determined by the quality and quantity of habitat available that meets the needs of each animal species.

3.2.1.2 Areas of Biological Conservation

A conservation area is a tract of land that has been given protected status in order to ensure that natural features or biota are safeguarded. Designation of natural land areas as conservation areas for biota is most common when unintended impacts from nearby activities may deteriorate land areas that were once able to support species that are in decline. The conservation area designation provides a management planning tool for SNL/NM personnel to more efficiently remain in compliance with federal and state laws and regulations.

Development is not prohibited in Conservation Areas. The Conservation Area designation identifies areas that are able to support species in decline and as such are appropriate for development mitigation. Development mitigation can include a range of scenarios from permitting development in a conservation area in exchange for preservation of land in another area, to avoiding development. Development mitigation is coordinated between the Ecology Program and Facilities Management and Operations Center (FMOC).

The OAEE is a snapshot of ecological conditions, the management of conservation areas is detailed in the Grassland Management Plan which provides guidance for balancing conservation with development as ecological conditions change over time.

The criteria for a Primary Conservation Area (PCA) are as follows:

- An area where state or federally listed species or DOE-protected species are dependent on the habitat and where regular human interference, or limited high-intensity human impact, will negatively impact these species. Land areas that are identified and set aside by the SNL/NM Ecology Program as conservation areas for regulated species will assist in planning.
- Any geographic area that exists within the land included in the jurisdiction of a regional wildlife cooperative agreement.
- Areas determined to be important pollinator habitat.

The criteria for designating a Secondary Conservation Area (SCA) are as follows:

- Good quality habitat for species in significant decline.
- Good quality habitat for Sensitive Species listed by other state and federal agencies.
- An area where select species, approved by state and federal permits, may efficiently and responsibly be relocated in response to development occurring in another area.
- Area is a contributing factor to the benefit of pollinator.

The criterion for an overlapping PCA/SCA is an area that meets one or more of the criteria defined for each conservation area. Any land areas that meet the requirements for both a PCA and SCA are classified accordingly, as both a PCA and SCA (SNL/NM 2016f).

Each OAEE section provides a map that includes the locations of PCAs, SCAs, owl/raptor roosts/nests, prairie dog colonies, bat habitats, wildlife guzzlers, and the Tijeras Wildlife Corridor, as applicable to the area. Details on the Ecology Program, and results for surveillance activities for vegetation, herpetofauna, avian, and remote camera stations, are provided in the SNl/NM ASER (SNL/NM 2016a).

Table 3-1 shows the federal and state listed threatened or endangered species known to occur, or that have occurred, in Bernalillo County (BISON-M, 2016).

Table 3-1. Federal and State Listed Threatened or Endangered Species Known to Occur, or That Have Occurred, in Bernalillo County

Common Name	Scientific Name	NMDGF	USFWS
Spotted Bat	*Euderma maculatum*	T	
Meadow Jumping Mouse	*Zapus hudsonius luteus*	E	E
Brown Pelican	*Pelecanus occidentalis*	E	
Common Black Hawk	*Buteogallus anthracinus*	T	
Bald Eagle	*Haliaeetus leucocephalus*	T	
Apomado Falcon	*Falco femoralis*	E	E
Peregrine Falcon	*Falco peregrinus*	T	
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	T	
Least Tern	*Sternula antillarum*	E	E
Neotropic Cormorant	*Phalacrocorax brasilianus*	T	
Yellow-Billed Cuckoo (western population)	*Coccyzus americanus occidentalis*		T
Mexican Spotted Owl	*Strix occidentalis lucida*		T
Broad-Billed Hummingbird	*Cynanthus latirostris*	T	
White-Eared Hummingbird	*Hylocharis leucotis*	T	
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	E
Bell's Vireo	*Vireo bellii*	T	
Gray Vireo	*Vireo vicinior*	T	
Sprague's Pipit	*Anthus spragueii*		C
Baird's Sparrow	*Ammodramus bairdii*	T	
Rio Grande Silvery Minnow	*Hybognathus amarus*	E	E

C = Candidate
E = Endangered
NMDGF = New Mexico Department of Game & Fish
T = Threatened
USFWS = U.S. Fish and Wildlife Service

3.2.1.3 Tijeras Arroyo Wildlife Corridor Memorandum of Understanding

The *Tijeras Arroyo Wildlife Corridor* MOU (DOE et al. 2007) addresses the agreement reached by the COA, KAFB, and DOE/NNSA/Sandia Field Office (SFO) to establish and maintain a

wildlife corridor within Tijeras Arroyo. The Wildlife Corridor is an important conservation area guided by the following noteworthy wildlife conservation principles:

- The parties are dedicated to the conservation and preservation of wildlife on lands under their jurisdiction.
- The protection and conservation of the Tijeras Arroyo Wildlife Corridor traversing KAFB is necessary to preserve the continuity of wildlife passage.
- The parties should coordinate efforts to ensure uniform and consistent land management and wildlife conservation practices.

As part of this MOU, the parties agree that "[e]ach party shall make all reasonable efforts to preserve the natural habitat of those areas of the Tijeras Arroyo within their respective jurisdictions so that the Tijeras Arroyo remains a viable wildlife corridor."

3.3 Environmental Restoration Operations

SNL/NM ER Operations personnel have identified, assessed, and remediated sites contaminated or potentially contaminated by past spill, release, or disposal activities, in accordance with the Resource Conservation and Recovery Act (RCRA) and its implementing regulations. The EPA formally authorized the implementation and enforcement of corrective action requirements under RCRA to the NMED. In light of this authority, Sandia, DOE, and NMED negotiated a Compliance Order on Consent, effective as of April 2004 (NMED 2004). The DOE and Sandia submit a request to the NMED for an approval on the status of ER sites as "Corrective Action Complete" (CAC) once they have met specific NMED criteria.

The criteria for CAC include a determination that there is an acceptable level of risk to human health and the environment presented by the contaminants at the site. The level of contamination remaining and the appropriate land-use category (i.e., industrial, residential, or recreational use) are used, together with the available information and conceptual model for each site, to determine any risk to human health and the environment. There are two types of CAC status regarding an ER site that are issued by the NMED: (1) CAC with controls; or (2) CAC without controls, requiring no further action. The individual OA sections present the status and locations of ER sites.

Soil samples are collected in support of several programs at SNL/NM, including ER Operations. Analytical data for soil samples may include the following (SNL/NM 2014a, 2016g):

- Gamma Spectroscopy Analysis
- Tritium (percent in soil moisture)
- Total Uranium
- Target Analyte List (TAL) Metals

Each OAEE section provides a map and information that includes ER site names/numbers, status (e.g., CAC with Controls), the Institutional Controls (ICs) in place, and locations within each OA, as applicable.

3.4 Groundwater Monitoring

The Long-Term Stewardship Groundwater Monitoring Program (GMP) is responsible for tracking information on all groundwater monitoring wells and characterization boreholes. The primary purpose of the GMP Well Registry and Oversight Task is to ensure that all wells are properly constructed and maintained to protect groundwater resources (SNL/NM 2016a,h).

3.4.1 Core Areas and Key Activities

The GMP consists of seven functional elements:

- Groundwater Surveillance
- Well Registry and Oversight
- Self-Assessment
- GMP Development
- Potential Sources for Groundwater Contamination
- LTS/ER Areas of Concern (AOCs) with Active Groundwater Monitoring
- Engineered Units with Detection Groundwater Monitoring

The GMP primary function is to conduct groundwater surveillance to detect possible groundwater contamination from current operations or undiscovered legacy sites. The GMP is responsible for tracking information on all wells at SNL/NM, including ER Operations wells and characterization boreholes. ER Operations groundwater activities are conducted in accordance with RCRA regulations. The NMED has imposed additional requirements. There are currently five ER Operations groundwater monitoring networks (individual OA sections provide well locations).

3.4.2 Data Collection

The GMP and ER Operations collect groundwater data from monitoring wells throughout SNL/NM OAs and ER sites. Groundwater monitoring is conducted on a quarterly, semiannual, or annual basis, depending on the individual project areas. Water level measurements are obtained on a monthly or quarterly basis, depending on the individual project areas. Analytical data are available for monitoring activities that have been conducted since 1989.

Additional program details, including information on monitoring networks, and groundwater sampling schedules, methods, and analytical results, are presented in the ASER/AGMR (SNL/NM 2016a). Typically, analytical data are available for the following analytes:

- Inorganic constituents – Metals and general chemistry
- Organic constituents – VOCs, SVOCs, PCBs, pesticides, TPH, and HE
- Radionuclides

Each OAEE section provides a map and information that includes current or former groundwater monitoring well locations within each OA, as applicable.

3.5 Long-Term Stewardship

The SNL/NM LTS Program establishes programs and processes to promote environmental protection approaches in planning Sandia facilities and operations (SNL/NM 2016f,g). The LTS Program conducts compliance oversight activities, including long-term monitoring, to comply with NMED requirements. A monitoring well network of more than 50 groundwater monitoring wells (GWPP and ER Operations wells) is sampled for the presence of constituents of concern (COCs) at various intervals during the year. The data from this sampling activity are evaluated on an ongoing basis and maintained in a comprehensive database. The LTS Program includes community outreach to keep the public informed of LTS Program activities. The LTS Program maintains ICs for various sites.

ICs are a mechanism used to manage property and restrict inappropriate uses of land, facilities, and environmental media. ICs are used at ER sites. ICs are to be used to achieve the following objectives:

- Protect the environment, including cultural and natural resources
- Implement and enforce the CAC status of ER sites
- Prevent inappropriate activities on former ER sites
- Prevent or limit inadvertent human and environmental exposure to residual contamination and other hazards
- Prevent new activities that may result in contamination exceeding regulatory limits
- Coordinate with the SNL/NM EMS

The two types of ICs used at SNL/NM are administrative and physical. All ER sites will have, at a minimum, some administrative controls in place. To ensure that proper land use does occur, some sites will also have physical ICs in place. Administrative and physical controls are discussed below.

Typical administrative ICs implemented at SNL/NM include the following:

- Maintaining site information management (controlling site information via the IC database and storage of records and data in the Customer Funded Records Center, the EGIS Program, and the Geographic Environmental Management System)
- Providing resource-use management to ensure that land use follows appropriate planning
- Designating each site with a classification for future land use
- Tracking and reporting requirements imposed by the NMED
- Identifying potential sites for consideration during the NEPA process

Typical physical ICs implemented at SNL/NM include the following:

- Post warning and information signs at the sites
- Use fences and access control gates to restrict access to the sites
- Monitor physical features (erosion control, for example)
- Perform periodic inspections of site conditions and condition of control measures
- Repair site features and access controls, as needed, to maintain effectiveness

Each OAEE section provides a map and information that includes ER site names/numbers, status (e.g., CAC with Controls), the ICs in place, and locations within each OA, as applicable.

3.6 Meteorological Program

The SNL/NM Meteorology (MET) Program provides mission and decision support services, data, and analyses to all programs and operations that require meteorological information. The Meteorology Program Plan describes general program operations and support activities (SNL/NM 2015b).

Tasks include the the operation and maintenance of monitoring instrumentation and networks used in health, safety, test planning, and general site operations. The meteorological monitoring network, the main network, provides meteorological state variables for SNL/NM, while the Potential Gradient Alarm and Detection System (PGRADS) is a customer-funded task providing atmospheric information to support work for the National Center of Excellence for Explosives. Details on meteorological monitoring and PGRADS are in operating procedures.

MET Program personnel operate and maintain the corporate lightning detection system, used in emergency management operations and for general personnel safety. Lightning data from the National Lighting Detection Network (NLDN) is included. A separate, facility-specific lighting detection and warning system supports work for the National Center of Excellence for Explosives. The Focused Lightning Alerts for Storm Hazards (FLASH) uses Earth Networks Total Lightning Network (ENTLN) data and is available at 18 explosive facilities at SNL/NM.

3.6.1 Meteorology Program Data

MET monitoring is conducted through a network of eight meteorological towers, all equipped to measure temperature, wind parameters, and relative humidity. Precipitation is measured at three locations; barometric pressure is measured at two towers. Each OA map shows meteorological tower locations, as applicable.

Meteorological data, primarily used to support health, safety, and other operational aspects, is available through this website: http://clean-air.sandia.gov/

Meteorological data is also used for the following environmental applications:

- Characterize transport and diffusion of actual or potential pollutants.
- Guide and support environmental surveillance and monitoring activities.
- Support regulatory air dispersion modeling permitting and compliance activities.

Atmospheric conditions can vary considerably across the network when looking at discrete time intervals, such as hourly averages, or current conditions, that are recorded in 15 minute intervals. Real-time variability of meteorological conditions has implications on the transport and dispersion of pollutants and is important in emergency operations and management. Long-term climatological information for each tower location may be similar, except for precipitation.

Mission support may also require the use of mobile meteorological instruments and assets to meet test objectives. These projects are generally customer funded and completed as needed.

The PGRADS network is not used for environmental applications; it is primarily a safety system. The PGRADS task includes operation and maintenance of 29 Electric Field Meters (EFMs) and 40 Remote Alarm Indicators (RAIs) located across SNL/NM. The EFMs measure the atmospheric electric field, which is related to the potential for a static discharge. The RAIs use color-coded lights and audible horns to alert and warn of potentially dangerous high-atmospheric electric fields. Research groups who use explosives at SNL/NM and groups with shock-sensitive assets monitor this network as part of safety protocol. Data is available to support off-normal occurrences and investigations. The PGRADS location map is accessible at this website: http://134.253.230.10/PGRADS/

3.6.2 Meteorological Program Mission Support

Services with an environmental aspect include plume or dispersion modeling of outdoor test effluent to quantify potential impacts. Noise modeling is also available for planning and operational support of large-scale tests. Most noise hazards are controlled by the use of engineering or administrative controls; e.g., performing tests during benign weather conditions is an administrative control.

Mission support can include forecasting services for weather criteria, which are the meteorological elements needed to optimize test results. Weather criteria may be related to dispersion characteristics of the atmospheric environment, or require specific wind speed and directions for mission success. General weather reports use large-scale models that may not resolve the local wind field; making use of on-site data and local studies contributes to the success of outdoor tests.

3.7 National Environmental Policy Act

Sandia provides DOE/NNSA/SFO with technical assistance supporting compliance with NEPA and the National Historic Preservation Act (NHPA). The SNL/NM NEPA Team reviews projects for conformance to existing DOE NEPA documents and determinations. The use of the NEPA software (NEPA Docs) facilitates SNL/NM NEPA reviews, citing existing NEPA documentation as appropriate. The ISMS NEPA module also streamlines the DOE/NNSA/SFO review, generates DOE NEPA checklists, when required, and supports quality assurance by providing a consistent framework that makes NEPA documentation and information readily available (SNL/NM 2016i).

3.7.1 Cultural Resources

At SNL/NM, cultural resources compliance is coordinated through the NEPA Program. Actions that could adversely affect cultural resources are initially analyzed in a NEPA checklist. Historic properties, as defined by NHPA and other implementing regulations, include archaeological sites and historic buildings and structures. Historic buildings and structures may include those over 50 years of age that are historically significant or younger structures of exceptional significance (individual OA sections provide locations of these buildings). Historic buildings are present on property owned by DOE/NNSA and on land permitted to DOE. Planning assists in avoiding potential impacts to these sites, and appropriate historical resource documentation is undertaken to mitigate effects when necessary.

Cultural resources include archaeological, traditional, and built resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. Federal, state, and local laws direct the preservation and protection of cultural resources that are historically significant.

Both prehistoric and historic resources are present within the SNL/NM area. During the past three decades, SNL/NM and the USAF have sponsored pedestrian archaeological surveys in the area, both as large overviews of the site and in support of specific projects. These surveys are used to determine locations of Archaeological sites, including prehistoric and historic resources.

Cultural resource surveys and assessments have been performed for all DOE-owned properties used by SNL/NM personnel. Early on, these surveys and assessments identified no properties eligible for the National Register of Historic Places (NRHP) (Hoagland and Lord 1993). The State Historic Preservation Officer (SHPO) concurred with these assessments, but recommended that buildings be assessed for NRHP eligibility as they reach 50 years of age.

Several of these cultural resource surveys and reports contributed to a larger survey report for SNL/NM ER Operations (Hoagland and Dello-Russo 1995). Since 1998, inventories for archaeological resources have been conducted on a project-by-project basis for use by SNL/NM personnel and only in places outside the five defined TAs.

Inventories and evaluations of buildings and structures have been conducted extensively within the TAs and at outdoor testing facilities as renovations and demolitions were planned. These assessments have resulted in DOE determinations of NRHP eligibility or ineligibility for the properties involved, in consultation with NM SHPO. In 2010, SNL/NM conducted a survey and assessment of the entire SNL/NM built environment. Consultation between SFO and New Mexico SHPO is not complete regarding that assessment, although there is a list of properties recommended as NRHP eligble in use within SNL.

3.7.2 Facitilites Routine Maintenance

Facilities Maintenance and Operations Center engages in routine maintenance activities defined as maintenance, repair, in-kind replacements, and removal actions. Routine maintenance

activities—corrective (that is, repair), preventive, and predictive—are required to maintain and preserve buildings, structures, infrastructures (e.g., pathways and roads, as approved by DOE/NNSA/SFO), vehicles, equipment, localized vegetation, and pest control. This includes activities to preserve facility appearance, working conditions, sanitation, cleaning, window washing, lawn mowing, trash collection, painting, and snow removal. During these activities, operations may be suspended and resumed.

The FMOC maintains an Engineering Standards Program. Within the program, there are construction standards that identify specifications for revegetation efforts at SNL/NM (Lawns and Grasses [Number 02992], Exterior Plants [Number 02932]) (SNL/NM 2007). The *Gardener Preventive Maintenance Guide* (W1-066) applies to vegetative control activities conducted by FMOC (SNL/NM 2016j).

Environmental concerns associated with SNL/NM routine maintenance activities have been analyzed in a NEPA checklist, which is currently on 3-year review cycle, or as-needed, if significant road maintenance route or process changes are anticipated. Only those Facilities Maintenance activities that fall outside the scope of routine operations are forwarded to the NEPA Program for additional review.

The road maintenance plan established for SNL/NM is periodically reviewed by SFO, and documented through the NEPA process. SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to work. The 2010 OAEE provided routine road maintenance maps by OA. Process knowledge, lessons learned, and ISMS/EMS/ISO 14001 continual improvement practices show that the best tool for managing potential environmental impacts that could result from routine road maintenance is the current NEPA checklist, which includes the DOE-approved map.

Each OAEE section provides a map and information that includes historic building locations within each OA, as applicable.

3.8 Radiological National Emission Standards for Hazardous Air Pollutants Compliance

DOE is required by 40 CFR 61 Subpart H – *National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities*, to report radionuclides emission releases. The radionuclide emission releases are reported yearly in the Annual Radiological NESHAP Report and the ASER. The EPA regulates radionuclide air emissions in accordance with 40 CFR 61, Subpart H.

The mission of the Radiological NESHAP Program is to minimize the impact of Sandia's operations on the environment through responsible management of airborne rad emissions and to assist line organizations in complying with applicable environmental laws and regulations related to radiological NESHAP reporting. To accomplish this mission, the Radiological NESHAP Program:

- Conducts annual inventories of potential radiological emission sources,
- Evaluates new and modified operations for potential radiological emissions, and
- Documents the evaluation of the annual emissions.

An annual radiological NESHAP report summarizes radionuclide air emission releases from SNL/NM facilities and presents the results of the annual dose assessment. Currently all facilities are defined as point emission sources at SNL/NM. Individual OA sections provide locations of radiological NESHAP facilities. Point sources are produced from an exhaust stack or vent (SNL/NM 2015c).

3.9 Safe Drinking Water

KAFB, supplies water to the DOE-owned SNL/NM drinking water distribution system. The KAFB water system is registered with the NMED/Drinking Water Bureau as a nontransient Community Public Water System. KAFB is identified as the sole registered party; therefore, the DOE-owned and SNL/NM-operated and maintained distribution system on KAFB is regulated by the NMED/Drinking Water Bureau as a component of the KAFB system (SNL/NM 2015k). The Safe Drinking Water Program works in conjunction with FMOC to maintain compliance with federal, state, local, and DOE regulatory requirements.

The mission of the SDWP Program is to coordinate drinking water activities at operated facilities. To accomplish this mission, the SDWP Program:

- Conducts potable water monitoring at remote Sandia and DOE sites on KAFB.
- Coordinates with:
  - DOE/Sandia Field Office (SFO) in the operation of the Sandia SDWP Program.
  - KAFB as mediated by DOE/SFO regarding Public Water System (PWS) issues.
  - Line customers and Facilities Maintenance and Operations Center (FMOC) regarding operations in backflow prevention (BFP) inspection, testing, and maintenance activities.
- Facilitates access to SNL/NM for KAFB and NMED for compliance related activities.
- Provides sampling and analysis support to FMOC for disinfection of new building commissioning, water line installation, and emergency repairs.
- Responds to address water quality complaints reported at Sandia.
- Reviews all Safe Drinking Water Act (SDWA) reporting.
- Supports compliance activities for the KAFB PWS at SNL/NM by collecting water samples for biological and chemical analysis and measuring chlorine residuals and pH levels within the distribution system when requested by KAFB.

3.10 Oil Storage and Spill Prevention Control and Countermeasures

The Oil Storage Program and the Spill Prevention Control and Countermeasures Plan (required under the Clean Water Act) describe the oil storage facilities at SNL/NM and the mitigation

controls in place to prevent inadvertent discharges of oil. The facilities at SNL/NM that are subject to regulations include oil storage tanks (aboveground and underground storage tanks), bulk storage areas (multiple containers), and temporary or portable tanks. Sandia currently operates 49 aboveground and 3 underground storage tanks at SNL/NM (SNL/NM 2015d).

3.11 Terrestrial Surveillance

The Terrestrial Surveillance (TS) Program at Sandia National Laboratories, New Mexico (SNL/NM) is designed and conducted to address DOE O 458.1 Admin Change 3, *Radiation Protection of the Public and the Environment*, which establishes standards and requirements to protect the public and the environment from undue risk from radiation associated with radiological activities under the control of DOE. The TS Program collects environmental media (soil, sediment, and vegetation) samples and analyzes these for radiological constituents, as required (SNL/NM 2016k). As a best management practice, samples are also collected in order to analyze metals and other site-specific constituents. In addition, ambient external gamma radiation levels are measured using thermoluminescent dosimeters (TLDs). These surveillance activities are conducted at designated locations that are on-site, off-site, and around the perimeter of DOE fee-owned areas, leased property, and KAFB.

Environmental radiological surveillance began at SNL/NM in 1959 (SNL/NM 1973). Nonradiological surveillance sampling began in 1993 with the implementation of the TS Program and the collection of samples for metal analyses. In 2000, SNL/NM contracted with a single analytical laboratory, which has lower metal detection capabilities than the TS Program, to analyze many of the samples. The same database has been used for statistical analysis from 2000 to the present.

The TS Program uses three sample location classifications: on-site, perimeter, and off-site (the latter previously referred to as "community locations"). Sampling locations have been selected based on several factors. The on-site sample locations are in areas of known contamination (Environmental Restoration sites), areas of potential release (sites with current outdoor testing activities), and areas where contamination may be naturally concentrated (arroyos and river banks). Perimeter sample locations are located around the boundaries of KAFB. Off-site sample locations are located within a 25-mile radius of KAFB. Off-site sample results are used for comparison to the on-site and the perimeter sample results.

Environmental sample media that are collected include surface soil (less than 2 inches deep), arroyo and river sediment samples, and vegetation. Vegetation samples, which are collected from native grasses and small leafy plants, monitor the potential uptake of radioactive materials and metals from the soil. Environmental TLDs are used to measure the cumulative ambient external radiation dose, and to closely approximate the dose potentially received from natural and nonnatural sources.

The ASER provides further information on the Terrestrial Surveillance Program and sampling results (SNL/NM 2016a). Each OAEE section provides a map and information that includes terrestrial surveillance sampling locations within each OA, as applicable.

3.12 Effluent Monitoring

Water resources at SNL/NM are managed through several different monitoring and surveillance programs. Sandia complies with water quality regulations established by local, state, and federal agencies. EPA standards are implemented at the state and local level by the NMED and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). There are 6 wastewater monitoring stations at SNL/NM that are permitted by the ABCWUA. Currently, EPA Region 6 implements stormwater permits under the National Pollutant Discharge Elimination System (NPDES). Stormwater is the only discharge at SNL/NM regulated under the NPDES.

Personnel at SNL/NM conduct monitoring of wastewater and stormwater. Sandia complies with water quality regulations established by local, state, and federal agencies. EPA standards are implemented at the state and local level by the NMED and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA).

The OAEE uses existing information sources to the extent possible. The ASER includes wastewater and stormwater sampling results as appendices (SNL/NM 2016a). For ease of reference, general details of MS4 areas are included in Figure 2-2.

3.12.1 Water Resource Permitting

The two main types of water-related permits that apply to SNL/NM are wastewater and stormwater. Wastewater permits are issued for industrial discharges. Wastewater stations are further divided into four general outfalls and two categorical stations located within buildings. Stormwater discharges are currently covered under three NPDES permits; Construction General Permit (CGP), Multi-Sector General Permit (MSGP), and Municipal Separate Storm Sewer System (MS4) Permit. SNL/NM Corporate Procedure ESH100.2.ENV.10, *Manage Surface and Stormwater Discharges*, provides more information about stormwater permit requirements (SNL/NM 2016l).

3.12.2 Stormwater

Stormwater runoff flowing over the ground surface has the potential to pick up and transport contaminants. The Stormwater Program works in coordination with the MSP2 Program, the Surface Discharge Program, Facilities Engineering, and ER Operations to implement measures and best management practices to prevent or reduce the potential for contaminant transport in stormwater runoff (SNL/NM 2014b). Potential COCs may derive from the following sources:

- Oils and solvents from machine shops and manufacturing areas
- Vehicle residues from streets and parking lots
- Hazardous chemicals and metals from waste handling facilities
- Residual radioactive and hazardous constituents from ER sites
- Building material contaminants from construction activities
- Pesticides and fertilizers from landscaped areas

Potential COCs that may be transported by stormwater runoff are controlled by routing all industrial wastewater to the sanitary sewer, storing most chemicals indoors, and providing secondary containments for all outdoor oil storage tanks and chemical containers.

NPDES regulations, under the Clean Water Act, require any point source discharges to be permitted. SNL facilities in TA-I, TA-II, and TA-IV have storm drains, culverts, and channels that divert stormwater runoff to point source discharge locations on the north side of Tijeras Arroyo. Sandia also conducts activities in remote mountain and canyon areas in the Arroyo del Coyote watershed, which empties into Tijeras Arroyo, to the northwest of the KAFB Golf Course. Activities in all of these areas are evaluated for possible NPDES permitting. There are 24 stormwater sampling points (SWSPs) located in areas best suited to collect a representative sample of stormwater runoff. Individual OA sections provide locations of SWSPs, if applicable (and are labeled as "SP" on the maps). Automatic sampling equipment is installed at five MPs that collect samples from the SNL/NM MS4 when stormwater is present.

Short-term construction permits also require protection of stormwater runoff during and after construction. All areas of the site that are susceptible to erosion must be stabilized upon completion of the project. Permits are issued for the length of the project.

3.12.3 Surface Discharge

Surface discharges are defined as releases of water and water-based compounds to roads, open areas, or impoundments. Typical surface discharge requests include discharges for conducting fire training exercises, flushing eyewash stations, and cleaning building exteriors.

All water and water-based compounds that discharge to the ground surface are evaluated for compliance with the New Mexico Water Quality Control Commission regulations as implemented by the NMED Groundwater Bureau. These regulations are designed to protect the groundwater and surface water of the state for potential use as a domestic potable water source. At SNL/NM, planned discharges of water to the surface are done only with the approval of the SNL/NM Surface Discharge Program (SNL/NM 2015e). Proposed discharges are evaluated for potential contaminants and concentration levels to determine whether the discharge complies with NMED regulations.

3.12.4 Wastewater

Wastewater discharged to the public sewer system from SNL/NM facilities is divided into two categories consisting of sanitary discharges and industrial discharges, described as follows:

- Sanitary waste streams include wastewater from restrooms and showers, food service establishments, and other domestic-type activities.

- Industrial discharges are produced from general laboratory research operations, including electroplating, metal finishing, microelectronic development, and photographic processes (SNL/NM 2015f).

4. TECHNICAL AREA I

The TA-I OA comprises 360 acres situated near the northern boundary of KAFB, bounded by Wyoming Boulevard on the west and Eubank Boulevard on the east. Both F and G Streets form the northern border, and Hardin Boulevard defines the southern boundary of TA-I. This is the most developed and populated of the SNL/NM TAs. TA-I is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 4-1 identifies the locations of the associated environmental conditions for TA-I, and the remainder of this section summarizes the information provided to establish the environmental conditions for TA-I.

MapID = sc17061 03/24/2017 SNL EGIS Org 4143

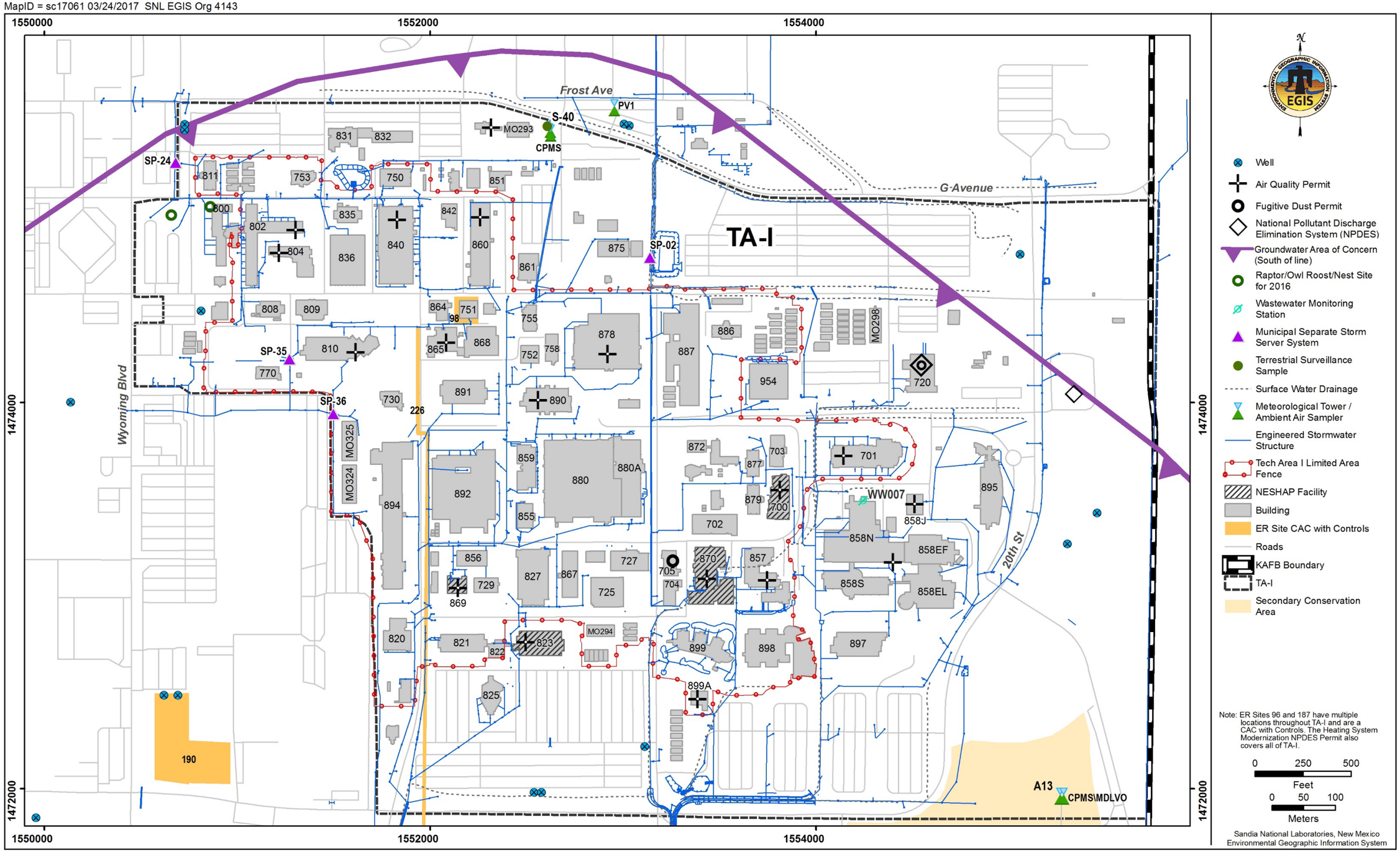

Figure 4-1. TA-I Environmental Conditions

4.1 Land Management

This section provides information on TA-I land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

4.1.1 Applicable Land-Use Permits

No applicable land-use permits pertain to TA-I (SNL/NM 2016m).

4.1.2 Ownership

TA-I is DOE-owned (also referred to as fee, fee-owned, and fee-title) property (SNL/NM 2016m). Figure 1-2 shows the legal land ownership of the KAFB area. Additional land (adjacent to KAFB) is leased to the DOE for SNL/NM use by the NMSLO.

4.1.3 Facilities and Infrastructure Features

TA-I is the focus of SNL/NM operations, housing the main administrative center and a close grouping of laboratories and offices. Figure 6-1 identifies TA-I infrastructure features, including roads, fences, gates, and buildings. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with TA-I (SNL/NM 2016n).

4.1.4 Vegetative Control

Vegetation along the eastern edge and southeastern corner of TA-I includes some nonlandscaped grass and shrub lands. The ground is kept free of potential fire hazards at all times by spraying, picking, and cutting vegetation. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk (SNL/NM, 2016j). SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to work.

Section 3.8, National Environmental Policy Act, including Section 3.8.2, Facilities Routine Maintenance, provides additional information.

4.1.5 Environmental Restoration Sites and Institutional Controls

TA-I contains 20 ER sites. Table 4-1 lists the CAC status for each site and the ICs that are in place. Figure 4-1 shows ER sites that have the status of CAC with Controls.

Table 4-1. TA-I ER Sites, CAC Status, and ICs

Site Name	Site Number	CAC Status	ICs in Place
PCB Spill (Reclamation Yard)	30	CAC without Controls	Administrative
Steam Plant Oil Spill	32	CAC without Controls	Administrative
Motor Pool Oil Spill	33	CAC without Controls	Administrative
Bldg. 838 Mercury Spill	41	CAC without Controls	Administrative
Acid Spill, Bldg. 879 Water Treatment Facility	42	CAC without Controls	Administrative
Hazardous Waste Repackaging and Storage (Bldg. 895)	73	CAC without Controls	Administrative
Storm System Drain	96	CAC with Controls	Administrative/Physical
Bldg. 863 (TCA, Photochemical Releases, Silver Catch Boxes)	98	CAC with Controls	Administrative/Physical
PCB Spill	104	CAC without Controls	Administrative
TCE Dumping South of Bldg. 859	186	CAC without Controls	Administrative
TA-I Sanitary Sewer Lines	187	CAC with Controls	Administrative/Physical
TA-I Waste Oil Tank	192	CAC without Controls	Administrative
Old Acid Waste Line	226	CAC with Controls	Administrative/Physical
Former Bldg. 829X Silver Recovery Sump	276	CAC without Controls	Administrative
Bldg. 828	278	CAC without Controls	Administrative
Bldg. 898 Septic System	1001	CAC without Controls	Administrative
Bldg. 803 Seepage Pit	1052	CAC without Controls	Administrative
Bldg. 885 Septic System	1101	CAC without Controls	Administrative
Former Bldg. 889 Septic System	1102	CAC without Controls	Administrative

CAC = Corrective Action Complete
ER = Environmental Restoration
IC = Institutional control
PCB = Polychlorinated biphenyl
TA-I = Technical Area I
TCA = Trichloroethane
TCE = Trichloroethene
UST = Underground storage tank

4.2 Air Quality Resources

Air quality permits, programs, and resources applicable to TA-I are described in the following sections. Figure 4-1 shows the locations of the TA-I meteorological tower, ambient air monitoring station, and radiological NESHAP facilities. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

4.2.1 Applicable Air Quality Permits

Air quality permits applicable for facilities in TA-I are listed in Table 4-2.

Table 4-2. TA-I Air Quality Permits

Permit Type	Location	Permit Number	Issue Date	Expiration Date
Stationary Source Permits				
Bldg. 701 Emergency Generator	TA-I, Bldg. 701	925-M2	3/5/2001	N/A
Bldg. 702 Emergency Generator	TA-I, Bldg. 702	924-RV1	2/8/2012	N/A
Bldg. 833 Emergency Generator	TA-I, Bldg. 833	2097-M2	9/1/2010	N/A
Bldg. 858 Complex	TA-I, Bldg. 858J	1820-M1	3/8/2011	N/A
Bldg. 862 Standby Generators	TA-I, Bldg. 862	402	5/7/1996	N/A
Bldg. 870 Emergency Generator and Boilers	TA-I, Bldg. 870	374-M2	12/6/2010	N/A
Bldg. 880 Emergency Generator and Boilers	TA-I, Bldg. 880	2116-M1	9/10/2015	N/A

Table 4-2.. TA-I Air Quality Permits (Concluded)

Permit Type	Location	Permit Number	Issue Date	Expiration Date
Stationary Source Registrations				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Bldg. 700 Source Registration	TA-I, Bldg. 700	1406-M1-RV1	10/4/2011	N/A
Bldg. 800 Source Registration	TA-I, Bldg. 800	2171	9/27/2011	N/A
Bldg. 802 Source Registration	TA-I, Bldg. 802	2109	10/28/2010	N/A
Bldg. 804 Source Registration	TA-I, Bldg. 804	2110	11/8/2010	N/A
Bldg. 810 Source Registration	TA-I, Bldg. 810	2111	11/8/2010	N/A
Bldg. 823 Source Registration	TA-I, Bldg. 823	2112	11/8/2010	N/A
Bldg. 840 Source Registration	TA-I, Bldg. 840	2113	11/8/2010	N/A
Bldg. 857 Source Registration	TA-I, Bldg. 857	2114	11/8/2010	N/A
Bldg. 860 Source Registration	TA-I, Bldg. 860	2115	11/8/2010	N/A
Bldg. 865	TA-I, Bldg. 865	1902-RV1	11/30/2010	N/A
Bldg. 878 Source Registration	TA-I, Bldg. 878	1888-RV1	5/11/2011	N/A
Bldg. 887 Source Registration	TA-I, Bldg. 887	2118	11/29/2010	N/A
Bldg. 890 Source Registration	TA-I, Bldg. 890	2117	11/29/2010	N/A
Bldg. 891 Source Registration	TA-I, Bldg. 891	2119	11/29/2010	N/A
Bldg. 892 Source Registration	TA-I, Bldg. 892	2120	11/29/2010	N/A
Bldg. 894 Source Registration	TA-I, Bldg. 894	2121	11/29/2010	N/A
Bldg. 895 Source Registration	TA-I, Bldg. 895	2170	9/27/2011	N/A
Bldg. 897 Source Registration	TA-I, Bldg. 897	2122	11/29/2010	N/A
Bldg. 899 Source Registration	TA-I, Bldg. 899	1823-RV1	9/30/2011	N/A
Fugitive Dust Control Permits				
Bldg. 705 Construction	K Ave./18 th St.	6771-C	08/04/2014	08/04/2019
Bldg. 887 Sanitary Sewer Replacement	K Ave./14th St.	6772-C	08/06/2014	08/06/2019
Bldg. 756 Construction	G Ave./6th St.	7405-C	6/29/2015	6/29/2018
Steam Plant Parking Lot	Wyoming Blvd. and K Ave.	7325-P	05/21/2015	05/21/2020

4.2.2 Air Quality Compliance Program

Chapter 3 provides a description of the SNL/NM Air Quality Compliance Program, and additional details are in the ASER (SNL/NM 2016a).

4.2.3 Radiological NESHAP Compliance

Four radiological NESHAP facilities are located in TA-I:

- RPICL: The RPICL laboratory performs radiation detection equipment calibration. In 2015, tritium was the only reported emission.
- START: The START laboratory is a small-scale operation. In 2015, START reported zero emissions.
- NGF: Principal production facility for neutron generators. In 2015, tritium was the only reported emission.
- PRD: Small-scale laboratory operation involved in the handling and research of sealed and unsealed tritiated materials. In 2015, tritium was the only reported emission.

4.3 Ecological Resources

The ecological resources and setting within TA-I are discussed in this section.

4.3.1 Terrestrial Vegetation

TA-I is a developed, urban, work area primarily consisting of paved surfaces where no natural, native vegetation occurs. The landscaped areas include ornamental trees, shrubs, perennials, bunch grasses, and a limited amount of turf or xeric grass near buildings and walkways. The eastern edge and southeastern corner is vegetated with nonlandscaped grasses and shrubs.

4.3.2 Terrestrial Wildlife

Wildlife species that occur within TA-I are typical of species in urban areas of central New Mexico. Diversity and abundance are generally lower for all animal groups than what occurs in wildland areas. Many bird species build nests in trees, shrubs, and in protected portions of buildings within TA-I. Desert cottontails and black-tailed jackrabbits occasionally forage nocturnally on the well-maintained landscaping. Coyotes sometimes venture into the area during evening and weekend hours.

Bird species commonly occurring within TA-I include the following:

- Mourning Dove (*Zenaida macroura*)
- House Finch (*Carpodacus mexicanus*)
- American Robin (*Turdus migratorius*)

Other species that commonly occur within TA-I include the following:

- Desert Cottontail (*Sylvilagus audubonii*)
- Rock Squirrel (*Spermophilus variegatus*)
- New Mexico Whiptail (*Aspidoscelis neomexicanus*)

4.3.3 Threatened and Endangered Species

As of August 2016, there are no federal or state listed threatened or endangered species found within TA-I.

4.3.4 Areas of Biological Conservation

A small portion in the southeastern corner of TA-I is designated as a Secondary Conservation Area (SCA). This SCA is contiguous with the SCA in the northeastern corner of TA-II (Figure 4-1).

4.4 Water Resources

The following sections detail the activities of water resource programs at TA-I. Chapter 3 describes programs and oversight activities, including those for water resources.

4.4.1 Applicable Water Resource-Related Permits

Two types of water resource-related permits are applicable to TA-I. A general sewer wastewater permit (2069F) includes the northwest portion of TA-I and a general wastewater permit (2069A) includes the remaining area expect for categorical permit 2069G that is only applicable to Buildings 858EF and 858N (also referred to as the MESA fabrication facility). Currently, five NPDES permits are in effect for facilities in TA-I.

Table 4-3 shows water resource-related permits for TA-I.

Table 4-3. TA-I Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/Monitoring Station	Waste Stream Process
Wastewater		
General Outfalls	2069A and 2069F	
Categorical: Semiconductor Manufacturing, Category 469 and Metal Finishing, Category 433 Bldgs. 858EF and 858N (also referred to as the MESA fabrication facility)	2069G/WW007	Laboratory industrial processes acid wastewater from MESA fabrication facility activities.
Stormwater		
CGP for each construction site	May be multiple numbers	
MSGP covers all SNL sites	NMR05122	
MS4 Permit	NMR04A012	

4.4.2 Effluent Monitoring

Sampling locations and effluent monitoring program activities applicable to TA-I include the following:

- **Stormwater Program:** Stormwater from TA-I is collected and channeled by a stormwater drainage system consisting of curb and gutter open channels and underground pipes. Discharges from the TA-I drainage system flow to the KAFB MS4 and Tijeras Arroyo, and are monitored by stormwater sampling points (SWSPs).

- **Wastewater Discharge Program**: There is one wastewater monitoring station, WW007, in TA-I. There is one wastewater monitoring station located south of TA-IV, WW001 that monitors wastewater from TA-I (excluding WW007 which is for the MESA fabrication facility only). There is another wastewater monitoring station WW006 that monitors wastewater from the northwest portion of TA-I.

Figure 4-1 shows TA-I water resources structures and monitoring locations for stormwater and wastewater.

4.4.3 Groundwater Resources

Depth to groundwater beneath TA-I is approximately 500 ft below ground surface (bgs), in the regional aquifer. A perched groundwater system (PGWS) lies above the regional aquifer in the vicinity of TA-I, TA-II, and TA-IV in the Tijeras Arroyo Groundwater (TAG) Area of concern (AOC).

Wells located within and near TA-I are shown in Figure 4-1. The ASER/AGMR provides groundwater resources details (SNL/NM 2016a).

4.5 Cultural Resources

Cultural resources are archaeological, traditional, and built resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources within TA-I.

4.5.1 Applicable Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible, and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

4.5.2 Archaeological Sites

No archaeological sites have been identified in TA-I (Hoagland, 1990a). The area is heavily disturbed, and no archaeological sites are anticipated.

4.5.3 Historic Buildings

SNL's roots go back to the immediate post-World War II period and its earliest permanent construction dates to the early Cold War. Properties within TA-I have been evaluated within the established SNL Cold War context. Some have previously been determined NRHP-eligible by SFO in consultation with the NM SHPO. Others are recommendated as eligible, but consultation has not been completed. An Early Sandia National Laboratories Historic District is proposed to encompass part of TA-I. The proposed district includes architecturally important buildings at SNL/NM, with several key historic buildings designed by noted regional architects such as W.C. Kruger and Associates; Max Flatow-Jason Moore; and Ferguson, Stevens, Mallory and Pearl. Other buildings within the proposed district and two not in the district housed critical Cold War activities related to nuclear weapons design and testing (SNL/NM 2010b).

Buildings or structures in TA-I that are eligible or recommendated as eligible for the NRHP are listed in Table 4-4 and shown in Figure 4-1 (SNL/NM 2016i). Also listed in Table 4-4 are buildings or structures that are deemed a contributing element to the historic district.

Table 4-4. TA-I Properties NRHP-Eligible or Recommended as Eligible

Building #	Name	Year	Eligible for NRHP	Non-Eligible	Contributing Element
Early Sandia National Laboratories Historic District					
800	Administration	1948	X		X
801	Security Offices	1951	X		X
802	Admin/DOE	1951	X		X
803	Administration	1957	X		X
804	Library	1951	X		X
808	R&D Labs	1949	X		X
809	High Bay Lab	1958	X		X
835	Weapons Sys Labs	1951	X		X
836	Weapons Systems	1957		X	X
840	Devel Shops	1951	X		X
849	Research Materials	1948	X		X
851	Energy Devel	1948	X		X
860	Env. Testing Lab	1949	X		X
862	Standby Power	1951		X	X
864	Glass Devel Labs	1957		X	X
865	Aerothermodynamics Building	1954		X	X
868	Systems Research	1950		X	X
874	Computer Building, Motor Pool	1971		X	X
875	Motor Pool Shops	1948		X	X
876	Motor Pool Shops	1951		X	X
885	Facil. Mgmt. & Purch.	1953		X	X
892	Military Liaison, Training, QA, Waste Mgmt.	1950	X		X
894	Power Sources	1950		X	X
8809	Storage Basement	1956		X	X
8810	Impact Test Structure	1956		X	X
952	LAZAP	1957	X		X
952A	LAZAP	1956	X		X
953	Storage	1953		X	X
TA-I Eligible Buildings, not in historic district					
869	Environmental Health Laboratory	1971	X		
871	Electro-Magnetic Environmental Simulation	1978	X		

NRHP = National Register of Historic Places
TA-I = Technical Area I

4.6 Additional Environmental Permits

Table 4-5 lists additional environmental and/or regulatory permits that exist for SNL/NM and TA-I.

Table 4-5. TA-I Additional Environmental Permits

Permit Type and/or Facility Name	Location	Permit Number	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NA	NMED
Asbestos NESHAP: Demolition at TA-I Buildings 884, 884A, 884B, 884C, 884D, 884E & 884F	TA-I	140669	COA
Asbestos Removal at Bldg. 840, 1st Floor East Side	TA-I	2094-840	COA

COA = City of Albuquerque
ER = Environmental Restoration
NESHAP = National Emission Standards for Hazardous Air Pollutants
NA = Not applicable
NMED = New Mexico Environment Department
TA-I = Technical Area I

4.7 Noise and Vibration

Activities at TA-I do not produce noise or vibrations of significant levels (SNL/NM 2005).

4.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for TA-I that are available for review.

4.8.1 Air Quality Data

Ambient air quality surveillance data is collected at a station in TA-I. Chapter 3 provides information on air quality data. Figure 4-1 shows the CPMS ambient air monitoring station, meteorological tower, and radiological NESHAP facilities located in TA-I. Results of ambient air quality surveillance are provided in the ASER for SNL/NM (SNL/NM 2016a).

4.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance and Ecology, and miscellaneous nonroutine projects. For the 2011 to 2016 time frame, no miscellaneous environmental samples for nonroutine projects have been collected from TA-I.

Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

4.8.2.1 Environmental Restoration Analytical Data

Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each TA-I ER site (available from ER Operations).

4.8.2.2 Terrestrial Soil Sampling Data

No terrestrial soil sampling data have been collected for TA-I.

4.8.3 Water Quality Data

Water quality data that are available for TA-I for the stormwater, wastewater, and groundwater programs are described in the following sections.

4.8.3.1 Stormwater Data

Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP and MS4 Permit. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

4.8.3.2 Wastewater Data

Wastewater effluent discharged from TA-I must meet Permits 2069A, 2069F, and 2069G requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements. A summary of wastewater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

4.8.3.3 Groundwater Data

Regional groundwater potentiometric surface details are provided in the ASER/AGMR (SNL/NM 2016a). Analytical data are available for monitoring activities that have been conducted since 1989. Details of groundwater sampling activities, schedules, methods, and analytical results are also presented in the ASER/AGMR (SNL/NM 2016a). Figure 4-1 shows monitoring well locations in the vicinity of TA-I.

Groundwater contamination has been identified in the perched groundwater system (PGWS) at the Tijeras Arroyo Groundwater (TAG) area of concern (AOC), which encompasses approximately 1.7 square miles and three SNL/NM TAs. The TAG AOC is located in the northwest portion of KAFB, and includes a portion of TA-I. The depth to potentiometric surface of the perched groundwater system (PGWS) ranges from approximately 220 to 330 ft bgs. Details of the PGWS are provided in the ASER/AGMR (SNL/NM 2016a).

Groundwater investigations conducted during the last 10 years by ER Operations have identified trichloroethene (TCE) and nitrate as the COCs in the TAG AOC (SNL/NM 2010c). Monitoring is ongoing.

4.8.4 Meteorological Data

Data from the A13 Tower is used to describe meteorology at TA-I.

4.8.5 Miscellaneous Sampling Data

No miscellaneous environmental samples for nonroutine projects have been collected from TA-I.

4.9 Environmental Conditions and Restrictions

A number of environmental conditions and restrictions are associated with TA-I and its facilities. Table 4-6 summarizes the environmental conditions and associated restrictions detailed in this report for TA-I. Figure 4-1 identifies the locations of the associated environmental conditions for TA-I.

Table 4-6. TA-I Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Water Resource-Related Permits:** Wastewater/General Outfall/Categorical Permit MESA (also referred to as Bldg. 858) Stormwater/NPDES Permits Municipal Separate Storm Sewer System Permit (covers all of TA-I) Multi-Sector General Permit (multiple locations; not shown in Figure 4-1) Construction General Permit (multiple locations; not shown in Figure 4-1)	Any activities that create a discharge and/or have the potential to impact water quality must be approved through NEPA checklist. Contact SNL/NM Water Resource SME.
	Air Quality Permits/Registrations: (not shown in Figure 4-1) Emergency generators Boilers Site-Wide HAP/VOC Registration Fugitive Dust Permits	Contact SNL/NM Air Quality Compliance SME.
Radiological NESHAP Facilities	Safety and Health Instrumentation (formerly Radiation Protection Instrument Calibration Laboratory) (Bldg. 869) Responsive Neutron Generator Product Deployment Center (Bldg. 870) Radiation Laboratory (Bldg. 827) START Laboratory (Bldg. 823) Ion Beam Laboratory (Bldg. 720)	Contact SNL/NM Certified Health Physicist SME.
Conservation Areas	**Use of area as habitat by several species in the following designated areas:** SCA	The area must be surveyed by SNL/NM Biologist prior to any outdoor activities.

Table 4-6. TA-I Environmental Conditions and Restrictions (Concluded)

Concern	Description	Restriction
Buildings recommended as eligible for listing on NRHP	**Buildings and structures determined eligible for NRHP:** 800 801 802 804 808 835 840 860 871 892 894	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.
Groundwater Contamination	Low-levels of trichloroethene and nitrate in the perched groundwater system in the vicinity of TA-I.	No formal restrictions present.
ER Sites	**Corrective Action Complete with Controls:** 96 Storm System Drain (not shown in Figure 4-1) 98 (former Bldg. 863 footprint, location near Bldg. 751 in Figure 4-1) 187 TA-I Sanitary Sewer Lines (not shown in Figure 4-1) 226 Old Acid Waste Line	Soil cannot be removed from the footprint of the site.

ER = *Environmental Restoration*
HAP = *Hazardous Air Pollutant*
MDL = *Microelectronics Development Laboratory*
MESA = *Microsystems and Engineering Sciences Applications*
NEPA = *National Environmental Policy Act*
NESHAP = *National Emission Standards for Hazardous Air Pollutants*
NRHP = *National Register of Historic Places*
SCA = *Secondary Conservation Area*
SHPO = *State Historic Preservation Officer*
SME = *Subject Matter Expert*
SNL/NM = *Sandia National Laboratories/New Mexico*
START = *Sandia Tomography and Radionuclide Transport*
TA-I = *Technical Area I*

5. TECHNICAL AREA II

The OA portion of TA-II is approximately 206 acres. TA-II is located in the north-central portion of KAFB. Future land-use designations are provided in the TA-II Sub-Area Plan (SNL/NM 2015). The total acreage considered in the Sub-Area Plan is approximately 245 acres and includes a portion of the Tijeras Arroyo as open space. TA-II is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 5-1 identifies the locations of the associated environmental conditions for TA-II, and the remainder of this section summarizes the information provided to establish the environmental conditions for TA-II.

Early activities at SNL/NM TA-II included weapons assembly that required the development of an area separate from TA-I. Construction of TA-II began in 1948, was completed in 1949, and provided a space for handling and incorporating explosives into weapons (SNL/NM 2004a).

MapID = sc17044 3/7/2017 SNL EGIS Org 4143

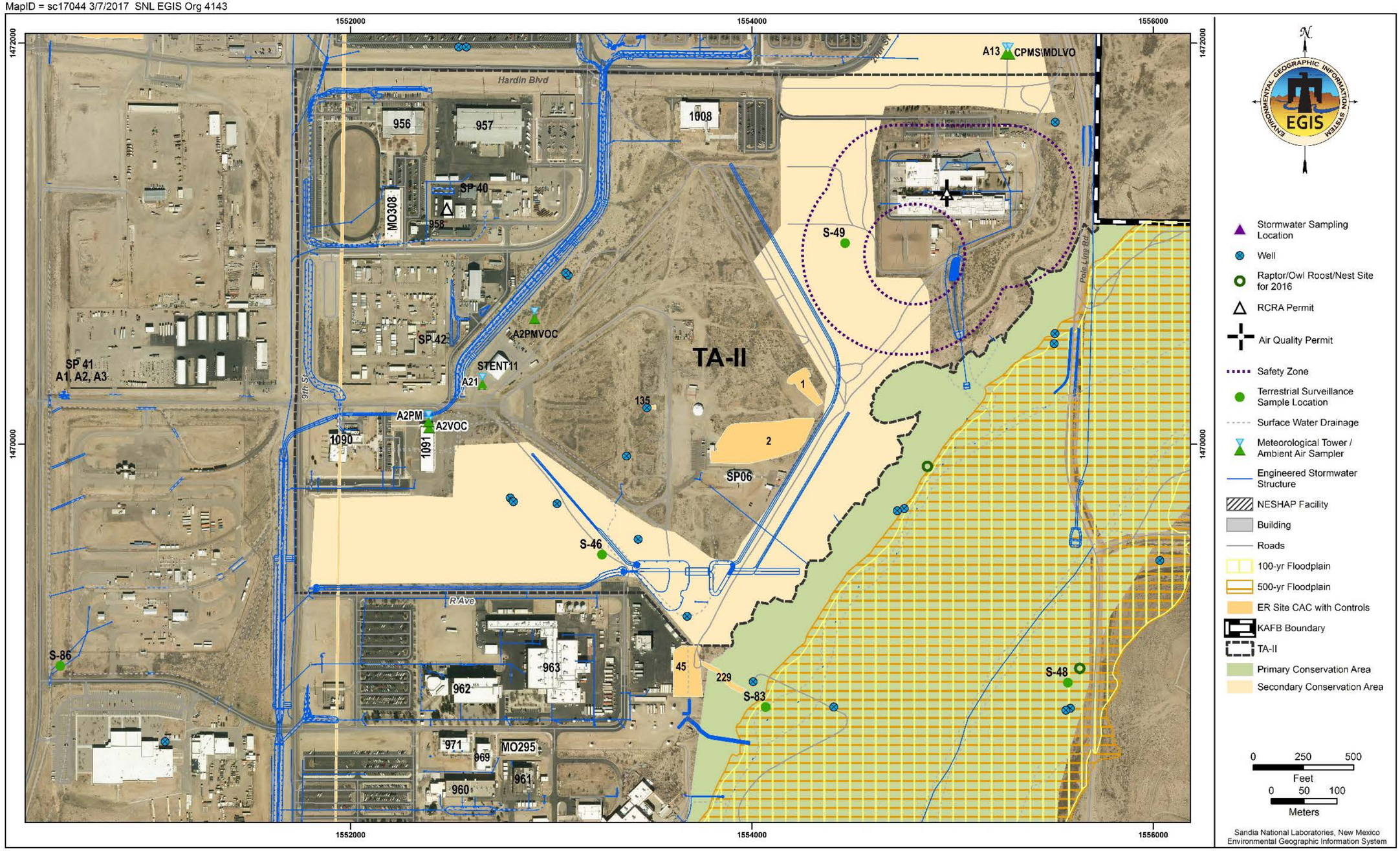

Figure 5-1. TA-II Environmental Conditions

5.1 Land Management

This section provides information on TA-II land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land use planning within both historical and current contexts.

5.1.1 Applicable Land Permits

No applicable land-use permits pertain to TA-II (SNL/NM 2016m).

5.1.2 Ownership

TA-II is DOE-owned (also referred to as fee, fee-owned, and fee-title) property (Figure 1-2). Additional lands are leased to the DOE for SNL/NM use by the NMSLO (Figure 1-2).

5.1.3 Facilities and Infrastructure Features

TA-II consists primarily of support service facilities along with the ECF and HWMF. Figure 5-1 identifies infrastructure features, including roads, fences, gates, and buildings within TA-II. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with TA-II (SNL/NM 2016n).

5.1.4 Vegetative Control

TA-II is developed with some planned landscaping but predominantly consists of paved roads, parking areas, and terrain that is not landscaped. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk. SNL/NM personnel are responsible for ensuring that NEPA guidelines are followed prior to work.

Section 3.8, National Environmental Policy Act, including Section 3.8.2, Facilities Routine Maintenance, provide additional information.

5.1.5 Environmental Restoration Sites and Institutional Controls

There are 18 ER sites in or near TA-II. Figure 5-1 shows the ER sites that have the status CAC with Controls. ER Sites 1 and 3 are treated as a combined site, and other ER sites have multiple subunits. Table 5-1 lists the TA-II ER Sites, CAC status, and ICs in place.

Table 5-1. TA-II ER Sites, CAC Status, and ICs

Site Name	ER Site Number	CAC Status	ICs in Place
Radioactive Waste Landfill/Chemical Disposal Pits	1/3	CAC with controls	Administrative/Physical
Classified Waste Landfill	2	CAC with controls	Administrative/Physical
Radioactive Material Storage Yard	43	CAC without controls	Administrative
Uranium Calibration Pits	44A, B	CAC without controls	Administrative
Liquid Discharge	45	CAC with controls	Administrative/Physical
Bldg. 904 Septic and High Explosive Drain System	48	CAC without controls	Administrative
Centrifuge Site	50	CAC without controls	Administrative
Area II Firing Sites	113	CAC without controls	Administrative
Explosive Burn Pit	114	CAC without controls	Administrative
Bldg. 906 Drain System	135	CAC with controls	Administrative/Physical
Bldg. 907 Septic and High Explosive Drain System	136	CAC without controls	Administrative
Bldg. 935 Septic System	159	CAC without controls	Administrative
Bldg. 901 Septic System	165	CAC without controls	Administrative
Bldg. 919 Septic System	166	CAC without controls	Administrative
Bldg. 940 Septic System	167	CAC without controls	Administrative
Bunker 904 Outfall	227	CAC without	Administrative
Centrifuge Dump Site	228A 228B	CAC without controls CAC without controls	Administrative Administrative
Storm Outfall System	229	CAC with controls	Administrative /Physical

CAC = Corrective Action Complete
ER = Environmental Restoration
IC = Institutional Control
TA-II = Technical Area II

5.2 Air Quality Resources

Air quality permits, programs, and resources applicable to TA-II are described in the following sections. Figure 5-1 shows the locations of the TA-II meteorological tower, ambient air monitoring station, and radiological NESHAP facilities. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

5.2.1 Applicable Air Quality Permits

Two air quality permits apply to facilities in TA-II (Table 5-2).

Table 5-2. TA-II Air Quality Permits

Permit Type	Location	Permit/Registration Number	Issue Date	Expiration Date
Stationary Source Registrations				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Building 905 Source Registration	TA-2, Bldg. 905	547-RV1	09/27/2011	N/A
Fugitive Dust Control Permits				
Bldg. 905 Addition/Renovation	TA-II	7492-C	8/21/2015	8/21/2018

5.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

5.2.3 Radiological NESHAP Compliance

The ECF is the only radiological NESHAP facility located in TA-II. The ECF is used for testing neutron-generator design and manufacturing. In 2015, the facility reported emissions of tritium.

5.3 Ecological Resources

The biological resources and ecological setting within TA-II are described in this section.

5.3.1 Terrestrial Vegetation

The vegetation classification (National Vegetation Classification System [NVCS]) for TA-II has been deemed as Disturbed Habitat (NVCS V.A.5.N.d) and urban area. During the past few years, some of the work areas and buildings in the central portion of TA-II have been removed, and the area has slowly undergone a natural succession to native grassland (although the formal classification has not changed).

In recent years, the west and north sides on the outer perimeter of TA-II have had new buildings and associated parking areas constructed. Newly constructed areas are primarily composed of impermeable surfaces and have limited landscaped trees, shrubs, perennials, bunch grasses, and xeric grass near buildings and walkways.

The habitat between the historical and new work areas is primarily comprised of lower- to moderate-quality grasslands that have been affected by the general demolition and construction activities over the past decade.

5.3.2 Terrestrial Wildlife

Wildlife communities within KAFB are typical of those found in wildlands of central New Mexico (Daniel B. Stephens and Associates 1996). Over the past several years, portions of TA-II have been going through varying stages of grassland and shrubland succession. The diversity and abundance of wildlife that utilize the area have also changed.

Common birds of prey occurring in TA-II include the following:

- Burrowing Owl (*Athene cunicularia*)
- American Kestrel (*Falco sparverius*)

Other bird species commonly occurring in TA-II include the following:

- Western Kingbird (*Tyrannus verticalis*)
- Loggerhead Shrike (*Lanius ludovicianus*)
- Western Meadowlark (*Sturnella neglecta*)

Common reptiles found within TA-II include the following:

- Prairie Rattlesnake (*Crotalus viridis*)
- Gopher Snake (*Pituophis catenifer)*
- Little Striped Whiptail (*Aspidoscelis inornatus*)
- New Mexico Whiptail (*Aspidoscelis neomexicanus*)

Common mammals occurring within TA-II include the following:

- Silky Pocket Mouse (*Perognathus flavus*)
- Coyote (*Canis latrans*)
- Black-Tailed Jackrabbit (*Lepus californicus*)
- Desert cottontail (*Sylvilagus audobonii*)

5.3.3 Threatened and Endangered Species

There are no federal or state listed threatened or endangered plant, bird, mammal, reptilian, or amphibian species within TA-II.

5.3.4 Areas of Biological Conservation

Within TA-II, SCAs have been designated for the southwest corner to the southern boundary, along the interface of Tijeras Arroyo, then to north part of the west end of Building 905, where it merges with the SCA located at the southeast corner of TA-I (Figure 5-1).

The TA-II SCA adjoins the Tijeras Arroyo PCA that is part of the wildlife corridor established between the COA, KAFB, and DOE/NNSA/SFO (DOE et al. 2007).

The *Tijeras Arroyo Wildlife Corridor* MOU (DOE et al. 2007) addresses the agreement reached by the COA, KAFB, and DOE/NNSA/SFO to establish and maintain a wildlife corridor within Tijeras Arroyo. TA-II is adjacent to the Tijeras Arroyo Wildlife Corridor (Figure 5-1), which is an important conservation area.

As part of this MOU, the parties agree that "[e]ach party shall make all reasonable efforts to preserve the natural habitat of those areas of the Tijeras Arroyo within their respective jurisdictions so that the Tijeras Arroyo remains a viable wildlife corridor" (Section 4.2).

5.4 Water Resources

The following sections detail the activities of water resource programs at TA-II. Chapter 3 describes programs and oversight activities, including those for water resources.

No surface water features are present in the immediate area of TA-II, although unfenced portions of the area extend into the Tijeras Arroyo (an ephemeral drainage feature on KAFB).

5.4.1 Applicable Water Resource-Related Permits

A general sewer waste water permit includes TA-II and the surrounding area. TA-II new waste water should flow to WW008 because there is very low flow and high capacity at this location. Table 5-3 shows water resource-related permits for TA-II and vicinity.

Table 5-3. TA-II Wastewater Discharge and Stormwater Permits and Stations

Permit Type	Permit Number/ Monitoring Station	Waste Stream Process
Wastewater		
General Outfall	2069 I/WW008 (south of TA-II, incl. TA-II facilities)	
Categorical	Not applicable	Not applicable
Stormwater		
CGP for each construction site	May be multiple numbers	
MSGP covers SNL industrial sites	NMR053122	
MS4 Permit	NMR04A012	

5.4.2 Effluent Monitoring

Sampling locations and activities of effluent monitoring programs applicable to TA-II include the following:

- **Stormwater Program:** Stormwater drainage from TA-II is a combination of overland flow and drainage controlled by storm inlets. Runoff from parking lots on the west side of TA-II is collected and discharged to the open ditch adjacent to the western edge of TA-II. This ditch empties into Tijeras Arroyo 1,500 ft to the south. Drainage from the southern and eastern portions of TA-II is channeled by storm inlets, open ditches, and swales, to the area just outside the south fence line and over the rim of Tijeras Arroyo. Stormwater runoff for the remainder of TA-II follows the existing slope to the east into Tijeras Arroyo. The HWMF has a lined catchment basin for stormwater runoff from the site. Any accumulated water is evaluated and then discharge to the stormwater drainage system. Figure 5-1 shows the engineered stormwater features in TA-II.

- **Wastewater Discharge Program:** Wastewater discharge from TA-II (including the ECF) is monitored at WW008, located south of TA-II (Figure 7-1).

5.4.3 Groundwater Resources

Depth to groundwater beneath TA-II is approximately 500 ft below ground surface (bgs), in the regional aquifer. A perched groundwater system (PGWS) lies above the regional aquifer in the vicinity of TA-I, TA-II, and TA-IV in the Tijeras Arroyo Groundwater (TAG) Area of concern (AOC).

Wells located in the vicinity of TA-II are shown in Figure 5-1. The ASER/AGMR provides groundwater resources details (SNL/NM 2016a).

5.5 Cultural Resources

Cultural resources are archaeological, traditional, and built resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources within TA-II.

5.5.1 Applicable Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

5.5.2 Archaeological Sites

TA-II was surveyed for Archaeological sites (both prehistoric and historic) (DOE 1999). Aside from isolated occurrences of artifacts, no archaeological sites have been identified (DOE 1999).

5.5.3 Historic Buildings

TA-II concurrently contains relatively young buildings that are not yet considered historically significant. In the past, the area contained nuclear weapon assembly activities that were determined to be historic and identified as the Area II Historic District in 1998. The area also housed a rocket-powered centrifuge installed in 1952 to support environmental testing of weapon prototypes. SFO determined the centrifuge was NRHP-eligible and received SHPO concurrence in 2011. Both the Area II Historic District and the Old Centrifuge have been demolished; SNL took appropriate mitigative action prior to demolition of both (SNL/NM 2011b).

5.6 Additional Environmental Permits

Table 5-4 lists additional environmental and/or regulatory permits that exist for SNL/NM and TA-II. Two permits are in effect for facilities or sites in TA-II.

Table 5-4. TA-II Additional Environmental Permits

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER Sites	NMED
Hazardous Waste Facility Permit Modules I, II, and III	HWMF, TA-II	NMED

ER = Environmental Restoration
HWMF = Hazardous Waste Management Facility
NM = New Mexico
NMED = New Mexico Environment Department
TA-II = Technical Area II

5.7 Noise and Vibration

Activities at TA-II do not produce noise or vibrations of significant levels (SNL/NM 2005).

5.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for TA-II that are available for review.

5.8.1 Air Quality Data

Ambient air quality surveillance data are collected at the A2PM Tower in TA-II for PM10 and VOCs. Section 4.1 provides information on air quality data. Figure 7-1 shows air quality resources, including the meteorological tower/ambient air sampler station, and radiological

NESHAP facilities within TA-II. Results of ambient air quality surveillance are provided in the ASER for SNL/NM (SNL/NM 2016a).

5.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance and Ecology, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

5.8.2.1 Environmental Restoration Analytical Data

Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each TA-II ER site (available from ER Operations).

5.8.2.2 Terrestrial Surveillance Sampling Data

No sediment or vegetation samples have been collected from TA-II (SNL/NM 2016a). Terrestrial soil sampling locations in TA-II are listed in Table 5-5, and shown in Figure 5-1.

Table 5-5. TA-II Terrestrial Radiological Surveillance Locations

Sample Number	Sample Location	Sample Type (Analyte/Sampling Frequency)			
		Soil	Sediment	Vegetation	TLD
S-46	TA-II (south corner)	X (Tritium, gamma spectroscopy, annual)			X
S-49	Near the ECF	X (Tritium, gamma spectroscopy, annual)			

ECF = Explosive Components Facility
TA-II = Technical Area II
TLD = Thermoluminescent dosimeter

5.8.3 Water Quality Data

Water quality data that are available for TA-II for the stormwater, wastewater, and groundwater programs are described in the following sections.

5.8.3.1 Stormwater Data

Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

5.8.3.2 Wastewater Data

Wastewater effluent discharged from TA-II must meet Permit 2069I requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements. A summary of wastewater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

5.8.3.3 Groundwater Data

Analytical data are available for monitoring activities that have been conducted since 1993. Details of groundwater sampling activities, schedules, methods, and analytical results are presented in the ASER/AGMR (SNL/NM 2016a).

Groundwater contamination has been identified in the PGWS at the Tijeras Arroyo Groundwater (TAG) area of concern (AOC), which encompasses approximately 1.7 square miles and three SNL/NM TAs. The TAG AOC is located in the northwest portion of KAFB, and includes all of TA-II. The depth to the potentiometric surface of the perched groundwater system (PGWS) ranges from approximately 220 to 330°feet below ground surface (ft°bgs). The extent of the PGWS is shown in the ASER/AGMR (SNL/NM 2016a).

Groundwater investigations conducted during the last 10 years by SNL/NM ER Operations have identified TCE and nitrate as the COCs in the TAG AOC (SNL/NM 2010c). Monitoring is ongoing.

5.8.4 Meteorological Data

Data from the A21 Tower is used to describe meteorology at TA-II and SNL/NM (Figure 5-1).

5.8.5 Miscellaneous Sampling Data

No other environmental or terrestrial sampling projects have taken place at TA-II.

5.9 Environmental Conditions and Restrictions

Based on the integrated evaluation of all the information presented in this section of the OAEE for TA-II, a number of environmental sensitivities, conditions, and restrictions are associated with TA-II.

Table 5-6 summarizes the TA-II environmental conditions and associated restrictions.
Figure 5-1 identifies the locations of environmental conditions for TA-II.

Table 5-6. TA-II Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Air Quality Permits/Registrations:** Boilers Site-Wide HAP/VOC Registration (not shown on Figure 5-1) Fugitive Dust Permit	Contact SNL/NM Air Quality Compliance SME.
	Wastewater Permits: (not shown in Figure 5-1) General Outfall Multi-Sector General Short-Term Construction – TA-II Escarpment	Contact SNL/NM Water Resources SME.
	RCRA Permits: Hazardous Waste Management Facility ER Sites (permits not shown in Figure 5-1)	Contact SNL/NM RCRA Permit SME.
Groundwater Contamination	Low levels of trichloroethene and nitrate in the perched groundwater system area of concern in the vicinity of TA-II.	No formal restrictions present.
ER Sites	**Corrective Action Complete with Controls:** 1/3 2 45 48 135 136 227 229	Soil cannot be removed from the footprint of the site.
Conservation Areas	**Conservation area status for TA-II:** Primary and secondary conservation areas exist within TA-II. The Tijeras Arroyo Wildlife Corridor is adjacent to TA-II.	The area must be surveyed by SNL/NM Biologist prior to any outdoor activities. Contact SME.
Safety Zone	There are several ESQDs for facilities in TA-II. The ESQD accounts for the types and severity of hazards each explosive material presents, and the degree of protection required for personnel and facilities adjacent to the explosive operations.	Contact SN/NM Explosives Safety SME for any activities within the safety zone.

ER = Environmental Restoration
ESQD = Explosive Safety Quantity-Distance
HAP = Hazardous Air Pollutant
NEPA = National Environmental Policy Act
NPDES = National Pollutant Discharge Elimination System
NRHP = National Register of Historic Places
RCRA = Resource Conservation and Recovery Act
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico
TA = Technical Area

6. TECHNICAL AREA III

The OA portion of TA-III is approximately 1,874 acres. TA-III is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 6-1 identifies the locations of the associated environmental conditions for TA-III, and the remainder of this section summarizes the information provided to establish the environmental conditions for TA-III.

MapID = sc17068 3/28/2017 SNL EGIS Org 4143

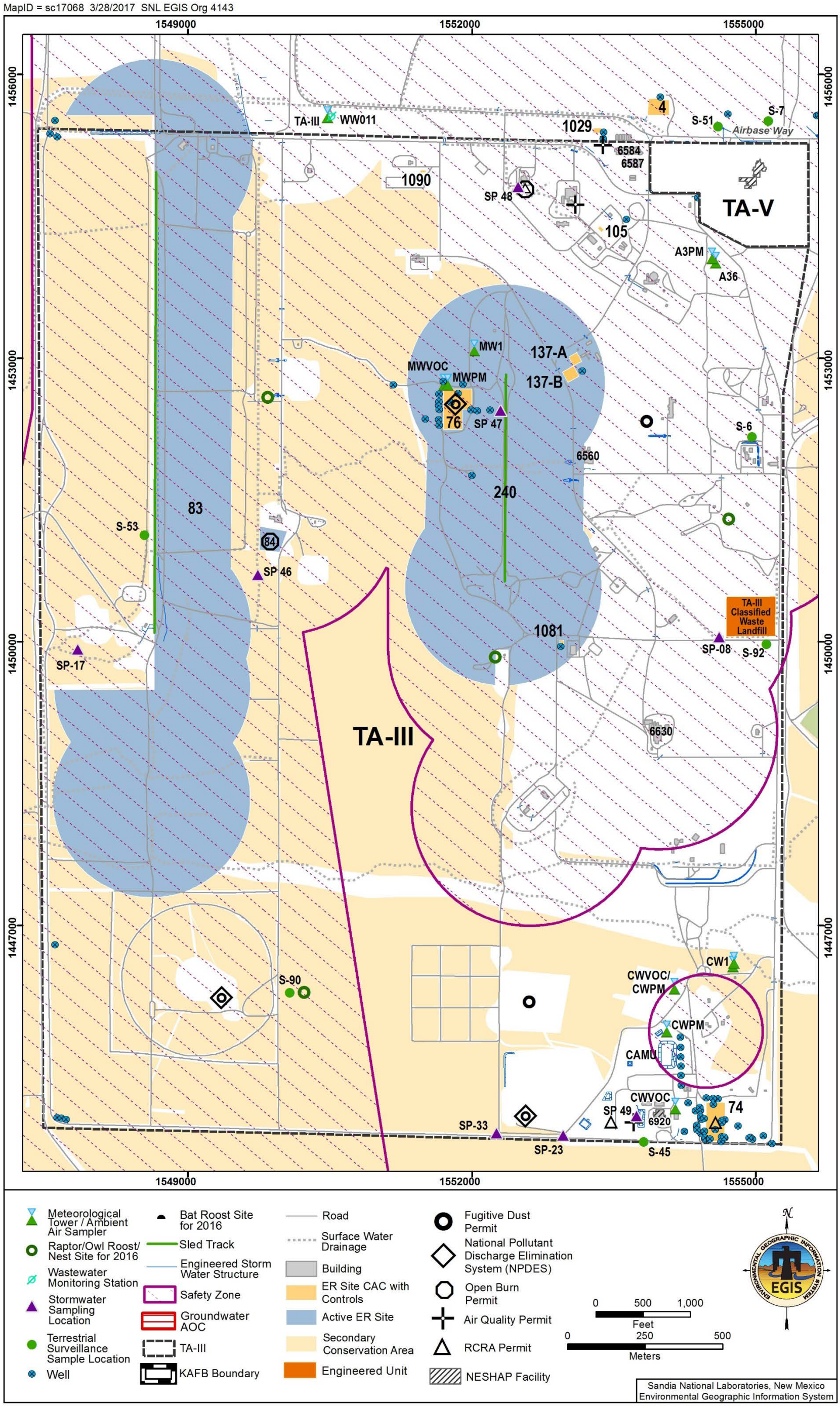

Figure 6-1. TA-III Environmental Conditions

6.1 Land Management

This section provides information on various TA-III land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

6.1.1 Applicable Land-Use Permits

No applicable land-use permits pertain to TA-III (SNL/NM 2016m).

6.1.2 Ownership

TA-III is DOE-owned (also referred to as fee, fee-owned, and fee-title) property (SNL/NM 2016m). Figure 1-2 shows the legal land ownership of the KAFB area. The sled track extension (west side and northwest corner of TA-III) is Air Force Fee Permitted to DOE/SNL, and the NMSLO Mesa del Sol buffer is also leased to DOE/SNL.

6.1.3 Facilities and Infrastructure Features

TA-III is the focus of SNL/NM operations, housing the main administrative center and a close grouping of laboratories and offices. Figure 6-1 identifies infrastructure features such as roads, fences, gates, and buildings within TA-III. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with TA-III (SNL/NM 2016n).

6.1.4 Vegetative Control

Vegetation in the project area is mostly desert grasslands and shrub land. There are some landscaped areas around Bldg. 6584. Vegetation is controlled in all explosive areas. The ground is kept free of potential fire hazards at all times by spraying, picking, and cutting vegetation. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk. SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to any work.

6.1.5 Environmental Restoration Sites and Institutional Controls

TA-III contains 57 ER sites, 1 ELM site, and 2 engineered units. Figure 6-1 shows TA-III ER Sites and Engineered Unit CACs with Controls. ER Sites 83, 84, and 240 are active ER sites, meaning they are in use to support operations. Table 6-1 lists the CAC status for each site and the ICs in place.

Table 6-1. TA-III ER/ELM Sites and Engineered Units, CAC Status, and ICs

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
Concrete Pad	18	CAC without controls	Administrative
Burial Site	26	CAC without controls	Administrative
Electrical Transformer Oil Spill	31	CAC without controls	Administrative
Centrifuge Oil Spill	34	CAC without controls	Administrative
Vibration Facility Oil Spill	35	CAC without controls	Administrative
Bldg. 6924 Pad, Tank, and Pit	51	CAC without controls	Administrative
Chemical Waste Landfill	74	CAC with controls	Administrative
Mixed Waste Landfill	76	Pending regulatory approval	Administrative
Gas Cylinder Disposal Pit	78	CAC without controls	Administrative
Long Sled Track (also called Rocket Sled Test Facility)	83	Pending	Administrative
Gun Facilities	84	Pending	Administrative
Bldg. 6620 Drain/Sump	100	CAC without controls	Administrative
Mercury Spill (Bldg. 6536)	105	CAC with controls	Administrative
Explosive Test Area	107	CAC without controls	Administrative
Bldg. 6715 Sump/Drain	111	CAC without controls	Administrative
Bldg. 6540/6542 Septic System	137 A B	CAC with controls	Administrative/Physical
Bldg. 6630 Septic System	138	CAC without controls	Administrative
Bldg. 6636 Septic System	161	CAC without controls	Administrative
Experimental Test Pit	195	CAC without controls	Administrative
Short Sled Track	240	Pending	Administrative
Storage Yard	241	CAC without controls	Administrative
Cable Debris Site[b]	501	CAC without controls	Administrative
Bldg. 6741 Septic System	1006	CAC without controls	Administrative
Bldg. 6741 Septic System	1007	CAC without controls	Administrative
Bldg. 6750 Septic System	1008	CAC without controls	Administrative
Bldg. 6620 Internal Sump	1009	CAC without controls	Administrative
Bldg. 6530 Septic System	1010	CAC without controls	Administrative
MO-146, MO-235, and T-40 Septic System	1020	CAC without controls	Administrative
Bldg. 6501 East Septic System	1025	CAC without controls	Administrative
Bldg. 6501 West Septic System	1026	CAC without controls	Administrative
Bldg. 6530 Septic System	1027	CAC without controls	Administrative
Bldg. 6560 Septic System	1028	CAC without controls	Administrative

Table 6-2. TA-III ER/ELM Sites, CAC Status, and ICs (Concluded)

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
Bldg. 6587 Septic System	1030	CAC without controls	Administrative
Former Buildings 6589 and 6600 Septic System	1031	CAC without controls	Administrative
Bldg. 6610 Septic System	1032	CAC without controls	Administrative
Bldg. 6631 Septic System	1033	CAC without controls	Administrative
Bldg. 6710 Septic System	1034	CAC without controls	Administrative
Bldg. 6715 Septic System	1035	CAC without controls	Administrative
Bldg. 6922 Septic System	1036	CAC without controls	Administrative
Bldg. 6920 Septic System	1077	CAC without controls	Administrative
Bldg. 6640 Septic System	1078	CAC without controls	Administrative
Bldg. 6643 Septic System	1079	CAC without controls	Administrative
Bldg. 6644 Septic System	1080	CAC without controls	Administrative
Bldg. 6650 Septic System	1081	CAC without controls	Administrative
Bldg. 6620 Septic System	1082	CAC without controls	Administrative
Bldg. 6570 Septic System	1083	CAC without controls	Administrative
Bldg. 6505 Septic System	1084	CAC without controls	Administrative
Bldg. 6526 Septic System	1086	CAC without controls	Administrative
Bldg. 6743 Septic System	1087	CAC without controls	Administrative
Bldg. 6734 Septic System	1089	CAC without controls	Administrative
Bldg. 6721 Septic System	1090	CAC with controls	Administrative
Bldg. 6720 Septic System	1091	CAC without controls	Administrative
MO 228 230 Septic System	1092	CAC without controls	Administrative
Bldg. 6584 West Septic System	1093	CAC without controls	Administrative
Bldg. 6531 Seepage Pits	1108	CAC without controls	Administrative
Bldg. 6536 Drain System	1110	CAC without controls	Administrative
Bldg. 6720 Seepage Pit	1111	CAC without controls	Administrative
Bldg. 6643 Septic System	1120	CAC without controls	Administrative
Corrective Action Management Unit (CAMU)	NA	CAC with controls	Administrative

[a]*Status is active due to ongoing operations at the site.*
[b]*Cable Debris Site was remediated under the guidance of the ELM Program.*
CAC = Corrective Action Complete
ER = Environmental Restoration
IC = Institutional Control
ELM = Environmental Life-Cycle Management
MO = Mobile Office
NA = Not applicable
T = Trailer
TA-III = Technical Area II

Of the 57 ER Sites, three sites within TA-III are still active with ongoing operations. The CAC status for each of the following sites will be determined when activities cease:

- Long Sled Track (part of the RSTF) – Site 83
- Gun Facility (now occupied by the TBF) – Site 84
- Short Sled Track (part of the RSTF) – Site 240

6.1.6 Landfills and Engineered Units

Several landfills and two engineered units are located in TA-III. These sites are described in this section, which also provides the current regulatory status for each site, if applicable.

6.1.6.1 Mixed Waste Landfill

The Mixed Waste Landfill (MWL), ER Site 76, is designated as an Underground Radioactive Materials Area under DOE requirements and is a SWMU subject to RCRA corrective action requirements administered and enforced by the NMED. The MWL consists of two distinct disposal areas; the classified area in the northeast portion occupies 0.6 acre and the unclassified area occupies 2.0 acres.

Approximately 100,000 ft^3 of low-level radioactive and mixed waste containing approximately 6,300 Ci of activity (at the time of disposal) were disposed of in the MWL from March 1959 through December 1988.

The MWL evapotranspirative (ET) cover (hereafter referred to as the ET Cover) was deployed from October 2006 through September 2009 and consists of four main layers: (1) compacted subgrade, (2) biointrusion barrier, (3) compacted native soil, and (4) topsoil. The overall footprint of the ET Cover is 4.1 acres including side slopes. The ET Cover was constructed with approximately 33,000 cubic yards (yd^3) of soil fill and 6,800 yd^3 of rock (in-place, compacted volumes). Details of the construction of the ET Cover are presented in the *Mixed Waste Landfill Corrective Measures Implementation Report* (SNL/NM 2010c), which was recently submitted to the NMED for approval.

6.1.6.2 Chemical Waste Landfill

The CWL, ER Site 74, is a hazardous waste disposal facility. The following site description was obtained from the *Supplemental Information Source Document: Waste Management* (SNL/NM 2010d). The CWL is a 1.9-acre disposal site used from 1962 until 1985 for disposal of hazardous, radioactive, and solid waste generated by research activities at SNL/NM. Disposal activities at the site ended in 1985. The CWL area was also used as a hazardous waste drum storage facility from 1981 to 1989. In 1985, groundwater monitoring began at the CWL, in accordance with RCRA requirements. Both TCE and chromium have been identified in the groundwater at concentrations exceeding the regulatory limits.

Two voluntary corrective measures (VCMs) have been conducted as part of the closure activities: soil vapor extraction (VE) and landfill excavation (LE). The active phase of the VE VCM was completed in July 1998; the passive VE phase is ongoing. During the LE VCM, the landfill contents were excavated between 1998 and 2002. Most of the excavated soil was suitable for management at the CAMU and was treated and contained there. Other soil and

excavated wastes were sent to permitted, off-site disposal facilities. The excavated area was backfilled during 2002 and 2003. An at-grade ET soil cover was constructed over the landfill during 2005. The cover includes a lower native soil layer covered by an 18-inch-thick layer of topsoil and native vegetation. The CWL is currently in post-closure care.

6.1.6.3 Corrective Action Management Unit

The CAMU, an engineered unit, was a 19-acre site used between 1999 and 2003 for management of remediation wastes generated as part of the VCM activities undertaken during closure of the nearby CWL. Prior to closure, the CAMU consisted of the following areas:

- Four staging areas for untreated and treated waste
- A treatment pad with two mobile treatment systems
- A containment cell
- Support areas

When operations were completed in 2003, the CAMU containment cell, which provides long-term containment of the wastes during post-closure care, was closed with waste in place. The containment cell consists of an engineered liner system and final cover system designed to prevent the migration of hazardous constituents to the environment from leachate and hazardous waste decomposition products generated during the post-closure period. The bottom and sidewall liner system consists of a high-density, polyethylene geomembrane, underlain by a geosynthetic clay liner. The cover system includes a polyethylene liner covered with a sand and gravel layer topped with soil and vegetation. The cover is mounded and contoured to direct stormwater away from the cell.

Monitoring systems are in place, and monitoring is expected to continue for 30 years. Monitoring will be evaluated periodically under the terms of the post-closure care permit issued by the NMED (SNL/NM 2010h).

6.1.6.4 TA-III Classified Waste Landfill

The TA-III Classified Waste Landfill is a 5-acre disposal site used from 1989 until 1993 for disposal of classified solid waste generated by research activities at SNL/NM. The landfill is not active and has not received any additional waste since November 1993 (SNL/NM 2010d).

According to the inventory records, the site contents include weapons scrap metal, plastic, and computer and printer parts. The DOE and Sandia determined that the site was to undergo excavation and closure. Items will be excavated from the site and initially sorted and segregated based on DOE classification. Classified items may be disassembled to allow complete or partial recycling of weapons components and associated equipment. The disassembly/sanitization operation is expected to result in recyclable metals, nonhazardous solid waste, and classified materials that require continued future storage. The excavated soil will be screened, segregated, stockpiled, sampled, and analyzed for hazardous constituents. Soil that meets the physical and environmental criteria may be used as backfill during restoration of the site. Soil that does not meet the environmental criteria will be managed in accordance with applicable requirements for contaminated soil.

An excavation plan has been approved by the NMED Solid Waste Bureau, although the implementation of the plan has yet to be funded.

6.2 Air Quality Resources

Air quality permits, programs, and resources applicable to TA-III are described in the following sections. Figure 6-1 shows the locations of the TA-III meteorological towers, ambient air monitoring stations, and radiological NESHAP facilities. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the 2014 ASER (SNL/NM 2016a).

6.2.1 Applicable Air Quality Permits

Three types of air quality permits are applicable for facilities in TA-III (Table 6-2): open burn (four permits), (2) stationary source (three permits), and fugitive dust (six permits).

Table 6-2. TA-III Air Quality Permits

Permit Type	Location	Permit/ Regis. Number	Issue Date	Expiration Date
Stationary Source Permits				
Classified Destruction Facility	Bldg. 6583	144-M1	09/28/2006	N/A
Radioactive and Mixed Waste Management Facility	Bldg. 6920	415-M2	05/28/2008	N/A
Thermal Test Complex and Boilers	Bldg. 6539	1712-RV1	10/06/2011	N/A
Stationary Source Registrations				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Open Burn Permits				
Thermite Applications	Terminal Ballistics Facility	16-0006	01/01/2015	12/31/2015
Propellant Applications	Terminal Ballistics Facility	16-0005	01/01/2015	12/31/2015
Explosives Applications	Terminal Ballistics Facility	16-0004	01/01/2015	12/31/2015
Thermal Treatment Facility	Terminal Ballistics Facility	16-0007	01/01/2015	12/31/2015
Explosives Testing	Sled Track	16-0032	6/8/2016	6/8/2017

Table 6-2. TA-III Air Quality Permits (Concluded)

Permit Type	Location	Permit/ Regis. Number	Issue Date	Expiration Date
Fugitive Dust Control Permits				
Programmatic	TA-III - Moving Vehicle Test	P08-0004	06/19/2013	06/19/2018
Programmatic	TA-III - Borrow Site	P08-0005	06/19/2013	06/19/2018
Construction	TA-III - 6596 D&D	7460-C	8/10/2015	8/6/2018
Construction	TA-III - Install Comm Fiber 9920-9950/9956	7975-C	5/13/2016	5/13/2017

6.2.2 Air Quality Compliance Program

Section 4.1 describes the SNL/NM Air Quality Compliance Program.

6.2.3 Radiological NESHAP Compliance

The RMWMU is the only Rad NESHAP facility located in TA-III. The RMWMU handles radioactive and mixed waste products The facility reports releases as determined by continuous stack monitoring. Although anticipated tritium releases do not exceed the regulatory threshold requiring continuous monitoring, it is performed voluntarily as a best management practice.

6.3 Ecological Resources

The ecological resources and setting within TA-III are provided in this section.

6.3.1 Terrestrial Vegetation

The primary types of vegetation that occur in TA-III include the following:

- Dwarf Shrub Grassland (NVCS Classification IV.A.2.N.a) consists of low-growing (generally less than 0.5 meters tall) shrubs that comprise 25 percent or greater of the total vegetative cover.

- Large Shrub Grassland (NVCS Classification III.A.5.N.b.) areas are dominated by shrubs greater than 0.5 meters in height.

- Grasslands with Sparse Dwarf-Shrubs (NVCS Classification V.A.8.N.c.) primarily consist of grasses of moderate height with dwarf shrubs forming less than 25 percent cover.

The ASER and the Grassland Management Plan provide extensive information on terrestrial vegetation, including grassland habitat (SNL/NM 2016a, 2016f).

6.3.2 Terrestrial Wildlife

Wildlife communities within KAFB are typical of those found in wildlands of central New Mexico (Daniel B. Stephens and Associates 1996). The composition of each wildlife community is determined by the quality and quantity of habitat available that meets the needs of each animal species. A wide diversity of wildlife occurs in TA-III.

Birds of prey species commonly occurring in TA-III include the following:

- Red Tailed Hawk (*Buteo jamaicensis*)
- Swainson's Hawk (*Buteo swainsoni*)
- American Kestrel (*Falco sparverius*)

Other bird species commonly occurring in TA-III include the following:

- Horned Lark (*Eremophila alpestris*)
- Loggerhead Shrike (*Lanius ludovicianus*)
- Western Meadowlark (*Sturnella neglecta*)
- Eastern Meadowlark (*Sturnella magna)*
- Sagebrush Sparrow (*Artemisiospiza nevadensis*)
- Cassin's Sparrow (*Aimophila cassinii*)

Common reptiles and amphibians found within TA-III include the following:

- Little Striped Whiptail (*Aspidoscelis inornata*)
- Side Blotched Lizard (*Uta stansburiana*)
- Prairie Rattlesnake (*Crotalus viridis*)
- Couch's Spadefoot Toad (*Scaphiopus couchii*)
- New Mexico Spadefoot Toad (*Spea multiplicata*)

Common mammals found within TA-III include the following:

- Desert Cottontail (*Sylvilagus audubonii*)
- Coyote (*Canis latrans*)
- Ord's Kangaroo Rat (*Dipodomys ordii*)

6.3.3 Threatened and Endangered Species

As of August 2016, there are no federal or state officially listed threatened or endangered species found within TA-III. However, the Desert Massasauga (*Sistrurus catenatus ssp. edwardsii*) is under review by the U.S. Fish and Wildlife Service for listing under the *Endangered Species Act*.

6.3.4 Areas of Biological Conservation

There are several large areas within TA-III is designated as an SCA (Figure 6-1). The SCAs within TA-III are associated with good quality grassland and shrubland that support eastern meadowlark, western meadowlark, loggerhead shrike, sagebrush sparrow, and Cassin's sparrow. One bat nesting location and four raptor nesting and/or roost sites are found within TA-III (Figure 6-1).

6.4 Water Resources

The following sections detail the activities of water resource programs at TA-III. Chapter 3 describes programs and oversight activities, including those for water resources.

Depth to groundwater beneath TA-III is approximately 500 ft bgs. Groundwater level and quality are monitored via a network of monitoring wells maintained by the ER Project and GMP. There are 26 groundwater monitoring wells within TA-III.

6.4.1 Applicable Water Resource Permits

Two types of water resource-related permits apply to TA-III. A general sewer wastewater permit includes TA-III and the surrounding area. Currently, four NPDES permits are in effect for facilities in TA-III. Table 6-3 shows major water resource-related permits for TA-III.

Table 6-3. TA-III (and Vicinity) Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/Monitoring Station
Wastewater	
General Outfall	2069K/WW011
Categorical	Not Applicable
NPDES Permits	
MSGP covers SNL industrial sites	DOE NMR0553114; Sandia NMR053122
CGP for each construction site	May be multiple numbers

6.4.2 Effluent Monitoring

Sampling locations and activities for effluent monitoring programs applicable to TA-III include the following:

- **Stormwater Program:** Discharges from TA-III flow to unnamed playa lakes. Sites covered under the MSGP are monitored by SWSPs.
- **Wastewater Discharge Program:** Wastewater monitoring station WW011, which services lines coming from TA-III, is located a short distance from TA-III (Figure 6-1).

6.4.3 Groundwater Resources

Depth to groundwater beneath TA-III is approximately 500 ft bgs. Wells located in the vicinity of TA-III are shown in Figure 6-1. The ASER/AGMR provides groundwater resources details, including information on the Chemical Waste Landfill and Mixed Waste Landfill groundwater monitoring activities (SNL/NM 2016a).

6.5 Cultural Resources

Cultural resources are archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in TA-III.

6.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible, and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

6.5.2 Archaeological Sites

TA-III was surveyed for the presence of archaeological properties (Hoagland 1990b). Although 23 isolated occurrences were identified, consisting of historic trash, historic and/or prehistoric chipped stone items, and prehistoric pot sherds, the survey identified no properties eligible for the NRHP.

6.5.3 Historical Buildings

Since 2000, several TA-III facilities have undergone extensive renovation and other, inactive older properties have been decontaminated and demolished. (SNL/NM 2003). In support of this activities, the facilities were evaluated for NRHP eligibility (SNL/NM 2010b). SFO determined that 21 properties in TA-III are historic. Based on a 2010 survey and assessment, an additional 10 are recommended as eligible, with 26 recommended as contributing elements to a proposed TA-III Historic District. As listed in Table 6-4, the TA-III Historic District encompasses 58 properties (Figure 6-1).

Table 6-4. TA-III Properties NRHP-Eligible or Recommended as Eligible

Building #	Name	Year	Eligible	Non-Eligible	Contributing Element
6501	Non-Hazardous Assembly	1956		X	X
6502	Storage & Assembly	1958		X	X
6506	Explosive Storage	1954		X	X
6507	Explosive Storage	1948		X	X
6508	Explosive Storage	1948		X	X
S6510	300-Ft Drop Tower	1957	X		X
S6510C	300-Ft Drop Tower Pool				
S6511	Variable Angle Launcher			X	X
S6515	185-Ft Drop Tower	1960	X		X
6520	Hydraulic Centrifuge	1954	X		X
S6522	Observation Tower	1985		X	X
6523	Pump Building	1954	X		X
6523B	Pump Bldg for 6526	1982	X		X
6525	Equipment Building	1954		X	X
6526	25 Foot Centrifuge Facility	1966	X		X
6527	Equip Building for 6526	1968		X	X
6530	Radiant Heat	1960	X		X
6540	Aerosol Research	1954	X		X
6542	Aerosol Research	1956	X		X
S6550	Old 2000-Ft Sled Track	1954	X		X
S6554	Test Stand	1954	X		X
6560	Vibration Test Facility	1955	X		X
6562	Metal Storage Building	1956		X	X
6563	Equip Bldg for 6560	1958		X	X
6570	Dynamic Shock	1956	X		X
6610	Complex Wave Test	1959	X		X
6610A	Shed	1956		X	X
6620	Hazardous Assembly	1958		X	X
6622	Operational Storage Igloo	1959		X	X
6622A	Storage Igloo	1965		X	X
6625	Instrument Shelter	1956		X	X
6630	Climatic Test Facility	1959	X		X
6631	Control Building	1959	X		X
6640	Acoustical Test Facil	1959	X		X
6710	Air Gun Test Facility	1958		X	X
6720	Explosive Loading	1969	X		X
6733	Explosive storage	1964		X	X
S6740	10,000-Ft Sled Track	1966	X		X
6741	Control Building	1966	X		X

Table 6-4. TA-III Properties NRHP-Eligible or Recommended as Eligible (Concluded)

Building #	Name	Year	Eligible	Non-Eligible	Contributing Element
6741A	Storage/Quonset	1956		X	X
6741C	Storage	1956		X	X
6742	Instrumentation Bunker	1968	X		X
6743	Rocket Motor Conditioning Building	1967	X		X
6743A	Storage	1966		X	X
6743B	Storage	1948		X	X
6744	Observation Tower	1966	X		X
6745	Observation Tower	1966	X		X
6746	Observation Tower	1966	X		X
6747	Operational Storage Igloo	1968		X	X
6750	Impact Test Facility	1966	X		X
6750E	Storage Building	1956		X	X
6751	Observation Tower	1966	X		X
6753	Gun Charge Assembly Building	1970		X	X
6753A	Explosive storage	1970		X	X
6753B	Explosive storage	1970		X	X
6921	Rad Prototype - RMWMF	1956	X		X
6922	Molten Core Lab	1955	X		X
6923	Explosive Test Facility	1955	X		X

ft = Foot
NRHP = National Register of Historic Places
RMWMF = Radioactive and Mixed Waste Management Facility
S = Structure
TA-III = Technical Area III

6.6 Additional Environmental Permits

Additional environmental permits may be in place, including RCRA operation permits and hazardous waste facility permits. Table 6-5 lists other applicable environmental permits for facilities or activities in TA-III.

Table 6-5. TA-III Additional Environmental Permits

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NMED
Hazardous Waste Facility Permit Modules I-III	TTF, TA-III	NMED
Class III Permit Modification for the Management of Hazardous Remediation Waste in the Corrective Action Management Unit, Technical Area III	CAMU, TA-III	NMED
RCRA Part A Permit Application for Hazardous and Mixed Waste Management Units	RMWMF, TA-III	NMED
Chemical Waste Landfill Post-Closure Care Permit	Chemical Waste Landfill, TA-III	NMED

CAMU = Corrective Action Management Unit
ER = Environmental Restoration
NA = Not applicable
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act
RMWMF = Radioactive and Mixed Waste Management Facility
TA-III = Technical Area III
TTF = Thermal Treatment Facility

6.7 Noise and Vibration

Activities at TA-III do not produce noise or vibrations of significant levels (SNL/NM 2005). Chapter 3 provides information on noise and vibration.

6.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for TA-III that are available for review.

6.8.1 Air Quality Data

Ambient air quality surveillance data are collected at the two stations within TA-III (A3PM and CWPM/CW/VOC for PM10 and VOCs) and a station located to the north of TA-III. Chapter 3 provides information on air quality data. Figure 6-1 shows the meteorological towers, ambient air monitoring stations, and radiological NESHAP facilities located in TA-III. Results of ambient air quality surveillance are provided in the ASER for SNL/NM (SNL/NM 2016a).

6.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance and Ecology, and miscellaneous nonroutine projects.

Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

6.8.2.1 Environmental Restoration Analytical Data
Confirmatory soil samples were collected by ER Operations personnel at ER Sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each TA-III ER site (available from ER Operations).

6.8.2.2 Terrestrial Soil Sampling Data
No arroyo or river sediment or vegetation samples have been collected for TA-III. Four quarters of TLD exposure data are available for the locations listed in Table 6-6. Figure 6-1 shows the TA-III terrestrial soil sampling locations.

Table 6-6. TA-III Terrestrial Radiological Surveillance Locations

Sample Number	Sample Location	Sample Type			
		Soil	Sediment	Vegetation	TLD
S-2NW	MWL (northwest)	X			X
S-2NE	MWL (northeast)	X			
S-2SE	MWL (southeast)	X			
S-2SW	MWL (southwest)	X			
S-6	TA-III (east of water tower)	X			X
S-35	Chemical Waste Landfill	X			
S-45	Radioactive and Mixed Waste Management Facility, TA-III (northwest corner)	X			X
S-45E	Radioactive and Mixed Waste Management Facility, TA-III (east fence)				X
S-52	TA-III, northeast of Buildings 6716 and 6717	X			
S-53	TA-III south of Rocket Sled Test Facility	X			
S-54	TA-III, Bldg. 6630	X			

MWL = Mixed Waste Landfill
NE = Northeas
NW = Northwest
SE = Southeast
SW = Southwest
TA-III = Technical Area III
TLD = Thermoluminescent dosimeter
TS = Terrestrial Sample

6.8.3 Water Quality Data

Water quality data that are available for TA-III for the stormwater, wastewater, and groundwater programs are described in the following sections.

6.8.3.1 Stormwater Data

Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

6.8.3.2 Wastewater Data

Wastewater effluent discharged from TA-III must meet Permit 2069K requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements. A summary of wastewater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

6.8.3.3 Groundwater Data

Analytical data are available for monitoring activities that have been conducted since 1993. Regional groundwater potentiometric surface details are provided in the ASER/AGMR (SNL/NM 2016a). Details of groundwater sampling activities, schedules, methods, and analytical results are also presented in the ASER/AGMR (SNL/NM 2016a).

Groundwater contamination has been identified at the CWL (ER Site 74) at approximately 500 ft bgs. Sampling results for groundwater monitoring wells installed during the 1980s and 1990s identified low levels of TCE and chromium exceeding regulatory limits. The groundwater AOC is shown in Figure 6-1. Monitoring is ongoing.

6.8.4 Meteorological Data

Data from the A36 (60-meter) tower is used to describe general meteorology at SNL/NM and TA-III. The ASER provides an annual climatic summary for the A36 Tower (SNL/NM 2016a).

6.9 Environmental Conditions and Restrictions

A number of environmental conditions and restrictions are associated with TA-III and its facilities. Table 6-7 summarizes the environmental conditions and associated restrictions detailed in this report for TA-III. Figure 6-1 identifies the locations of the associated environmental conditions for TA-III.

Table 6-7. TA-III Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Air Quality Permits/Registrations:** Classified Destruction Facility RMWMF TTC	Contact SNL/NM Air Quality Compliance SME.
	Open Burn Permits: TBF – Propellant Applications TBF – Thermite Applications TBF – Explosive Applications TTF	
	Fugitive Dust Permits: Moving Vehicle Test (not shown in Figure 6-1) Borrow Site Cell 1 Borrow Pit Cell 3 Mixed Waste Landfill Cover Liquefied Natural Gas Test Bldg. 6570 Test Capabilities Revitalization Upgrades (not shown in Figure 6-1)	
	Stormwater (NPDES): MSGP (multiple locations) CGP (multiple locations)	Any activities with discharges or the ability to impact water quality must be approved through NEPA checklist. Contact SNL/NM Water Quality Stormwater SME or Wastewater SME.
	Groundwater Contamination in Vicinity of the CWL: Low levels of trichloroethene and chromium in groundwater.	No formal restrictions present. Contact SNL/NM Water Quality Groundwater Protection SME.

Table 6-7. TA-III Environmental Conditions and Restrictions (Continued)

Concern	Description	Restriction
Existing Permits	**RCRA Permits:** Hazardous Waste Facility Permit Modules IV – ER Sites (not shown in Figure 6-1) Hazardous Waste Treatment Facility Permit Modules I-III – TTF Class III Permit Modification for the Management of Hazardous Remediation Waste in the CAMU RCRA Part A Permit Application for Hazardous and Mixed Waste Management Units – RMWMF Post-Closure Care permit for the CWL	Contact SNL/NM Compliance SME.
Conservation Area	**Conservation area status for TA-III:** Use of area as habitat by several species (see Figure 6-1). SCA	The area must be surveyed by SNL/NM Biologist prior to any outdoor activities.
Buildings Eligible for NRHP	**Buildings and structures determined eligible for NRHP:** 6520, 6523, 6526, 6530, 6540, 6542, 6560, 6570, 6610, 6630, 6631, 6640, 6720, 6741, 6742, 6743, 6744, 6745, 6746, 6750, 6751, 6921, 6922, 6923, 6523B, S6510, S6515, S6550, S6554, S6740	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.

Table 6-7. TA-III Environmental Conditions and Restrictions (Concluded)

Concern	Description	Restriction
ER Sites and Engineered Unit	**Active Sites – Institutional Controls:** 83 Long Sled Track (part of RSTF) 84 Gun Facility (occupied by TBF) 240 Short Sled Track (part of RSTF) **Corrective Action Complete with Controls:** 137 Bldg. 6540/6542 Septic System 1081 Bldg. 6650 Septic System CAMU **Engineered Units:** CAMU Chemical Waste Landfill Classified Waste Landfill Mixed Waste Landfill	Soil cannot be removed from the footprint of the site.
Safety Zone	Several ESQDs are in effect for facilities in TA-III. The ESQD accounts for the types and severity of hazards each explosive material presents, and the degree of protection required for personnel and facilities adjacent to the explosive operations.	Contact SNL/NM explosives safety SME for any activities within the safety zone.

CAMU = Corrective Action Management Unit
CWL = Chemical Waste Landfill
ER = Environmental Restoration
ESQD = Explosive Safety Quantity Distance
LNG = Liquefied natural gas
MWL = Mixed Waste Landfill
NEPA = National Environmental Policy Act
NEWC = Nuclear Energy and Work Complex
NPDES = National Pollutant Discharge Elimination System
NRHP = National Register of Historic Places
RCRA = Resource Conservation and Recovery Act
RMWMF = Radioactive and Mixed Waste Management Facility
RSTF = Rocket Sled Test Facility
SCA = Standard Conservation Area
SHPO = State Historic Preservation Officer
SME = Subject matter expert
SNL/NM = Sandia National Laboratories/New Mexico
TA-III = Technical Area III
TBF = Terminal Ballistic Facility
TTC = Thermal Test Complex
TTF = Thermal Treatment Facility

7. TECHNICAL AREA IV

For the purpose of this report, the TA-IV OA encompasses approximately 80 acres in the north-central portion of KAFB. Facilities located in TA-IV are comprised of numerous principal buildings and structures developed to respond to the need for test locations for X-ray, gamma-ray, and particle beam fusion accelerators. Approximately 47 acres of TA-IV are fenced for security. TA-IV is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figures 7-1 and 7-2 identify the locations of the associated environmental conditions for TA-IV, and the remainder of this section summarizes the information provided to establish the environmental conditions for TA-IV.

7.1 Land Management

This section provides information on various TA-IV land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

7.1.1 Applicable Land-Use Permits

No applicable land-use permits pertain to TA-IV (SNL/NM 2016m).

7.1.2 Ownership

TA-IV is DOE-owned (also referred to as fee, fee-owned, and fee-title) property (SNL/NM 2016m). Figure 1-2 shows the legal land ownership of the KAFB area. Additional land (adjacent to KAFB) is leased to the DOE for SNL/NM use by the NMSLO.

MapID = sc17069 3/28/2017 SNL EGIS Org 4143

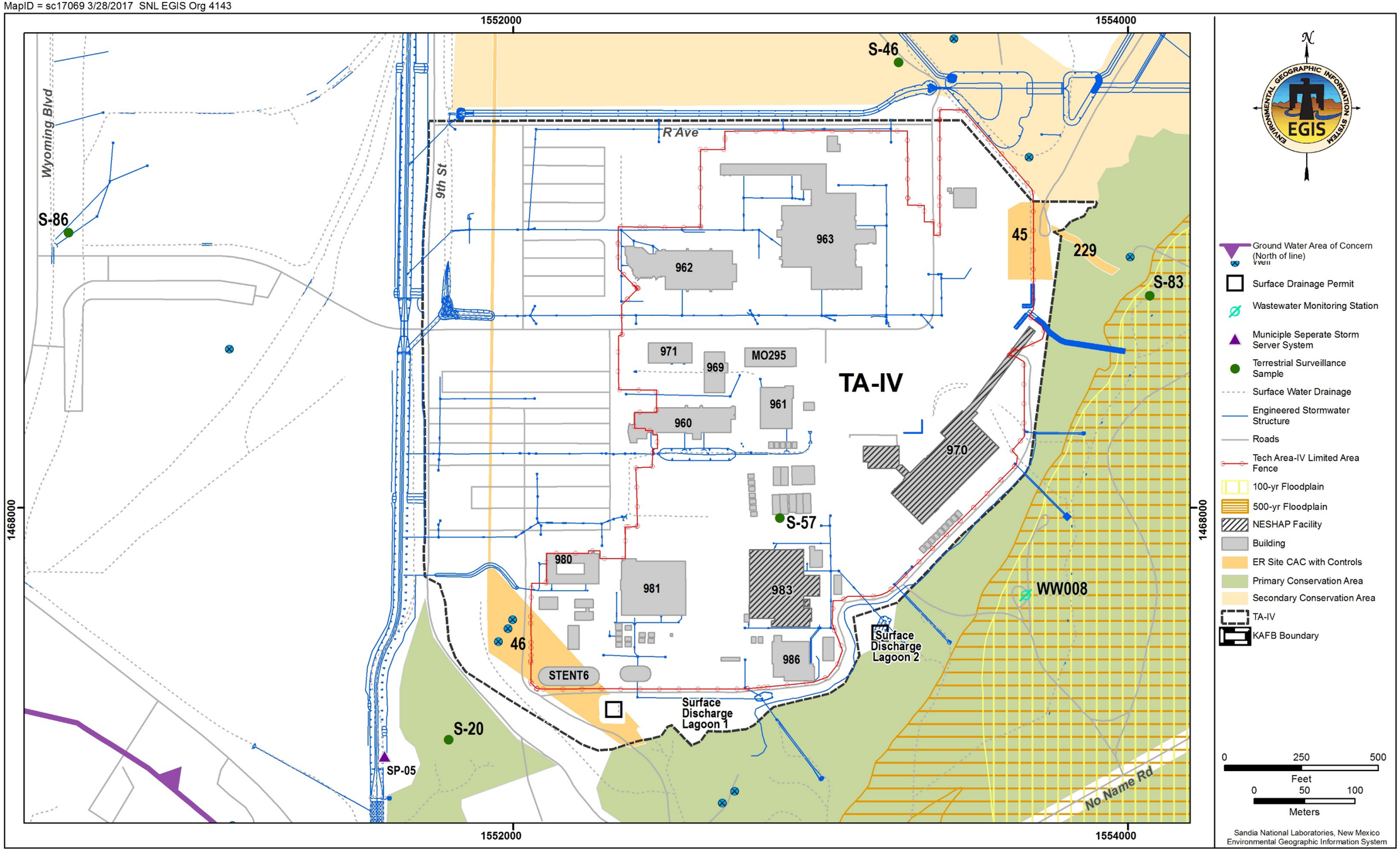

Figure 7-1. TA-IV Environmental Conditions

MapID = sc17208 04/05/2017 SNL EGIS Org 4143

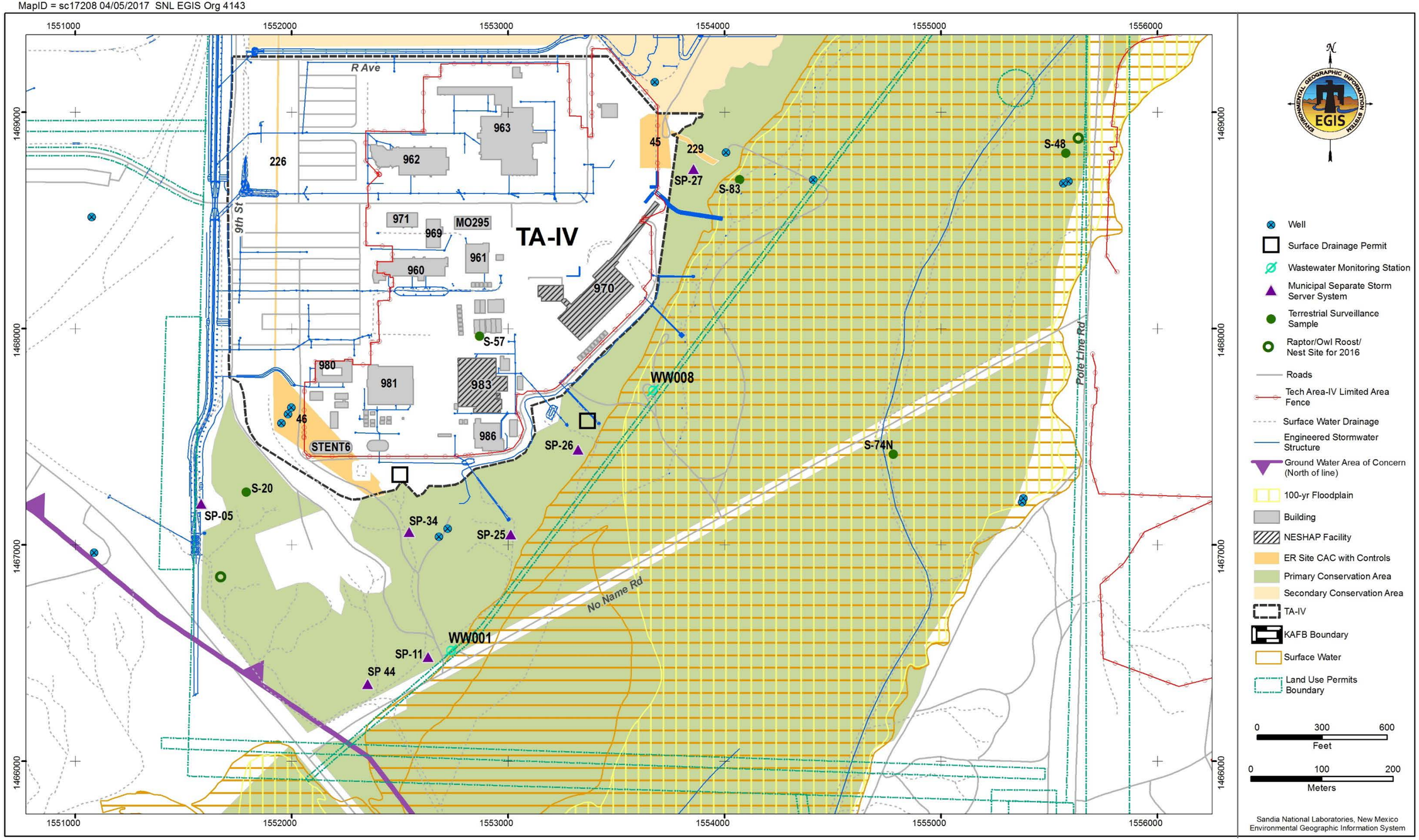

Figure 7-2. Environmental Conditions South of TA-IV

7.1.3 Facilities and Infrastructure Features

TA-IV is the focus of SNL/NM operations, housing the main administrative center and a close grouping of laboratories and offices. Figure 7-1 identifies infrastructure features including roads, fences, gates, and buildings within TA-IV. Further information is provided in the *TA-IV Sub-Area Plan Overview & Summary* (SNL/NM 2015h). A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with TA-IV (SNL/NM 2016n).

7.1.4 Vegetative Control

Vegetation within TA-IV is very limited. There are some landscaped areas, and there is some naturally occurring native vegetation located on the east side. The ground is kept free of potential fire hazards at all times by spraying, picking, and cutting vegetation. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk. SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to any work.

7.1.5 Environmental Restoration Sites and Institutional Controls

Seven ER sites are located in or near TA-IV that are associated with activities conducted within TA-IV. Figure 7-1 shows ER sites that have the status CAC with controls. Table 7-1 lists the CAC status for each site and the ICs in place.

Table 7-1. TA-IV ER Sites, CAC Status, and ICs

Site Name	Site Number	CAC Status	ICs in Place
Liquid Discharge (Behind TA-IV)	45	CAC with controls	Administrative
Old Acid Waste Line	46	CAC with controls	Administrative
Oil Surface Impoundments	77	CAC without controls	Administrative
Storm Drain System Outfall	229	CAC with controls	Administrative
Storm Drain System Outfall	230	CAC without controls	Administrative
Storm Drain System Outfall	231	CAC without controls	Administrative
Storm Drain System Outfall	232	CAC without controls	Administrative
Storm Drain System Outfall	233	CAC without controls	Administrative
Storm Drain System Outfall	234	CAC without controls	Administrative

CAC = Corrective Action Complete
ER = Environmental Restoration
IC = Institutional Control
TA-IV = Technical Area IV

7.2 Air Quality Resources

Air quality permits, programs, and resources applicable to TA-IV are described in the following sections. Figure 7-1 shows the location of the meteorological tower and ambient air monitoring station (in TA-II), and TA-IV radiological NESHAP facilities. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

7.2.1 Applicable Air Quality Permits

Air quality permits applicable for facilities in TA-IV are listed in Table 7-2.

Table 7-2. TA-IV Air Quality Permits

Permit Type	Location	Permit/Registration Number	Issue Date	Expiration Date
Stationary Source Permits				
Emergency Generator and Boilers (4)	Bldg. 962	1930-RV1	02/03/2012	N/A
Emergency Generator	Bldg. 963	1900	01/11/2008	N/A
Stationary Source Registration				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Boilers (2)	Bldg. 960	2169	09/27/2011	N/A
Boilers (2)	Bldg. 981	2175	09/22/2011	N/A
Boilers (2)	Bldg. 983	3111	09/13/2013	N/A
Boilers (2)	Bldg. 963	3211	02/15/2015	N/A
Building 6580 Source Registration	TA-4, Bldg. 6580	2174-RV1	1/26/2012	N/A
Building 6585 Source Registration	TA-4, Bldg. 6585	2172-RV1	1/26/2012	N/A
Building 6597 Source Registration	TA-4, Bldg. 6597	2173	2/10/2012	N/A
Fugitive Dust Control Permits				
Construction	TA-IV - South Escarpment Stabilization	6895-C	10/10/2014	10/10/2019

7.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

7.2.3 Radiological NESHAP Compliance

Two radiological NESHAP facilities are located in TA-IV:

HERMES: HERMES is a gamma simulator used primarily for simulating the effects of prompt radiation from a nuclear burst on electronics and complete military systems. In 2015, nitrogen-14 and oxygen-15 were the only reported emissions.

Z-Facility: The Z-Facility is an experimental facility for research on light ion inertial confinement fusion. In 2015, tritium was the only reported emission

7.3 Ecological Resources

The ecological resources and setting within TA-IV are provided in this section.

7.3.1 Terrestrial Vegetation

TA-IV primarily consists only of landscaped areas with ornamental trees, shrubs, perennials, bunch grasses, and limited amount of turf or xeric grass areas. South and east of TA-IV, and exterior to the fence, but within the DOE fee-owned area, native vegetation grows.

7.3.2 Terrestrial Wildlife

Although TA-IV is an urban environment, it is frequented by many species that are not commonly associated with urban environments, due to its remote location surrounded by wildlands. Snakes commonly occur in TA-IV, as do grassland and scrubland bird species.

Bird species commonly occurring in TA-IV include the following:

- Western Kingbird (*Tyrannus verticalis*)
- Western Meadowlark (*Sturnella neglecta*)
- Mourning Dove (*Zenaida macroura*)

Common reptiles found within TA-IV include the following:

- Gopher Snake (*Pituophis catenifer)*
- Prairie Rattlesnake (*Crotalus viridis*)
- Little Striped Whiptail (*Aspidoscelis inornata*)

Common mammals found within TA-IV include the following:

- Black-Tailed Jackrabbit (*Lepus californicus*)
- Pocket Gopher (*Thomomys species*)
- Ord's Kangaroo Rat (*Dipodomys ordii*)

7.3.3 Threatened and Endangered Species

As of August 2016, there are no federal or state listed threatened and endangered species known to occur in TA-IV.

7.3.4 Areas of Biological Conservation

Figure 7-1 shows a small section of TA-IV located on the north and east side of Bldg. 970 has been designated as an SCA. The area to the south, in Tijeras Arroyo (adjacent to TA-IV), has a designation as a PCA (SNL/NM 2016f).

7.4 Water Resources

The following sections identify the activities at TA-IV associated with water resource programs. Chapter 3 describes programs and oversight activities, including those for water resources.

There are two evaporative lagoons in TA-IV. The Groundwater Protection Program (GMP) is responsible for tracking information on all groundwater monitoring wells, including ER Project wells, and characterization boreholes. The primary purpose of the GMP Well Registry and Oversight Task is to ensure that all wells are properly constructed and maintained to protect groundwater resources.

7.4.1 Applicable Water Resource Permits

Three water related permits apply to TA-IV: the MS4 Permit, one surface-water discharge permit, and a general sewer wastewater permit which includes TA-IV and the surrounding area. Table 7-3 lists water resource-related permits for TA-IV.

Table 7-3. TA-IV Water Resource-Related Permits, Stations, and Features

Permit Type	Permit Number/ Monitoring Station	Waste Stream Process
Wastewater		
General Outfall	2069A/WW001	All waste streams
Categorical	Not applicable	Not applicable
Stormwater		
CGP - Each construction site	One or Multiple	
MSGP covers all SNL sites	NMR053122	
MS4 Permit	NMR04A012	Contact SW SME
Surface Discharge		
Pulsed Power Development Facilities (Bldgs. 970, 981, 983)	DP-530	Stormwater accumulated in the oil storage secondary containment structures is pumped to the evaporative lagoons

7.4.2 Effluent Monitoring

Sampling locations and activities for effluent monitoring programs applicable to TA-IV include the following:

- **Stormwater Program:** Stormwater drainage from TA-IV is a combination of overland flow and drainage controlled by storm inlets. In TA-IV west parking lots, runoff is collected and discharged to the open ditch adjacent to the western edge of TA-IV. This ditch empties into Tijeras Arroyo south of TA-IV. Drainage from the southern and eastern portions of TA-IV is channeled by storm inlets, open ditches, and swales, to just outside the south fence line, and over the rim of Tijeras Arroyo. Stormwater runoff for the remainder of TA-IV follows the existing slope to the east into Tijeras Arroyo. The western three-quarters of TA-IV discharges via the storm drain system directly to Tijeras Arroyo. Direct flows from SNL to Tijeras Arroyo are monitored by a stormwater sampling point. The eastern portion of TA-IV does not discharge directly to the storm drainage system, rather via overland flow to Tijeras Arroyo the arroyo. Figure 7-1 shows engineered stormwater features in TA-IV.

- **Process-Related Surface Discharges at the TA-IV Lagoons:** The Surface Discharge Program at SNL/NM reports water quality results from routine samples obtained from two evaporative lagoons in TA-IV. Lagoon #1 is located within TA-IV and Lagoon #2 is outside the TA-IV boundary (Figure 7-1). Both lagoons are permitted through the NMED under DP [Discharge Permit]-530 (Table 7-3). The two evaporative lagoons are used to contain and evaporate water that collects in the secondary containments around eight outdoor oil storage tanks used to store dielectric oil. Significant volumes of precipitation can collect in the containment structures during storm events. The water is visually inspected for oil contamination and any oil present is skimmed off prior to discharge to the TAIV lagoons**.**

- **Wastewater Discharge Program:** Two wastewater monitoring stations, WW001 and WW008 are associated with TA-IV (Figure 7-1).

7.4.3 Groundwater Resources

Depth to groundwater beneath TA-IV is approximately 500 ft below ground surface (bgs), in the regional aquifer. A perched groundwater system (PGWS) lies above the regional aquifer in the vicinity of TA-I, TA-II, and TA-IV in the Tijeras Arroyo Groundwater (TAG) Area of concern (AOC).

Wells located in the vicinity of TA-IV are shown in Figure 7-1. The ASER/AGMR provides groundwater resources details (SNL/NM 2016a).

7.5 Cultural Resources

Cultural resources are archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in TA-IV.

7.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not

previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

7.5.2 Archaeological Sites

In 1987, SNL/NM contractors surveyed the northern portion of TA-IV for cultural resources, prior to the construction of Buildings 962 and 963. The survey identified no archaeological sites or isolated objects (Condie 1987). The 1990 and 1995 SNL/NM contractor surveys for all of SNL/NM, including TA-IV, found no archaeological properties (Hoagland and Dello-Russo 1995, Hoagland 1990c).

7.5.3 Historical Buildings

One building (Building 983, which houses the Z Machine) was previously determined eligible for the NRHP by SFO. Five additional buildings in TA-IV (Table 7-4) are recommended as eligible for listing on the NRHP (Figure 7-1) (SNL/NM 2010b). These six, along with nine additional contributing elements form a proposed historic district.

Table 7-4. TA-IV Properties NRHP-Eligible or Recommended as Eligible

Building #	Name	Year	Eligible	Non-Eligible	Contributing Element
	Particle Beam Sculpture			X	X
960	Reactor Support Facility	1983		X	X
961	Reactor Support Facility	1983		X	X
962	Strategic Defense Facility	1989		X	X
963	Strategic Defense Facility	1995		X	X
965	Strategic Defense Facility	1995		X	X
966	Process Support Facility	1995		X	X
970	Simulation Technical Lab	1984	X		X
970A	Simulation Support	1987		X	X
981	Particle Beam Fusion	1979	X		X
983	Particle Beam Accelerator	1983	X		X
983A	Beam Accelerator Support	1985		X	X
983B	Beam Accelerator Phase B	1985	X		X
984	Neutron Measurement Lab	1990	X		X
986	Components Develop. Lab	1983	X		X

NRHP = National Register of Historic Places
TA-IV = Technical Area IV

7.6 Additional Environmental Permits

Table 7-5 lists additional environmental and/or regulatory permits that exist for SNL/NM and TA-IV.

Table 7-5. TA-IV Additional Environmental Permits

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NMED

ER = Environmental Restoration
NMED = New Mexico Environment Department
TA-IV = Technical Area IV

7.7 Noise and Vibration

Activities at TA-IV do not produce noise or vibrations of significant levels (SNL/NM 2005). Chapter 3 provides information on noise and vibration.

7.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for TA-IV that are available for review.

7.8.1 Air Quality Data

Ambient air quality surveillance data are collected at the A21 Tower in TA-II, north of TA-IV, for PM10 and VOCs. Figure 7-1 shows air quality resources, including the meteorological tower/ambient air monitoring station, and radiological NESHAP facilities within TA-IV. Results of ambient air quality surveillance are provided in the ASER for SNL/NM (SNL/NM 2016a). Chapter 3 provides information on air quality data.

7.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance and Ecology, and miscellaneous nonroutine projects.

Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

7.8.2.1 Environmental Restoration Analytical Data

Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each TA-IV ER site (available from ER Operations).

7.8.2.2 Terrestrial and Ecological Soil Sampling Data

Table 7-6 lists the sampling locations in TA-IV where soil was collected in 2007 (and previous years) for radiological parameters. Figure 7-1 shows the TA-IV terrestrial soil sampling location.

Table 7-6. TA-IV Terrestrial Radiological Surveillance Locations

Sample Number	Sample Location	Sample Type (Analyte/Sampling Frequency)			
		Soil	Sediment	Vegetation	TLD
S-57	TA-IV	X (Tritium and gamma spectroscopy, annually)	—	—	—

TA-IV = Technical Area IV
TLD = Thermoluminescent dosimeter
TS = Terrestrial Sample

7.8.3 Water Quality Data

Water quality data that are available for TA-IV for the stormwater, surface discharge, wastewater, and groundwater programs are described in the following sections.

7.8.3.1 Stormwater Data
Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP and MS4 Permit. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

7.8.3.2 Surface Discharge Data
The Surface Discharge Program at SNL/NM reports water quality results for routine samples obtained from the two surface discharge lagoons in TA-IV.

7.8.3.3 Wastewater Data
Wastewater effluent discharged from TA-IV must meet Permit 2019A requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements. A summary of wastewater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

7.8.3.4 Groundwater Data
The regional groundwater potentiometric surface is provided in detail in the ASER/AGMR (SNL/NM 2016a). Analytical data are available for monitoring activities that have been conducted since 1993. Details of groundwater sampling activities, schedules, methods, and analytical results are presented in the ASER/AGMR (SNL/NM 2016a).

Groundwater contamination has been identified in the perched groundwater system (PGWS) at the Tijeras Arroyo Groundwater (TAG) area of concern (AOC), which encompasses approximately 1.7 square miles and three SNL/NM TAs. The TAG AOC is located in the northwest portion of KAFB, and includes all of TA-IV. The depth to potentiometric surface of the PGWS ranges from approximately 220 to 330 feet below ground surface (ft bgs). A portion of the groundwater AOC boundary is shown in Figure 7-1.

7.8.4 Meteorological Data

Data from the A21 Tower located in TA-II (Figure 7-1) is used to describe meteorology at TA-IV.

7.8.5 Miscellaneous Sampling Data

No other environmental or terrestrial sampling projects have taken place at TA-IV.

7.9 Environmental Conditions and Restrictions

A number of environmental sensitivities, conditions, and restrictions are associated with TA-IV based on the evaluation of the information presented in this report for TA-IV. Table 7-7 summarizes the environmental conditions and associated restrictions for TA-IV. Figure 7-1 identifies the locations of the associated environmental conditions within TA-IV.

Table 7-7. TA-IV Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Air Quality Permits/Registrations:** Strategic Defense Fac. Emergency Generator (not shown in Fig. 7-1) Miscellaneous HAP Registration (not shown in Figure 7-1)	Contact SNL/NM Air Quality Compliance Program SME.
	Surface Discharge Permit: DP-530 (Lagoons #1 and #2)	Contact SNL/NM Surface Discharge Program SME.
	Wastewater Permit: 2069A (serves TA-IV, but not located in TA-IV; not shown in Figure 7-1)	Contact SNL/NM Wastewater Discharge Program SME.
	Hazardous Waste Facility Permit Module IV: All ER Sites (permits not shown in Figure 7-1)	Contact SNL/NM Hazardous Waste Permits SME.
Groundwater Contamination	Low levels of trichloroethene and nitrate in the perched groundwater system in the vicinity of TA-IV.	No formal restrictions present.
Conservation Areas	**Conservation area status for TA-IV:** The Tijeras Arroyo Wildlife Corridor, a PCA, borders TA-IV directly on the east. An SCA is located directly to the north, within TA-II.	The area must be surveyed by SNL/NM Biologist prior to any outdoor activities. Contact SNL/NM Environmental Programs SME.
Buildings/Structures Eligible for Listing with NRHP	**Buildings and structures determined eligible for NRHP:** 970 981 983 983B 984 986	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.
ER Sites	**Corrective Action Complete with Controls:** 45 Liquid Discharge (Behind TA-IV) 46 Old Acid Waste Line 229 Storm Drain System Outfall (see Table 7-1)	Soil cannot be removed from the footprint of the site.

HAP = Hazardous Air Pollutant
NEPA = National Environmental Policy Act
NRHP = National Register of Historic Places
PCA = Primary Conservation Area
SCA = Secondary Conservation Area
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico
TA-IV = Technical Area IV

8. TECHNICAL AREA V

The TA-V OA consists of approximately 33 acres, located in the north-central portion of KAFB (Figure 8-1). TA-V is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 8-1 identifies the locations of the associated environmental conditions for TA-V, and the remainder of this section summarizes the information provided to establish the environmental conditions for TA-V.

MapID = sc17070 3/28/2017 SNL EGIS Org 4143

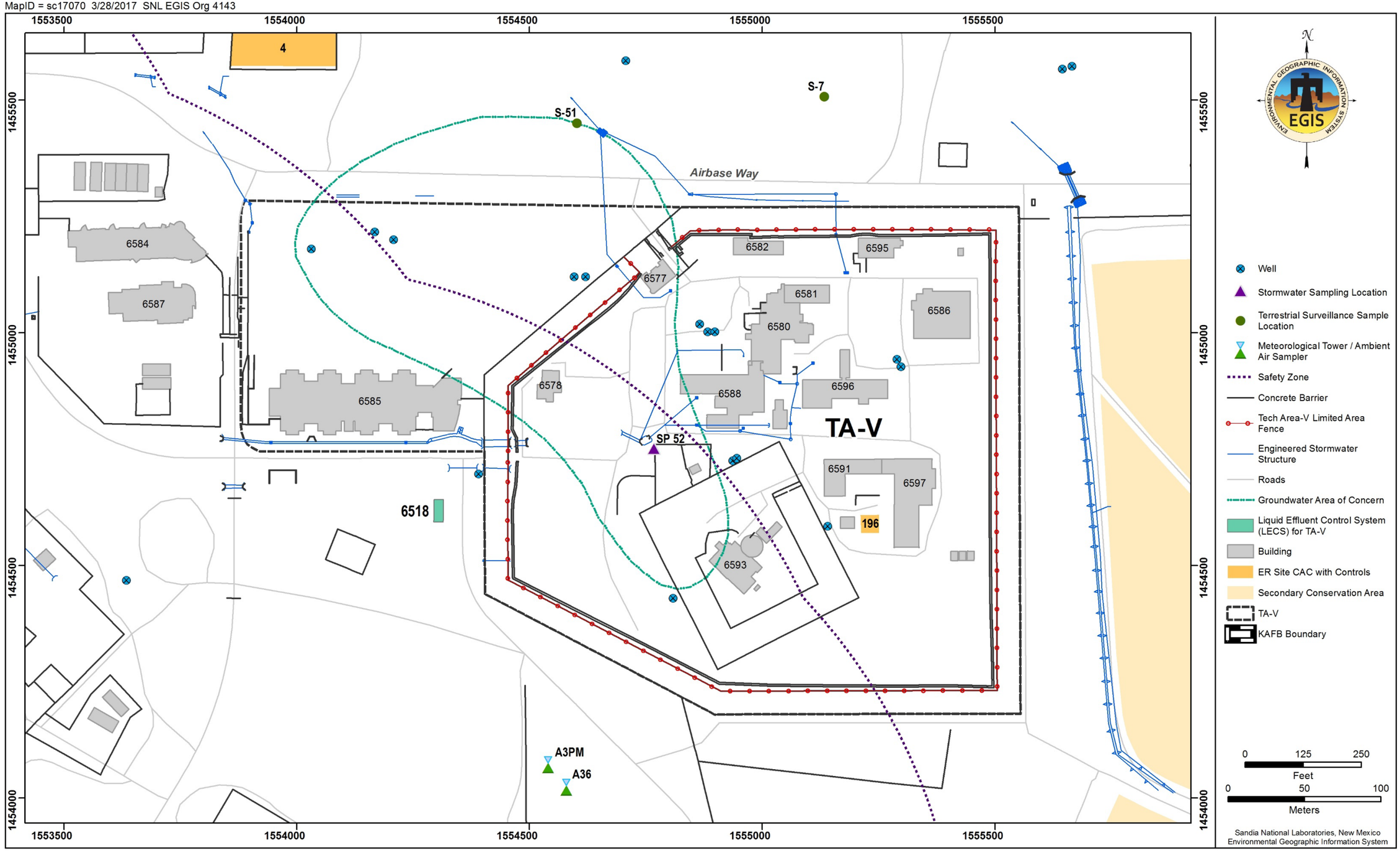

Figure 8-1. TA-V Environmental Conditions

8.1 Land Management

This section provides information on various TA-V land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land use planning in both historical and current contexts.

8.1.1 Applicable Land-Use Permits

No applicable land-use permits are required at TA-V (SNL/NM 2016m).

8.1.2 Ownership

TA-V is DOE-owned (also referred to as fee, fee-owned, and fee-title) property. Additional lands are leased to DOE for SNL/NM use from the NMSLO (Figure 1-2).

8.1.3 Facilities and Infrastructure Features

TA-V is a remote research area housing experimental and engineering nuclear reactors and support facilities. Figure 8-1 identifies major TA-V facilities and infrastructure features including roads, fences, gates, and buildings within TA-V. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with TA-V (SNL/NM 2016n).

8.1.4 Vegetative Control

TA-V is widely developed,consisting of paved (“hard-scaped”) roads and parking areas. There is some landscaping on the west side of Bldg. 6580. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk.

A road adjacent to the area is designated for routine maintenance, and SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to work activities.

8.1.5 Environmental Restoration Sites and Institutional Controls

TA-V contains 16 ER sites. Figure 8-1 shows ER sites with the status CAC with Controls. Table 8-1 lists the CAC status for each site and the ICs in place.

Table 8-1. TA-V ER Sites, CAC Status, and ICs

Site Name	Site Number	CAC Status	ICs in Place
LWDS Surface Impoundments	4	CAC with controls	Administrative/Physical
LWDS Drainfield	5	CAC without controls	Administrative
HERMES Oil Spill	36	CAC without controls	Administrative
PROTO Oil Spill	37	CAC without controls	Administrative
LWDS Holding Tanks	52	CAC without controls	Administrative
Bldg. 6597 Cistern	196	CAC with controls	Administrative/Physical
TA-V Seepage Pits	275	CAC without controls	Administrative
Former T-12, T-42, and T-43 Septic System	1014	CAC without controls	Administrative
Former MO 231-234 Septic System	1015	CAC without controls	Administrative
Bldg. T-52 and Former Bldg. 6500 Septic System	1072	CAC without controls	Administrative
Bldg. 6580 Seepage Pit	1073	CAC without controls	Administrative
Bldg. 6581/6582 MO 32/57 Septic System	1074	CAC without controls	Administrative
TA-V Plenum Rooms Drywell	1098	CAC without controls	Administrative
Bldg. 6595 Seepage Pit	1104	CAC without controls	Administrative
Bldg. 6596 Drywell	1105	CAC without controls	Administrative
Bldg. 6590 Reactor Sump Drywell	1112	CAC without controls	Administrative
Bldg. 6597 Drywell	1113	CAC without controls	Administrative

CAC = Corrective action complete
ER = Environmental Restoration
HERMES = High Energy Radiation Megavolt Electron Source (a facility no longer located in TA-V)
IC = Institutional control
LWDS = Liquid Waste Disposal System
MO = Mobile office
PROTO = A prototype facility no longer in operation
T = Trailer
TA-V = Technical Area V

8.2 Air Quality Resources

Air quality permits, programs, and resources applicable to TA-V are described in the following sections. Figure 8-1 shows the location of the meteorological tower and ambient air monitoring station (in TA-III), and TA-V radiological NESHAP facilities. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

8.2.1 Applicable Air Quality Permits

Air quality permits applicable for facilities in TA-V are listed in Table 8-2.

Table 8-2. TA-V Air Quality Permits

Permit Type	Location	Permit/ Registration Number	Issue Date	Expiration Date
Stationary Source Registrations				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Boilers (2)	Bldg. 6585	2172-RV1	1/26/2012	N/A
Boilers (4)	Bldg. 6580 Hot Cell Facility	2174-RV1	1/26/2012	N/A
Boiler	Bldg. 6597	2173	2/10/2012	N/A

8.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

8.2.3 Radiological NESHAP Compliance

Two RadNESHAP facilities are located in TA-V:

ACRR: Reactor used to perform in-pile experiments for severe-reactor-accident research projects. Argon-41, an air activation product, was the only reported release in 2015 (SNL/NM 2016a).

AHCF: The AHCU is used to identify, sort, characterize, and repackage legacy nuclear materials for permanent removal from the SNL/NM site. Legacy material may include accountable nuclear material, spent nuclear fuel, and radiological material. Krypton-85, Strontium-90, Cesium-137, Samarium-151, and Tritium were the reported releases in 2015.

8.3 Ecological Resources

The ecological resources and setting within TA-V are provided in this section.

8.3.1 Terrestrial Vegetation

In TA-V, the vegetation classification (NVCS) has been deemed as an urban/landscaped area (no NVCS code). The TA-V area is mostly covered with impermeable surfaces including buildings and paved areas. There is a little landscaping present within TA-V. No naturally occurring native vegetation is present in the area; some small, unpaved areas contain only weed species.

8.3.2 Terrestrial Wildlife

TA-V is primarily an urban work area. The area surrounding TA-V is desert grassland, and occasionally wildlife will be found within TA-V, listed as follows:

- Common TA-V Birds:
  - House Finch (*Carpodacus mexicanus*)
  - House Sparrow (*Passer domesticus*)
  - Mourning Dove (*Zenaida macroura*)
  - Greater Roadrunner (*Geococcyx california*)

- Common TA-V Reptiles:
  - Prairie Rattlesnake (*Crotalus viridis*)
  - Sonoran Gopher Snake (*Pituophis catenifer affinis*)
  - Southwestern Fence Lizard (*Sceloporus cowles*)
  - New Mexican Whiptail (*Aspidoscelis neomexicana*)

- Common TA-V Mammals:
  - Merriam's Kangaroo Rat (*Dipodomys merriami*)
  - Ord's Kangaroo Rat (*Dipodomys ordii*)
  - Deer Mouse (*Peromyscus maniculatus*)

8.3.3 Threatened and Endangered Species

As of August 2016, no federal or state threatened and endangered species are know to occur withing TA-V.

8.3.4 Areas of Biological Conservation

There are no PCAs or SCAs within TA-V.

8.4 Water Resources

The following sections identify the activities at TA-V associated with water resource programs. Chapter 3 describes programs and oversight activities, including those for water resources.

8.4.1 Applicable Water Resource Permits

Figure 8-1 shows the wastewater features associated with TA-V and the surrounding area. Table 8-3 shows water resource-related permits for TA-V.

Table 8-3. TA-V (and Vicinity) Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/Monitoring Station/Comments
Wastewater	
General Outfall	2069K/WW011
Categorical	Not Applicable
Stormwater	
CGP for each construction site	May be multiple numbers
MSGP covers SNL industrial sites	NMR05122
MS4 Permit	NMR04A012
Non-Permitted Feature	
LECS (Section 5.2.2)	Radiological screening of TA-V process water

8.4.2 Effluent Monitoring

Sampling locations and activities for effluent monitoring programs applicable to TA-V include the following:

- **Stormwater Program:** Stormwater discharges from TA-V covered under the MSGP are monitored by SWSPs.

- **Surface Discharge Program:** If discharges do not meet the surface water quality standards, alternative disposal methods are found.

- **Wastewater Discharge Program:** No permitted wastewater monitoring stations are present within TA-V; however, the SNL/NM research and engineering reactors in TA-V have the potential to produce radioactive process wastewater that includes liquids from floor drains, laboratory sinks, and other drains located in buildings that use, process, or store radioactive materials.

  To ensure that all wastewater from these facilities meets regulatory standards, liquid effluent is separated into two process streams defined as non-process and process wastewater described as follows:

- Non-process wastewater is water generated from rest rooms and nonradioactive laboratory activities.

- Process wastewater generated from areas that use, process, or store radioactive materials is channeled into three 5,000-gallon holding tanks, where it can be screened for radiological contaminants within the Liquid Effluent Control System (LECS), located outside the boundary of TA-V (Figure 5-4). The LECS was developed as a control system to maintain the integrity of the ABCWUA sanitary sewer system by collecting, analyzing, and handling SNL/NM process wastewater from TA-V activities. The LECS is an engineered facility operating within an established safety envelope. Water samples are analyzed for tritium, gross alpha, gross beta, and gamma spectroscopy to ensure radiological levels meet regulatory standards before the water is released to the public sewer system.

- If radioactivity levels are detected above regulatory limits, the water will not be released to the sanitary sewer system, and an alternative disposal path will be found.

All water discharged from LECS in 2015 met federal regulatory standards and DOE directives for radiological levels in wastewater. (SNL/NM 2016a). There is one stormwater sampling points (SWSPs) within TA-V (SWSP-52).

If radioactivity levels are detected above regulatory limits, the water will not be released to the sanitary sewer system, and an alternative disposal path will be found or the radionuclides will be allowed to decay in place over a matter of days or weeks if the contamination is due to short-lived radioisotopes. Once the activity is at or below regulatory levels, the water can be safely discharged to the public sewer system.

8.4.3 Groundwater Resources

The depth to groundwater beneath TA-V is approximately 500 ft bgs. Wells located in the vicinity of TA-V and the groundwater area of concern (TAVG AOC) are shown in Figure 8-1. The TAVG AOC extends into Coyote Test Field East (CTF-East). The ASER/AGMR provides groundwater resources details, including information on the Chemical Waste Landfill, Mixed Waste Landfill, and TAVG AOC (SNL/NM 2016a).

8.5 Cultural Resources

Cultural resources are archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in TA-V.

8.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not

previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

8.5.2 Archaeological Sites

TA-V was surveyed for Archaeological sites (both prehistoric and historic) (DOE 1999). Aside from isolated occurrences of artifacts, no archaeological sites have been identified (DOE 2006).

8.5.3 Historic Buildings

No properties have been determined to be eligible for the NRHP. Nine properties are recommended as eligible. Together with eight additional non-eligible properties, they form the proposed SNL Reactor Complex Historic District (SNL/NM 2010b) (Table 8-4 and Figure 8-1).

Table 8-4. TA-V Properties NRHP-Eligible or Recommended as Eligible

Building #	Name	Year	Eligible	Non-Eligible	Contributing Element
6577	Perimeter Control Building	1990		X	X
6580	HCF	1963	X		X
6580A	HCF	1956		X	X
6580B	HCF	1956		X	X
6580C	HCF	1956		X	X
6580D	HCF	1956		X	X
6581	Security Services Building	1975		X	X
6582	Evacuation Building	1963	X		X
6586	GIF	1995		X	X
6588	ACRR	1963	X		X
6590	SPR	1961	X		X
6591	Reactor Control	1961	X		X
6592	SPR Lab	1966	X		X
6593	SPR Equipment Building	1961	X		X
6594	Low Level Counting Lab	1964	X		X
6595	Irradiated Materials Storage	1965		X	X
6597	AHCF	1971	X		X

NRHP = National Register of Historic Places
TA-V = Technical Area V

8.6 Additional Environmental Permits

A RCRA permit is in place for addressing ER sites at SNL/NM, including those in TA-V (Table 8-5).

Table 8-5. TA-V Additional Environmental Permits

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NMED
RCRA Part A Permit Application for Hazardous and Mixed Waste Management Units	Auxiliary Hot Cell, TA-V	NMED

ER = Environmental Restoration
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act
TA-V = Technical Area V

8.7 Noise and Vibration

Activities at TA-V do not produce noise or vibrations of significant levels (SNL/NM 2005). Chapter 3 provides information on noise and vibration.

8.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for TA-V that are available for review.

8.8.1 Air Quality Data

Ambient air quality surveillance data is collected at the A36 tower located near TA-V. The data are collected for PM10 and VOCs. Chapter 3 provides information on air quality data. Figure 8-1 shows air quality resources, including the meteorological tower, ambient air sampler station, and radiological NESHAP facilities near and within TA-V. Results for all air quality monitoring programs are provided in the ASER for SNL/NM (SNL/NM 2016a).

8.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance and Ecology, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

8.8.2.1 Environmental Restoration Analytical Data

Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each ER site in TA-V (available from ER Operations).

8.8.2.2 Terrestrial Soil Sampling Data

The staff of the Terrestrial Surveillance Program sample surface soil, arroyo and river sediment, and vegetation and collect data from TLDs at various on-site, perimeter, and off-site locations. The samples are used to detect the presence of anomalous radiological and nonradiological constituents.

Soil sampling locations in TA-V are listed in Table 8-6. Figure 8-1 shows the TA-V terrestrial soil sampling location.

Table 8-6. TA-V Terrestrial Radiological Surveillance Locations

Sample Number	Sample Location	Sample Type (Analyte/Sampling Frequency)			
		Soil	Sediment	Vegetation	Thermoluminescent Dosimeters
S-56	TA-V	X[a]			

[a]*Tritium and gamma spectroscopy/annually*
TA-V = Technical Area V

8.8.3 Water Quality Data

Water quality data for TA-V that are available for the stormwater, wastewater, and groundwater programs are described in the following sections.

8.8.3.1 Stormwater Data

Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

8.8.3.2 Wastewater Data

The wastewater from the LECS is screened for radiological constituents. Wastewater effluent discharged from TA-V must meet Permit 2069K requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements. A summary of wastewater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

8.8.3.3 Groundwater Data

Analytical data are available for monitoring activities that have been conducted since 1993. Details of groundwater sampling activities, schedules, methods, and analytical results are presented in the AGMR/ASER, including information on the Chemical Waste Landfill, Mixed Waste Landfill, and TAVG AOC (SNL/NM 2016a).

Groundwater contamination was identified in 1992 in the regional groundwater system in the vicinity of TA-V (Figure 10-1). Groundwater investigations conducted by SNL/NM ER Operations have identified TCE and nitrate as the COCs in the TAVG AOC (shown in Figure 10-1).

8.8.4 Meteorological Data

Data from the A36 Tower is used to describe meteorology at TA-V. The ASER provides an annual climatic summary for the A36 Tower (SNL/NM 2016a).

8.8.5 Miscellaneous Sampling Data

No other environmental or terrestrial sampling projects have taken place at TA-V.

8.9 Environmental Conditions and Restrictions

A number of environmental conditions and restrictions are associated with TA-V and its facilities. Table 8-7 summarizes the environmental conditions and associated restrictions detailed in this report for TA-V. The Figure 8-1 map shows the locations of the associated environmental conditions for TA-V.

Table 8-7. TA-V Environmental Conditions and Restrictions

Concern	Description	Restriction
Groundwater Contamination	Low-levels of trichloroethane and nitrate in the perched groundwater system in the vicinity of TA-V.	No formal restrictions present.
Conservation Areas	**Conservation area status for TA-V:** An SCA is located approximately 250 feet east of TA-V.	The area must be surveyed by SNL/NM biologist prior to any outdoor activities. Contact SME.
Building Eligible for NRHP	**Buildings and structures determined eligible for NRHP:** 6580 6582 6588 6590 6591 6592 6593 6594 6597	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.
Safety Zone	A portion of TA-V is within the ESQD for facilities in the northern portion of TA-III. The ESQD accounts for the types and severity of hazards each explosive material presents, and the degree of protection required for personnel and facilities adjacent to the explosive operations.	Contact SNL/NM explosives safety SME for any activities within the safety zone.
ER Sites	**Corrective Action Complete with Controls:** 4 LWDS Surface Impoundments 196 Bldg. 6597 Cistern	Soil cannot be removed from the footprint of the site.

ESQD = Explosive Safety Quantity-Distance
NEPA = National Environmental Policy Act
NRHP = National Register of Historic Places
SCA = Secondary Conservation Area
SHPO = State Historic Preservation Officer
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico
TA-V = Technical Area V

9. COYOTE TEST FIELD EAST

The CTF-East OA consists of a large area within KAFB that contains a variety of remote testing sites and facilities. For the purpose of this report, the entire eastern portion of KAFB will be considered CTF-East (Figure 1-2). This portion of KAFB (referred to as CTF-East) is in an area of the Cibola National Forest that has been withdrawn from the public domain for the exclusive use of KAFB and the DOE. CTF-East is not located within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 9-1 identifies the locations of the associated environmental conditions for CTF-East, and the remainder of this section summarizes the information provided to establish the environmental conditions for CTF-East.

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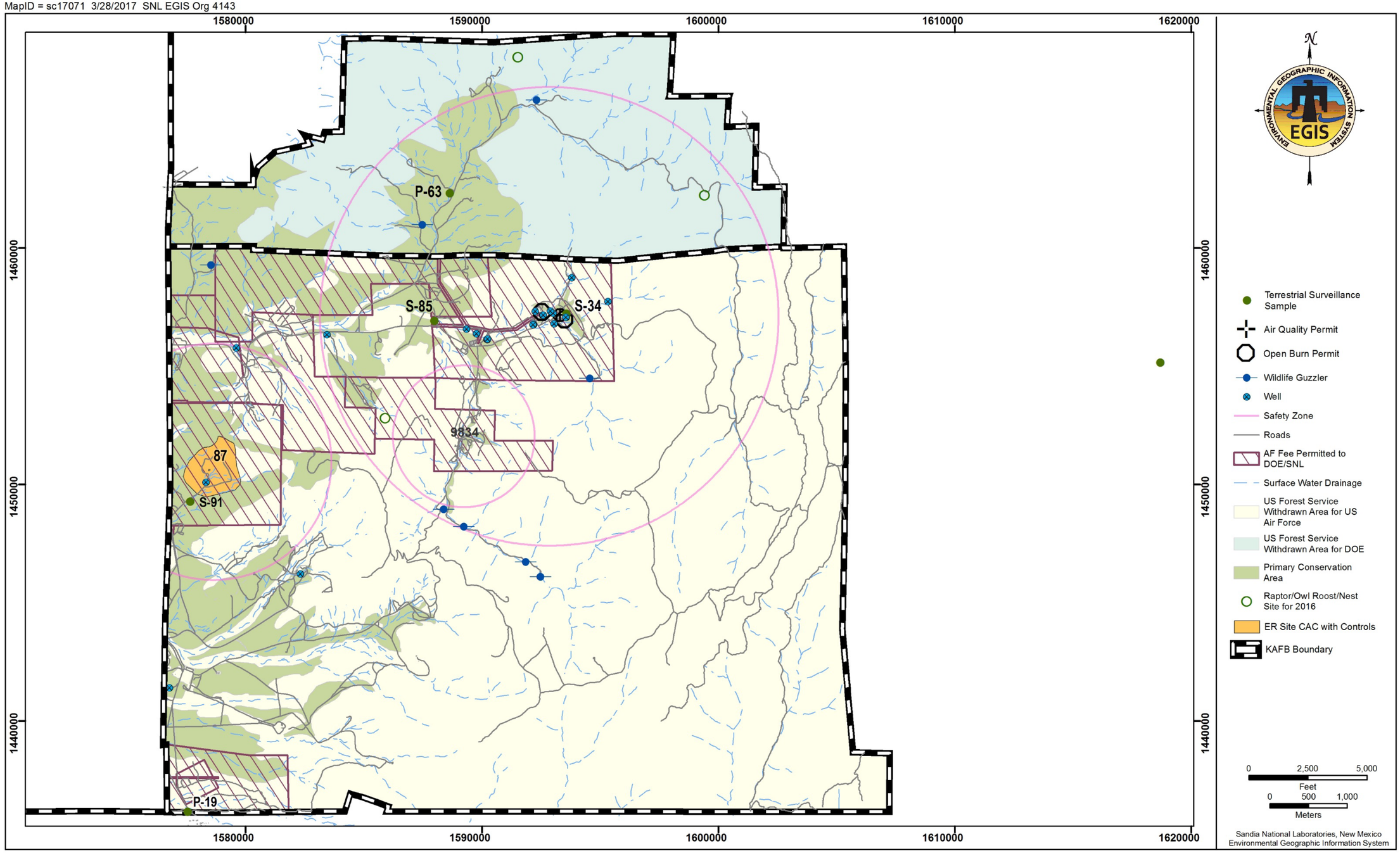

Figure 9-1. CTF-East Environmental Conditions

9.1 Land Management

This section provides information on CTF-East land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

9.1.1 Applicable Land-Use Permits

The area that CTF-East occupies is owned by the Cibola National Forest, but has been withdrawn from the public domain for the exclusive use of KAFB and DOE (Figure 1-2). Additional lands are leased to the DOE for SNL/NM use by the NMSLO.

9.1.2 Ownership

Eight SNL/NM land-use permits pertain to the CTF-East area. Table 9-1 lists all applicable land-use permits, and Figure 9-2 identifies the permitted areas within CTF-East (SNL/NM 2016m).

Table 9-1. CTF-East Land-Use Permits

Reference Number	Description	Acres
20	Underground Cable System Complex	1.27
32	Ingrant for Sol se Mete Cable Test Area	412.65
40	Research Remote Facility Complex	765.90
42	Lurance Canyon Burn Site	800.00
99	Ingrant for National Seismic Station Program (FACT site)	45.76
103	Ingrant for 12-kV power line to Madera and Lurance Canyons	19.66
105	Live Fire Range	675.13
106A	Transportation Safeguards Division – Service Center	745.32

CTF = Coyote Test Field *kV = Kilovolt*
FACT = Facility for Acceptance, Calibration, and Testing

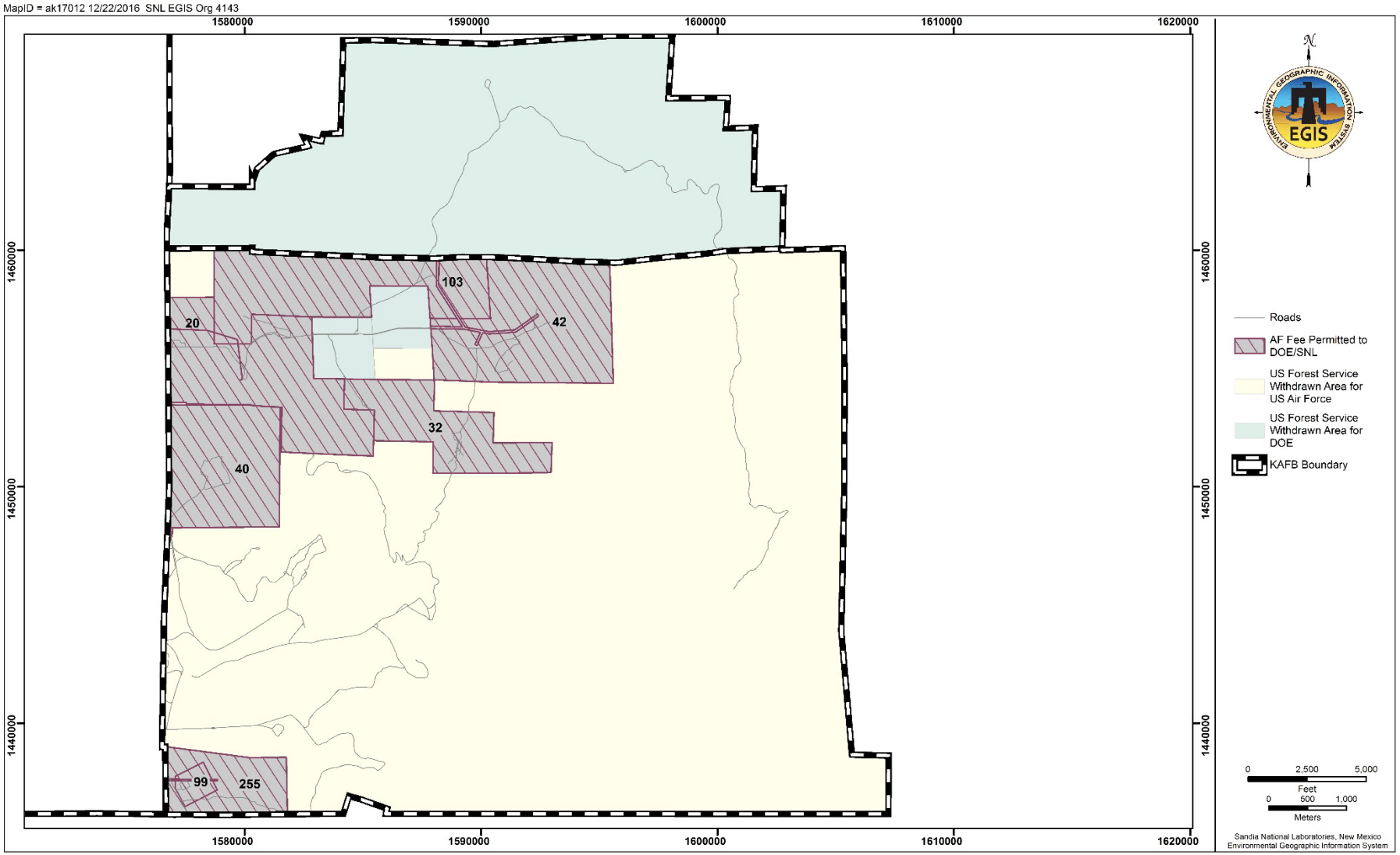

Figure 9-2. CTF-East Land-Use Permits

9.1.3 Facilities and Infrastructure Features

The SNL/NM facilities in CTF-East include those at the ACF, LCBS, and FACT, described in the previous sections and shown in Figure 9-1. Figure 9-1 also shows infrastructure features for CTF-East, including roads, fences, and major gates. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with CTF-East (SNL/NM 2016n).

9.1.4 Vegetative Control

Specific roads are designated for routine maintenance, and SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to conducting work activities.

9.1.5 Environmental Restoration Sites and Institutional Controls

There are 23 ER sites (including drain and septic systems) and several have multiple subunits located in CTF-East. Figure 9-1 shows the CTF-East ER sites that have the status CAC with Controls. Table 9-2 lists each CTF-East site and shows the CAC status and ICs that are currently in place for each site.

9.2 Air Quality Resources

Air quality permits, programs, and resources applicable to CTF-East are described in the following sections. Figure 9-1 shows the location of the meteorological tower (in CTF-West). Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

Table 9-2. CTF-East ER Sites, CAC Status, and ICs

Site Name	Site Number	CAC Status	ICs
Open Arroyo Channel	12A,B	CAC without controls	Administrative
Lurance Canyon Burn Site Oil Surface Impoundment	13	CAC without controls	Administrative
Trash Pits (Fustration Site)	15	CAC without controls	Administrative
TRUPAK Boneyard Storage Area	19	CAC without controls	Administrative
Animal Disposal Pit (Coyote Canyon)	27	CAC without controls	Administrative
Mine Shafts	28-1, 28-3 through 28-10, 28-2	CAC without controls	Administrative
Unmanned Seismic Observatory	47	CAC without controls	Administrative
Bldg. 9820 Drains (Lurance Canyon)	49	CAC without controls	Administrative
Ballon Test Area	63A,B	CAC without controls	Administrative
Gun Site(Madera Canyon)	64	CAC without controls	Administrative
Lurance Canyon Explosive Site	65A throughE	CAC without controls	Administrative
Boxcar Site	66	CAC without controls	Administrative
Fustration Site	67	CAC without controls	Administrative
Operation Beaver Site	72	CAC without controls	Administrative
Scrap Yard	81A through F	CAC without controls	Administrative
Old Aerial Cable Site	82	CAC without controls	Administrative
Bldg. 9900 Firing Site	87	CAC with controls	Administrative/Physical
Madera Canyon Rocket Launcher pads	93, B, and C	CAC without controls	Administrative
Lurance Canyon Burn Site	94 A,C,D,E,G, 94 B, F, H	CAC without controls	Administrative
Bldg. 9990 Septic System	116	CAC without controls	Administrative
Bldg. 9832 Septic System	160	CAC without controls	Administrative
New Firing Range East of Optical Range	277	CAC without controls	Administrative
Live Fire Range East Septic System (Lurance Canyon)	1094	CAC without controls	Administrative

CAC = Corrective Action Complete
CTF = Coyote Test Field
ER = Environmental Restoration
IC = Institutional Control

9.2.1 Applicable Air Quality Permits

Four applicable air permits are in effect for facilities located in CTF-East, and a site-wide permit is applicable to all of SNL/NM (Table 9-3).

Table 9-3. CTF-East Air Quality Permits

Permit Type	Location	Permit/Registration Number	Issue Date	Expiration Date
Stationary Source Registrations				
Fire Laboratory (formerly SMERF) for the Fire Laboratory for Accreditation of Modeling by Experiment (FLAME)	Lurance Canyon Burn Site	196	5/19/1988	N/A
R&D - Combustion	9830 Igloo - Lurance Canyon Burn Site	3216	3/26/2015	N/A
Open Burn Permit				
Fuel Fire Tests	Burn Site	16-0022	4/1/2016	12/31/2016
Crude Oil Combustion Tests	Burn Site	16-0035	7/11/2016	7/10/2016

9.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

9.2.3 Radiological NESHAP Compliance

No radiological NESHAP facilities are located in CTF-East.

The DOE is required by radiological NESHAP regulations to continuously monitor any radionuclide air emission source that has the potential to produce a specified dose. Chapter 3 describes programs and oversight activities for radiological NESHAP compliance.

9.3 Ecological Resources

The ecological resources and setting within CTF-East are provided in this section.

9.3.1 Terrestrial Vegetation

The primary vegetation types that occur within CTF-East are described in this section.

Closed Canopy Woodland (NVCS Classification I.A.8.N.b.) is composed of evergreen trees with crowns that overlap to form a canopy, generally comprising a 60- to 100-percent cover, with low abundance of understory plants. Common plants within this NVCS include the following:

- Piñon pine (*Pinus edulis*)
- One-seed juniper (Juniperus monosperma)
- Cliff fendlerbush (*Fendlera rupicola*)
- Mountain mahogany (*Cercocarpus montanus*)

Open Canopy Woodland (NVCS Classification II.A.5.N.a) is composed of evergreen trees with crowns that do not usually touch, generally forming a 25- to 60-percent cover, with understory plants that range in abundance from low to moderate. Common plants within this NVCS include the following:

- One-seed juniper (Juniperus monosperma)
- Mountain mahogany (*Cercocarpus montanus*)
- Mormon tea (Ephedra trifurca)
- Little awn needlegrass (*Achnatherum lobatum*)

Shrub, Woodland, Grassland (NVCS Classification III.A.5.N.b.) habitat is composed of shrubs that are generally greater than 0.5 meters tall, with individuals or clumps that do not touch to those that do overlap; tree cover is generally less than 25 percent, and understory grasses range from moderate to high abundance. Common plants include:

- One-seed juniper (Juniperus monosperma)
- Four-wing saltbush (*Atriplex canescens*)
- Black grama grass (*Bouteloua eriopoda*)
- Blue grama grass (*Bouteloua gracilis*)

SNL/NM and KAFB woodlands provide necessary habitat to support many species of birds, reptiles, amphibians, and mammals that rely on good quality and relatively undisturbed habitats.

9.3.2 Terrestrial Wildlife

The large area included in CTF-East covers much of the northeastern portion of KAFB. The topography is primarily mountains and foothills. A wide diversity of wildlife species occur in this high-quality habitat. A large portion of the CTF-East area is considered to be some of the best gray vireo habitat available; this bird species is listed as "threatened" by the State of New Mexico (NMDGF 2016).

CTF-East common birds of prey include the following:

- Golden Eagle (Aquila chrysaetos)
- Cooper's Hawk (*Accipter cooperi*)
- American Kestrel (*Falco sparverius*)

Other bird species commonly found within CTF-East include the following:

- Gray Vireo (Vireo vicinior)
- Bewick's Wren (Thryomanes bewickii)
- Canyon Towhee (*Pipilo fuscus*)

Common CTF-East reptiles and amphibians include the following:

- Chihuahuan Spotted Whiptail Lizard (*Aspidoscelis exsanguis*)
- Collared Lizard (Crotaphytus collaris)
- Eastern Fence Lizard (*Sceloporus undulatus*)
- Western Diamondback Rattlesnake (*Crotalus atrox*)
- Great Plains Skink (*Eumeces obsoletus*)

Mammals common in CTF-East include the following:

- Gray Fox (Urocyon cinereoargenteus)
- Black Bear (Ursus americanus)
- Bobcat (Felis rufus)
- Black-Tailed Jackrabbit (*Lepus californicus*)
- Southern Plains Woodrat (*Neotoma micropus)*

9.3.3 Threatened and Endangered Species

As of August 2016, with the exception of the Gray Vireo (a New Mexico state listed as threatened species), there are no other known, officially listed federal or state listed threatened and endangered species within the CTF-East area.

9.3.4 Areas of Biological Conservation

Large tracts within CTF-East have been designated as either PCA andSCA (Figure 9-1). Several areas have been designated as an overlapping PCA/SCA in association with the state listed Gray Vireo.

9.4 Water Resources

The following sections detail the activities of water resource programs at CTF-East. Chapter 3 describes programs and oversight activities, including those for water resources.

9.4.1 Applicable Water Resource Permits

Currently, no wastewater permits are in effect within CTF-East. Table 9-4 shows water resource-related permits for CTF-East.

Table 9-4. CTF-East (and Vicinity)
Stormwater Discharge Permits, Stations, and Features

Permit Type	Permit Number/ Monitoring Station	Waste Stream Process
Stormwater		
CGP for each construction site	May be multiple numbers	Not applicable.
MSGP covers SNL industrial sites	NMR053122	Not applicable.

9.4.2 Effluent Monitoring

Sampling locations and activities for effluent monitoring programs applicable to CTF-East include the following:

- **Stormwater Program:** Six SWSPs are located within CTF-East (Figure 9-1) .
- **Wastewater Discharge Program:** No wastewater monitoring stations are located in CTF-East.

9.4.3 Groundwater Resources

Groundwater beneath CTF-East resides in a complex system of fault zones and fractured bedrock. Depth to groundwater is highly variable, depending on the location. The Burn Site Groundwater (BSG) Area of concern (AOC) is located in CTF-East.

Wells located in the vicinity of CTF-East are shown in Figure 9-1. The ASER/AGMR provides groundwater resources details, including information on the BSG AOC (SNL/NM 2016a).

9.5 Cultural Resources

Cultural resources are archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in CTF-East.

9.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

9.5.2 Archaeological Sites

Some cultural resource inventories on KAFB have included areas used by SNL/NM through land-use agreements with the USAF and the USFS. These areas have been completely surveyed, except for the southeastern portion of CTF-East (DOE 1999). Multiple archaeological sites have been identified.

9.5.3 Historic Buildings

Previous surveys and assessments in CTF-East have identified ineligible and eligible properties. Buildings and structures at the Burn Site were previously determined to be not eligible for the NRHP. Three buildings at the ACF (9831, 9832, and 9834) are all eligible (Figure 9-1) (SNL/NM 2010b).

9.6 Additional Environmental Permits

A RCRA permit is in place for addressing ER sites at SNL/NM, including those located in CTF-East (Table 9-5).

Table 9-5. Additional Environmental Permits for SNL/NM

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NMED

ER = Environmental Restoration
NMED = New Mexico Environment Department
SNL/NM = Sandia National Laboratories/New Mexico

9.7 Noise and Vibration

Activities within the CTF-East area do not produce noise or vibrations of significant levels (SNL/NM 2005).

9.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for CTF-East that are available for review.

9.8.1 Air Quality Data

No ambient air quality surveillance stations are located in CTF-East.

9.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

9.8.2.1 Environmental Restoration Analytical Data
Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each CTF-East ER site (available from ER Operations).

9.8.2.2 Terrestrial Soil Sampling Data
Soil and sediment samples and data from TLDs have been collected in the CTF-East area. Table 9-6 lists the sampling locations in CTF-East and sample type. Figure 9-1 shows the CTF-East terrestrial soil sampling locations.

Table 9-6. CTF-East Terrestrial Surveillance Locations

Sample Number	Sample Location	Sample Type (Analyte)			
		Soil	Sediment	Vegetation	Thermoluminescent Dosimeters
P-12	Northeast Perimeter	X			
P-19	USGS Seismic Center Gate	X			X
P-80	Madera Canyon	X			
S-34	Lurance Canyon Burn Site	X			
P-63	No Sweat Boulevard	X			
S-79	Arroyo del Coyote (upgradient)	X	X		
S-85	Arroyo del Coyote Cable Site		X		

CTF = Coyote Test Field
TP = Terrestrial Perimeter
TS = Terrestrial Sample
USGS = U.S. Geological Survey

9.8.3 Water Quality Data

The following sections provide general description of the activities of water resource programs at CTF-East. Chapter 3 describes programs and oversight activities, including those for water resources.

9.8.3.1 Stormwater Data
For stormwater data, visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

9.8.3.2 Groundwater Data

Analytical data have been available for monitoring events conducted since 1997. Details of groundwater sampling activities, schedules, methods, and analytical results are presented in the ASER/AGMR (SNL/NM 2016a).

9.8.4 Meteorological Data

Data from the SC1 Tower is used to describe meteorology at CTF.

9.8.5 Miscellaneous Sampling Data

No other environmental or terrestrial sampling projects have taken place at CTF-East.

9.9 Environmental Conditions and Restrictions

A number of environmental sensitivities, conditions, and restrictions are associated with CTF-East based on the evaluation of the information presented in this report for CTF-East. Table 9-7 summarizes the environmental conditions for CTF-East and the associated restrictions. Figure 9-1 shows the locations of environmental conditions associated with CTF-East.

Table 9-7. CTF-East Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Open Burn Permit:** Lurance Canyon Burn Site Wood Crib Carbon Fiber Epoxy Burn Test Igloo	Contact the SNL/NM Air Quality Compliance SME for further information.
	Air Quality Permits/Registrations: Fire Laboratory (Lurance Canyon Burn Site) Miscellaneous HAP Registration (not shown in Figure 9-1)	
Conservation Areas	**Conservation area status for CTF-East:** Use of areas as habitat by numerous species. PCA	The area must be surveyed by an SNL/NM biologist prior to outdoor activities. Contact the SME for further information.
Building Eligible for NRHP	**Buildings and structures determined eligible for NRHP:** 9831 9832 9834	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.

Table 9-7. CTF-East Environmental Conditions and Restrictions (Concluded)

Concern	Description	Restriction
Groundwater Contamination	Low levels of nitrate contamination are present in fractured bedrock material in the vicinity of Lurance Canyon Burn Site (not shown in Figure 11-1 due to complex nature).	No formal restrictions present. Contact the SNL/NM Groundwater SME for further information.
ER Sites	**Corrective Action Complete with Controls:** 87 Bldg. 9990 Firing Site	Soil cannot be removed from the footprint of the site.
Safety Zone	There are several ESQDs for facilities in CTF-East. The ESQD accounts for the types and severity of hazards for each explosive material present and the degree of protection for personnel and facilities adjacent to the explosive operations.	Contact explosives safety SME for any activities within the safety zone.

CTF = Coyote Test Field
ER = Environmental Restoration
ESQD = Explosive Safety Quantity-Distance
HAP = Hazardous Air Pollutant
NEPA = National Environmental Policy Act
NRHP = National Register of Historic Places
PCA = Primary Conservation Area
SHPO = State Historic Preservation Officer
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico

10. COYOTE TEST FIELD WEST

The CTF-West OA encompasses the west-central portion of KAFB, excluding the TAs. Portions of the Tijeras Arroyo and Arroyo del Coyote in CTF-West are located within the boundaries of the 500- and 100-year floodplains. Figure 10-1 identifies the locations of the associated environmental conditions for CTF-West, and the remainder of this section summarizes the information provided to establish the environmental conditions for CTF-West.

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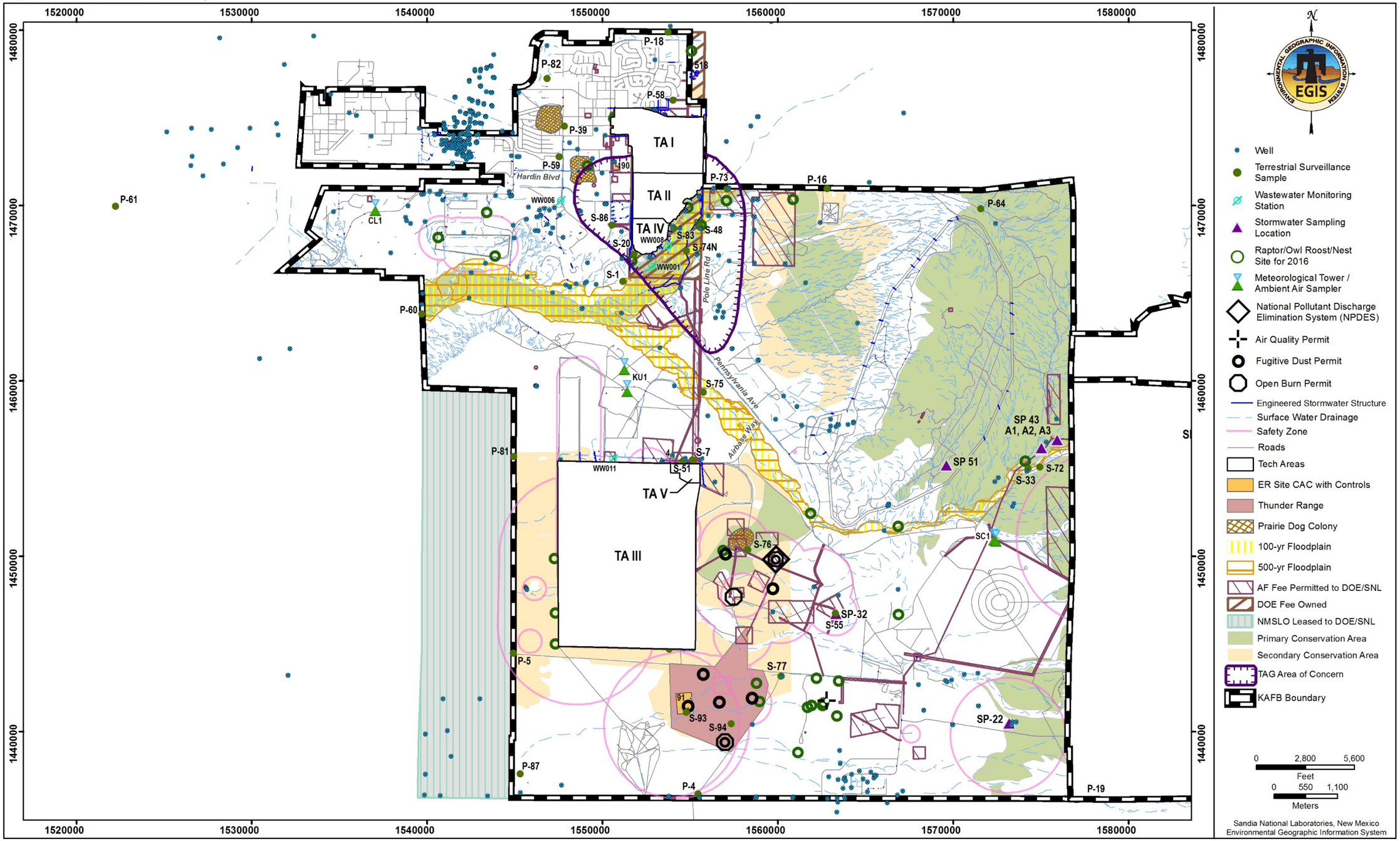

Figure 10-1. CTF-West Environmental Conditions

10.1 Land Management

This section provides information on various CTF-West land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

10.1.1 Applicable Land-Use Permits

Table 10-1 lists all applicable land-use permits and leases, and Figure 10-2 shows the permitted and leased areas within CTF-West (SNL/NM 2016m).

10.1.2 Ownership

The majority of the CTF-West area is federally owned by the USAF and is part of KAFB. Additional lands are leased to the DOE for SNL/NM use by the NMSLO (Figure 1-2).

Table 10-1. CTF-West Land-Use Permits and Leases

Reference Number	Description	Acreage
3	DOE fee owned	289[a]
10	Ingrant for Facility for Antenna and Radar Cross-Section Measurements and Access to Bldg. 9970	86.42
13	Bldg. 627	1.58
15	Parking Lot, Southeast Corner of Wyoming Boulevard and H Street	0.41
17A	Containment Technology Test Facility (East)	45.78
18	Ingrant for Explosives Devices Test Facility, 9930 Complex (Bldgs. 9930, 9931, 9932, 9933, 9934)	80.00
20	Ingrant for underground cable system	1.27
22	9960 Complex	5.81
23	Ingrant for DSVS Site, Formerly the Explosives Forming Area	10.62
24	Ingrant for Bldgs. 9920, 9921, 9922, 9923, 9924, 9926	37.28
25	Ingrant for Bldgs. 9940, 9941, 9942, 9943, 9944 access road right of way	12.33
26	Ingrant for STAR Facility Buildings 9950, 9951, 9952, 9953, 9954	23.00
27B	Ingrant for Bldg. 9925	7.67
28	Ingrant for "Thunder Range" Complex, Structures 9927, 9928, 9929, 9965, and 9966	522.56
29	Ingrant for underground electrical distribution and telephone alignment from Complex 9927 to Complex 9940	0.45
30	National Atomic Museum, Bldg. 20358 and surrounding grounds	5.96
35	Ingrant for 6000 Igloo Storage Area	316.00
38	Ingrant for TA-V security enhancements	6.20
40	Research Remote Facility Complex	764.90
41	Exterior Intrusion Detection and Assessment Test Field	74.70

Table 10-1. CTF-West Land-Use Permits and Leases (Concluded)

Reference Number	Description	Acreage
57/57A	14-inch Waterline to SNL/NM TA-III and TA-V and 44/46 kV Electric Powerline	147.99
58A	Roadway to Electron Beam Fusion Facility	1.03
59	Ingrant with New Mexico State Land Office	2,747.24
93	Ingrant for National Solar Thermal Test Facility	490.00
94	Ingrant for National Solar Thermal Test Facility utility easements	17.21
98	Ingrant for 10-inch water line to TA-III	12.79
102A	Technology Support Center Telephone Cable Duct Row	0.40
108	9th Street Storm Drains	4.30
109	Ingrant for Overhead Power Line to the 28,000 Igloo Area, KAFB	1.42
113	Sled Test Track	1334.62
115	Ingrant for Autonomous Land Vehicle Test Area (Robotic Vehicle Range)	225.85
121	Igloos and Storage Facilities within Manzano Weapons Storage Area	2,684.00
121C	28,000 Igloos Storage Area	0.25
124	G Avenue 115-kV Power Line Right-of-Way	4.05
140	Salvage/Reapplication Yard	1.60
162	Video Technology Laboratory	6.41
166	Fuel Oil Supply Line Between Tank Farm & Steam Plant	5.3
167	Hydrogeologic Characterization Wells Project	NA[b]
170	Large Melt Facility	30.60
225	Center for Integrated Nanotechnologies Utility Easement	3.3
228	Thunderstorm and Lightening Detection Sensor – TA-III	8.3
232	CTF Pressure Reduction System	0.48
230	TA-V Berm and Security Buffer	47
234	Tijeras Arroyo Groundwater and Soil Vapor Wells	97.54
242	CTF Water System	15.60

[a]*Represents the portion of Permit 3 shown in Figure 12-2; does not include TAs.*
[b]*Permit includes many small well pads, acreage not applicable.*
CTF = Coyote Test Field
DOE = U.S. Department of Energy
DSVS = Deployable Seismic Verification System
KAFB = Kirtland Air Force Base
kV = Kilovolt
NA = Not applicable
SNL/NM = Sandia National Laboratories/New Mexico
STAR = Shock Thermodynamics Applied Research
TA = Technical Area

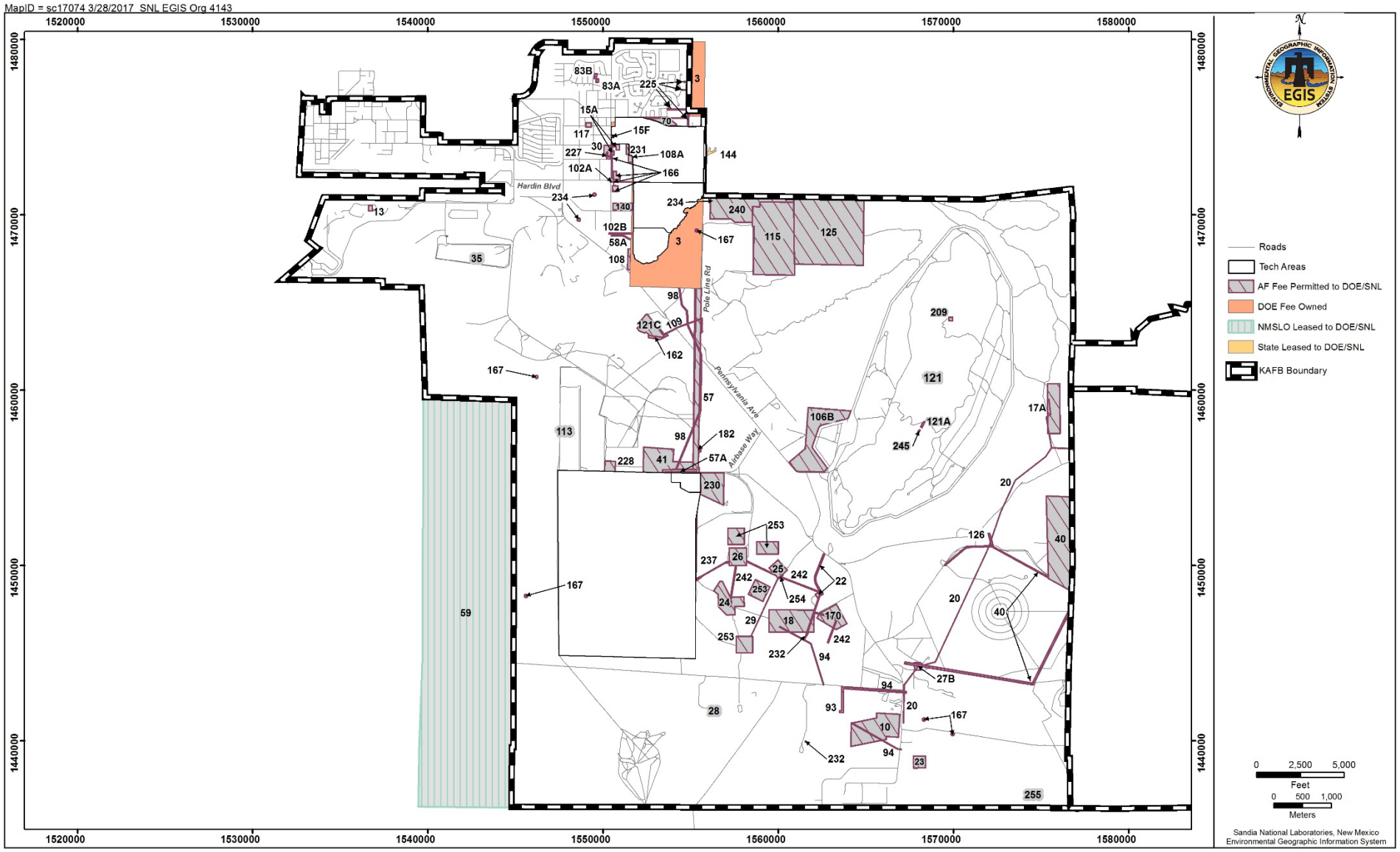

Figure 10-2. CTF-West Land-Use Permits and Leases

10.1.3 Facilities and Infrastructure Features

The DOE and SNL/NM facilities in CTF-West include those at Site 9940, Thunder Range, and the other facilities discussed. Figure 10-1 shows the identified facilities at CTF-West, and identifies various infrastructure features including roads, fences, gates, and buildings within CTF-West. A NEPA checklist identifies the current DOE-approved unpaved road maintenance area associated with CTF-West (SNL/NM 2016n).

10.1.4 Vegetative Control

Specific roads are designated for routine maintenance, and SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to work. Some areas are sprayed with a vegetation controller to prevent growth of unwanted vegetation and to minimize fire risk.

10.1.5 Environmental Restoration Sites and Institutional Controls

CTF-West contains 76 ER sites. Figure 10-2 shows the CTF-West ER sites that have the status CAC with Controls. Table 10-2 lists the CTF-West CAC status for each site and the ICs in place.

10.2 Air Quality Resources

Air quality permits, programs, and resources applicable to CTF-West are described in the following sections. Figure 10-1 shows the location of the CTF-West meteorological towers and ambient air monitoring stations. Chapter 3 describes programs and oversight activities, including those for radiological NESHAP compliance.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

10.2.1 Applicable Air Quality Permits

Numerous air quality permits are applicable for facilities in CTF-West, currently consisting of three open burn line permits, two site-specific air quality permits, and ten fugitive dust control and demolition line permits (Table 10-3).

Table 10-2. CTF-West ER Sites, CAC Status, and ICs

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
TNT	Not applicable	CAC without controls	Administrative
Gas Cylinder Disposal Pit	6 A	CAC without controls CAC without controls	Administrative Administrative
Open Dump (Coyote Canyon Blast Area)	8	Pending regulatory approval	Administrative
Burial/Open dump (Schoolhouse Mesa)	9	CAC without controls	Administrative
Burial Mounds (Bunker Area North of Pendulum Site)	10	CAC without controls	Administrative
Explosive Burial Mounds	11	CAC without controls	Administrative
Burial Site (Bldg. 9920)	14	CAC without controls	Administrative
Open Dumps (Arroyo del Coyote)	16	CAC without controls	Administrative
Scrap Yards/Open Dump (Thunder Range)	17 A B C D E F G H	CAC without controls	Administrative
School House Mesa Burn Site	20	CAC without controls	Administrative
Metal Scrap (Coyote Springs)	21	CAC without controls	Administrative
Storage/Burn (West of Direct Energy Experimental Range)	22	CAC without controls	Administrative
Disposal Trenches (near Tijeras Arroyo)	23	CAC without controls	Administrative
Oil Spills (Bldg. 9920)	38	CAC without controls	Administrative
Oil Spill - Solar Facility	39	CAC without controls	Administrative
Oil Spill (6000 Igloo Area)	40	CAC without controls	Administrative
Bldg. 9923 Storage Igloo	53	CAC without controls	Administrative
Pickax Site (Thunder Range)	54	CAC without controls	Administrative
Red Towers Site (Thunder Range)	55	CAC without controls	Administrative
Old Thunderwells (Thunder Range)	56 A B	CAC without controls	Administrative
Workman Site-Firing Site	57 A B	CAC without controls	Administrative
Coyote Canyon Blast Area	58	Pending regulatory approval	Administrative
Pendulum Site	59	CAC without controls	Administrative
Bunker Area	60	CAC without controls	Administrative
Schoolhouse Mesa Test Site	61 A B C	CAC without controls	Administrative

Table 10-2. CTF-West ER Sites, CAC Status, and ICs (Continued)

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
Greystone Manor Site (Coyote Springs)	62	CAC without controls	Administrative
Old Burn Site	68	Pending regulatory approval	Administrative
Old Borrow Pit	69	CAC without controls	Administrative
Explosives Test Pit (Water Towers)	70	CAC without controls	Administrative
Moonlight Shot Area	71	CAC without controls	Administrative
Burial Site (Bldg. 9920)	85 1-4	CAC without controls	Administrative
Firing Site (Bldg. 9927)	86	CAC without controls	Administrative
Firing Site	88 A B	CAC without controls	Administrative
Shock Tube Site (Thunder Range)	89 A B C	CAC without controls	Administrative
Beryllium Firing Site (Thunder Range)	90	CAC without controls	Administrative
Lead Firing Site (Thunder Range)	91	CAC with controls	Administrative/ Physical
Pressure Vessel Test Site (Coyote Canyon Blast Area)	92	CAC without controls	Administrative
Bldg. 9926/9926A Septic System and Seepage Pit	101	CAC without controls	Administrative
Radioactive Disposal Area	102	CAC without controls	Administrative
Scrap Yard (Bldg. 9939)	103	CAC without controls	Administrative
Firing Site (Bldg. 9940)	108	CAC without controls	Administrative
Firing Site (Bldg. 9950)	109	CAC without controls	Administrative
Explosive Contaminated Sump (Bldg. 9956)	112	CAC without controls	Administrative
Firing Site (Bldg. 9930)	115 A B C	CAC without controls	Administrative
Trenches (Bldg. 9939)	117	CAC without controls	Administrative
Bldg. 9964 Septic System	139	CAC without controls	Administrative
Bldg. 9965 Septic System (Thunder Range)	140 A B	CAC without controls	Administrative
Bldg. 9967 Septic System	141 A B	CAC without controls	Administrative
Bldg. 9970 Septic System	142	CAC without controls	Administrative
Bldg. 9972 Septic System	143	CAC without controls	Administrative
Bldg. 9980 Septic System	144 A B	CAC without controls	Administrative

Table 10-2. CTF-West ER Sites, CAC Status, and ICs (Continued)

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
Bldg. 9981/9982 Septic System	145 A B C	CAC without controls	Administrative
Bldg. 9920 Drain System (Coyote Test Field)	146-1	CAC without controls	Administrative
Bldg. 9925 Septic System (Coyote Test Field)	147 A B	CAC without controls	Administrative
Bldg. 9927 Drain System (Coyote Test Field)	148	CAC without controls	Administrative
Bldg. 9930 Septic System (Coyote Test Field)	149	Pending regulatory approval	Administrative
Buildings. 9939/9939A Septic System and Drain Field (Coyote Test Field)	150 A B	CAC without controls	Administrative
Bldg. 9940 Septic System	151-1 -2	CAC without controls	Administrative
Bldg. 9950 Drain System (Coyote Test Field)	152	CAC without controls	Administrative
Bldg. 9956 Drain System (Coyote Test Field)	153 A B	CAC without controls	Administrative
9960 Septic System and Seepage Pits (Coyote Test Field)	154 A B	Pending regulatory approval	Administrative
Steam Plant Tank Farm	190	CAC with controls	Administrative/Physical
Equus Red Site (Thunder Range)	191	CAC without controls	Administrative
Sabotage Test Area	193	CAC without controls	Administrative
General Purpose Heat Source Test Area	194	CAC without controls	Administrative
Storm Drain System Outfall	235	CAC without controls	Administrative
Bldg. 6969 Septic System (Robotic Vehicle Range)	1004	CAC without controls	Administrative
Mobile Office 242-245 Septic System (TA-III)	1024	CAC without controls	Administrative
Bldg. 6584 North Septic System (TA-III)	1029	CAC with controls	Administrative/Physical
Bldg. 9938 Seepage Pit (Coyote Test Field)	1095	CAC without controls	Administrative
Bldg. 6583 Septic System (TA-III)	1096	CAC without controls	Administrative
Bldg. 9978 Drywell (Coyote Test Field)	1114	CAC without controls	Administrative

Table 10-2. CTF-West ER Sites, CAC Status, and ICs (Concluded)

Site Name	Site Number/ Suffix	CAC Status	ICs in Place
Former Offices Septic System (National Solar Thermal Test Facility)	1115	CAC without controls	Administrative
Bldg. 9981A Seepage Pit (National Solar Thermal Test Facility)	1116	CAC without controls	Administrative
Bldg. 9982 Drywell (National Solar Thermal Test Facility)	1117	CAC without controls	Administrative

CAC = Corrective Action Complete
CTF = Coyote Test Field
ER = Environmental Restoration
IC = Institutional control
NSTTF = National Solar Thermal Test Facility
TA-III = Technical Area III

Table 10-3. CTF-West Air Quality Permits

Permit Type and/or Facility Name	Location	Permit/ Registration Number	Issue Date	Expiration Date
Stationary Source Registrations				
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A
Open Burn Permits				
Explosives Applications	Thunder Range	16-0008	1/1/2016	12/31/2016
Explosives Applications	DETS	16-0003	1/1/2016	12/31/2016
Explosives Applications	9920 Test Site	16-0001	1/1/2016	12/31/2016
Explosives Applications	9930 Test Site	16-0002	1/1/2016	12/31/2016
Explosives Applications	9939 Test Site	16-0009	1/1/2016	12/31/2016
High Heat Flux Tests	Solar Tower	16-0023	4/1/2016	12/31/2016
Fugitive Dust Control Permits				
Programmatic	Thunder Range - Range 1	P08-0062	06/18/2013	06/18/2018
Programmatic	Thunder Range 4	P09-0022	12/16/2014	12/16/2019
Programmatic	Thunder Range 5	P08-0063	06/19/2013	06/19/2018
Programmatic	Thunder Range 6	P08-0061	06/18/2013	06/18/2018
Programmatic	Thunder Range 7	P09-0021	12/16/2014	12/16/2019
Programmatic	DETS Complex	P09-0014	06/23/2014	06/23/2019
Programmatic	DETS - East	P09-0016	06/23/2014	06/23/2019
Programmatic	DETS - South	P10-0018	12/2/2010	12/02/2015
Construction	Thunder Range	6303-C	10/9/2013	10/9/2018
Construction	6000 Igloos	7324-C	05/21/2015	05/21/2016

10.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

10.2.3 Radiological NESHAP Compliance

No radiological NESHAP facilities are located in the CTF-West area.

The DOE is required by radiological NESHAP regulations to continuously monitor any radionuclide air emission source that has the potential to produce a specified dose. Chapter 3 describes programs and oversight activities for radiological NESHAP compliance.

10.3 Ecological Resources

The ecological resources and setting within CTF-West are provided in this section.

10.3.1 Terrestrial Vegetation

The primary types of vegetation that occur in CTF-West include the following:

- Dwarf Shrub Grassland (NVCS Classification IV.A.2.N.a) consists of low-growing (generally less than 0.5 meters tall) shrubs that comprise 25 percent or greater of the total vegetative cover.
- Large Shrub Grassland (NVCS Classification III.A.5.N.b.) areas are dominated by shrubs greater than 0.5 meters in height.
- Grasslands with Sparse Dwarf-Shrubs (NVCS Classification V.A.8.N.c.) primarily consist of grasses of moderate height with dwarf shrubs forming less than 25 percent cover.

The ASER and the Grassland Management Plan provide extensive information on terrestrial vegetation, including grassland habitat (SNL/NM 2016a, 2016f).

10.3.2 Terrestrial Wildlife

Wildlife communities within KAFB are typical of those found in wildlands of central New Mexico (Daniel B. Stephens and Associates Inc. 1996). Figure 3-7 shows terrestrial wildlife habitats within KAFB. The composition of these communities is dependent on the quality and quantity of available habitat that matches the needs of each wildlife species. The sizeable area of CTF-West covers most of the western part of KAFB and encompasses varied grassland habitats. A wide diversity of wildlife species occur in this area, which are typical of desert grassland animals in central New Mexico.

Birds of prey commonly occurring in CTF-West include the following:

- Red-tailed hawk (*Buteo jamaicensis*)
- Swainson's Hawk (*Buteo swainsoni*)
- American kestrel (*Falco sparverius*)

Other bird species commonly occurring in CTF-West include the following:

- Western Meadowlark (*Sturnella neglecta*)
- Horned Lark (Eremophila alpestris)
- Loggerhead Shrike (*Lanius ludovicianus*)

Common reptiles and amphibians found within CTF-West include the following:

- Little striped Whiptail (*Aspidoscelis inornata*)
- Eastern Side Blotched Lizard (*Uta stansburiana stejnegeri*)
- Prairie Rattlesnake (*Crotalus viridis*)
- Red-Spotted Toad (*Anaxyrus punctatus*)

Common mammals found within CTF-West include the following:

- Ord's Kangaroo Rat (*Dipodomys ordii*)
- Merriam's Kangaroo Rat (*Dipodomys merriami*)
- Gunnison's Prairie Dog (*Cynomys gunnisoni*)
- Coyote (Canis latrans)
- Black-Tailed Jackrabbit (*Lepus californicus*)

10.3.3 Threatened and Endangered Species

The Gray Vireo (*Vireo vicinior*) is a state of New Mexico listed as "Threatened" bird that breeds in the scattered Pinyon-Juniper grassland and woodland areas found in portions of the CTF-West OA. The Desert Massasauga (*Sistrurus cantenatos edwardii*) is under review by USFWS for listing under the ESA. No other Federal or state species are known to occur within the CTF-West area.

10.3.4 Areas of Biological Conservation

Several areas in CTF-West are designated as SCAs, PCAs, and overlapping PCA/SCAs (Figure 10-1). Besides the state of New Mexico listed Gray Vireo, several raptor roosts/nests and areas with prairie dog colonies are present. These areas are shown in Figure 10-1.

10.4 Water Resources

Water resources at SNL/NM are managed through several different monitoring and surveillance programs. Sandia complies with water quality regulations established by local, state, and federal agencies. EPA standards are implemented at the state and local level by the NMED and the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). There are 6 wastewater monitoring stations at SNL/NM that are permitted by the ABCWUA. Currently, EPA Region 6 implements stormwater regulations under the National Pollutant Discharge Elimination System (NPDES). Stormwater is the only discharge at SNL/NM regulated under the NPDES.

The Long-Term Stewardship Groundwater Monitoring Program (GMP) is responsible for tracking information on all groundwater monitoring wells and characterization boreholes. The primary purpose of the GMP Well Registry and Oversight Task is to ensure that all wells are properly constructed and maintained to protect groundwater resources. An ephemeral (short-lived) drainage, Tijeras Arroyo, is the primary drainage feature on KAFB. Arroyo del Coyote also provides for ephemeral drainage from the foothills. Several well-defined, unnamed arroyos and drainages are present to the south of Arroyo del Coyote but disappear as the topographic relief decreases to the west. An ephemeral (short-lived) drainage, Tijeras Arroyo, is the primary drainage feature on KAFB. Arroyo del Coyote also provides for ephemeral drainage from the foothills. Several well-defined, unnamed arroyos and drainages are present to the south of Arroyo del Coyote but disappear as the topographic relief decreases to the west.

10.4.1 Applicable Water Resource Permits

Table 10-4 shows water resource-related permits for CTF-West.

Table 10-4. CTF-West Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/Monitoring Station
Wastewater	
General Outfall	2069K/WW011
Categorical	Not Applicable
Stormwater	
CGP for each construction site	May be multiple numbers
MSGP covers SNL industrial sites	NMR053122

10.4.2 Effluent Monitoring

Sampling locations and activities for effluent monitoring programs applicable to CTF-West include the following:

- **Stormwater Program:** Four stormwater SWSPs are located in CTF-West (Figure 10-1).

- **Wastewater Discharge Program**: There is one wastewater general discharge permit for CTF-West.

10.4.3 Groundwater Resources

The depth to groundwater beneath CTF-West is approximately 500 ft bgs. Wells located in the vicinity of CTF-West are shown in Figure 10-1. The ASER/AGMR provides groundwater details (SNL/NM 2016a).

10.5 Cultural Resources

Cultural resources are archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in CTF-West.

SNL/NM personnel supported project-specific surveys in the Thunder Range area, including a 1991 survey in support of a road near Bldg. 9920 and the cultural resources investigation for the ER sites (SNL/NM 2008b). The most recent comprehensive archaeological surveys of the area were completed for the USAF by TRC Mariah Associates, Inc. in 1996 and AMEC Earth and Environmental Inc. and Lopez Garcia Group in 2001 (TRC 1997, AMEC 2002). Additionally, historic building surveys of the original Thunder Range test site and cluster of properties at the 9940 Complex were completed in 2005 and 2006, respectively. The area also was included in the SNL/NM site-wide historic building survey and assessment (SNL/NM 2010b).

10.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consulting with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

10.5.2 Archaeological Sites

Eleven archaeological sites have been identified within the Thunder Range area. These sites indicate that, until very recently in history, the human presence in the area consisted of individuals and groups traversing the relatively open space between the Rio Grande Valley and the Manzano Mountains foothills. There are indications of temporary campsites in the area that date from the Prehistoric Paleo-Indian period through the early Historic eras.

10.5.3 Historic Buildings

Two proposed historic districts are identified within CTF-West. The National Solar Thermal Test Facility Historic District includes four properties recommended as eligible. The Explosive Testing Historic District includes five buildings recommended as eligible with an additional twenty recommended as contributing elements (Table 10-5) (Figure 10-1) (SNL/NM 2010b).

Table 10-5. CTF-West Properties NRHP-Eligible or Recommended as Eligible

Building #	Name	Year	Eligible	Non-Eligible	Contributing Element
National Solar Thermal Test Facility Historic District, Sandia National Laboratories					
9980	Solar Power Tower	1978	X		X
9981	5MW Solar Control Building	1980	X		X
9982	5MW Solar Assembly Building	1978	X		X
9984	Engine Test Facility	1989	X		X
Explosive Testing Historic District, Sandia National Laboratories					
9920	Explosive Test Facility Complex	1959	X		X
9921A	Explosive Storage Igloo	1982		X	X
9921B	Explosive Storage Igloo	1982		X	X
9921C	Explosive Storage Igloo	1982		X	X
9921D	Explosive Storage Igloo	1982		X	X
9924	Storage	1984		X	X
9926	Explosive Research Lab	1968	X		X
9926M	Quonset Storage Building	1956		X	X
9926S	Storage Building	1956		X	X
9930	Explosive Test and Lab	1961	X		X
9931	Explosive Storage Bunker	1961		X	X
9932	Explosive Storage Bunker	1961		X	X
9933	Explosive Storage Bunker	1961		X	X
9933A	Storage Magazine	1961		X	X
9934	Explosive Storage Igloo	1962		X	X
9934A	Storage Magazine	1962		X	X
9937	Explosive Storage Bunker	1965		X	X
9938	Explosive Facility Test Cells	1974		X	X
9939	Laboratory/Explosive Control Building	1974		X	X
9940	Explosive Devices Test	1963	X		X
9958	Explosive Storage Igloo	1967		X	X
9959	Explosive Storage Igloo	1967		X	X
9960	Explosive Preparation	1965	X		X
9961	Storage Bunker	1981		X	X
9962	Explosive Storage Magazine	1981		X	X

CTF = Coyote Test Field
ft = Foot
TA-III =Technical Area III

10.6 Additional Environmental Permits

Table 10-6 lists additional environmental and/or regulatory permits that exist for SNL/NM and CTF-West.

Table 10-6. CTF-West Additional Environmental Permits

Permit Type and/or Facility Name	Location	Regulatory Agency
Hazardous Waste Facility Permit Module IV	All ER sites	NMED
RCRA Part A Permit Application for Hazardous and Mixed Waste Management Units	Manzano Storage Bunkers	NMED

CTF = Coyote Test Field
ER = Environmental Restoration
NMED = New Mexico Environment Department
RCRA = Resource Conservation and Recovery Act

10.7 Noise and Vibration

Activities within the CTF-West area do not produce noise or vibrations of significant levels (SNL/NM 2005).

10.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for CTF-West that are available for review.

10.8.1 Air Quality Data

For CTF-West, ambient air quality surveillance data are collected at the TA-III tower. Chapter 3 provides information on air quality data. Figure 10-1 shows air quality resources, including the meteorological tower and ambient air sampler station within CTF-West. Results for all air quality monitoring programs are provided in the ASER (SNL/NM 2016a).

10.8.2 Soil Sampling Data

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

10.8.2.1 Environmental Restoration Analytical Data

Confirmatory soil samples were collected by ER Operations personnel at ER sites during the process of site closure under the SNL/NM RCRA Permit. Further information is provided in the Proposal for CAC for each CTF-West ER site (available from ER Operations).

10.8.2.2 Terrestrial and Ecological Soil Sampling Data

Table 10-7 presents terrestrial soil sampling data that have been collected.

Table 10-7. CTF-West Terrestrial Radiological Surveillance Locations

Sample Number	Sample Identification	Sample Type			
		Soil	Sediment	Vegetation	TLD
S-1	Pennsylvania Ave.	X			X
S-3	Coyote Canyon Control	X			X
P-4	Isleta Reservation Gate	X			X
P-5	McCormick Gate	X			X
S-7	Unnamed Arroyo (north of TA-V)	X			X
P-12	Northeast Perimeter	X			
P-16	Four Hills	X			X
P-18	North Perimeter Road				X
S-20	TA-IV (SW) (KAFB Skeet Range)	X		X	X
S-33	Coyote Springs	X		X	
S-35	Chemical Waste Landfill	X			
P-39	Northwest DOE Complex				X
S-41	TA-V (northeast fence)	X			X
S-42	TA-V (east fence)	X			X
S-43	TA-V (southeast fence)	X		X	X
S-47	Tijeras Arroyo (east of TA-IV)				X
S-48	Tijeras Arroyo (east of TA-II)				X
S-51	TA-V (north of culvert)	X			
S-55	Large Melt Facility, Bldg. 9939	X		X	
P-58	North KAFB Housing	X			
P-59	Zia Park (southeast)	X			
P-64	North Manzano Base	X			
S-66	KAFB Facility	X			X
S-72	Arroyo del Coyote (midstream)		X		
P-73	Tijeras Arroyo (upgradient)		X		
S-74	TA-IV, Tijeras Arroyo (midstream)		X		
S-75	Arroyo del Coyote (downgradient)		X		
S-76	Thunder Range (north)	X			
S-77	Thunder Range (south)	X			
S-78	School House Mesa	X			
P-81	KAFB West Fence	X			X
S-82	Commissary	X			
S-83	Tijeras Arroyo Groundwater Well		X		
S-84	SWMP-10		X		
S-86	Corner of Wyoming and S Street	X			X

CTF = Coyote Test Field
DOE = U.S. Department of Energy
KAFB = Kirtland Air Force Base
SWSP = Stormwater Sampling Point
TA = Technical Area
TLD = Thermoluminescent Dosimeter
TP = Terrestrial Perimeter
TS = Terrestrial Sample

10.8.3 Water Quality Data

Water quality data that are available for the stormwater, wastewater, and groundwater programs are described in the following sections.

10.8.3.1 Stormwater Data
Visual, analytical, and environmental surveillance sampling are performed at intervals in keeping with the MSGP. A summary of stormwater monitoring data and analysis is included in the ASER (SNL/NM 2016a).

10.8.3.2 Wastewater Data
Wastewater effluent discharged from CTF-West must meet Permit 2069K requirements. All 2015 SNL/NM wastewater effluent discharges were within the NMED and ABCWUA established limits. All analytical results from sampling conducted in 2015 met ABCWUA discharge requirements.

10.8.3.3 Groundwater Data
Groundwater contamination was identified in 1992 in the regional groundwater system in the vicinity of TA-V. Details of groundwater sampling activities, schedules, methods, and analytical results are presented in the ASER/AGMR (SNL/NM 2016a).

Groundwater investigations conducted by SNL/NM ER Operations personnel identified TCE and nitrate as the COCs in the TA-V groundwater (TAVG) area of concern (AOC) (shown in Figure 10-1). The TAVG AOC extends into CTF-West. CTF-West groundwater monitoring wells are also shown in Figure 10-1. Monitoring of these wells is ongoing.

10.8.4 Meteorological Data

Data from the A36, CW1, KU1, SC1, or MW1 towers may be used to describe meteorology at CTF-West.

10.8.5 Miscellaneous Sampling Data

Annual soil sampling results are provided in the ASER (SNL/NM 2016a).

10.9 Environmental Conditions and Restrictions

A number of environmental conditions and restrictions are associated with CTF-West and its facilities. Figure 10-1 identifies the locations of the associated environmental conditions for CTF-West. Table 10-8 summarizes the environmental conditions and associated restrictions detailed in this report for CTF-West.

Table 10-8. CTF-West Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Open Burn Permits:** Thunder Range Site 9940 (DETS Complex) Bldg. 9920 Test Site	Contact SNL/NM Air Quality Compliance SME.
	Air Quality Permits/Registrations: National Solar Thermal Test Facility HAP Registration	Contact SNL/NM Air Quality Compliance SME.
	Fugitive Dust Permits: Thunder Range: Ranges 1, 2, 4, 5, 6, 7, and 8 DETS Complex/Bldg. 9940, West, and East	Contact SNL/NM Air Quality Compliance SME.
MOU Tijeras Arroyo Wildlife Corridor	All parties will coordinate efforts to ensure uniform and consistent land management and wildlife conservation practices.	Contact SNL/NM Biologist prior to any outdoor activities.
Conservation Areas	**Use of area as habitat by several species in the following designated areas:** PCA SCA	The area must be surveyed by SNL/NM Biologist prior to any outdoor activities.
Buildings Eligible for NRHP	**Buildings and structures determined eligible for NRHP:** 9980 9981 9982 9984 9920 9926 9960 9930 9940 S6740	Buildings determined by SFO to be NRHP-eligible are historic. Proposed renovation or demolition must be reviewed by the SNL Historian and possibly by the SFO NEPA Compliance Officer and NM SHPO via the NEPA process.

Table 10-8. CTF-West Environmental Conditions and Restrictions (Concluded)

Concern	Description	Restriction
Groundwater Areas of Concern	Low levels of TCE and nitrate in the perched groundwater system in the Tijeras Arroyo Area. Low levels of TCE and nitrate in the regional aquifer in the vicinity of TA-V.	No formal restrictions present. Contact SNL/NM Groundwater SME for further information.
ER Sites	**Corrective Action Complete with Controls:** TNT 54 190 1029	Soil cannot be removed from the footprint of the site.
Safety Zone	There are several ESQDs for facilities in CTF-West. The ESQD accounts for the types and severity of hazards each explosive material presents, and the degree of protection required for personnel, and facilities adjacent to the explosive operations.	Contact SNL/NM explosives safety SME for any activities within the safety zone.

CTF = Coyote Test Field
DETS = Dynamic Explosives Test Site
ER = Environmental Restoration
ESQD = Explosive Safety Quantity-Distance
HAP = Hazardous Air Pollutant
MOU = Memorandum of Understanding
NEPA = National Environmental Policy Act
NRHP = National Register of Historic Places
PCA = Primary Conservation Area
SCA = Secondary Conservation Area
SHPO = State Historic Preservation Officer
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico
TCE = Trichloroethene.
TNT = Trinitrotoluene

11. EUBANK CORRIDOR

The Eubank Corridor OA, located north of KAFB, is approximately 78 acres on the west side of Eubank Boulevard. Eubank Corridor is not within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 11-1 identifies the locations of the associated environmental conditions for Eubank Corridor, and the remainder of this section summarizes the information provided to establish the environmental conditions for Eubank Corridor.

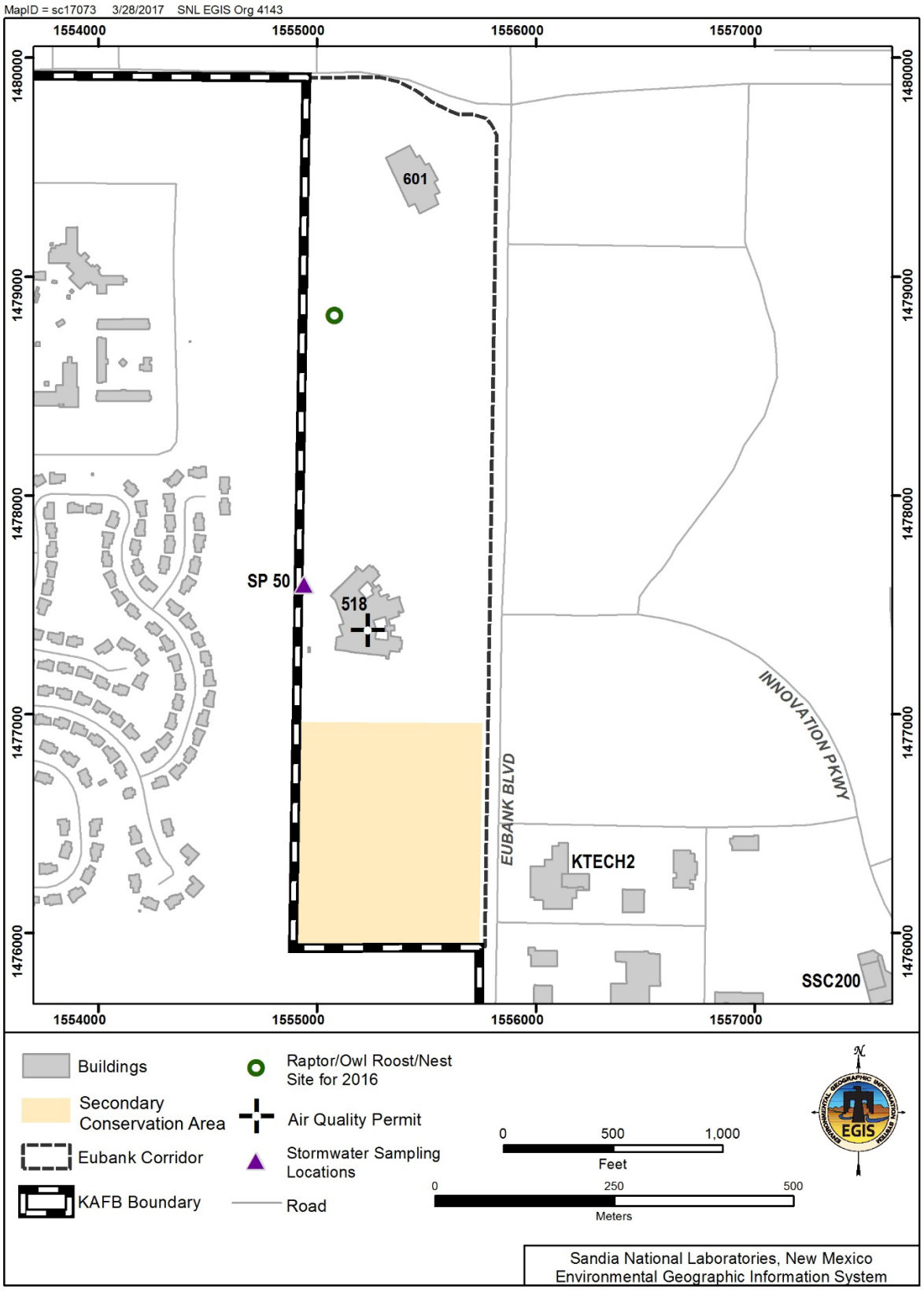

Figure 11-1. Eubank Corridor Environmental Conditions

11.1 Land Management

This section provides information on various Eubank Corridor land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

11.1.1 Applicable Land-Use Permits

There are no applicable land-use permits in Eubank Corridor (SNL/NM 2008b).

11.1.2 Ownership

Eubank Corridor is DOE-owned (also referred to as fee, fee-owned, and fee-title) property. The area is bordered on the west and south by KAFB. Land to the east and north is privately owned with various zoning types. Additional lands adjacent to KAFB are leased to the DOE for SNL/NM use by the NMSLO (Figure 1-2).

11.1.3 Facilities and Infrastructure Features

Facilities, infrastructure, and other buildings within the Eubank Corridor are shown in Figure 11-1.

11.1.4 Vegetative Control

Eubank Corridor is partially developed with some limited landscaping. Specific roads are designated for routine maintenance, and SNL/NM personnel are responsible for ensuring that NEPA coverage is in place prior to conducting work activities.

11.1.5 Environmental Restoration Sites and Institutional Controls

No ER sites are present within the Eubank Corridor, and no Eubank Corridor locations or facilities require ICs under the Compliance Order on Consent (NMED 2004).

11.2 Air Quality Resources

Air quality permits, programs, and resources applicable to Eubank Corridor are described in the following sections. Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016).

11.2.1 Applicable Air Quality Permits

One air quality permit is applicable for a facility in Eubank Corridor (Table 11-1).

Table 11-1. Eubank Corridor Air Quality Permits

Permit Type	Location	Permit Number	Issue Date	Expiration Date
Stationary Source Permits				
Emergency Generator, Boilers (2), Humidifiers (7)	CINT	1725-M1	4/12/2012	N/A
HAP/VOC	Site-Wide	1901-RV1	10/24/2011	N/A

11.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

11.2.3 Radiological NESHAP Compliance

No radiological NESHAP facilities are located in Eubank Corridor.

Chapter 3 describes programs and oversight activities for radiological NESHAP compliance.

11.3 Ecological Resources

The ecological resources and setting within the Eubank Corridor are provided in this section.

11.3.1 Terrestrial Vegetation

The Eubank Corridor vegetation classification (NVCS) has been deemed as urban/landscaped area (no NVCS code) and Grassland with Sparse Dwarf-Shrub Layer (NVCS Classification V.A.8.N.c.).

11.3.2 Terrestrial Wildlife

The composition of each wildlife community is determined by the quality and quantity of habitat available that matches the needs of each species.

Wildlife species occurring in the Eubank Corridor area are typical of desert grassland animals. Common species that have been observed in the Eubank Corridor are listed below (but this is not a comprehensive list):

- Bird species common in the Eubank Corridor area:
  - Western Kingbird (*Tyrannus verticalis*)
  - Mourning Dove (*Zenaida macroura*)
  - Say's Phoebe (*Sayornis saya*)

- Common Eubank Corridor reptiles:
  - Sonoran Gopher Snake (*Pituophis catenifer affinis*)
  - New Mexican Whiptail (*Aspidoscelis newmexicana*)

- Mammals common in Eubank Corridor:
  - Desert Cottontail (*Sylvilagus audubonii*)
  - Coyote (*Canis latrans*)

11.3.3 Threatened and Endangered Species

As of August 2016, there are no known federal or state listed threatened or endangered species occurring with the Eubank Corridor.

11.3.4 Areas of Biological Conservation

Over the past 15 years, the Prairie Dog colony has dwindled to the point of extirpation, along with the Burrowing Owls that utilized the Prairie Dog burrows. Currently (2016), only the southern portion of the Eubank Corridor is designated as an SCA (Figure 11-1). That designation is based on the good quality of remaining grassland in the area.

11.4 Water Resources

Stormwater drainage from Eubank Corridor is a combination of overland flow in the open fields and controlled drainage by retention/detention ponds and underground storm sewers. Runoff from parking lots is collected by storm sewers that discharge to the KAFB stormwater detention facility west of the site.

11.4.1 Applicable Water Resource Permits

One water resource-related permit applies to Eubank Corridor. A categorical sewer wastewater permit is in effect for the CINT. Currently no NPDES permits have been issued for facilities in Eubank Corridor. Table 11-2 shows water resource-related permits for Eubank Corridor.

Table 11-2. Eubank Corridor Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/ Monitoring Station	Waste Stream Process
Wastewater		
General Outfall	NA	NA
Categorical CINT	2238A	Laboratory industrial processes acid waste from CINT activities
Stormwater		
CINT - MSGP	NMR053122	NA

CINT = Center for Integrated Nanotechnologies
NA = Not applicable
NPDES = National Pollutant Discharge Elimination System

11.4.2 Effluent Monitoring

Stormwater Program: There is one stormwater sampling point (SWSP) located within the Eubank Corridor at CINT. Only visual assessments are performed at this SWSP.

Wastewater Discharge Program: No wastewater monitoring stations are located in the Eubank Corridor.

11.4.3 Groundwater Resources

The depth to groundwater beneath Eubank Corridor is approximately 500 ft bgs. There are no wells located in the vicinity of Eubank Corridor. The ASER/AGMR provides groundwater resources details (SNL/NM 2016a).

11.5 Cultural Resources

Cultural resources include archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources in the Eubank Corridor.

11.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

11.5.2 Archaeological Sites

The Eubank Corridor area was surveyed for surface cultural resources as part of a larger survey conducted in 1990 (Gerow 1990). No cultural resources were recorded, and subsurface resources were not anticipated (Gerow 1990).

11.5.3 Historic Buildings

Currently, no buildings or structures in Eubank Corridor are eligible for the NRHP (SNL/NM 2010b).

11.6 Additional Environmental Permits

No additional environmental permits were identified during the research supporting this report.

11.7 Noise and Vibration

Activities within the Eubank Corridor do not produce noise or vibrations of significant levels (SNL/NM 2005).

11.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for the Eubank Corridor that are available for review.

11.8.1 Air Quality Data

No air quality data have been collected for the Eubank Corridor.

11.8.2 Soil Sampling Data

No soil data have been collected for the Eubank Corridor.

Soil sampling is managed through several programs, including ER Operations, Terrestrial Surveillance, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that utilize soil sampling. Further information, including soil sampling locations, and the most recent soil sampling results for the SNL/NM site, is available in the ASER (SNL/NM 2016a).

11.8.3 Water Quality Data

No water quality data are available for the stormwater, surface discharge, wastewater, and groundwater programs for the Eubank Corridor, as no water samples have been collected.

11.8.4 Meteorological Data

No specific climate data have been collected for the Eubank Corridor.

11.8.5 Miscellaneous Sampling Data

No other environmental or terrestrial sampling projects have taken place within the Eubank Corridor.

11.9 Environmental Conditions and Restrictions

As discussed in this report for Eubank Corridor, neither cultural resources nor groundwater contamination have been identified for this area. The southern portion of the Eubank Corridor, however, is designated as an /SCA. Table 11-3 summarizes the environmental conditions and associated restrictions, and Figure 11-1 shows associated environmental conditions for the Eubank Corridor.

Table 11-3. Eubank Corridor Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Wastewater Permit:** Categorical at CINT (not shown in Figure 11-1)	Contact SNL/NM Water Resources SME
	Air Quality Permits/Registrations: Emergency generator at CINT	Contact SNL/NM Air Quality Compliance SME
Conservation Area	**Conservation area status for Eubank Corridor:** Use of area as habitat by several species. SCA	The area must be surveyed by SNL/NM biologist prior to any outdoor activities. Contact SME

CINT = Center for Integrated Nanotechnologies
SCA = Secondary Conservation Area
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico

12. OFF-SITE FACILITIES

The Off-Site Facilities are located outside the KAFB boundary. Of the six facilities evaluated, four are adjacent to TA-I on the east, one is west of CTF-West, and one is approximately 3 miles northwest of SNL/NM. None of the Off-Site Facilities are within the boundaries of either the 500- or 100-year floodplains that have been identified for Tijeras Arroyo or Arroyo del Coyote. Figure 12-1 identifies the locations of the associated environmental conditions for Off-Site Facilities, and the remainder of this section summarizes the information provided to establish the environmental conditions for Off-Site Facilities.

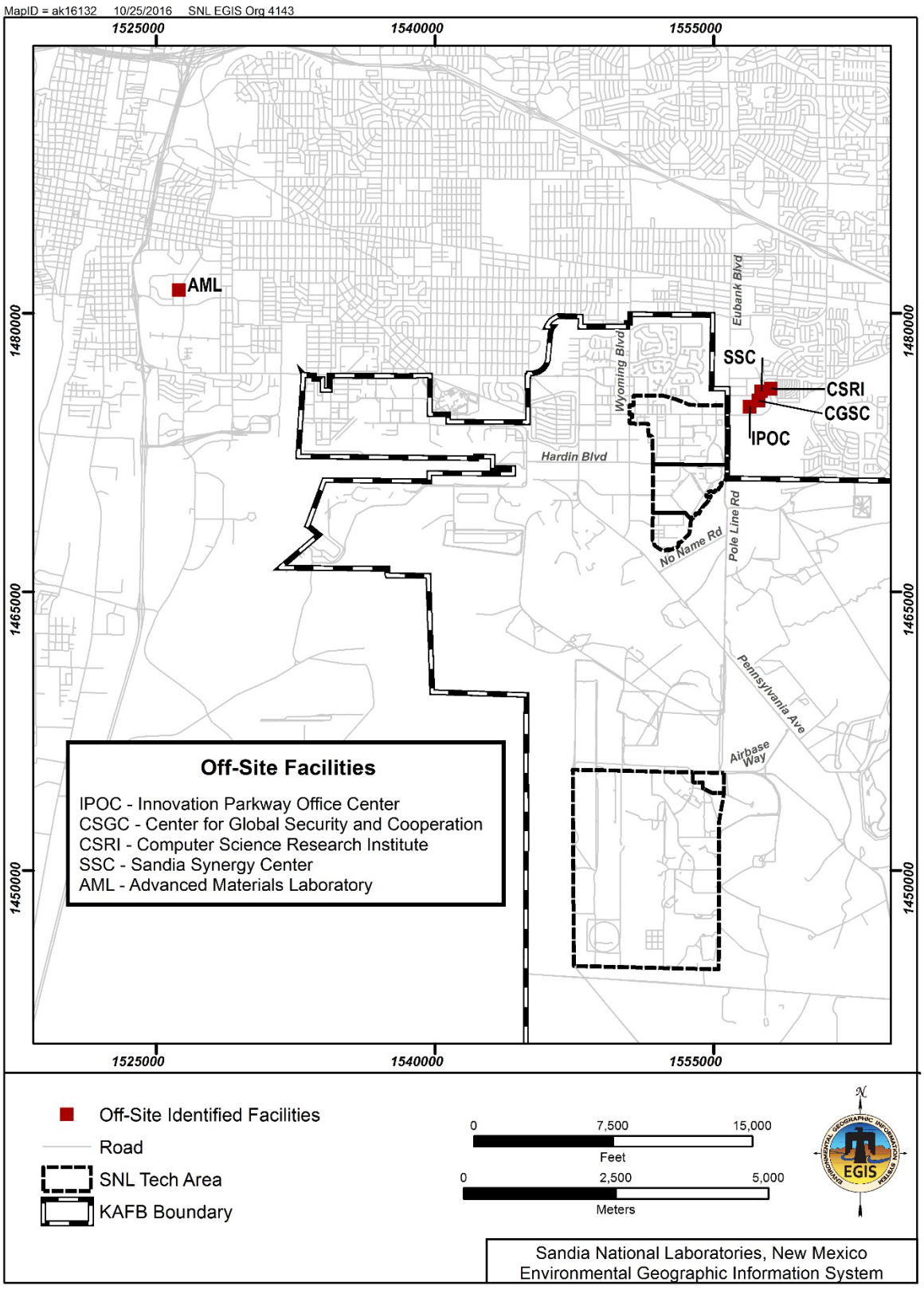

Figure 12-1. Off-Site Identified Facilities

12.1 Land Management

This section provides information on various Off-Site Facilities land management elements. Complex land ownership and land-use agreements define jurisdictions and areas used by SNL/NM. SNL/NM activities are conducted for DOE and other DOE-approved entities. These ownership and agreement designations provide a framework for summarizing SNL/NM land use and land-use planning within both historical and current contexts.

The SNL/NM Off-Site Facilities are located within the COA and are subject to the local zoning and planning codes of the COA. Compliance with local zoning and planning codes is the responsibility of the Lessor. The locations of the leased Off-Site Facilities are shown in Figure 14-1.

The CSRI, IPOC, IPB, and SSC are located in the Sandia Science and Technology Park, an office complex of more than 200 acres located adjacent to KAFB. The Sandia Science and Technology Park is zoned as an Industrial Park. Development surrounding the SNL/NM leased properties is predominately office and commercial, although to the east there are residential properties immediately adjacent to the Park.

The AML facility is zoned as Special Use-1 (SU-1). SU-1 is a COA zone designation that is applied to a specific site. The AML is surrounded by office buildings affiliated with UNM. The zoning designation for the FCC/AANC is SU-1, Airport and Related Facilities. The AANC is surrounded by Albuquerque International Sunport property and vacant land.

Future land use for the properties on which the leased Off-Site Facilities are located is the responsibility of the Lessors.

12.1.1 Applicable Land-Use Permits

The Off-Site Facilities are not on DOE-leased lands; therefore, no land-use permits are applicable for the facilities (SNL/NM 2016m).

12.1.2 Ownership

Facility ownership and the length of each lease for the Off-Site Facilities are provided in Table 12-1.

Table 12-1. Off-Site Facility Ownership and Lease Information

Off-Site Facility	Owner	Lease
AML	UNM	One-year lease with 4 one-year options to renew
CSRI	Privately owned (Avalon Investments, Inc.)	One-year lease with 6 one-year options to renew
IPOC	Privately owned (DePonte Investments, Inc.)	One-year lease with 19 one-year options to renew
IPB	Privately owned (ASR/Sandia 1 LLC)	Ten-year lease with 2 five-year options to renew
SSC	Privately owned (Union Development Corporation)	One-year lease with 6 one-year options to renew

Source: Infrastructure Operations Procurement Department

AML = Advanced Materials Laboratory
COA = City of Albuquerque
CSRI = Computer Science Research Institute
IPB = International Programs Building
IPOC = Innovation Parkway Office Center
SSC = Sandia Synergy Center
UNM = University of New Mexico

12.1.3 Facilities and Infrastructure Features

The AML is located on property owned by UNM and consists of approximately 27,500 ft^2 of leased space, of which 13,000 ft^2 comprises laboratory space .

The other four facilities are located in the Sandia Science and Technology Park outside of KAFB, on the east side of Eubank Boulevard, and include the following:

- The CSRI, a 34,500-ft^2, two-story office building
- The IPOC, a 150,000-ft^2, three-story office building
- The IPB, a 65,000-ft^2, three-story office building
- The SSC, a set of two 7,000-ft^2 (total), office suites (SSC 200 and 300)

12.1.4 Vegetative Control

All of the Off-Site Facilities are located on developed property, with planned landscaping and paved parking areas. Landscape and vegetation management are the responsibility of the Lessors and are defined in the respective lease agreements for the Off-Site Facilities.

12.1.5 Environmental Restoration Sites and Institutional Control

There are no ER sites on or in proximity to any of the identified Off-Site Facilities.

12.2 Air Quality Resources

Air quality permits, programs, and resources applicable to Off-Site Facilities are described in the following sections.

Climatology and meteorology have been described in detail in the 2010 OAEE (SNL/NM 2011a) and the ASER (SNL/NM 2016a).

12.2.1 Applicable Air Quality Permits

The AML is the only Off-Site Facility required to obtain an air quality permit or registration. The permit applies to general chemical exhaust from fume hoods (SNL/NM 2010a). Table 12-2 lists the applicable air quality permit for the AML. There are no air quality permits for the AANC, CSRI, IPB, IPOC, or SSC facilities.

Table 12-2. Off-Site Facilities Air Quality Permits

Permit Type and/or Facility Name	Location	Permit Number	Regulatory Agency
Air Quality Stationary Source Registration –HAP/VOC Registration (for AML)	Site-Wide	1906-RV1	COA

AML = Advanced Materials Laboratory
COA = City of Albuquerque
HAP = Hazardous Air Pollutant
VOC = Volatile Organic Compound

12.2.2 Air Quality Compliance Program

Chapter 3 describes the SNL/NM Air Quality Compliance Program.

12.2.3 Radiological NESHAP Compliance

None of the Off-Site Facilities are radiological NESHAP facilities. Chapter 3 describes programs and oversight activities for radiological NESHAP compliance.

12.3 Ecological Resources

The Off-Site Facilities are on privately owned lands.

12.3.1 Terrestrial Vegetation

The Off-Site Facilities are located on developed property with planned landscaping and parking. Because the Off-Site Facilities are privately owned; the vegetation is not classified by the SNL/NM Ecology Progam. Vegetation cover type classifications are not available for these facilities.

12.3.2 Terrestrial Wildlife

A biological assessment was completed prior to construction of the leased office space in the Sandia Science and Technology Park (IPOC, IPB, SSC, and CSRI). Recommendations and requirements were limited to construction activities at the site (Cox 2005a and 2005b).

12.3.3 Threatened and Endangered Species

There are no known federal or state listed threatened and endangered species occurring within the Off-Site Facilities.

12.3.4 Areas of Biological Conservation

A conservation area is a tract of land that has been given protected status in order to ensure that natural features, cultural heritage, or biota are safeguarded. Designation of natural land areas as conservation areas for biota is most common when unintended impacts from nearby activities may deteriorate land areas that were once able to support species that are in decline. The conservation area designation provides a management planning tool for SNL/NM personnel to more efficiently remain in compliance with federal and state laws and regulations.

The Off-Site Facilities are located on non-DOE land and have not been evaluated for consideration as SNL/NM conservation areas.

12.4 Water Resources

Water resources at SNL/NM are monitored and surveyed through SNL/NM programs that address stormwater monitoring, surface and wastewater discharges, and groundwater protection. Some of these programs maintain permits. The following sections detail the activities of these programs in the Eubank Corridor.

12.4.1 Applicable Water Resource Permits

The two main types of water-related permits that apply to SNL/NM consist of wastewater and stormwater. Wastewater permits are issued for industrial discharges. Wastewater stations are further divided into four general outfalls and two categorical stations located within buildings. Stormwater discharges have the potential for coverage under three NPDES permits; Construction General Permit (CGP), Multi-Sector General Permit (MSGP) and/or Municipal Separate Storm Sewer System (MS4) Permit. For more information about stormwater permit requirements, please refer to Corporate Procedure: ESH100.2.ENV.10, Manage Surface and Stormwater Discharges (major revision will occur by the end of 2015).

One applicable water resource-related permit applies to Eubank Corridor. A categorical sewer wastewater permit is in effect for the Center for Integrated Nano Technology (CINT). Currently no NPDES permits have been issued for facilities in Eubank Corridor. Table 12-3 shows major water resource-related permits for Eubank Corridor.

Table 12-3. Off-Site Facilities Wastewater Discharge and Stormwater Permits, Stations, and Features

Permit Type	Permit Number/ Monitoring Station	Waste Stream Process
Wastewater		
General Outfall	NA	NA
Categorical Semiconductor Manufacturing, Category 469 and Metal Finishing, Category 433 Bldg. 518 (also referred to as the CINT facility)	2238A (CINT)	Laboratory industrial processes acid wastewater from CINT activities

12.4.2 Effluent Monitoring

- **Stormwater Program:** There are no stormwater sampling points for the Off-Site Facilities.

- **Surface Discharge Program:** The Off-Site Facilities are located within leased land areas that are non-DOE-owned or –permitted property and are not included in the SNL/NM Surface Discharge Program.

- **Wastewater Discharge Program:** If discharges do not meet the surface water quality standards, alternative disposal methods are found.

12.4.3 Groundwater Resources

The depth to the water table in the Albuquerque basin is variable, ranging from approximately 1 ft bgs near the river to about 1,200 ft bgs in other parts of the basin (U.S. Geological Survey 2010). The depth to groundwater at the Off-Site Facility locations ranges between 150 and 500 ft bgs (Bartolino and Cole 2002). No SNL/NM groundwater monitoring wells are located in the vicinity of any of the Off-Site Facility locations.

12.5 Cultural Resources

Cultural resources include archaeological, traditional, and built environmental resources, including districts, sites, buildings, structures, or objects from both the prehistoric and historic eras of human history. The following sections describe cultural resources at Off-Site Facilities, if applicable.

12.5.1 Applicable Cultural Permits

There is no mechanism for the issuance of cultural resource permits for use by SNL/NM personnel. Clearance for activities or construction on a site is obtained by consultation with the SNL/NM Historian and through the completion of a NEPA checklist. For properties not

previously determined to be NRHP eligible or ineligible and for those previously determined to be historic, SFO may undertake additional consultation with the NM SHPO.

12.5.2 Archaeological Sites

The area that was developed into the Sandia Science and Technology Park (currently housing the CSRI, IPOC, IPB, and SSC facilities) was surveyed for surface cultural resources as part of a larger survey conducted in 1990 (Gerow 1990). No cultural resources were recorded, and subsurface resources are not anticipated (Gerow 1990).

12.5.3 Historic Buildings

Because the Off-Site Facilities are privately owned leased properties, none of the Off-Site Facility locations were surveyed for NRHP eligibility (SNL/NM 2010b).

12.6 Additional Environmental Permits

No other additional environmental permits were located that pertain to the Off-Site Facilities during the completion of this report.

12.7 Noise and Vibration

The Off-Site Facilities have not been evaluated for noise and vibration.

12.8 Available Analytical Data

SNL/NM programs collect data from air quality stations, environmental media (soil, sediment from natural drainages, surface water, and groundwater), MET towers, and miscellaneous environmental monitoring. The following sections discuss analytical data for Off-Site Facilities that may be available for review.

12.8.1 Air Quality Data

Based on review of SNL/NM program databases, no air quality data have been collected for the AANC, CSRI, IPC, IPOC, or SSC. Air quality data are reported for the AML as determined by the air quality permit. The results for all air quality monitoring programs are compiled in the ASER (SNL/NM 2016).

12.8.2 Soil Sampling Data

Based on review of SNL/NM program databases, no specific soil sampling data have been collected for the Off-Site Facility locations.

Soil sampling is managed through several programs, including ER Operations, Terrestrial, and miscellaneous nonroutine projects. Chapter 3 provides general information on programs that

utilize soil sampling. Further information, including the most recent sampling results, are available in the ASER (SNL/NM 2016a).

12.8.3 Water Quality Data

Based on review of SNL/NM program databases, no groundwater data have been collected for the Off-Site Facility locations. In addition, no groundwater contamination has been identified at the Off-Site Facility locations.

12.8.4 Meteorological Data

Based on the mission objective for the specific off-site facility, a review of available local resources can be conducted to identify pertinent meteorological data.

12.8.5 Miscellaneous Sampling Data

Based on review of SNLam datab/NM prograses, no other environmental or terrestrial sampling data have been collected for the Off-Site Facility locations.

12.9 Environmental Conditions and Restrictions

Based on the information presented in this report for the Off-Site Facilities, this section summarizes the environmental sensitivities, conditions, and restrictions associated with the Off-Site Facilities. Table 12-4 summarizes the environmental conditions and restrictions associated with the Off-Site Facilities identified in this OAEE.

Table 12-4. Off-Site Facilities Environmental Conditions and Restrictions

Concern	Description	Restriction
Existing Permits	**Air Quality Permits/Registrations:** AML HAP Registration (not shown in Figure 12-1)	Contact SNL/NM Air Quality Compliance SME for further information.

AML = Advanced Materials Laboratory
HAP = Hazardous Air Pollutant
SME = Subject Matter Expert
SNL/NM = Sandia National Laboratories/New Mexico

13. APPENDIX
ADDITIONAL STORMWATER RESOURCE INFORMATION - MS4 AREA MAPS

The following figures are excerpts from the Middle Rio Grande Watershed-Based Municipal Separate Storm Sewer System (MS4) permit document, and show the MS4 permit areas with respect to surface drainages. The northern MS4 permit area corresponds roughly to TA-I, TA-II, and TA-IV, combined (Figures 13-1 through 13-6). The southern MS4 permit area corresponds to the TA-V OA and a portion of the northeast corner of TA-III (Figures 13-1, 13-2, 13-7, 13-8).

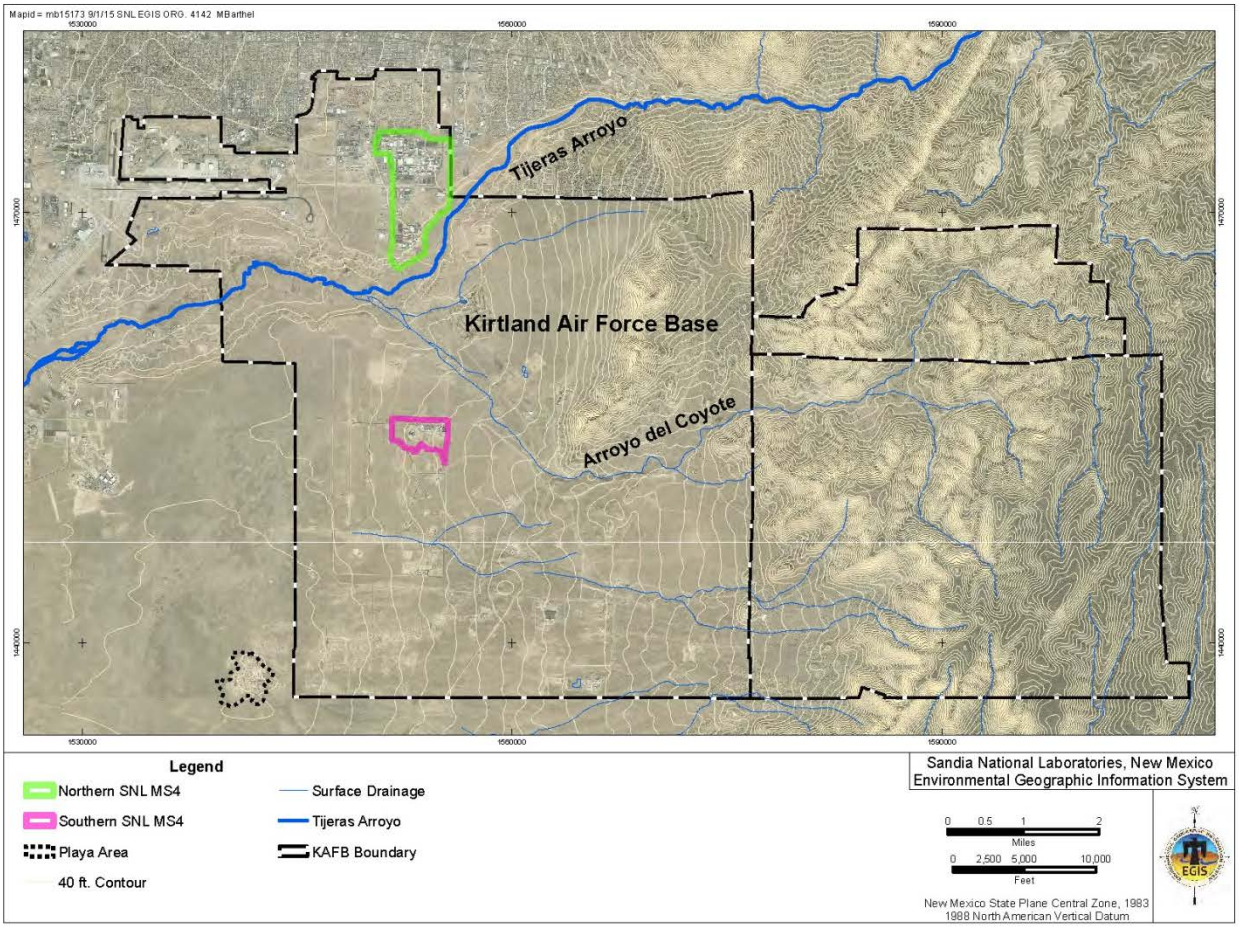

Figure 13-1. SNL MS4 Areas

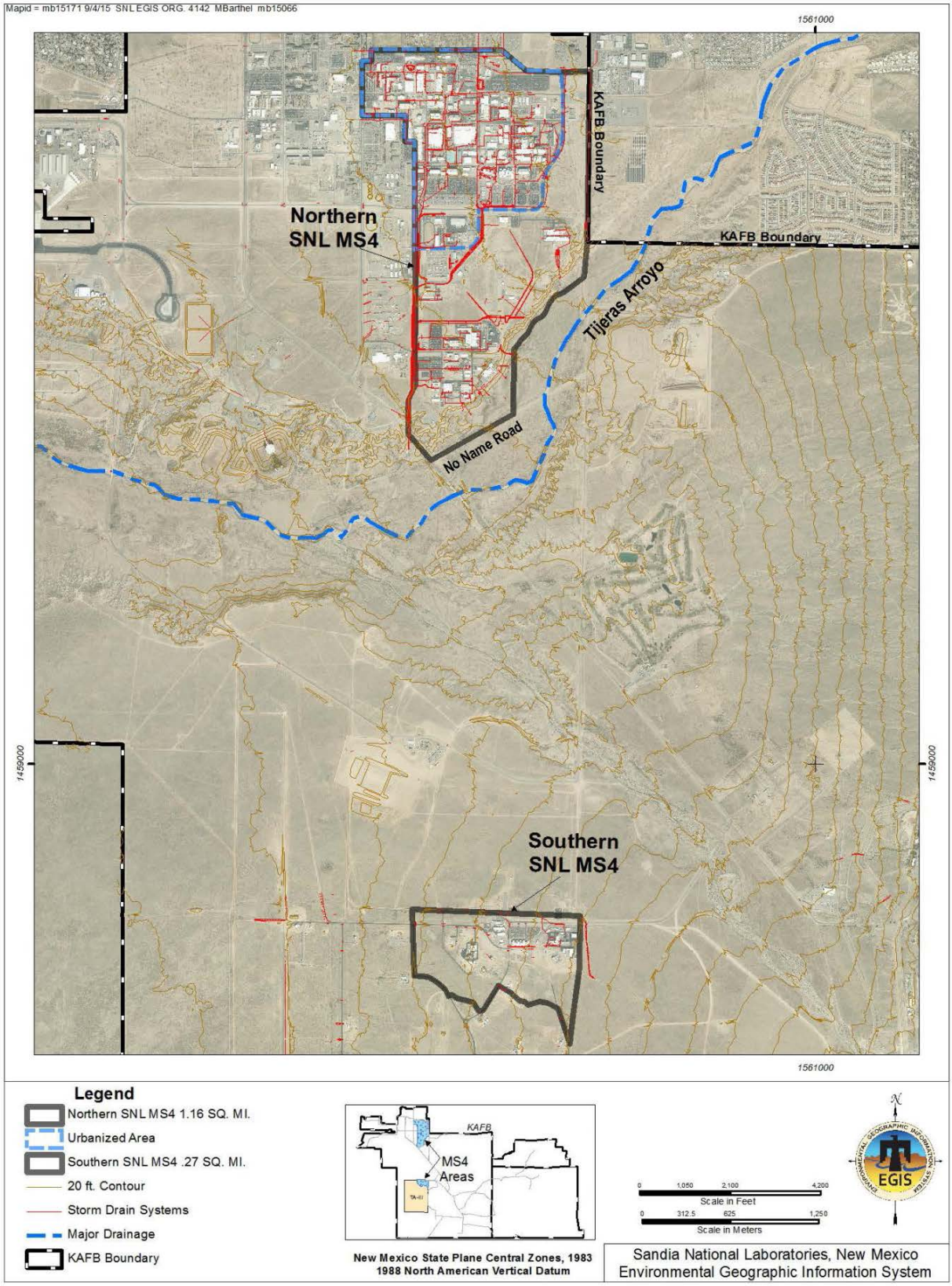

Figure 13-2. Northern SNL MS4 and Southern SNL MS4

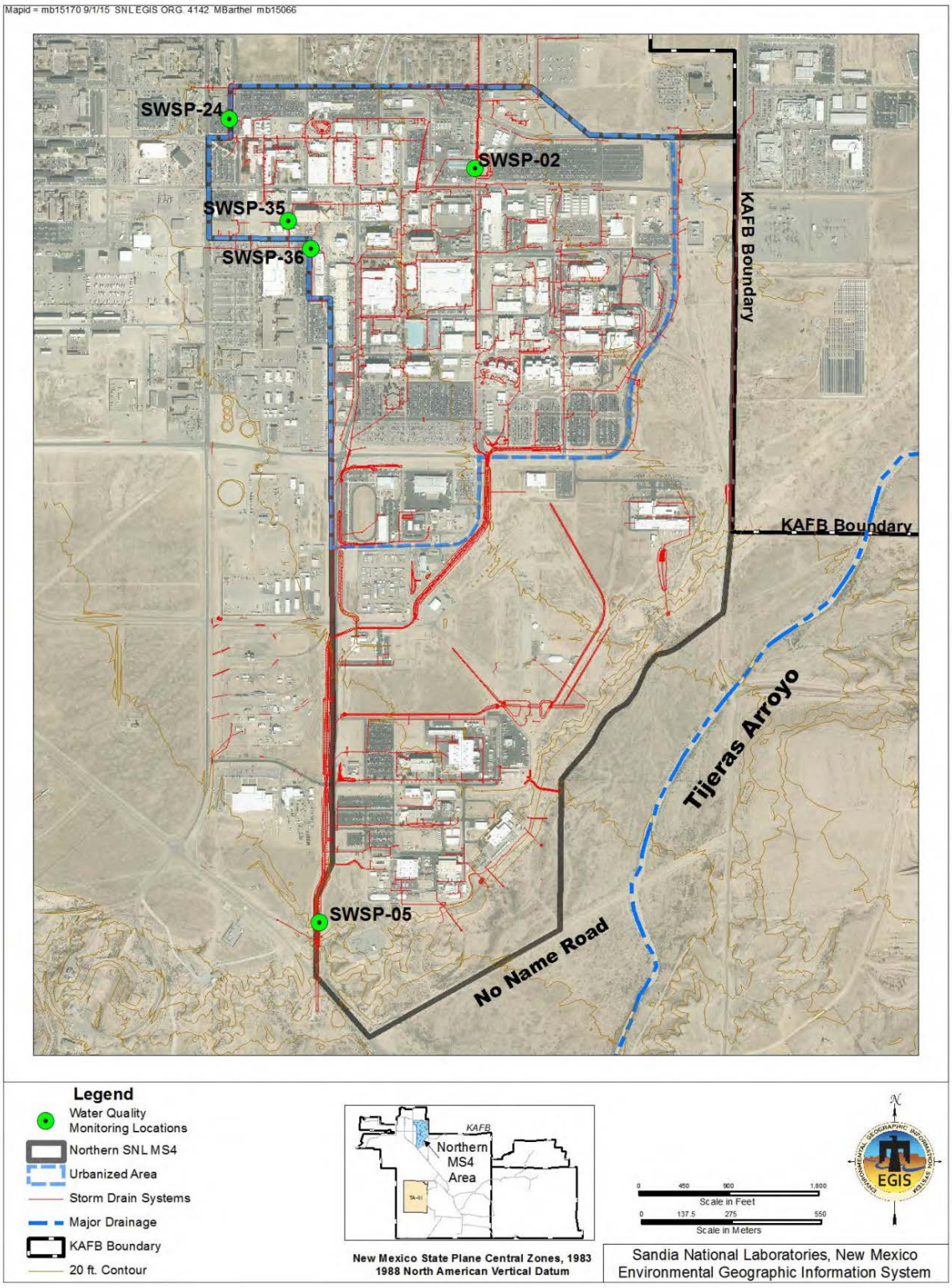

Figure 13-3. Northern SNL MS4

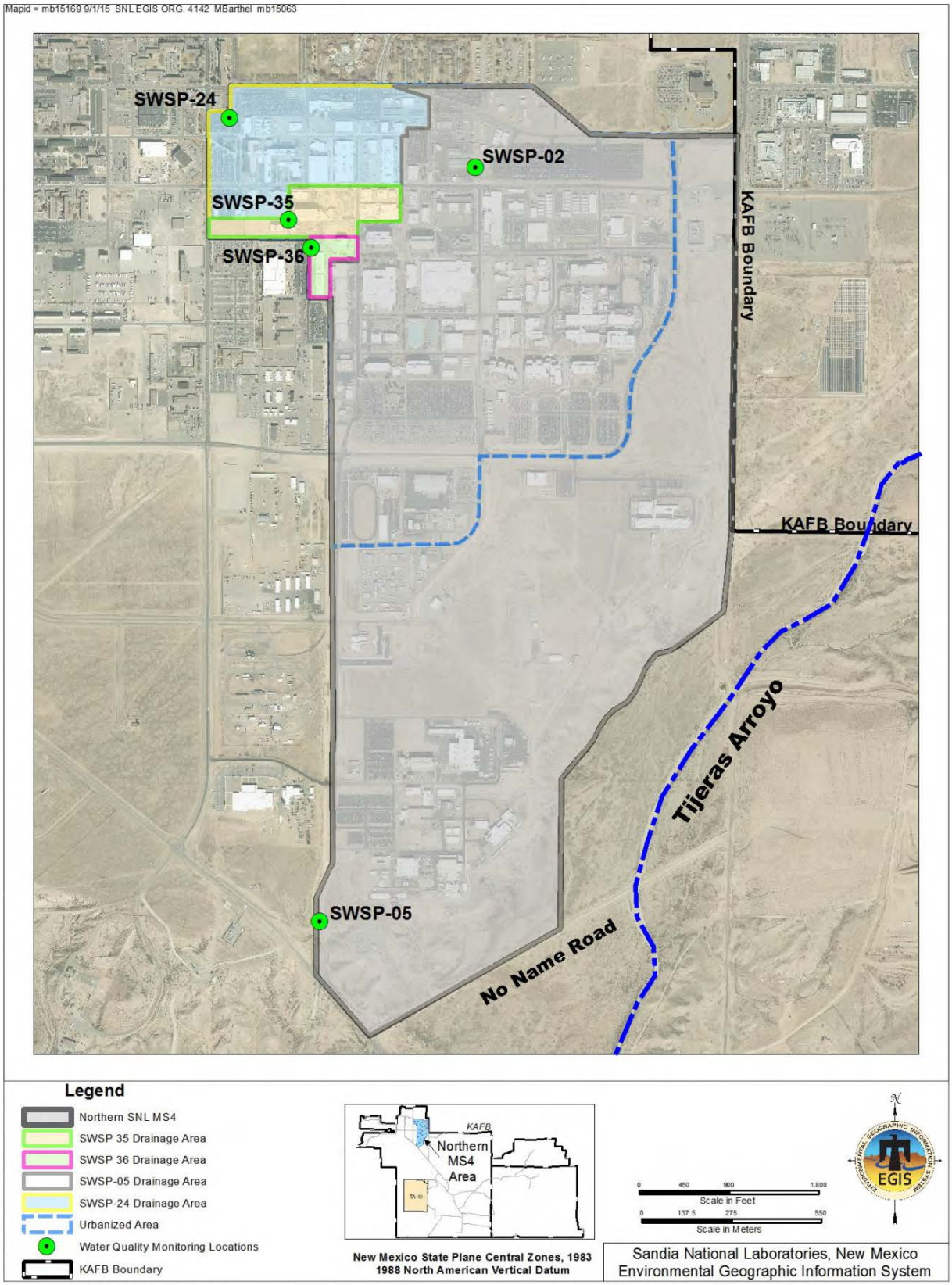

Figure 13-4. Northern MS4 Drainage Areas and Monitoring Locations

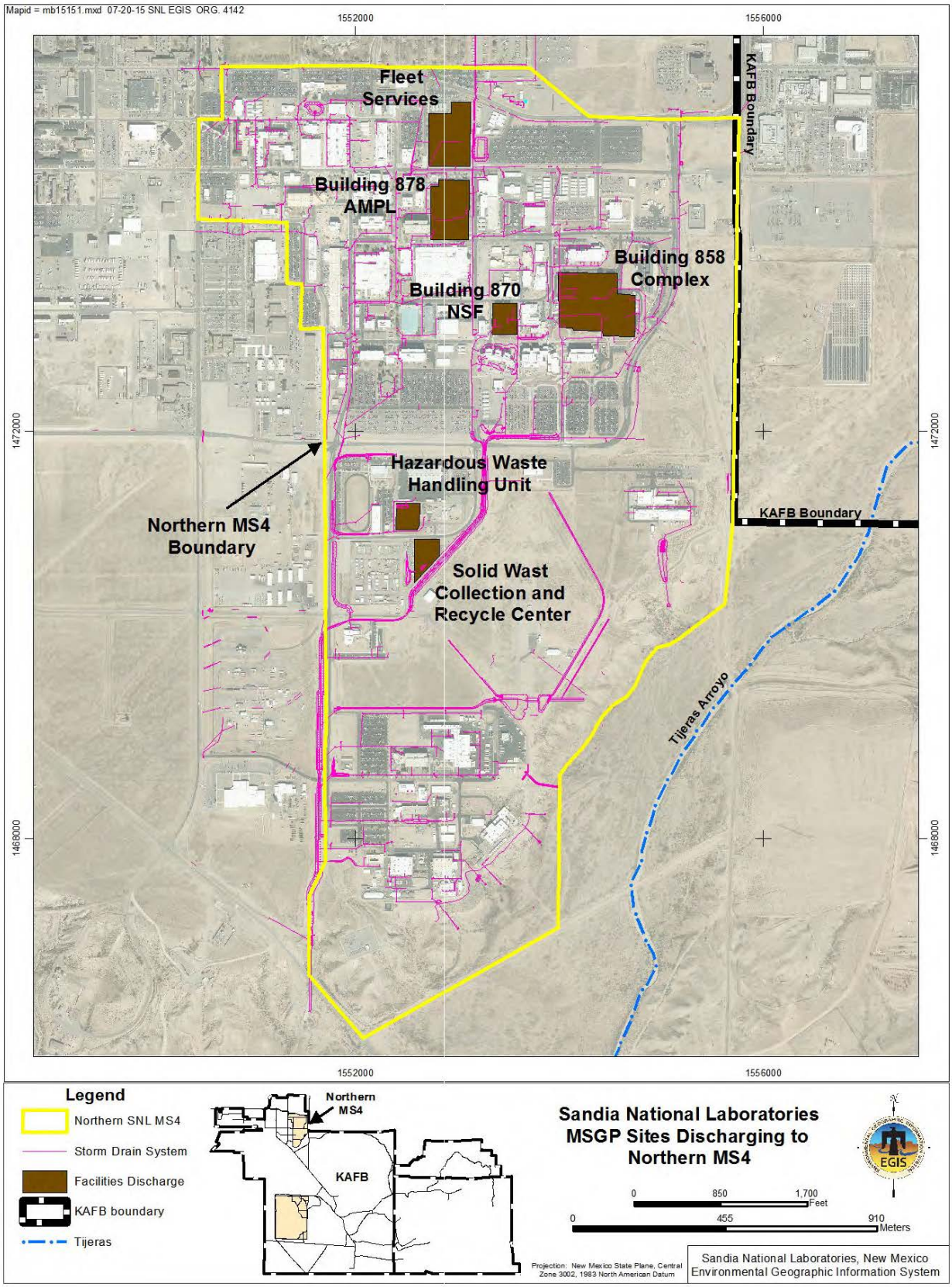

Figure 13-5. SNL/NM MSGP Sites Discharging to Norther MS4

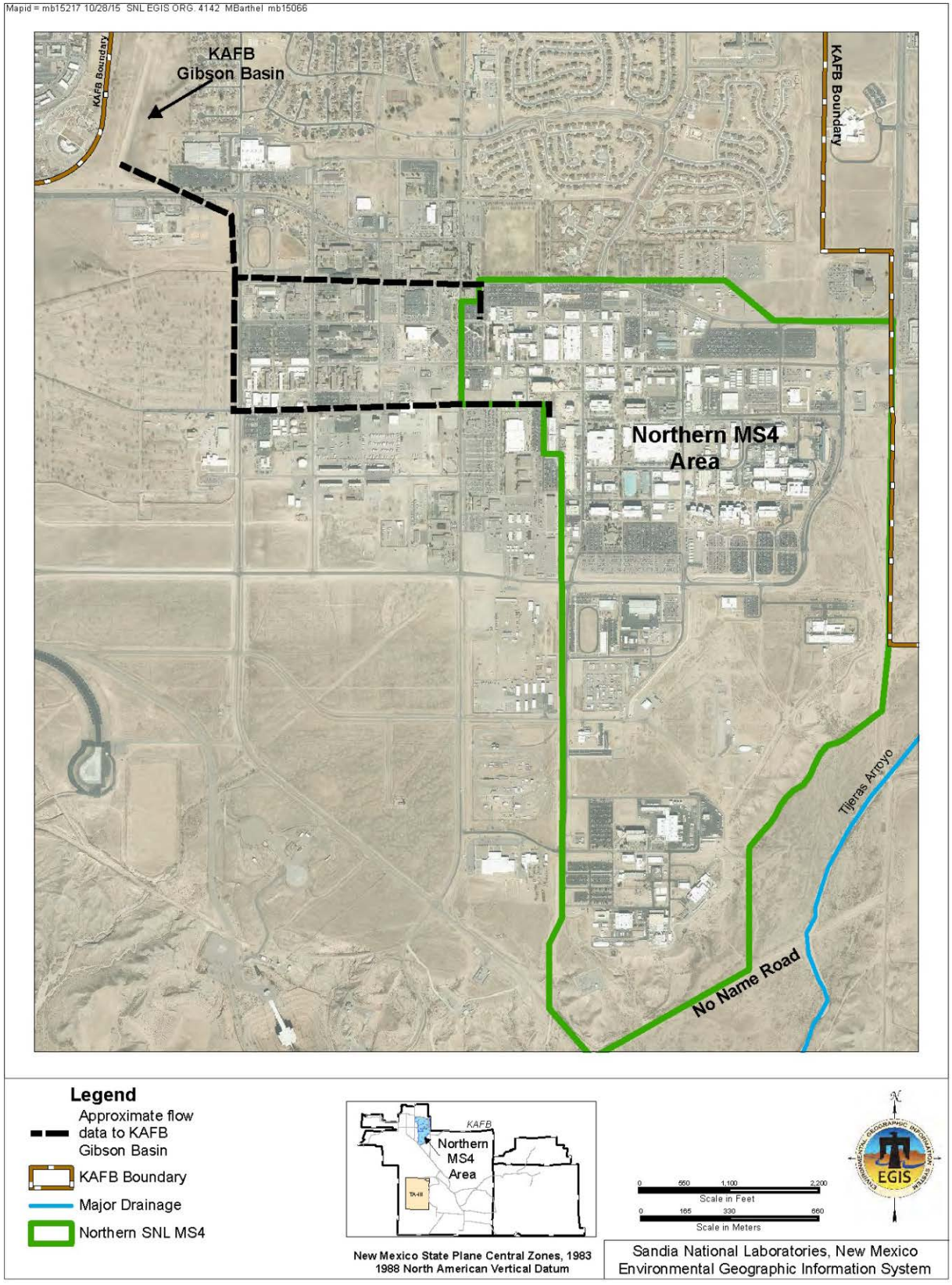

Figure 13-6. Generalized Flow Path of Stormwater Discharged from the SNL MS4 through the KAFB MS4

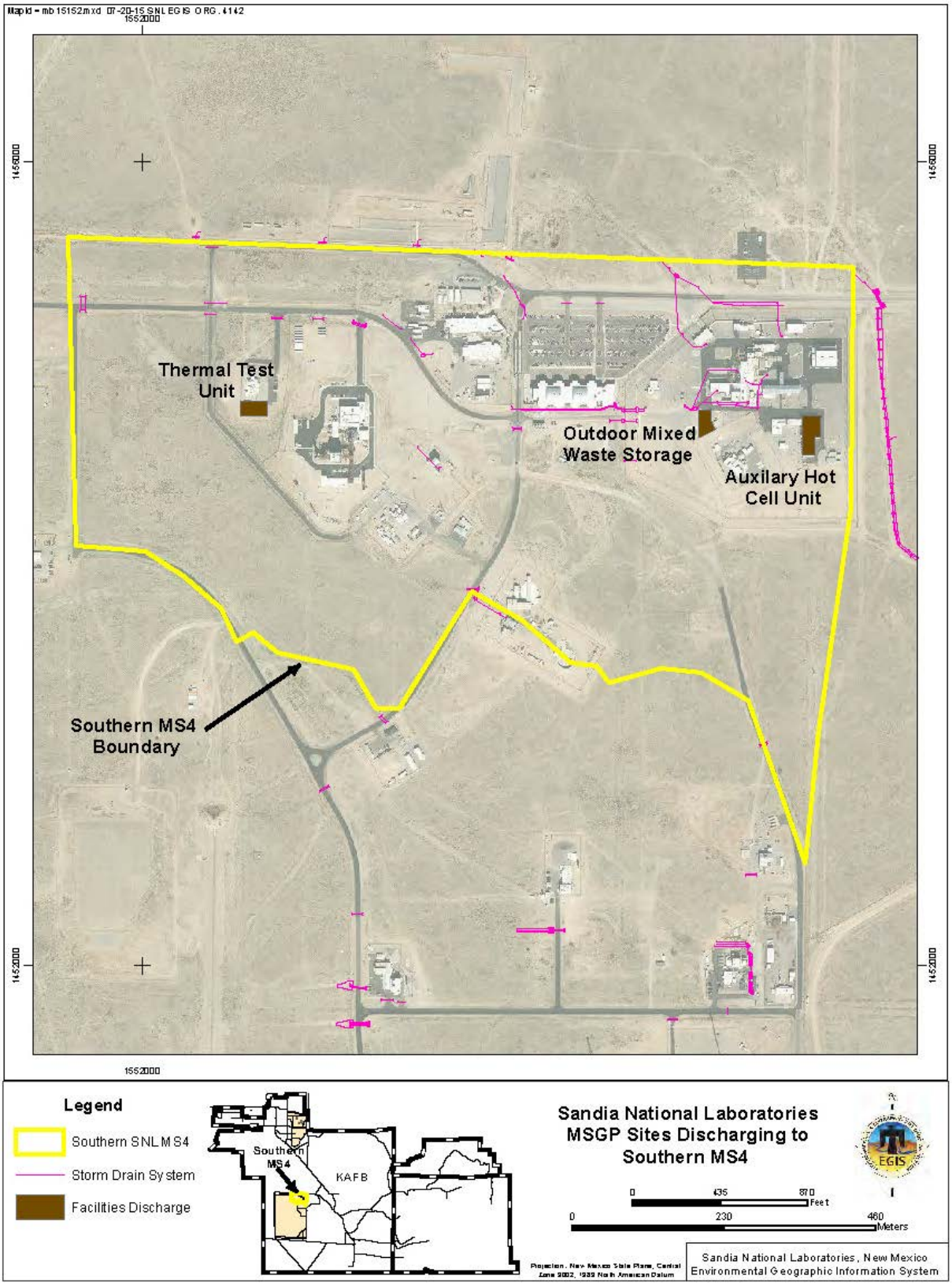

Figure 13-7. SNL/NM MSGP Discharging to Southern MS4

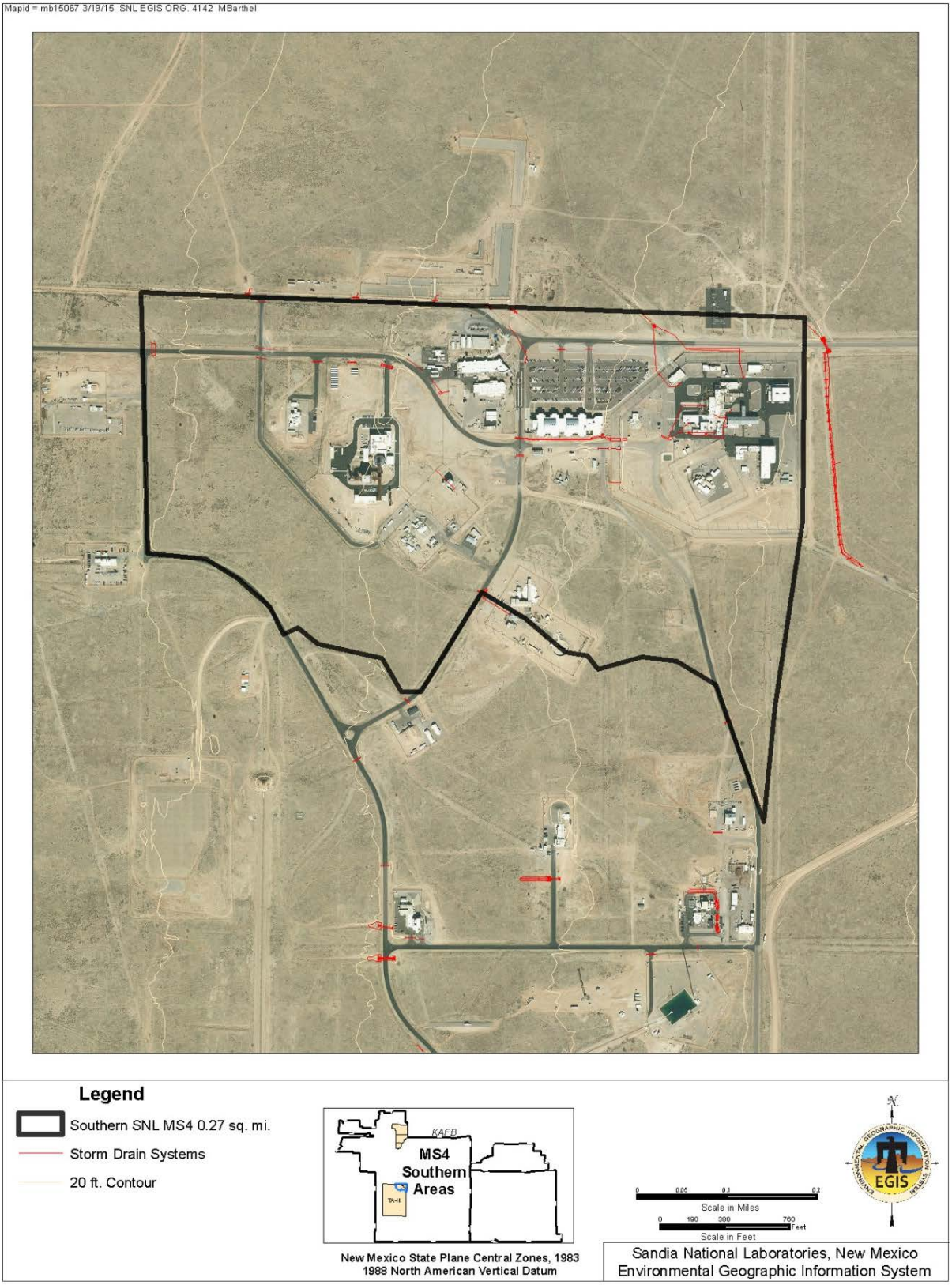

Figure 13-8. Southern SNL/NM MS4

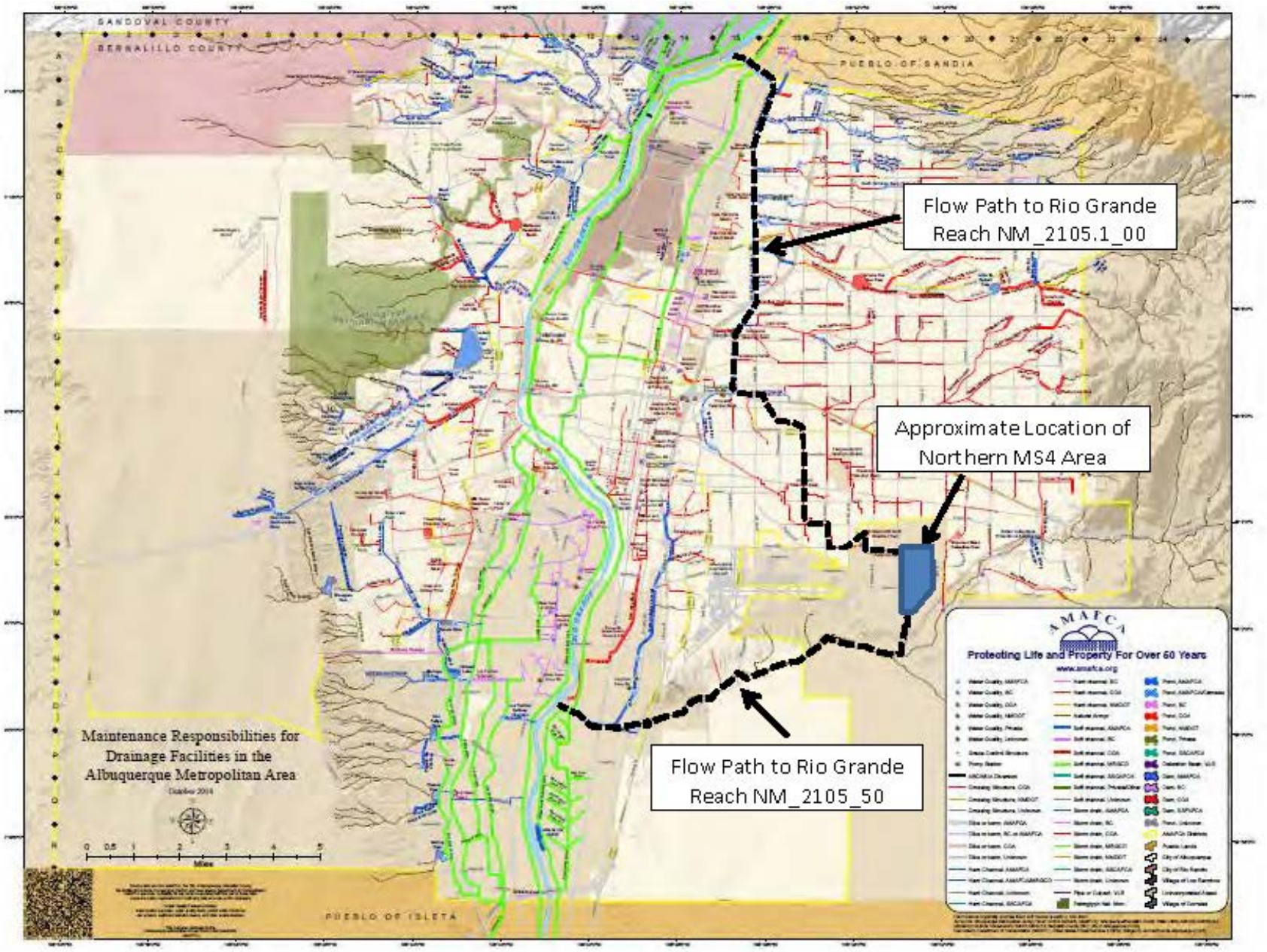

Figure 13-9. Albuquerque Metro Area Flood Control Authority (AMAFCA) Stormwater Drainage Map Showing Generalized Flow Paths of Stormwater from the SNL MS4 to the Rio Grande

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