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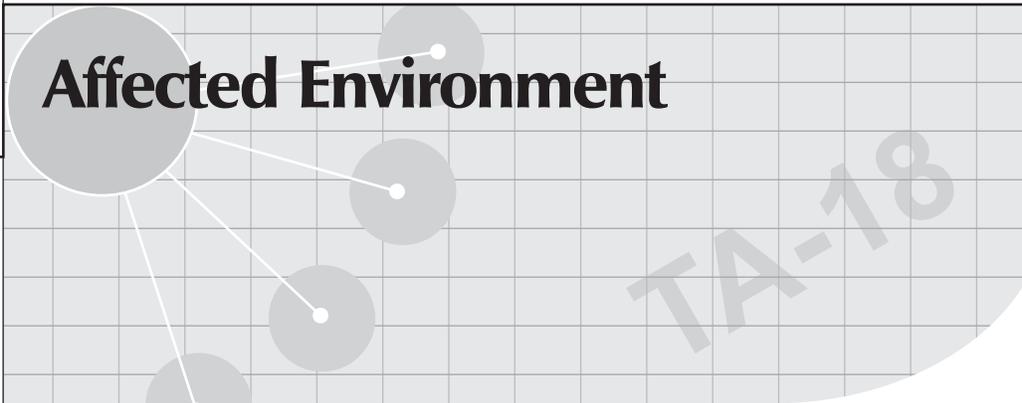
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4. AFFECTED ENVIRONMENT

In Chapter 4, the affected environment descriptions provide the context for understanding the environmental consequences described in Chapter 5. They serve as a baseline from which any environmental changes brought about by implementing the proposed action can be evaluated; the baseline conditions are the currently existing conditions. The affected environments at Los Alamos National Laboratory, Sandia National Laboratories/New Mexico, Nevada Test Site, and Argonne National Laboratory-West are described for the following impact areas: land resources, site infrastructure, air quality, noise, geology and soils, water resources, ecological resources, cultural and paleontological resources, socioeconomics, environmental justice, existing human health risk, and waste management.

4.1 APPROACH TO DEFINING THE AFFECTED ENVIRONMENT

In accordance with the Council on Environmental Quality guidance under National Environmental Policy Act (NEPA) regulations (40 CFR 1500 through 1508) for preparing an environmental impact statement (EIS), the affected environment is “Interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.” The affected environment descriptions presented in this chapter provide the context for understanding the environmental consequences described in Chapter 5. They serve as a baseline from which any environmental changes brought about by implementing the proposed action can be evaluated; the baseline conditions are the currently existing conditions.

For this *Draft Environmental Impact Statement for the Proposed Relocation of Technical Area 18 Capabilities and Materials at the Los Alamos National Laboratory, (TA-18 Relocation EIS)* the candidate sites are Los Alamos National Laboratory (LANL); Sandia National Laboratories/New Mexico (SNL/NM), located within the boundaries of Kirtland Air Force Base (KAFB); Nevada Test Site (NTS); and Argonne National Laboratory-West (ANL-W), located within the boundaries of the Idaho National Engineering and Environmental Laboratory (INEEL). The affected environment is described for the candidate sites for the following resource areas: land resources, site infrastructure, air quality, noise, geology and soils, water resources, ecological resources, cultural and paleontological resources, socioeconomics, environmental justice, existing human health risk, and waste management. For each U.S. Department of Energy (DOE) site, each resource area is described first for the site as a whole and then for the candidate sites, as appropriate. The level of detail varies depending on the potential for impacts resulting from each relocation alternative.

The Solution High-Energy Burst Assembly (SHEBA) could be relocated from TA-18 to a new building constructed at LANL’s TA-39, and other security Category III/IV activities could be relocated to TA-55. LANL’s TA-18 and TA-55 affected environments are presented in this chapter. LANL’s TA-39 affected environment is presented separately in Chapter 5, Section 5.6.2, in association with the separate SHEBA and other security Category III/IV relocation analysis.

The following site-specific and recent project-specific documents were important sources of information in describing the existing environment at each of the proposed relocation sites. Numerous other sources of site- and resource-related data were also used in the preparation of this chapter and are cited as appropriate.

- *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (LANL SWEIS)* (DOE 1999b)

- *Final Site-Wide Environmental Impact Statement for Sandia National Laboratories/New Mexico (SNL/NM SWEIS) (DOE 1999f)*
- *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (NTS SWEIS) (DOE 1996e)*
- *Idaho High-Level Waste and Facilities Disposition Draft Environmental Impact Statement (DOE 1999j)*
- *Final Environmental Impact Statement for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel (DOE 2000e)*
- *Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, Including the Role of the Fast Flux Test Facility (NI PEIS) (DOE 2000k)*

DOE evaluated the environmental impacts of the proposed action within defined regions of influence at each of the candidate sites and along potential transportation routes. The regions of influence are specific to the type of effect evaluated, and encompass geographic areas within which any significant impact would be expected to occur. For example, human health risks to the general public from exposure to airborne contaminant emissions were assessed for an area within an 80-kilometer (50-mile) radius of the proposed facilities. The human health risks of shipping materials between sites were evaluated for populations living along roadways linking the DOE sites. Economic effects such as job and income changes were evaluated within a socioeconomic region of influence that include the county in which the site is located and nearby counties in which substantial portions of the site’s workforce reside. Brief descriptions of the regions of influence are given in **Table 4–1**. More detailed descriptions of the regions of influence and the methods used to evaluate impacts are presented in Appendix F.

Table 4–1 General Regions of Influence for the Affected Environment

<i>Environmental Resources</i>	<i>Region of Influence</i>
Land resources	The site and the areas immediately adjacent to the site
Site infrastructure	The site
Air quality	The site, nearby offsite areas within local air quality control regions, where significant air quality impacts may occur, and Class I areas within 100 kilometers
Noise	The site, nearby offsite areas, access routes to the sites, and the transportation corridors
Geology and soils	Geologic and soil resources within the site and nearby offsite areas
Water resources	Onsite and adjacent surface water bodies and groundwater
Ecological resources	The site and adjacent areas
Cultural and paleontological resources	The area within the site and adjacent to the site boundary
Socioeconomics	The counties where approximately 90 percent of site employees reside
Environmental justice	The minority and low-income populations within 80 kilometers (50 miles) of the site, and along the transportation corridors between the sites
Existing human health risk	The site, offsite areas within 80 kilometers (50 miles) of the site, and the transportation corridors between the sites where worker and general population radiation, radionuclide, and hazardous chemical exposures may occur
Waste management	The site

At each of the candidate sites, baseline conditions for each environmental resource area were determined for ongoing operations from information provided in previous environmental studies, relevant laws and regulations, and other Government reports and databases. More detailed information of the affected

environment at the candidate sites can be found in annual site environmental reports and site NEPA documents.

4.2 LOS ALAMOS NATIONAL LABORATORY

LANL is located on 11,272 hectares (27,832 acres) of land in north central New Mexico (**Figure 4-1**). The site is located 97 kilometers (60 miles) north-northeast of Albuquerque, 40 kilometers (25 miles) northwest of Santa Fe, and 32 kilometers (20 miles) southwest of Española. LANL is owned by the Federal Government and administered by DOE's National Nuclear Security Administration (NNSA). It is operated by the University of California under contract to DOE. Portions of LANL are located in Los Alamos and Santa Fe Counties. DOE's principal missions are national security, energy resources, environmental quality, and science and each of these missions is supported by activities conducted at LANL.

LANL is divided into 49 separate technical areas (TAs) with location and spacing that reflect the site's historical development patterns, regional topography, and functional relationships (**Figure 4-2**). While the number of structures changes somewhat with time (e.g., as a result of the recent Cerro Grande Fire; see Section 4.2.1.1), there are 944 permanent structures; 512 temporary structures; and 806 miscellaneous buildings with approximately 465,000 square meters (5,000,000 square feet) that could be occupied. In addition to onsite office space, 19,833 square meters (213,262 square feet) of space is leased within the Los Alamos town site and White Rock community (DOE 1999b).

TA-18 is the current location of the Los Alamos Critical Experiments Facility. Facilities within this TA study both static and dynamic behavior of critical assemblies of nuclear materials. Special nuclear materials (SNM) are used to support a wide variety of activities for stockpile management, stockpile stewardship, emergency response, nonproliferation, and safeguards. In addition, this facility provides the capability to perform hands-on training and experiments with SNM in various configurations below critical (DOE 1999b).

TA-55 is one of the sites proposed for the relocation of missions currently performed at TA-18. TA-55 is located in the west-central portion of LANL. TA-55 facilities provide research and applications in chemical and metallurgical processes for recovering, purifying, and converting plutonium and other actinides into many compounds and forms, as well as research into material properties and fabrication of parts for research and stockpile applications. Additional activities include the means to safely and securely ship, receive, handle, and store nuclear materials, as well as manage the waste and residue produced by TA-55 operations (DOE 1999b). Unless otherwise referenced, the following descriptions of the affected environment at LANL, TA-18, and TA-55 are based all or in part on information provided in the *LANL SWEIS* (DOE 1999b), which is incorporated by reference.

4.2.1 Land Resources

4.2.1.1 Land Use

Land use in this region is linked to the economy of northern New Mexico, which depends heavily on tourism, recreation (e.g., skiing, fishing), agriculture, and the state and Federal Governments for its economic base. Area communities are generally small, such as the Los Alamos town site with under 12,000 residents, and primarily support urban uses including residential, commercial, light industrial, and recreational facilities. The region also includes Native American communities; lands of the Pueblo of San Ildefonso share LANL's eastern border, and a number of other pueblos are clustered nearby. Major governmental bodies that serve as land stewards and determine land uses within Los Alamos and Santa Fe counties include the county governments, DOE, the U.S. Forest Service, the National Park Service, the State of New Mexico, the U.S. Bureau of Land Management, and several Native American pueblos. Bandelier National Monument and

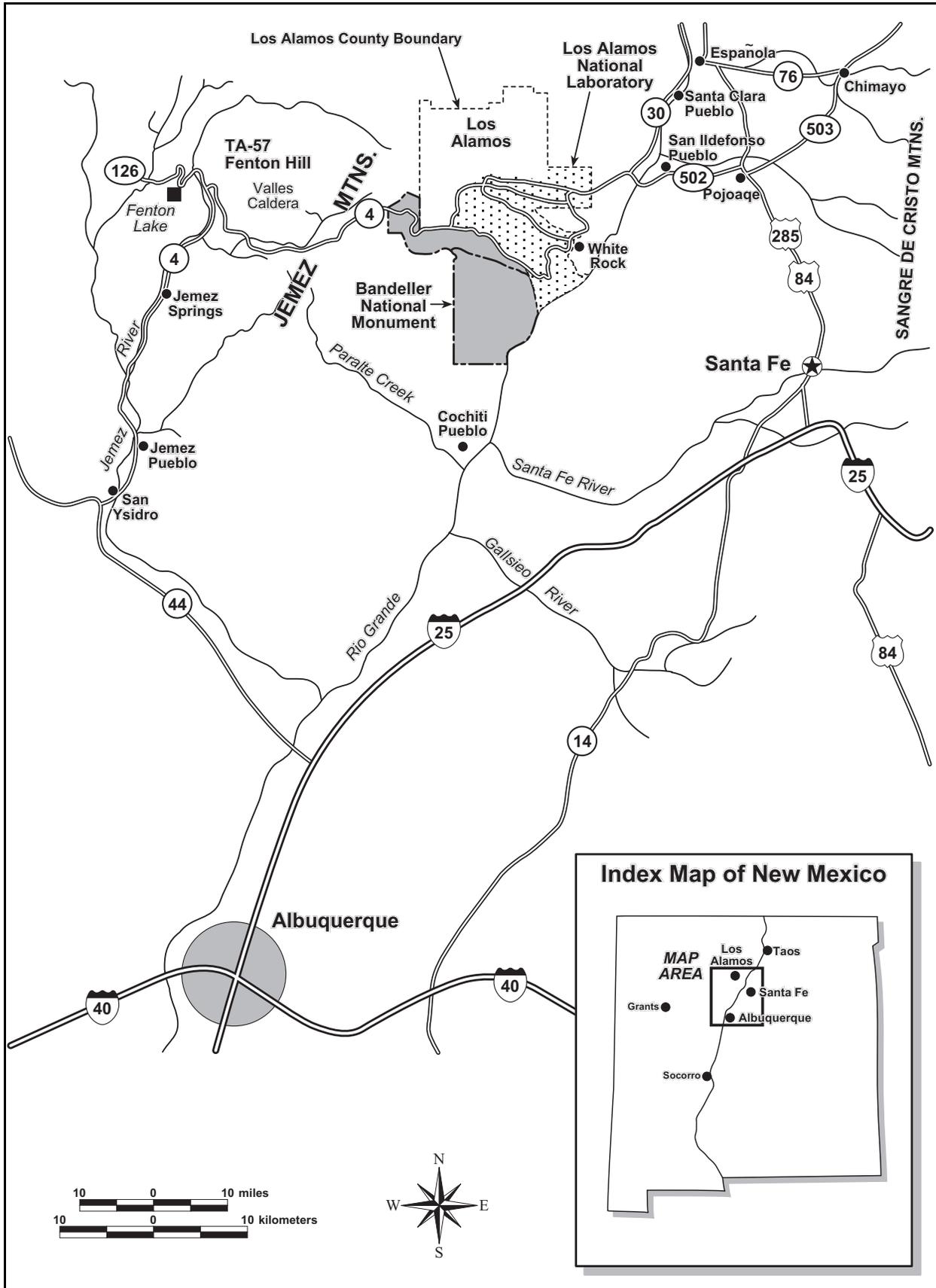


Figure 4-1 Location of LANL

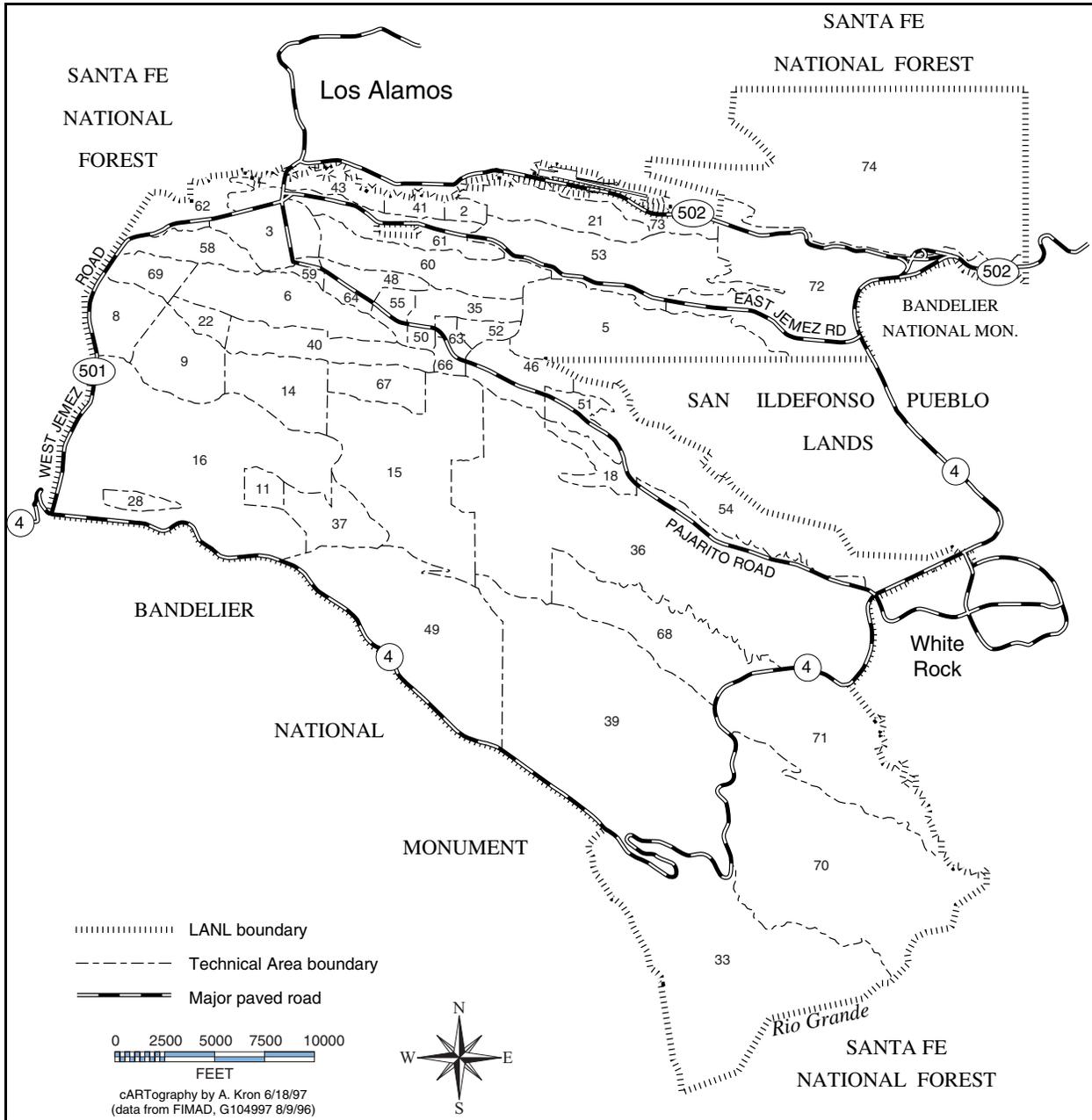


Figure 4-2 Technical Areas of LANL

Santa Fe National Forest border LANL primarily to the southwest and northwest, respectively; however, small portions of each also border the site to the northeast (see **Figure 4-3**).

Land use characterization at LANL is based on the most hazardous activities in each TA and is organized into six categories.

Support—Includes TAs with only support facilities that do not perform research and development activities and are generally free from chemical, radiological, or explosive hazards; also includes undeveloped TAs other than those that serve as buffers.

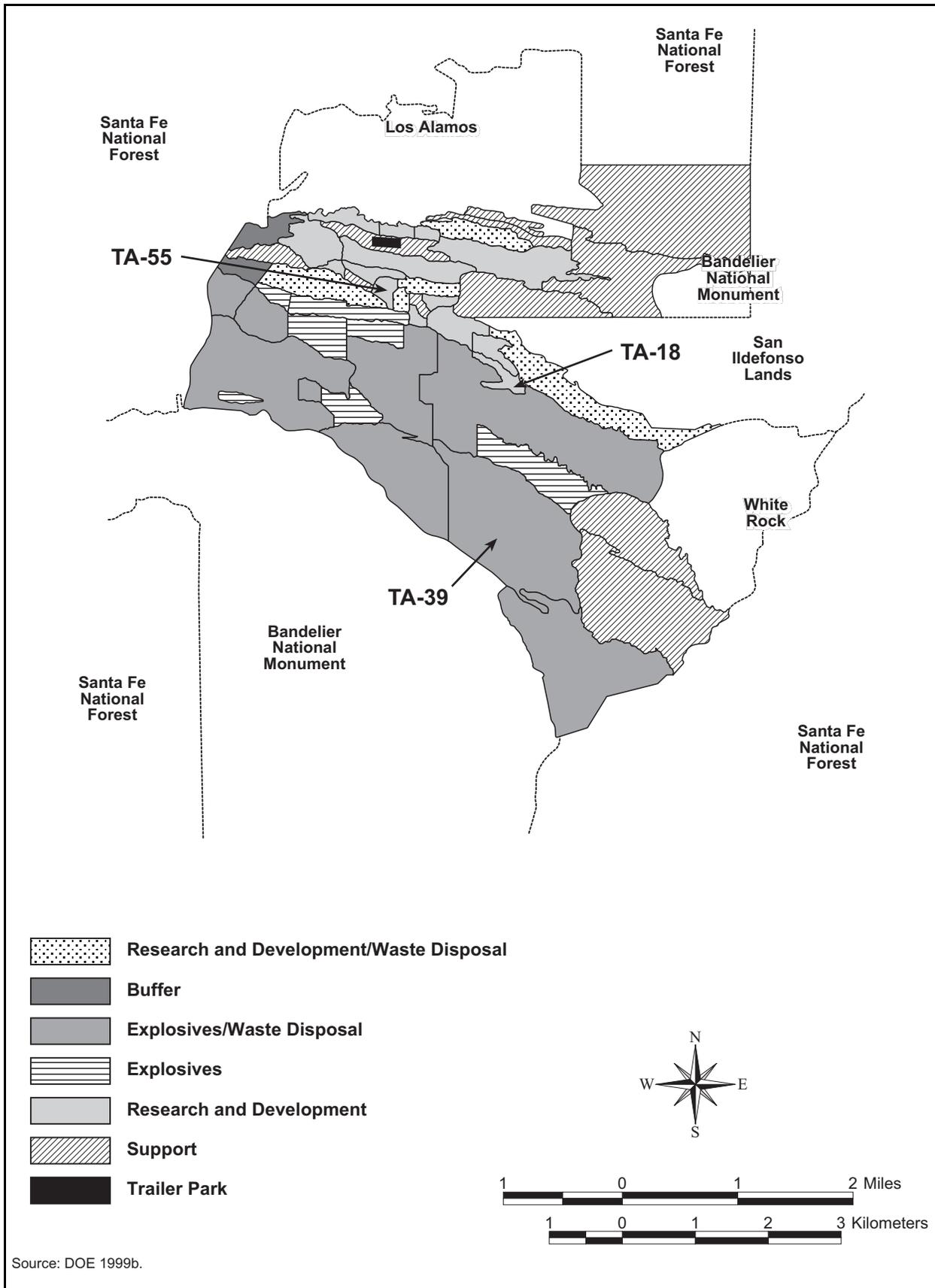


Figure 4-3 Land Use at LANL

Research and Development—Includes TAs that perform research and development activities with associated chemical and radiological hazards, but that are generally free of explosives hazards; does not include waste disposal sites.

Research and Development/Waste Disposal—The remaining research and development areas (i.e., those areas that are generally free of explosives hazards and have existing waste disposal sites).

Explosives—Includes TAs where explosives are tested or stored, but does not include waste disposal sites.

Explosives/Waste Disposal—The remaining sites where explosives are tested or stored (i.e., those with existing waste disposal sites).

Buffer—Land identified in each of the usage types described above also may serve as a buffer area. This last land use category therefore includes areas that only serve as buffers for the safety or security of other TAs, usually explosives areas.

LANL is divided into TAs that are used for building sites, experimental areas, and waste disposal locations. However, those uses account for only a small part of the total land area of the site. In fact, only 5 percent of the site is estimated to be unavailable to most wildlife (because of security fencing). Most of the site is undeveloped to provide security, safety, and expansion possibilities for future mission requirements. There are no agricultural activities present at LANL, nor are there any prime farmlands. In 1977, DOE designated LANL as a National Environmental Research Park, which is used by the national scientific community as an outdoor laboratory to study the impacts of human activities on pinyon-juniper woodland ecosystems (DOE 1996g). In 1999, the White Rock Canyon Wildlife Reserve was dedicated. It is about 405 hectares (1,000 acres) in size and is located on the southeast perimeter of LANL. The reserve is managed jointly by DOE and the National Park Service for its significant ecological and cultural resources and research potential (LANL 2000f).

Beginning on May 5, 2000, a wildfire, known as the Cerro Grande Fire, burned across the Los Alamos area. By the time the fire was fully contained on June 6, it had burned a total of 17,462 hectares (43,150 acres), of which 3,061 hectares (7,650 acres) were within the boundaries of LANL. In general, impacts of the fire on land use in the region should be temporary. For example, access and use of certain recreation areas and trails will be restricted over the next two to three years within at least part of LANL and the surrounding forestlands. Within LANL, 45 structures (trailers, transportable, and storage units) were totally destroyed and 67 were damaged. The fire also affected land use in the Los Alamos town site, where about 230 housing units were totally destroyed (LANL 2000b, DOE 2000h).

The Los Alamos County Comprehensive Plan, which established land planning issues and objectives, addresses private and county lands comprising 3,488 hectares (8,613 acres). Twenty-nine percent of this land is located within the Los Alamos town site and 26 percent is located in the community of White Rock. The remaining 45 percent of the land is undeveloped and is used for recreational activities and open space. LANL is autonomous from a planning perspective and, therefore, is not addressed in the county plan. Land-use designations in the Santa Fe County Plan are based on groundwater protection goals. Therefore, this plan designates LANL as “Agricultural and Residential,” although, as noted above, there are no agricultural activities on the site, nor are there any residential uses within LANL boundaries (DOE 1996g).

TA-18 is located within the Research and Development land use category (Figure 4–3). Facilities at TA-18 are located on a 53-hectare (131-acre) site that is situated 4.8 kilometers (3 miles) from the nearest residential area, White Rock. Approximately 20 percent of the site has been developed. Site facilities are located in a canyon near the confluence of Pajarito Canyon and Three Mile Canyon. TA-18 structures include a main

building, three outlying remote-controlled critical assembly buildings known as CASAs, and several smaller laboratory, nuclear material storage, and support buildings. A security fence to aid in physical safeguarding of SNM bounds the entire site (see Figure 3-1).

TA-55 is also located within the Research and Development land use category (see Figure 4-3). Facilities at TA-55 are located on a 16-hectare (40-acre) site that is situated 1.8 kilometers (1.1 miles) south of the city of Los Alamos. Forty-three percent of the site has been developed. The main complex has five connected buildings; the Nuclear Materials Storage Facility is separate from the main complex but shares an underground transfer tunnel. A security fence to aid in physical safeguarding of SNM bounds the entire site (see Figure 3-1).

The Cerro Grande Fire at times threatened structures at TA-18 and TA-55 (LANL 2000b). However, no permanent buildings were damaged or destroyed.

4.2.1.2 Visual Resources

The topography in northern New Mexico is rugged, especially in the vicinity of LANL. Mesa tops are cut by deep canyons, creating sharp angles in the land form. In some cases, slopes are nearly vertical. Often, little vegetation grows on these steep slopes, exposing the geology, with contrasting horizontal planes varying from fairly bright reddish orange to almost white in color. A variety of vegetation occurs in the region, the density of vegetation and height of which may change over time and can affect the visibility of an area within the LANL viewshed. Undeveloped lands within LANL have a Bureau of Land Management Visual Resource Contrast rating of Class II and III. Management activities within these classes may be seen but should not dominate the review.

For security reasons, much of the development within LANL has occurred out of the public's view. Passing motorists or nearby residents can see only a small fraction of what is actually there. Prior to the Cerro Grande Fire, the view of most LANL property from many stretches of area roadways was that of woodlands and brushy areas. Views from various locations in Los Alamos County and its immediate surroundings have been altered by the Cerro Grande Fire, which burned over 17,462 hectares (43,150 acres) of the area in the summer of 2000. Although the visual environment is still diverse, interesting, and panoramic, portions of the visual landscape are dramatically stark. Rocky outcrops forming the mountains are now visible through the burned forest areas. The eastern slopes of the Jemez Mountains, instead of presenting a relatively uniform view of dense green forest, are now a mosaic of burned and unburned areas. Grasses and shrubs initially will replace forest stands and will contribute to the visual contrast between the burned and unburned areas for many years. Local effects include reduced visual appeal of trails and recreation areas (DOE 2000h).

The most visible developments at LANL are a limited number of very tall structures; facilities at relatively high, exposed locations; or those beside well-traveled, publicly accessible roads within the core part of LANL, the TA-3 area. Developed areas within LANL are consistent with a Class IV Visual Resource Contrast rating, in which management activities dominate the view and are the focus of viewer attention.

At lower elevations, at a distance of several miles away from LANL, the facility is primarily distinguishable in the daytime by views of its water storage towers, emission stacks, and occasional glimpses of older buildings that are very austere and industrial in appearance. Similarly, the Los Alamos town site appears mostly residential in character, with the water storage towers very visible against the backdrop of the Jemez Mountains. At elevations above LANL, along the upper reaches of the Pajarito Plateau rim, the view of LANL is primarily of scattered austere buildings and the nested several-storied buildings of TA-3. Similarly, the residential character of the Los Alamos town site is predominately visible from higher elevation

viewpoints. At night, the lights of LANL, the Los Alamos town site, and White Rock are directly visible from various locations across the viewshed as far away as the towns of Española and Santa Fe.

TA-18 is located at the bottom of a canyon at the confluence of Pajarito Canyon and Threemile Canyon. Since the surrounding canyon walls rise approximately 61 meters (200 feet) above the site, TA-18 is not visible from any offsite location, including White Rock, which is located 4.8 kilometers (3 miles) to the east. Developed portions of TA-18 would have a Class IV Visual Resource Contrast rating.

TA-55 is located on a mesa about 1.6 kilometers (1 mile) southeast of TA-3. While not visible from lower elevations, TA-55 is visible from higher elevations to the west along the upper reaches of the Pajarito Plateau rim, from where it appears as one of several scattered built-up areas among the heavily forested areas of the site. As is the case for TA-18, developed portions of TA-55 would have a Class IV Visual Resource Contrast rating.

4.2.2 Site Infrastructure

Site infrastructure characteristics for LANL are summarized in **Table 4-2**.

Table 4-2 LANL Sitewide Infrastructure Characteristics

<i>Resource</i>	<i>Site Usage</i>	<i>Site Capacity</i>
Transportation		
Roads (kilometers)	130 ^a	Not applicable
Railroads (kilometers)	0	Not applicable
Electricity ^b		
Energy (megawatt-hours per year)	475,868	937,000
Peak load (megawatts)	83	107
Fuel		
Natural gas (cubic meters per year)	70,000,000 ^c	229,400,000 ^d
Liquid fuels (liters per year)	Negligible	Not limited
Coal (metric tons per year)	0	0
Water (liters per year)	1,715,000,000	2,050,000,000 ^e

^a Includes paved roads and paved parking areas only.

^b Usage and capacity values are for the entire Los Alamos Power Pool.

^c Usage value for LANL plus baseline usage for other Los Alamos County users.

^d Entire service area capacity which includes LANL and other Los Alamos area users.

^e Equivalent to 30 percent of the water right allocation from the main aquifer.

Source: DOE 1999b, DOE 1999h, LANL 2000e.

4.2.2.1 Ground Transportation

About 130 kilometers (80 miles) of paved roads and parking surface have been developed on LANL (see Table 4-2). There is no railway service connection at the site. Local and linking regional transportation systems, including roadways, are detailed in Section 4.2.9.4.

4.2.2.2 Electricity

Electrical service to LANL is supplied through a cooperative arrangement with Los Alamos County, known as the Los Alamos Power Pool, which was established in 1985. Electric power is supplied to the pool through two existing regional 115-kilovolt electric power lines. The first line (the Norton-Los Alamos line) is administered by DOE and originates from the Norton Substation near White Rock, and the second line (the Reeves Line) is owned by the Public Service Company of New Mexico and originates from the

Bernalillo-Algodones Substation. Both substations are owned by the Public Service Company of New Mexico. DOE also operates a gas-fired steam/power plant at TA-3 that is used on an as-needed basis and maintains various low-voltage transformers at LANL facilities and approximately 55 kilometers (34 miles) of 13.8-kilovolt distribution lines (DOE 2000c).

Pool resources currently provide a contractually limited 73 megawatts during winter months to about 95 megawatts during the spring and early summer months from a number of hydroelectric, coal, and natural gas power generators throughout the western United States (LANL 2000e). Onsite electric generating capacity for the pool is limited to the existing TA-3 steam/power plant, which has an operating capacity of 12 megawatts in the summer and 15 megawatts in the winter. Historically, offsite power system failures have disrupted operations in LANL facilities. Therefore, all facilities that require safe shutdown capability for power outages are equipped with emergency generators to assure these needs are met, including nuclear facilities such as TA-55 and the Chemistry and Metallurgy Research Building. The TA-3 steam/power plant currently provides the additional electricity needed to meet peak load demands exceeding the allowable supply. The TA-3 steam/power plant and the majority of LANL's electrical distribution network are past or nearing the end of their design life and require replacement or upgrading. To improve overall supply reliability, construction and operation of a new 115-kilovolt power line is planned that would originate at the existing Public Service Company of New Mexico-owned Norton Substation and terminate at a proposed DOE-administered West Technical Area Substation (DOE 2000c).

Electricity consumption and peak demands by LANL have historically fluctuated largely as a result of power demand by the Los Alamos Neutron Science Center. Electric power availability from the pool (based on a summer peak load capacity of 107 megawatts) is 937,000 megawatt-hours per year (DOE 1999h). In fiscal year 1999 (FY99), LANL used 369,321 megawatt-hours of electricity which was an eight-year low. Other Los Alamos County users consumed an additional 106,547 megawatt-hours. The FY99 peak load usage was about 68 megawatts for LANL and about 14 megawatts for the rest of the county (LANL 2000e). The estimated peak load capacity is 107 megawatts during the summer peak season (see Table 4-2) (DOE 1999h). In FY 2000, TA-55 used 14,158 megawatt-hours of electricity. Electric power usage at TA-18 is estimated to consistently average 2,836 megawatt-hours annually (LANL 2001a).

4.2.2.3 Fuel

Natural gas is the primary fuel used in Los Alamos County and at LANL. The natural gas system includes a high-pressure main and distribution system to Los Alamos County and pressure-reducing stations at LANL buildings. In August 1999, DOE sold the 209-kilometer-long (130-mile) main gas supply line and associated metering stations to Los Alamos and vicinity to Public Service Company of New Mexico (LANL 2000e). The county and LANL both have delivery points where gas is monitored and measured. LANL burns natural gas to generate steam to heat buildings. The natural gas delivery system servicing the Los Alamos area has a contractually-limited capacity of about 229 million cubic meters (8.07 billion cubic feet) per year (DOE 1999h). In FY99, LANL used approximately 40.5 million cubic meters (1.43 billion cubic feet) of natural gas (see Table 4-2). Some 90 percent of the natural gas used at LANL is for heating and the remainder for electricity generation to meet peak demands (LANL 2000e). The rest of the service area including Los Alamos County is estimated to use an average of 29.5 million cubic meters (1.04 billion cubic feet) of natural gas annually (DOE 1999h). Relatively small quantities of fuel oil are also stored at LANL as a backup fuel source and use is therefore negligible (DOE 1996g). TA-18 and TA-55 use natural gas to fire boilers and for other facility uses. Natural gas usage at TA-18 is estimated to be about 200 cubic meters (7,000 cubic feet) per year. TA-55 is estimated to use approximately 1.3 million cubic meters (45 million cubic feet) of natural gas annually (LANL 2001a).