

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the natural and human environment that could be affected by the Proposed Action and the No Action Alternative and the potential environmental consequences of those actions. Based on the Proposed Action description, environmental resources that may potentially be affected as a result of implementing the Proposed Action have been considered.

Environmental issues were identified and either addressed in this section or not, based on the “Sliding Scale Approach” discussed earlier in this EA (Section 1.4). Table 3 identifies the subsection where potential environmental issues are discussed or notes why they are not addressed in this document.

Table 3. Potential Environmental Issues

Environmental Category	Applicability	Subsection
Waste Management	Yes	3.2.1
Air Quality	Yes	3.2.2
Cultural Resources	Yes	3.2.3
Visual Resources	Yes	3.2.4
Transportation, Traffic, and Infrastructure	Yes	3.2.5
Geologic Setting	Yes	3.2.6
Water Quality	Yes	3.2.7
Human Health	Yes	3.2.8
PRs	Yes	3.2.9
Noise	Yes	3.2.10
Socioeconomic	Yes	3.2.11
Land Use	No. Land uses and land use designations as a result of the Proposed Action would not change or be affected. The Proposed Action is consistent with the Comprehensive Site Plan 2000 (LANL 2000) land use designations for HE research and development within the Experimental Engineering Planning Area, and the SWEIS hazard characterization of the project area for “Explosives” land uses.	N/A
Environmental Justice	No. Populations that are subject to Environmental Justice considerations are present within 50 miles (mi) (80 kilometers [km]) of Los Alamos County; potential effects of this project would be localized within a 10-mi (16-km) radius. Populations nearest to the construction site and within this radius are not predominantly minority and low-income populations.	N/A
Biological Resources	Yes	3.2.12
Floodplains and Wetlands	Yes	3.2.13

3.1 Regional Setting

The Proposed Action would be located within the area of Los Alamos County that includes LANL. LANL comprises a large portion of Los Alamos County and extends into Santa Fe County. LANL is situated on the Pajarito Plateau along the eastern flank of the Jemez Mountains and consists of 49 technical areas. The Pajarito Plateau slopes downward towards the Rio Grande along the eastern edge of LANL and contains several fingerlike mesa tops separated by relatively narrow and deep canyons.

Commercial and residential development in Los Alamos County is confined primarily to several mesa tops lying north of the core LANL development, in the case of the Los Alamos town site, or southeast, in the case of the communities of White Rock and Pajarito Acres. The lands surrounding Los Alamos County are largely undeveloped wooded areas with large tracts located to the north, west, and south of LANL that are administered by the U.S. Department of Agriculture, Santa Fe National Forest, and the U.S. Department of the Interior (DOI), National Park Service, Bandelier National Monument; and to the east by the DOI, Bureau of Land Management.

DX facilities fall mainly within the Experimental Engineering and Dynamic Testing Planning Areas described in the Comprehensive Site Plan 2000 (LANL 2000). The plan designates the Experimental Engineering Planning Area as “HE research and development” and “administration” land uses. The Dynamic Testing Planning Area is a primary locus for stockpile stewardship and nonnuclear testing. These areas have been continuously used since the early days of the Manhattan Project.

Lands immediately west of SR 501 are in the Santa Fe National Forest. Bandelier National Monument lies approximately 0.6 mi (1 km) away south of SR 4. The general public uses both SR 4 and SR 501.

LANL’s natural resources environment, cultural resources, socioeconomics, waste management, regulatory compliance record, and general operations are described in detail in the SWEIS (DOE 1999a). Additional information is available in the most recent annual Environmental Surveillance Report (LANL 2002b) and the *Special Environmental Analysis for the Department of Energy, National Nuclear Security Administration, Actions taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 2000b). These documents may be found in the LANL library and are also available at the Public Reading Room at 1619 Central Avenue, Los Alamos, New Mexico.

3.2 Potential Environmental Issues

This section addresses the issues listed in Table 3. The first part of each subsection describes the resources potentially affected by the Proposed Action. The second part analyzes the anticipated effects of implementing the Proposed Action on that resource. The third part of the subsections describe the anticipated effects of implementing the No Action Alternative on the resources.

3.2.1 Waste Management

3.2.1.1 Affected Environment

LANL generates solid waste⁹ from construction¹⁰, demolition, and facility operations. These wastes are managed and disposed of at appropriate solid waste facilities. Both LANL and Los Alamos County use the same solid waste landfill located within LANL boundaries on DOE land. The Los Alamos County Landfill also accepts solid waste from other neighboring communities. The Los Alamos County Landfill receives about 50,000 tons of solid waste per year (45,500 metric tons per year), with LANL contributing about 10,500 tons per year (9,555 metric tons per year), or about 21 percent of the total. Because of the combined use of the Los Alamos County Landfill by NNSA, LANL, and Los Alamos County, these parties are now considering new solid waste management and disposal options for solid waste generated during LANL operations, as well as, for the management and disposal of Los Alamos County community solid wastes.

Construction and demolition debris storage yards on Sigma Mesa, the Los Alamos County Landfill or other approved material management areas at LANL are currently used to store concrete rubble, asphalt, and clean soil for future re-use at LANL or for recycling offsite. Asbestos removal is stringently controlled. Asbestos disposal is regulated under RCRA as a nonhazardous waste. It is classified as a New Mexico Special Waste that has unique handling, transportation, and disposal requirements to ensure protection of the environment and the health, welfare, and safety of the public. Asbestos wastes generated during demolition activities are regulated under the NESHAP for Asbestos (40 CFR 61) and would be managed in accordance with all applicable regulations. Hazardous waste¹¹ regulated under RCRA is transported to TA-54 at LANL for proper management, which is carried out in accordance with applicable laws, regulations, and DOE Orders. RCRA-regulated and non-RCRA-regulated hazardous wastes may be treated and then both types of waste are disposed of offsite at various commercial disposal sources. The disposal sites are audited for regulatory compliance before being used by UC for the disposal of such waste. Hazardous waste disposal sites currently used by UC are located across the U.S. Potential disposal locations for hazardous waste that could be produced by LANL demolition activities are shown in Table 4.

⁹ Solid waste, as defined in 40 CFR 261.2 and in 20 NMAC 9.1, is any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.

¹⁰ As defined in 20 NMAC 9.1, construction and demolition debris means materials generally considered to be not water soluble and nonhazardous in nature, including, but not limited to, steel, glass, brick, concrete, asphalt roofing materials, pipe, gypsum wallboard, and lumber from the construction or destruction of a structure as part of a construction or demolition project, and includes rocks, soil, tree remains, trees, and other vegetative matter that normally results from land clearing. If construction and demolition debris is mixed with any other types of solid waste, whether or not originating from the construction project, it loses its classification as construction and demolition debris. Construction and demolition debris does not include friable, category I non-friable, or category II non-friable asbestos or liquids, including, but not limited to, waste paints, solvents, sealers, adhesives, or potentially hazardous materials. Construction and demolition debris that is not also hazardous waste as defined by RCRA is regulated as a solid waste by the State of New Mexico as well.

¹¹ Hazardous waste, as defined in 40 CFR 261.3, which addresses RCRA regulations, and by reference in 20 NMAC 4.1, is waste that meets any of the following criteria: a) waste exhibits *any* of the four characteristics of a hazardous waste: ignitability, corrosivity, reactivity, or toxicity; b) waste is specifically *listed* as being hazardous in one of the four tables in Subpart D of the CFR; c) waste is a mixture of a *listed* hazardous waste item and a nonhazardous waste; d) waste has been *declared* to be hazardous by the generator.

Table 4. Potential Offsite Disposal Locations for Hazardous Waste

Location	Type of Hazardous Waste					Distance from Los Alamos (mi/km)
	Asbestos	Lead	Beryllium	HE-contaminated waste	Photo-chemicals	
Mountainair, NM	X					130/209
Phoenix, AZ	X					550/880
Albuquerque, NM		X				90/144
Henderson, CO			X			380/608
Kettleman Hills, CA			X			965/1,544
Lake Charles, LA				X		1,253/2,005
Fernley, NV					X	1,080/1,728

Dedicated pipelines to the Sanitary Wastewater System plant at TA-46 deliver sanitary liquid wastes from the Two-Mile Mesa Complex and other technical areas at LANL. The plant has a design capacity of 600,000 gallons (2.27 million liters) per day and, in 2001, processed about 94.7 million gallons of treated wastewater and sewage, an average of about 259,275 gallons (0.97 million liters) per day (LANL 2002c).

LLW from LANL operations is disposed of at LANL, TA-54 Area G or is shipped to appropriate permitted facilities. Depleted uranium (DU) waste may be managed solely as a radioactive waste or as a mixed waste depending on various factors¹². DU waste is transported to TA-54 where it is managed either as LLW or mixed LLW¹³ and is stored and disposed of at appropriate facilities in accordance with appropriate laws, regulations, and DOE Orders.

3.2.1.2 Proposed Action

The Proposed Action would have no effect on waste management operations since it would not require establishment of any new waste treatment, storage, or disposal facilities. As previously discussed in the Proposed Action description in Section 2.1.1, the Two-Mile Mesa Complex would be designed, constructed, and operated to incorporate, to the maximum extent practical, waste minimization practices required by LANL’s Laboratory Implementing Requirement for General Waste Management (LANL 1998a).

Construction

The Proposed Action would generate solid waste from construction that would be disposed of at the Los Alamos Country Landfill, its replacement facility, or other New Mexico solid waste landfills in accordance with the waste minimization plan. Table 5 identifies estimated waste types generated by construction activities and includes estimated bounding quantities, effect on traffic, and potential disposal locations. Construction solid waste is estimated at 11,993 yd³ (9,115 m³).

¹² Waste that consists solely of DU that is also source, special nuclear, or byproduct material as defined by the AEA is typically not a hazardous or mixed waste – even if it exhibits a hazardous characteristic. However, if DU waste is mixed with hazardous waste, regardless of the status of the DU relative to its AEA characterization, the mixture would generally be categorized as a mixed waste. Lastly, waste DU that is not source, special nuclear, or byproduct material as defined by the AEA, is generally categorized as a mixed waste because it is both radioactive and exhibits a hazardous characteristic.

¹³ Mixed LLW is LLW that is also a RCRA hazardous waste or is combined with a RCRA hazardous waste.

Table 5. Estimated Construction Wastes: Sources, Quantities, and Transportation

Source	Quantity yd ³ (m ³)	Traffic (truck/week)	Start Date	Duration (months)
SDP Building	806 (613)	2	FY 03	6
CERL Building	806 (613)	2	FY 05	6
CHEM Laboratory	2,465 (1,873)	6	FY 05	6
EDF Building	806 (613)	2	FY 05	6
High Bay Laboratory	616 (468)	1–2	FY 07	6
Contained Firing Capability structures	806 (613)	2	FY 05	6
Gas Gun Facility building(s)	806 (613)	2	FY 08	6
Three Office/Laboratory buildings	2,418 (1,839)	6	FY 04	6
Classified HE Storage Building	616 (468)	1–2	FY 10	6
Detonator Qualification Laboratory	616 (468)	1–2	FY 10	6
Lecture Hall	616 (468)	1–2	FY 10	6
Machine Shop	616 (468)	1–2	FY 10	6

The waste quantities shown in Table 5 have been developed from preliminary estimates and from similar post-project knowledge and are expected to bound the actual waste amounts generated. The estimates would be refined as additional information becomes available during the development of the project design.

Operations

Proposed operations would have minimal effects on waste management. Operations that would be consolidated in the Two-Mile Mesa Complex under the Proposed Action would generally produce the same types of waste, possibly in lower quantities, as are generated in the facilities where these operations are currently located. No new radioactive or other wastewater or hazardous waste streams would be generated. DX would utilize environmentally responsible processes to the extent possible, which could result in a decrease in hazardous wastes generated.

Under the Proposed Action, use of the sanitary sewer system in vacated buildings would be discontinued and the sanitary sewer system would be expanded in the refurbished complex to include the newly constructed buildings. The total volume of sanitary waste generated, treated, and disposed of at LANL would remain unchanged.

Demolition

Demolition activities would not adversely affect waste management. The Proposed Action would require managing and disposing of wastes from demolition activities. No new solid waste landfills or hazardous waste treatment, storage, or disposal facilities would need to be established to manage these wastes.

As part of the demolition program, a waste characterization study would refine the estimates of the types and volumes of waste that would be generated by these activities. Not all waste types would be present in all buildings. The volume of solid waste from demolition activities is estimated to be approximately 21,800 yd³ (16,568 m³). Most of the waste would be uncontaminated building debris.

Hazardous wastes would be identified and removed from buildings scheduled for demolition before general structural demolition begins. Some buildings at TA-9, TA-14, TA-36, TA-39, and TA-40 that may be demolished are likely to be HE-contaminated or DU-contaminated. Sampling would be done to verify the presence or absence of HE or DU contamination. No

other buildings are expected to be HE- or DU-contaminated, but there would be hazardous waste generated from demolishing buildings containing asbestos-contaminated material, buildings with lead-based paints, and buildings contaminated with photochemicals (including silver components). Asbestos-contaminated waste would be disposed of offsite. Lead- and silver-contaminated items are RCRA-designated “characteristic” hazardous waste constituents. The wastes would be managed and disposed of offsite through the existing LANL waste management program. Disposal of these waste streams would not require new facilities and the date of closure of existing facilities would not be appreciably advanced.

Table 6 identifies estimated waste types and bounding volumes generated by demolition activities and potential disposal locations. Transportation needs are also shown in Table 6.

Table 6. Estimated Demolition Waste Types, Quantities, Traffic Effects, and Disposal Locations

Type/Source	Quantity yd ³ (m ³)	Traffic over a 96 month period (truck/year)	Potential Disposal Location
Uncontaminated building debris	21,001 (15,961)	131	Los Alamos County Landfill or other Offsite Facility
Asbestos building components	610 (464)	less than 4	Mountainair, NM, or Phoenix, AZ
Lead-based paint	2 (1.5)	less than 1	Albuquerque, NM
Photochemicals (silver)	9 (7)	less than 1	Fernley, NV
HE-contaminated material	160 (122)	less than 20	Lake Charles, LA
LLW (DU)	20 (15)	less than 1	LANL, Area G, TA-54

3.2.1.3 No Action Alternative

There would be no additional waste generation under the No Action Alternative as there would be no construction or demolition wastes generated. The construction and demolition waste shipments to other landfills or recycling centers would not occur.

3.2.2 Air Quality

3.2.2.1 Affected Environment

The *Clean Air Act* (CAA) (40 CFR 50) establishes air quality standards to protect public health and the environment from the harmful effects of air pollution. The act requires establishment of national standards of performance for new stationary sources of emissions, limitations for any new or modified structure that emits or may emit an air pollutant, and standards for emission of hazardous air pollutants (HAPs). In addition, the CAA requires that specific emission increases be evaluated to prevent a significant deterioration in air quality.

The EPA is the regulating authority for the CAA. However, EPA has granted the State of New Mexico primacy for regulating air quality under an approved State Implementation Plan¹⁴ (SIP). In New Mexico, all of the CAA regulations, with the exception of NESHAP for radionuclides (40 CFR 61), certain provisions relating to Stratospheric Ozone Protection (40 CFR 82), and the Risk Management Program (40 CFR 68) have been adopted by the state as part of the SIP, and are regulated under the *New Mexico Air Quality Control Act*.

¹⁴ The purpose of the SIP is to ensure that Federal emission standards are being implemented and National Ambient Air Quality Standards (NAAQs) are being achieved.

The New Mexico Environmental Improvement Board, as provided by the *New Mexico Air Quality Control Act*, regulates air quality through a series of air quality control regulations in the NMAC. These regulations are administered by the New Mexico Environment Department (NMED). Under the federal CAA and the SIP, LANL is subject to Federal air quality regulations, including those that are not part of the SIP, and performs all work in accordance with EPA requirements and LANL standards. In addition to the existing Federal programs, the 1990 amendments to the CAA mandate new program requirements that include control technology for HAPs, enhanced monitoring, prevention of accidental releases, and chlorofluorocarbon replacement.

LANL is considered a major air emission source under the State of New Mexico Operating Permit program because it emits more than 100 tons (91 metric tons) per year of certain nonradioactive substances. Specifically, LANL is a major source of nitrogen oxides, emitted primarily from the TA-3 steam plant boilers. Combustion units are the primary point sources of criteria pollutants (nitrogen oxides, sulfur oxides, particulate matter, and carbon monoxide) emitted at LANL.

The Proposed Action would be located in Los Alamos County. This area is in attainment with NAAQS and all New Mexico Ambient Air Quality Standards¹⁵ (NMAAQS). Air quality is a measure of the amount and distribution of potentially harmful pollutants in ambient air. The ambient air quality in and around LANL meets all EPA and DOE standards for protecting the public and workers (LANL 2001a). Air surveillance at Los Alamos includes monitoring emissions to determine the air quality effects of LANL operations. UC staff at LANL calculate annual actual LANL emissions of regulated air pollutants and report the results annually to the NMED.

In 2000, independent auditors completed a report of LANL's 1999 compliance status with the Rad NESHAP. The independent audit found that in 1999, LANL was in compliance with the Rad NESHAP requirements of the CAA. In addition, at a public meeting in Los Alamos on October 22, 2002, an independent technical audit team (Risk Assessment Corp., a South Carolina-based team) announced the results of its recently performed independent audit, the third in a series mandated by a 1997 Consent Decree resulting from a lawsuit brought against DOE and LANL by the Concerned Citizens for Nuclear Safety. The team's findings reported that LANL was in compliance with air quality standards for the audit year 2001. Total radioactive emissions during 2001 were less than 20 percent of the maximum allowed at the LANL boundary. The team further determined that there were no substantive deficiencies requiring another audit in 2003, as allowed under the Consent Decree.

Both EPA and NMED regulate nonradioactive air emissions. NMED does not regulate dust from excavation or construction, but UC or their subcontractors would take appropriate steps during construction activities to control fugitive dust and particulate emissions using, for example, BACMs such as water sprays and soil tackifiers. Excavation and construction activities are not considered stationary sources of regulated air pollutants under the New Mexico air quality requirements; these activities are not subject to permitting under 20 NMAC, Parts

¹⁵ Ambient air is defined in 40 CFR 50.1 as "that portion of the atmosphere external to buildings, to which the public has access." It is defined in the NMAC Title 20, chapter 2, part 72, as "the outdoor atmosphere, but does not include the area entirely within the boundaries of the industrial or manufacturing property within which the air contaminants are or may be emitted and public access is restricted within such boundaries."

2.70 and 2.72. Annual dust emissions from daily windblown dust are generally higher than short-term construction-related dust emissions. LANL would ensure that the NMAAQs and the NAAQS for particulate emissions are met throughout any construction activities.

Some actions relevant to construction operations and demolition require notifications or registration to the EPA or NMED. All demolition actions, as well as installation of ignition sources (such as boilers and generators), require UC to notify NMED. Mobile sources, such as automobiles and construction vehicles, are additional sources of air emissions; however, mobile sources are not regulated by NMED. Diesel emissions from conveyance vehicles are not regulated as stationary sources of emissions. Mechanical equipment including bulldozers, excavators, backhoes, cranes, tamper compactors, trenchers, and drill rigs are exempt from permitting (20 NMAC 2.72) and do not require notification to NMED.

Under the State's permit requirements listed in 20 NMAC 2.72, standby emergency generators operating less than 500 hours per year are exempt from permitting; however, a notification to the State is required. Therefore, hours of generator use are metered to qualify for this exemption.

Asbestos is present in most of the older LANL buildings being considered for demolition. Asbestos removal involves such techniques as the use of plastic barriers and HEPA filtration to mitigate airborne emissions. UC is required to provide advance notice of demolition and major renovations at LANL to NMED, to take steps to mitigate airborne emissions, and to ensure proper packaging and disposal of asbestos and asbestos wastes (40 CFR 61).

3.2.2.2 Proposed Action

Construction and demolition activities for the proposed Two-Mile Mesa Complex would be expected to produce only temporary and localized air emissions and the effects on air quality would also be temporary and localized. There would be no long-term degradation of regional air quality. Proposed operations at the new Two-Mile Mesa Complex already exist in various LANL locations and would be consolidated in a single location within the new Two-Mile Mesa Complex. Operational emissions may decrease due to increased efficiency with more modern equipment and facilities and due to a reduction in the scope or level of some operational activities.

Construction

The Proposed Action would include construction of new buildings. Construction and earth-moving activities, including landscaping, paving of parking areas, and soil contouring, associated with the Proposed Action would temporarily increase localized particulate (dust) emissions at the construction sites during the construction phase.

Although new building construction is not expected to disturb PRSs, any hazardous wastes from PRSs that cannot be avoided in the siting process would be removed by the Two-Mile Mesa Complex project before the proposed construction activities begin. Remediation activities could potentially affect air quality on a temporary basis. Excavation activities for the purpose of removing contaminated soil from the PRSs for treatment or transport could result in a minor amount of airborne fugitive dust. The amounts of air emissions would be kept to a minimum by the control measures proposed as part of the Proposed Action, such as the use of water spray trucks and soil tackifiers.

Demolition

The Proposed Action also involves demolition of buildings determined to be of no further use to LANL operations. Demolition would also be a potential temporary source of increased particulate emissions. Effects of demolition activities on air quality would be distributed over a period of several years.

Demolition activities associated with buildings that are contaminated with DU, such as the TA-36 firing sites, would be evaluated for potential requirements, such as emissions monitoring and prior approval by EPA, under the Rad NESHAP. Asbestos is present in most of the buildings being considered for demolition or renovation. Emissions from asbestos and asbestos wastes generated during renovation and demolition activities would be stringently controlled and emissions would be negligible. As noted in Section 2.1.3, BACMs would be used to control particulate dust emissions. BACMs would be selected and applied based on the particular demolition under consideration.

Waste transport and construction vehicles, such as dump trucks, bulldozers, and cranes, would also produce temporary and localized emissions of air pollutants. These emissions would be expected to be similar to those from other recent construction actions, such as the construction of the Strategic Computing Complex and the Nonproliferation and International Security Center buildings, and from recent demolition activities at LANL.

Operations

The Proposed Action would involve the relocation of existing operations from other areas of LANL. Air emissions would not increase and, in some cases, air emissions would decrease because of use of more efficient equipment facilities. No effects on air quality are expected.

Vehicle use associated with operation of the Two-Mile Mesa Complex would result in negligible localized increases in some nonradioactive air emissions. There would be no change in overall LANL vehicle emissions since there is no increase in LANL personnel attributed to the Proposed Action.

3.2.2.3 No Action Alternative

There would be no change in air quality effects associated with implementing the No Action Alternative. Buildings would be maintained to the extent necessary to prevent airborne releases of asbestos or other materials that could pose a risk to workers, the public, or the environment.

3.2.3 Cultural Resources

3.2.3.1 Affected Environment

Cultural resources include any prehistoric sites, buildings, structures, districts, or other places or objects considered to be important to a culture or community for scientific, traditional, religious, or any other reason. They combine to form the human legacy for a particular place (DOE 1999a). To date, over 2,000 archaeological sites and historic properties have been recorded at LANL.

The criteria used for evaluating cultural resources depends upon their significance as sites eligible for listing to the National Register of Historic Places (NRHP) as described in the *National Historic Preservation Act* (16 USC 470). These determinations of significance are met

by evaluating each cultural resource based on it meeting any one or more of the following criteria:

- Criterion A association with events that have made a significant contribution to the broad pattern of our history,
- Criterion B association with the lives of persons significant in our past,
- Criterion C illustration of a type, period, or method of construction; for its aesthetic values or for its representation of the work of a master; or if it represents a significant and distinguished entity whose components may lack individual distinction, and
- Criterion D it has yielded, or may be likely to yield, information important in prehistory or history.

One historic archaeological site, a historic homestead, is located near the existing Two-Mile Mesa Complex. The remaining evidence of the homestead, located on the edge of Pajarito Canyon, consists of a stone cabin foundation, stone pens and corrals, various outbuildings, an *horno*, rock walls, and barbed-wire fences. There are also trails to the bottom of the canyon. Remnants of the original fence line and a rock retaining wall still define the perimeters of the homestead. A cleared field area is located north of the central site. No concentrated refuse disposal area was located; but scattered surface refuse is present. Based on the artifacts and the known history of the area, this site was determined to have been occupied between the 1890s and 1943.

Five archaeological sites are located in the vicinity of the proposed new access roads and access-control stations. The preferred option for the entrance road at TA-16 passes between two archaeological sites east of Cañon de Valle; these archaeological sites would be avoided. There are three prehistoric archaeological sites in the area of the second option for the access road and access-control station at TA-69. Two of these sites (a historic rock alignment and a prehistoric lithic scatter) have been determined to be ineligible for the NRHP and need not be avoided. The NRHP-eligible site would be avoided.

Numerous structures in TA-9, TA-14, TA-15, TA-22, TA-36, TA-39, TA-40, and TA-69 have been identified as historic or potentially historic structures. Fifty-three Manhattan Project and Cold War Era properties (1943–1963) and three later buildings, which were identified as significant Laboratory properties in the SWEIS (DOE 1999a), are located within the proposed area of consolidation at TA-9, TA-14, TA-15, TA-22, TA-36, TA-39, TA-40, and TA-69. With exception of four buildings, these buildings have not had a formal determination of eligibility for the NRHP. NRHP eligibility recommendations for buildings affected by the Proposed Action are listed in Table 7. A Cultural Resource Management Plan is being prepared for LANL that will include a management strategy of historic and prehistoric properties, including those affected by the Proposed Action.

3.2.3.2 Proposed Action

The planned consolidation of the DX complex would not affect the recorded historic archaeological site or the recorded prehistoric archaeological sites. The demolition of various historic buildings would have an adverse effect on NRHP-eligible and potentially eligible historic structures. The primary effect would be the loss of NRHP-eligible and potentially eligible properties through demolition. The importance of these buildings and others to LANL's history has not been assessed. Many buildings are considered eligible for the NRHP under

Criteria A, B, or C. An NRHP eligibility assessment for these buildings would be completed and sent to the New Mexico SHPO for concurrence. Also, the Advisory Council on Historic Preservation would be notified of any adverse effects. NRHP-eligible properties that could be adversely affected by the Proposed Action are identified in Table 7. Adverse effects to NRHP-eligible properties would have to be resolved before implementing the Proposed Action.

Table 7. NRHP Eligibility Recommendation for Buildings to be Vacated under the Proposed Action

Building Number	Building Name	Date Built	Eligible or Potentially Eligible	Effect on NRHP-Eligible Historic Buildings
TA-9-21	Laboratory and Office Building	1952	Yes	Yes
TA-9-28	Shop Building (Machine Shop)	1952	Yes	Yes
TA-9-29	Stock and Equipment Building	1952	Yes	Yes
TA-9-30	Gas Storage	1952	Yes	Yes
TA-9-31	Solvent Storage	1952	Yes	Yes
TA-9-32	Laboratory/Office Building	1952	Yes	Yes
TA-9-33	Laboratory Building	1952	Yes	Yes
TA-9-34	Process Laboratory	1952	Yes	Yes
TA-9-35	Process Laboratory	1952	Yes	Yes
TA-9-36	Magazine	1952	Yes	Yes
TA-9-37	Process Laboratory	1952	Yes	Yes
TA-9-43	Process Laboratory	1952	Yes	Yes
TA-9-49	Magazine	1952	Yes	Yes
TA-9-50	Receiving and Shipping	1952	Yes	Yes
TA-9-52	Magazine	1952	Yes	Yes
TA-9-53	Magazine	1952	Yes	Yes
TA-9-54	Magazine	1952	Yes	Yes
TA-9-55	Magazine	1952	Yes	Yes
TA-9-28	Shop Building	1952	Yes	Yes
TA-9-48	Machining Building	1952	Yes	Yes
TA-9-272	Transportable	1988	No	No
TA-9-273	Transportable	1984	No	No
TA-9-265	Boiler Building	2000	No	No
TA-14-6	Storage	1944	Yes	Yes
TA-14-22	Magazine	1952	Yes	Yes
TA-14-23	Control Building	1952	Yes	Yes
TA-14-24	Magazine	1952	Yes	Yes
TA-15-30	Guard Station	1949	Yes	Yes
TA-15-40	Laboratory and Office Building	1951	Yes	Yes
TA-15-46	Exercise Facility (Former Guard Station)	1951	Yes	Yes
TA-15-140	Storage Building	1952	Yes	Yes
TA-15-183	Laboratory and Office Building	1961	Yes	Yes
TA-15-447	Trailer	1984	No	No
TA-15-448	Trailer	1984	No	No
TA-15-456	Transportable	1984	No	No
TA-15-476	Trailer	1986	No	No
TA-22-52	Machine Shop	1952	Yes	Yes
TA-22-66	Storage Building	1956	Yes	Yes
TA-22-67	Storage Building	1956	Yes	Yes
TA-22-68	Storage Building	1956	Yes	Yes
TA-22-69	Storage Building	1956	Yes	Yes
TA-36-5	Preparation Building	1950	Yes	Yes
TA-36-6	Control Building	1950	Yes	Yes
TA-39-2	Laboratory/Office Building	1953	Yes	Yes
TA-39-6	Firing Chamber #1	1953	Yes	Yes

Table 7. continued

Building Number	Bldg Name	Date Built	Eligible or Potentially Eligible	Effect on NRHP-Eligible Historic Buildings
TA-39-67	Capacitor Bank Enclosure (Support for Chamber #1, TA-39-6)	1964	No	No
TA-39-103	Transportable	1985	No	No
TA-39-107	Transportable	1987	No	No
TA-39-138	Neutron Flux Storage (Support for Chamber #1, TA-39-6)	1979	Yes	Yes
TA-40-1	Laboratory and Office	1950	Yes	Yes
TA-40-2	Magazine	1950	Yes	Yes
TA-40-3	Preparation Building	1950	Yes	Yes
TA-40-4	Firing Point	1950	Yes	Yes
TA-40-8	Firing Point	1950	Yes	Yes
TA-40-9	Firing Point	1950	Yes	Yes
TA-40-12	Crystal Laboratory	1950	Yes	Yes
TA-40-13	Magazine	1950	Yes	Yes
TA-40-14	Preparation Building	1950	Yes	Yes
TA-40-15	Firing Point	1950	Yes	Yes
TA-40-23	Machine Shop	1950	Yes	Yes
TA-40-36	Magazine	1952	Yes	Yes
TA-40-37	Magazine/Firing Chamber	1952	Yes	Yes
TA-40-38	Magazine	1952	Yes	Yes
TA-40-39	Magazine	1952	Yes	Yes
TA-40-40	Inert Preparation Building	1952	Yes	Yes
TA-40-41	Laboratory Building	1951	Yes	Yes
TA-40-45	Solvent Shed	1970	No	No
TA-40-90	Transportable	1999	No	No
TA-69-1	Guard Station	1955	Yes	Yes
TA-69-2	Doublewide Trailer	1987	No	No
TA-69-5	Trailer	1986	No	No
TA-69-26	Guard Station #431 (placed at this site approximately 1996) (Building physically has number TA-69-4 attached to it)	1991	No	No

Because the demolition of NRHP-eligible Manhattan Project and Cold War Era buildings would be an adverse effect to the property under Section 106 of the *National Historic Preservation Act of 1966* (as amended) and (36 CFR 800), “Assessment of Adverse Effects,” a treatment plan to resolve these adverse effects would be negotiated between the SHPO and NNSA. One treatment plan would cover all of the eligible buildings affected by the Proposed Action. The treatment plan for the affected buildings could include a combination of the following elements: archival medium-format photographs, existing architectural blueprints, preparation of as-built drawings, preparation of detailed reports on buildings’ histories, and interviews with past and present workers. Not all elements would necessarily be applied to all of the eligible buildings. Changes to the treatment plan could result from negotiations with the SHPO over the resolution of the adverse effects.

A Memorandum of Agreement between NNSA and the SHPO for resolution of adverse effects would be prepared following SHPO concurrence on the NRHP eligibility assessment. The treatment plan would be implemented and would proceed parallel with this EA. The Advisory Council on Historic Preservation would be notified of the Memorandum of Agreement and would have an opportunity to comment.

Archaeological sites in the vicinity of the proposed access roads and access-control stations would be avoided. Road alignments and designs would be reviewed as design proceeded into final phases to ensure that archaeological sites are sufficiently protected from construction impacts.

3.2.3.3 No Action Alternative

The effect of the No Action Alternative on cultural resources is that potentially NRHP-eligible historic structures would not be demolished and would continue to be used in their current fashion. As portions of buildings or entire structures were deemed to no longer be suitable for continuous human occupancy, those buildings or portions of buildings would be abandoned. The structures would deteriorate with no or minimal maintenance. This type of deterioration is also considered an adverse effect under Section 106.

3.2.4 Visual Resources

3.2.4.1 Affected Environment

The visual environment of LANL is described in the SWEIS (DOE 1999a). The natural setting of the Los Alamos area is panoramic and scenic. The mountain landscape, unusual geology, varied plant communities, and archaeological heritage of the area create a diverse visual environment. Portions of the viewshed underwent substantial changes as a result of the Cerro Grande Fire. The fire burned large areas of the mountain slopes that form the principal scenic background in the Los Alamos area. The resulting landscape is both more stark and less uniform than before the fire (DOE 2000b).

Much of the development within LANL is austere and utilitarian. Overcrowded conditions have often resulted in an unplanned, visually discordant assembly of temporary and permanent structures. Much of the development has occurred out of the public's view. The most visible developments are a few tall structures, facilities at high, exposed locations, and those beside well-traveled, publicly accessible roads. The extremely dense mixed development in areas such as TA-3 has been identified as an adverse visual effect (DOE 1999b).

The Proposed Action would be implemented mainly within LANL's Experimental Engineering and Dynamic Experimentation Planning Areas. These areas consist of undeveloped forested areas and areas of secondary forest growth interspersed with clusters of buildings. Some of the building clusters are industrial in appearance; others, such as that at the existing Two-Mile Mesa Complex, resembles an industrial park. Vistas of the Sangre de Cristo Mountains and the east face of the Jemez Mountains are common in the areas affected by the Proposed Action. Views across the Two-Mile Mesa Complex, and in other areas of DX facilities, are generally pleasant, with industrial elements visually subservient to other landscape elements.

3.2.4.2 Proposed Action

Construction activities under the Proposed Action would have some local short-term adverse effects; long-term effects on the viewscape from construction and demolition are expected to be minimal. Consolidation of operations under the Proposed Action would have no effects on visual resources.

The Proposed Action is consistent with goals for architectural and landscaping upgrades identified in LANL's Comprehensive Site Plan 2000 (LANL 2000). The proposed Two-Mile

Mesa Complex is generally not visible from public roads; the proposed buildings would be similar in height to existing buildings. The visual effects of construction would be confined to the immediate area of the existing Two-Mile Mesa Complex.

Short-term temporary adverse visual effects would occur during the construction period. These effects involve staging and use of construction vehicles and erecting construction fences. Occasional fugitive airborne dust from soil disturbance may temporarily obscure local views for short periods of time.

In the long term, the area would experience minimal effects. After completion of proposed construction, the Two-Mile Mesa Complex would still resemble an industrial park but on an expanded scale. Buildings would generally be more prominent elements within the overall landscape but vistas would typically not be affected. The proposed campus setting of the Two-Mile Mesa Complex would incorporate buildings of similar style and would include unifying landscaping which would enhance the immediate visual environment.

Demolition activities would generally result in the same local, short-term adverse effects as would occur during the construction phase. Overall, the removal of buildings would enhance the visual characteristics of the areas where they are currently located. Depending on the extent to which buildings are removed from the various technical areas, some areas would be returned to more natural conditions.

3.2.4.3 No Action Alternative

Under the No Action Alternative, the existing building appearance and configuration would be retained. No visual resources effects would occur from construction or demolition. Adverse visual effects could result over time from deteriorating structures.

3.2.5 Transportation, Traffic, and Infrastructure

3.2.5.1 Affected Environment

The transportation system in and around the Two-Mile Mesa Complex consists of local roads. Currently, the only access to the complex is via Anchor Ranch Road and Two-Mile Mesa Road. A new connector road links Two-Mile Mesa Complex with Anchor Ranch Road in TA-08. These interior roads are not open to public traffic. SR 501, a highway owned by DOE but open to the public, provides access to these interior roads. SR 501 links Los Alamos town site and SR 502 with SR 4. Parking lots are currently provided next to all of the buildings in the Two-Mile Mesa Complex.

The water system in the Anchor Ranch area and at the Two-Mile Mesa Complex is in fair to marginal condition. The distribution lines are constructed of asbestos containing cement and are reaching the end of their design life. Asbestos containing cement lines are susceptible to ground movement and surges, which create cracks and joint leaks that are expensive to repair. There are several distribution lines in the area that need to be replaced and upgraded to meet current fire protection standards. The existing water storage and distribution system would have to be upgraded to support future growth.

The natural gas distribution system, which is in generally good condition, can provide excess capacity to support another two to three buildings in the TA-22, TA-40, TA-16, and TA-15 areas. To determine if there is sufficient capacity for additional buildings at the Two-Mile Mesa

Complex, a load study of the existing system is necessary. If additional capacity is required to supply the Two-Mile Mesa Complex, the existing 2.5-inch (6.25-centimeter) gas main could be upgraded in its current location.

The electrical distribution system serving the Anchor Ranch area and Two-Mile Mesa Complex is adequate to support the current loads, but cannot accommodate any expansion. Due to its length, the existing 13.8-kilovolt (kV) circuit is prone to lightning-caused interruption. An electrical upgrade, currently under construction, will provide a new 13.8-kV line to TA-15 and will include the new Western Technical Area (WTA) substation located just north of Two-Mile Mesa Complex. This substation has a 50-megawatt capacity and will support growth in the Anchor Ranch area while improving service reliability. A new 115-kV transmission line that would cross the Anchor Ranch area is now in the design stage (DOE 2000c). This line would provide electrical power to support operations at the Two-Mile Mesa Complex and would provide another connection to the northern New Mexico power grid. This connection would allow more power to be delivered to the new WTA substation, giving LANL a more robust system that could support larger loads. There will be sufficient power capacity at the new WTA substation and more power could be delivered through the proposed 115-kV line from outside sources to WTA, but projects or programs at the Two-Mile Mesa Complex would have to install new feeder connections from WTA to accomplish this. These new feeders would also provide redundancy and increased reliability.

The sewers at the Two-Mile Mesa Complex are in fair to good condition but there are concerns about deterioration because of some of the materials (such as vitrified clay, asbestos cement, and concrete) that were used in the system when it was installed. There is capacity to support development at the Two-Mile Mesa Complex, but the collection system would need to be upgraded to accommodate new buildings and population. There are two major lift stations that handle the site; one installed for Buildings 90 and 91 at TA-22, and another installed for the Sanitary Wastewater System Consolidation (SWSC) project in 1991. The collection line and lift station for Buildings 90 and 91 would be the most likely place to add flow and the pumps could be upgraded if necessary since these pump to the SWSC lift station. The SWSC lift station at the south side of the site could handle a larger population because it is sized to handle higher discharges.

Telecommunications and data systems for the Two-Mile Mesa Complex are connected to telecommunications and data systems in TA-3. The present telecommunications capacity at the complex consists of approximately 250 lines. An additional copper feeder cable would be needed as the Two-Mile Mesa Complex is developed. Fiber optic capacity at the Two-Mile Mesa Complex is sufficient to serve the planned new facilities.

3.2.5.2 Proposed Action

Implementing the Proposed Action would have a net beneficial effect on transportation and safety at LANL. It would also have an overall benefit on utility use and infrastructure.

The proposed new access control station and access road from SR 501 to Anchor Ranch would address traffic safety concerns that have resulted from the queuing that now occurs along SR 501 at TA-69 and Anchor Ranch Road. There would also be localized enhancements to vehicle access and circulation and parking in and around the Two-Mile Mesa Complex. Walkways would also be provided for pedestrians.

The net increase in worker population at the Two-Mile Mesa Complex over the 10-year build out would be approximately 460 persons. However, most of these workers already commute to other technical areas accessed from SR 501; therefore, there would be no substantial increase in traffic on SR 501. Approximately 80 construction workers would be engaged during the peak construction period and this would add about 70 average daily trips to the local road network. These workers would park their personal vehicles either in existing parking lots or in other designated parking areas. In addition, about three NNSA and 20 UC workers may perform site inspections and monitor construction and demolition activities during peak activity periods. Vehicles (such as dump trucks) and heavy machinery (such as bulldozers, drill rigs, dump trucks, cranes, and cement mixer trucks) would be used onsite during the construction phase. These vehicles would operate primarily during the daylight hours and would be left onsite over night.

Utilities may be upgraded to assure capacity and reliability and to reduce maintenance costs. Approximately 16,000 linear ft (4,800 m) of trenches would need to be excavated to accommodate these upgrades. As stated earlier, new construction projects would incorporate energy efficient technologies and designs. The Proposed Action is expected to decrease overall utility use per building. Utility usage would increase at the Two-Mile Mesa Complex and decrease at other DX technical areas after operations in those areas are moved to new structures in the Two-Mile Mesa Complex.

3.2.5.3 No Action Alternative

Under the No Action Alternative, the new entrance from SR 501, new parking lots, and proposed utility upgrades would not be constructed in and around the Two-Mile Mesa Complex area. Traffic hazards and related accidents along SR 501 at TA-16 and Anchor Ranch Road would remain unchanged. However, the additional construction traffic generated by development of the Two-Mile Mesa Complex would not materialize. Existing utilities would be maintained and repaired as required when there are service disruptions but additional utility capacity would not be added to existing systems.

3.2.6 Geologic Setting

3.2.6.1 Affected Environment

The Jemez Mountains volcanic field is located in northern New Mexico at the intersection of the western margin of the Rio Grande Rift and the Jemez Lineament (Figure 5) (Gardner et al. 1986; Heiken et al. 1996). The Jemez Lineament is a northeast-southwest-trending alignment of young volcanic fields ranging from the Springerville volcanic field in east-central Arizona to the Raton volcanic field of northeastern New Mexico (Heiken et al. 1996). The Jemez Mountains volcanic field is the largest volcanic center along this lineament (LANL 1992). Volcanism in this volcanic field spans a roughly 16-million-year period beginning with the eruptions of numerous basaltic lava flows. Various other eruptions of basaltic, rhyolitic, and intermediate composition lavas and ash flows occurred sporadically during the next 15 million years with volcanic activity culminating in the eruption of the rhyolitic Bandelier Tuff at 1.79 and 1.23 million years ago (Self and Sykes 1996). All of LANL is within this volcanic field along the western edge of the Rio Grande Rift. Most of the bedrock immediately underlying LANL is composed of Bandelier Tuff.

The geologic structure of the area is dominated by the north-south-trending Pajarito Fault system. The Pajarito Fault system forms the western structural boundary of the Rio Grande Rift,

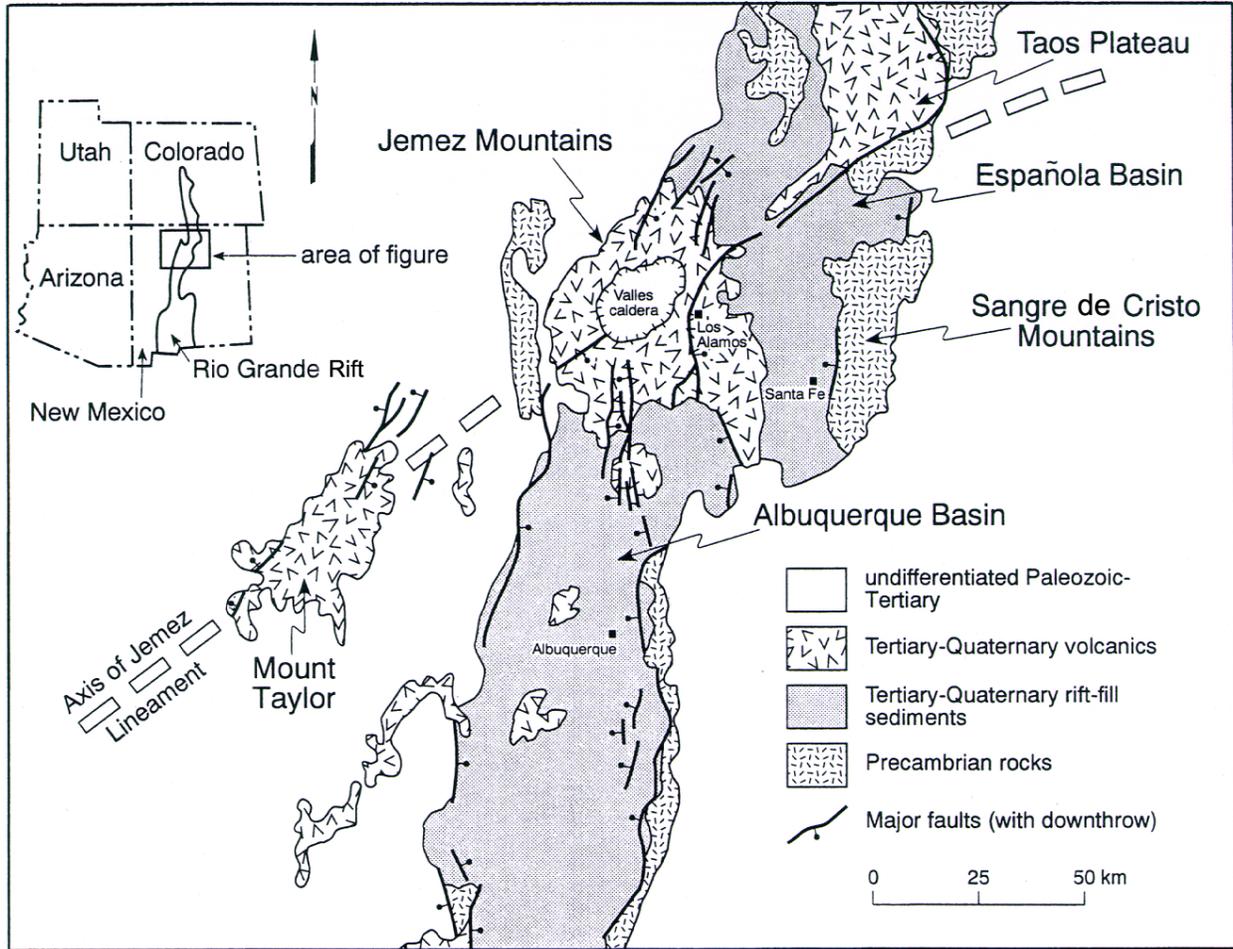


Figure 5. Generalized geologic map of the Rio Grande Rift in the vicinity of the Jemez Mountains volcanic field. From Self and Sykes (1996).

along the western edge of the Española Basin, and the eastern edge of the Jemez Mountains volcanic field. The Pajarito Fault system consists of three major faults and numerous secondary faults with vertical displacements ranging from 80 ft to 400 ft (24 m to 120 m). Estimates of the timing of the most recent surface rupturing paleoearthquakes along this fault range from 3,000 to 24,000 years ago (LANL 2001c).

The bedrock in the area of the Two-Mile Mesa Complex consists of units 3 and 4 of the Tshirege member of the Bandelier tuff (LANL 2002c). Atop the tuff units sits various alluvial gravels containing reworked post-Bandelier pumice beds. The source of the pumice is the Cerro del Medio dome complex within the Valles Caldera. These gravels are no younger than ca. 50 to 60 thousand years (LANL 2002c).

Faulting and fracturing between TA-3 and TA-16 are dominated by north-northeast- to north-northwest-striking faults and associated folds with small amounts of downward displacement to the east and west. The deformation in this area extends at least 5,000 ft (1,500 m) to the east of the main escarpment of the Pajarito Fault, which is immediately west of and roughly parallel to SR 501. This deformation appears to be associated with the Pajarito Fault.

Immediately southwest of TA-22 Buildings 66, 67, 68, and 69 is a series of small northeast trending faults in Figure 6 (LANL 2002c). These faults represent the eastern edge of a sedimentary basin bounded on two sides by faults (a feature known as a “graben”). This graben is about 1,000 ft (300 m) wide near Two-Mile Mesa Complex and widens to about 2,000 ft (600 m) near TA-16. The length of the graben is about 4,000 ft (1,200 m). This graben is the largest structure within the area. The F3 faults have an overall displacement of about 10 ft (3 m) down to the west. The western bounding fault of this graben may connect to a mapped fault northwest of Building 9-48 near the Two-Mile Mesa Complex area. This fault has a displacement of about 5 ft (1.5 m) down to the east. The graben may extend northward in the subsurface through the Two-Mile Mesa Complex (west of Building 22-90) although this has not been substantiated.

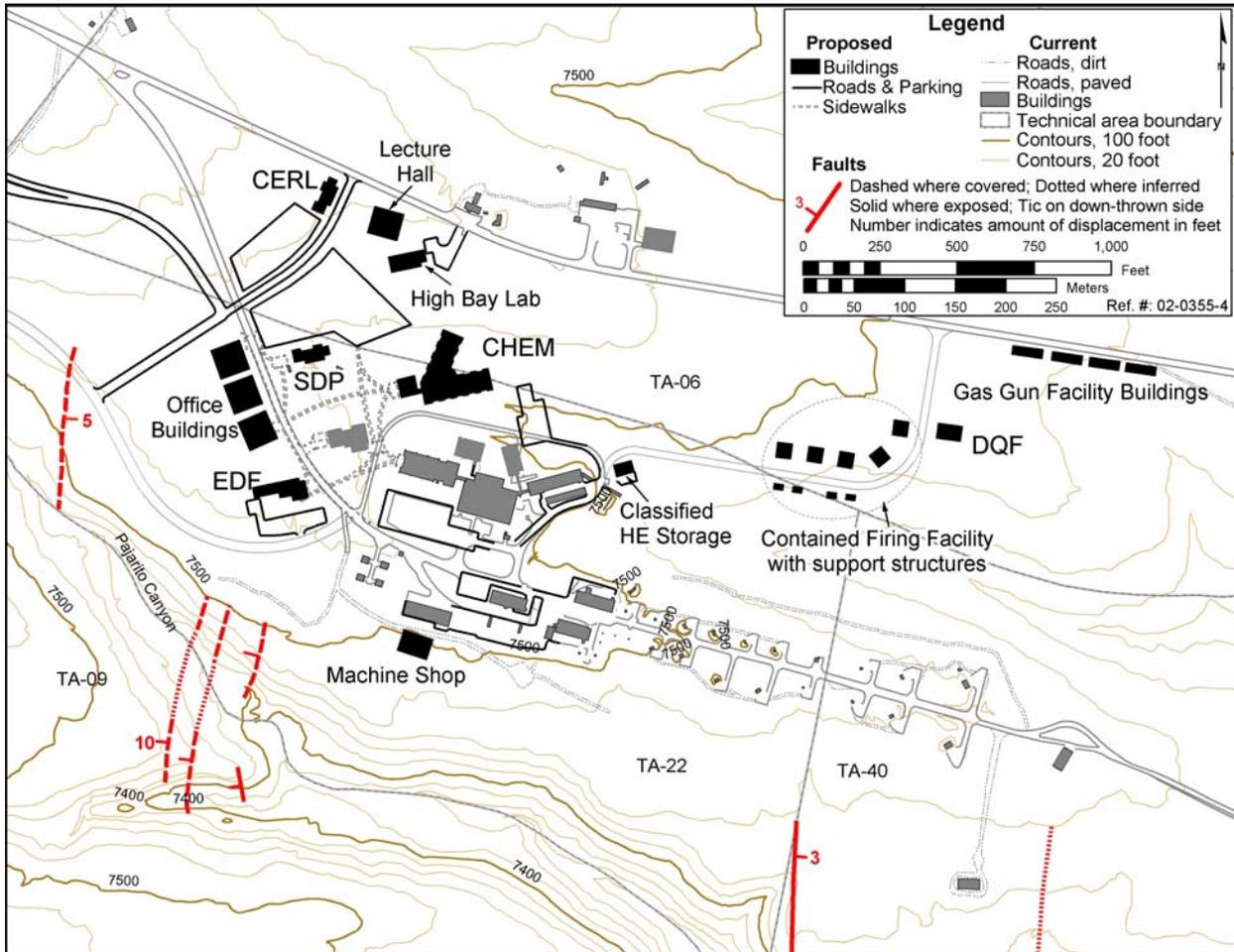


Figure 6. Conceptual drawing of the proposed Two-Mile Mesa Complex showing the approximate locations of the Pajarito and other faults (LANL 2002c).

Most, if not all, of the area of the Two-Mile Mesa Complex lies within the Pajarito Fault Zone. Therefore, the area has a generally higher potential for seismic surface rupture, relative to locations farther removed from the Pajarito Fault Zone (LANL 2001b, 2002b). However, probabilistic analysis of 1 in 10,000 year seismic events suggests that significant seismic events

are only expected to occur along, or on, the main trace of the Pajarito Fault (LANL 2001b, 2002b) west of SR 501. Even though probabilities are low, the Pajarito Fault Zone must be considered active or “capable” in the definitions of 10 CFR 100 Appendix A. The LANL Seismic Hazards Program recommends that siting new facilities over the trace of a potential fault active since the Holocene should be avoided (LANL 1999b).

3.2.6.2 Proposed Action

The Proposed Action would not affect or be affected by geological conditions. A review of existing information on local geology at the Two-Mile Mesa area indicates that there are no *known* geologic hazards in the immediate vicinity of this site. However, faults were mapped immediately south of the proposed buildings (see Figure 6) where they are exposed in the canyon wall. Projection of some of these mapped faults northward takes them directly through proposed building locations. There are currently insufficient data to determine exactly where faults pass through the Two-Mile Mesa Complex. It is also not known if these mapped faults are active. Other similar subsidiary faults to the Pajarito fault within the boundaries of LANL have been shown, through paleoseismic trenching investigations, to be active (LANL 2002d). Because of uncertainties regarding the exact location of these faults and the unknown potential for surface rupture on any newly identified faults, a site-specific seismic hazards survey would be performed early in the design phase to determine the locations of these faults and to what degree they might be active. This will allow for the proper siting of new facilities with respect to seismic hazards in the area. Facilities would be sited, designed, and constructed to meet appropriate seismic code requirements, LANL construction standards, and DOE guidance. However, probabilistic analysis of 1 in 10,000 year seismic events suggests that seismic events are expected to be significant only along, or on, the main trace of the Pajarito Fault (Gardner et al 2001), which is sub-parallel to, and west of, SR 501 along the western boundary of LANL.

3.2.6.3 No Action Alternative

Under the No Action Alternative, operations would not be consolidated in the Two-Mile Mesa Complex area and various operations would continue in buildings that do not meet the seismic hazard standards that apply to new construction. If operations in these facilities are not relocated as part of the Proposed Action, NNSA would evaluate the seismic hazards and would implement mitigation measures as necessary. Probabilistic analysis of 1 in 10,000 year events indicate that surface rupture would only become a notable hazard on the main trace of the Pajarito Fault [(LANL 2001b, 2002b) and references therein].

3.2.7 Water Quality

3.2.7.1 Affected Environment

Analysis of LANL surface water and groundwater samples taken from streams and test wells indicate that LANL operations and activities have affected the surface water within LANL boundaries and some of the alluvial and intermediate perched zones in the LANL region. Details on the surface and groundwater quality can be found in the annual LANL Environmental Surveillance Report (LANL 2001a).

Radiation (gross alpha, gross beta, and gross gamma) and radionuclide levels in surface waters are generally below drinking water and public dose standards, although surface waters at LANL are not used for drinking water. However, some measurements exceeding drinking water

standards have been recorded at those locations on LANL where former or current radioactive liquid waste discharges occurred: Acid and Pueblo, DP and Los Alamos, and Mortandad Canyons. There are no permitted outfalls within the existing Two-Mile Mesa Complex. Most buildings, however, have roof drains that empty into the environment.

Metals in surface water samples are typically below applicable standards when the samples are filtered before analysis. However, metal concentrations exceeding drinking water standards are relatively widespread when samples are not filtered. Radionuclide concentrations exceed regional comparison values in several sediment samples below former or current radioactive liquid waste discharges. In general, while some sediment samples exceed regional comparison value concentrations for trace metals, most of these metals may occur naturally in the sediments. The exception to this is selenium in sediments from upper Los Alamos Canyon and mercury in several locations (LANL 2001a).

In the regional aquifer, which serves LANL and Los Alamos County, drinking water standards have been met for all radionuclides. Trace amounts of tritium, plutonium, americium, and strontium have been detected in regional aquifer test wells, but not in the potable water supply. Organic compounds have been detected in the regional aquifer from test wells at TA-49 and TA-16. Inorganic compounds have also been detected in the regional aquifer at LANL. Nitrate has been detected down-canyon from the Bayo Wastewater Treatment Plant in Pueblo Canyon on the north side of LANL and perchlorate was detected below drinking water standards in one water supply well. Contaminants also have been detected in alluvial and intermediate perched groundwater near former or present effluent discharge points (DOE 1999b).

3.2.7.2 Proposed Action

Water quality in this area would not be affected by the Proposed Action. New facilities would be designed using pollution prevention processes that lead to minimal waste generation. BMPs, as specified in the Storm Water Pollution Prevention Plan, would be employed during construction to restrict surface water movement and minimize soil erosion that could degrade surface water quality. Post construction landscaping would also serve to protect surface and groundwater quality.

No new outfalls, wastewater, or hazardous waste streams would be created by implementing the Proposed Action. Use of the sanitary sewer system in the buildings to be vacated would be discontinued and a reconfiguration of the sanitary system would be made in the Two-Mile Mesa Complex. Water quality would not change as a result of operations of new buildings in the Two-Mile Mesa Complex.

Removal of asphalt in some areas would decrease surface water runoff and would increase surface water infiltration. Establishment of new asphalt parking areas would have the reverse effect. Water use would be expected to be static. The net increased infiltration is not expected to have any adverse effects on groundwater quality.

3.2.7.3 No Action Alternative

There would be no effects to water quality under the No Action Alternative. No increased infiltration because of asphalt removal would occur.

3.2.8 Human Health

3.2.8.1 Affected Environment

This section considers the health of LANL workers and non-UC construction or demolition workers. These two categories are considered in this EA because each category of worker would either be involved in the routine operation of the proposed consolidation of DX operations, work on the construction of new buildings, demolition of vacated buildings and structures, or could be affected by potential accidents at the new Two-Mile Mesa Complex. Members of the public are not considered because they are not likely to be affected by routine operations, construction or demolition activities, or any potential accident scenarios that could result from the Proposed Action.

The health of LANL workers is routinely monitored depending upon the type of work performed. Health monitoring programs for LANL DX workers consider a wide range of potential concerns including exposures to radioactive materials, HE, hazardous chemicals, and routine workplace hazards. In addition, LANL DX workers involved in hazardous operations are protected by engineering controls and required to wear appropriate PPE. Training is also required to identify and avoid or correct potential hazards typically found in the work environment and to respond to emergency situations. Because of the various health monitoring programs and the requirements for PPE and routine health and safety training, LANL workers are generally considered to be a healthy workforce with a below average incidence of work-related injuries and illnesses.

UC staff monitor environmental media for contaminants that could affect non-UC workers or members of the public. This information is reported to regulatory agencies, such as the NMED and to the public in accordance with various permits and reporting mechanisms and it is used to assess the effects of routine operations at LANL on the general public. For detailed information about environmental media monitoring and doses to the public, see LANL's Environmental Surveillance Report for 2001 (LANL 2002b). For those persons that work within the boundaries of LANL as subcontractors or construction workers and could be exposed to radioactive or other hazardous materials, their exposures are monitored in the same manner as LANL workers. In addition, site-specific training and PPE requirements would also apply to these workers.

3.2.8.2 Proposed Action

Construction and demolition work planned under the Proposed Action would not be expected to have any adverse health effects on LANL workers. LANL workers would not be directly involved in the construction or demolition of buildings and structures, parking areas, road upgrades, or the movement of fencing and utilities but they would be active in management, site inspections, and utility hook-ups. Approximately three NNSA and 20 LANL workers would perform site inspections and monitor construction and demolition activities during periods of peak activity. Applicable safety and health training and monitoring, PPE, and work-site hazard controls would be required for these workers.

The Proposed Action is not expected to result in an adverse effect on the health of construction workers. Approximately 80 peak-period construction workers, including approximately 35 construction vehicles, would be actively involved in potentially hazardous activities such as heavy equipment operations, soil excavations, and building construction. Construction activities would occur over about a 10-year period ending about 2013. Potentially serious exposures to

various hazards or injuries are possible during the construction phase of the Proposed Action. Adverse effects could range from relatively minor (e.g., cuts or sprains) to major (e.g., broken bones or fatalities). To prevent serious injuries, all site construction contractors are required to submit and adhere to a Contractor Safety Plan (Plan). This Plan is reviewed and approved by LANL staff before construction activities can begin. Following approval of this Plan, LANL and NNSA site inspectors would routinely verify that construction contractors are adhering to the Plan, including applicable Federal and state health and safety standards. Adherence to an approved Plan, use of PPE and engineered controls, and completion of appropriate hazards training are expected to prevent adverse health effects on construction workers.

Demolition work could begin during the construction phase but would likely be completed by about 2013. Approximately 80 peak-period demolition workers would be actively involved in the same potentially hazardous activities as would construction workers. In addition, exposures to radioactive debris, beryllium, asbestos, uranium, HE, and hazardous chemicals could also pose a potential health hazard to these workers. Adherence to the Plan, use of PPE and engineered controls, and completion of appropriate hazards training are expected to prevent adverse health effects on construction workers. Engineered controls and the use of hazard control plans to protect worker health and safety would be a routine part of construction activities.

Improvements in facilities and operations planned under the Proposed Action are expected to have a beneficial effect on the health of LANL and subcontractor workers. Applicable safety and health training and work-site hazard controls would be required for these workers and for any hazardous operations they would perform. The health effects of hazardous operations planned under the Proposed Action have been analyzed in detail in the SWEIS (DOE 1999a). In particular, worker health hazards are possible from exposure to radioactive materials, HE, electrical fields, pyrophoric metal, metal work, saws and lathes, and other physical hazards. Machining of nontoxic metals pose respiratory and disease risks. Exposures to various chemicals used in the fabrication of plastics can also cause injury.

Although all of the hazardous activities performed at the Two-Mile Mesa Complex and analyzed in the SWEIS would continue to be performed under the Proposed Action, the relocation of these activities into remodeled or new and modern facilities would reduce the potential for worker exposures and injuries or illnesses. Improvements in ventilation controls, storage and transport of hazardous materials, use of automated and remotely operated equipment, and other process improvements would effectively reduce worker health and safety risks below the risk levels that currently exist in DX operating facilities.

3.2.8.3 No Action Alternative

Under the No Action Alternative, the potential for injuries to UC workers, construction workers, demolition workers, and members of the public would not occur from the construction of the proposed buildings. No exposures to hazardous or radioactive materials would occur as a result of demolition activities. Existing facilities would continue to be used to perform hazardous operations and to house workers. Because of the age of existing facilities and the difficulties in meeting current health and safety codes and standards, the needs for additional controls would likely increase over time. Therefore, it is expected that either more safety measures would need to be put into effect or the existing facilities would need to be vacated over time.

3.2.9 Environmental Restoration

3.2.9.1 Affected Environment

DOE and LANL staff at LANL are jointly responsible for implementing the DOE ER Program at LANL, which is a designated RCRA hazardous waste facility. The ER Project is governed primarily by the corrective action process prescribed in the RCRA, but it is also subject to LANL policies and to other applicable laws and regulations. The NMED administers RCRA in New Mexico. DOE conducts site characterization and waste cleanup (corrective action) activities at PRSs at LANL. Site characterization and cleanup is needed to reduce risk to human health and the environment posed by potential releases of contaminants at ER Project sites.

PRSs include SWMUs and AOCs, collectively. PRSs at LANL include septic tanks and lines, chemical storage areas, wastewater outfalls (the area below a pipe that drains wastewater), material disposal areas (landfills), incinerators, firing ranges and their impact areas, surface spills, and electric transformers. PRSs are found on mesa tops, in material disposal areas, in canyons, and in a few areas in the Los Alamos town site.

The primary means of contaminant release from these sites are surface water runoff carrying potentially contaminated sediments and soil erosion exposing buried contaminants. The main pathways by which released contaminants can migrate are infiltration into alluvial aquifers, airborne dispersion of particulate matter, and sediment migration from surface runoff. The contaminants involved include volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, asbestos, pesticides, heavy metals, beryllium, radionuclides, petroleum products, and HE. The 1999 LANL SWEIS (DOE 1999a) contains additional information on contaminants.

There are nine PRSs in the vicinity of the proposed Two-Mile Mesa Complex according to the LANL ER Program database. These are described in Table 8. Five of these PRSs overlap and are depicted on ER Project maps as a single consolidated site. Development may occur in clean areas of the consolidated PRS.

Table 8. Potential Release Sites in the Vicinity of the Proposed Two-Mile Mesa Complex

PRS #	Description	Status
06-002	Former septic tank	NMED requires further sampling
C-06-005	Location of former Detonator Assembly Building	NMED requires further sampling
06-003(c)	Inactive firing site	"Clean," recommended for No Further Action (NFA)
C-06-006	Location of former Explosives Pressing Building	"Clean," recommended for NFA
C-06-016	Location of former explosives magazine	"Clean," recommended for NFA
C-06-020	Location of former employee resthouse	"Clean," recommended for NFA
08-009(a)	Former storm drain outlet, drainline, outfall	Requires further investigation
08-009(e)	Drains and outfall	Recommended for NFA; may require additional sampling
22-015(c)	Former NPDES-permitted outfall	Inactive; cleaned up; removal from facility permit requested

3.2.9.2 Proposed Action

The Proposed Action is not expected to adversely affect PRSs. The PRSs near the intersection of the proposed road and Two-Mile Mesa Road have all been characterized. The NMED has determined that both PRS 06-002 and PRS C-06-005 require additional sampling to characterize

the contamination. At some point, it will be necessary to further characterize and define the contamination, the extent of the contamination, and finally, assess the seriousness of the contamination. If the contamination poses an unacceptable risk to the public or to LANL workers, the sites must be cleaned up. Samples should be taken in the area where the proposed construction might disturb, or bury, known contamination.

The other PRSs in the area (PRS 06-003[c], C-06-006, C-06-016, and C-06-020) have been recognized as “clean.” No further cleanup is planned at these sites. SWMU 22-015(c) is a former NPDES-permitted outfall that has been inactive since 1977. The site has been cleaned up and regraded to minimize erosion. Verification samples have been collected to ensure that cleanup was successful. New construction of buildings, roads, and utility corridors is not expected to disturb PRSs. If they cannot be avoided, the areas would be remediated or otherwise mitigated to allow for construction. If required, PRSs would be sampled and remediated in accordance with the NMED requirements before ground disturbance would commence at these locations.

3.2.9.3 No Action Alternative

Under the No Action Alternative, the PRSs would not be disturbed by construction, demolition, or excavation activities. Site cleanup activities would not be accelerated to provide remediation of any PRS before its scheduled date.

3.2.10 Noise

3.2.10.1 Affected Environment

Noise is defined as unwanted sound. Noise is categorized into two types: *continuous noise*, which is characterized as longer duration and lower intensity, such as a running motor, and *impulsive or impact noise*, which is characterized by short duration and high intensity, such as the detonation of HE. The intensity of sound is measured in decibel units and has been modified into an A-weighted frequency scale (dBA) for setting human auditory limits.

Noise measured at LANL is primarily from occupational exposures that generally take place inside buildings or at open-air firing sites compared against an established Threshold Limit Value (TLV). The TLV is administratively defined as the sound level to which a worker may be exposed for a specific work period without probable adverse effects on hearing acuity. The TLV for continuous noise is 85 dBA for an 8-hour workday. The TLV for impulsive noise during an 8-hour workday is not fixed because the number of impulses allowed per day varies depending on the dBA of each impulse, however, no individual impulse should exceed 140 dBA. An action level (level of exposure to workplace noise that is below the TLV, but the use of PPE is recommended) has been established for noise in the workplace at LANL. The action level for continuous noise is 82 dBA for an 8-hour workday. Although there is the potential for high impact noise levels at open-air firing sites, hearing protection is not required for firing site operators who are inside buildings at the time of the detonation.

Environmental noise levels at LANL are measured outside of buildings and away from routine operations. These sound levels are highly variable and are dependent on the generator. The following are examples of typical sound levels (dBA) for certain noise producing activities: barking dogs (58), sport events (74), nearby vehicle traffic (63), aircraft overhead (66), children playing (65), and birds chirping (54). Sources of environmental noise at LANL consist of

background sound, vehicular traffic, routine operations, and periodic HE testing. Measurements of environmental noise in and around LANL facilities and operations average below 80 dBA.

The averages of measured values from limited ambient environmental sampling in Los Alamos County were found to be consistent with expected sound levels (55 dBA) for outdoors in residential areas. Background sound levels at the White Rock community ranged from 38 to 51 dBA (Burns 1995) and from 31 to 35 dBA at the entrance of Bandelier National Monument (Vigil 1995). The minimum and maximum values for LANL and the County ranged between 38 dBA and 96 dBA, respectively.

3.2.10.2 Proposed Action

The Proposed Action would result in limited short-term increases in noise levels associated with various construction and demolition activities. Following the completion of these activities, noise levels would return to existing levels. Noise generated by the Proposed Action is not expected to have an adverse effect on construction workers, LANL workers, or the public.

The construction of new office space and the demolition of some buildings would require the use of heavy equipment for clearing, leveling, construction, and demolition activities. Heavy equipment such as front-end loaders and backhoes would produce intermittent noise levels at around 73 to 94 dBA at 50 ft (15 m) from the work site under normal working conditions (Canter 1996; Magrab 1975). Construction truck traffic would occur frequently but would generally produce noise levels below that of the heavy equipment. The finishing work within the building structures would create noise levels slightly above normal background levels for office work areas. Noise levels may go up to around 80 dBA at the work site if light machinery is used in this stage of construction (Canter 1996). Workers would be required to have hearing protection if site-specific work produced noise levels above the LANL action level of 82 dBA for steady-state noise. Sound levels would be expected to dissipate to background levels within the Two-Mile Mesa Complex and along SR 501 and should not be noticeable by members of the public or disturb local wildlife. Traffic noise from commuting construction workers would not be expected to noticeably increase the present traffic noise level on Diamond Drive or East Jemez Road and SR 501 during rush hour. The vehicles of construction workers would remain parked during the day and would not contribute to the background noise levels during this time. Therefore, noise levels are not expected to exceed the established TLV. After construction and demolition activities are completed, noise levels would return to background levels.

Under the Proposed Action, the continued use of open-air firing sites would pose a potential health risk from infrequent but high levels of impact noise. However, consistent with current operations, hearing protection for workers should not be required. Also, members of the public should not be adversely affected. Based on a number of physical features (such as vegetation, topography, and distance to occupied areas) that can attenuate or reduce sound intensity, noise levels should return to background levels within about 200 ft (66 m) of the noise source (Canter 1996). In addition, the number of operational firing sites would be reduced under this proposal; however, the total number of explosive experiments are expected to remain about the same. Also, planned containment of smaller explosive experiments would further reduce the potential for impulse noise levels to pose a concern to nearby workers. Impact testing work would continue to generate minor and temporary increases in impact noise in certain work areas.

Once the new and remodeled facilities become operational, noise generated by routine building operations would be negligible. Noise levels would be similar to those encountered around

typical office buildings, crafts and machine shops (such as ventilation fans and testing of back-up power and emergency response systems), operating power equipment, and vehicle traffic.

3.2.10.3 No Action Alternative

Under the No Action Alternative, ambient noise levels would remain unchanged in the vicinity of the Two-Mile Mesa Complex. Potential noise from construction and demolition activities associated with the Proposed Action would not occur, but ongoing routine operations, vehicle traffic, and construction activities from other projects in the vicinity of the Two-Mile Mesa Complex would continue to generate noise. In addition, the firing sites scheduled for dispositioning under the Proposed Action would remain operational under the No Action Alternative. However, the environmental noise levels in and around facilities or operations at LANL would be expected to remain below 80 dBA on average.

3.2.11 Socioeconomics

3.2.11.1 Affected Environment

LANL operations have a notable and positive influence on the economy of north-central New Mexico. Specifically, in FY 01 (the latest year for which such information is available) LANL had an operating budget that was 1.667 billion dollars and a total workforce of 13,570. Salaries and benefits accounted for 880 million dollars. This translated into a 3.8 billion dollar impact on the tri-county region that includes Los Alamos, Santa Fe, and Rio Arriba Counties. In effect, nearly one of every three jobs in the tri-county region was created or supported by LANL. FY 01 procurements in northern New Mexico were 357 million dollars (LANL 2002e). Approximately 80 percent of the jobs created indirectly by LANL in the region occurred in the trade, finance, insurance, real estate, and services sectors (DOE 1999c).

3.2.11.2 Proposed Action

This project would not have a long-term effect on socioeconomic conditions in north-central New Mexico but there would be short-term benefits during construction in the form of jobs and procurement. The projects included in the DX Strategic Plan in and around the Two-Mile Mesa Complex would include construction of several buildings, along with work on roads, parking, landscaping and utilities, and also some demolition. At least 70 million dollars and possibly up to 110 million dollars would be spent for this project on design, oversight, and construction contracts over a 10-year period. Most materials would be purchased in New Mexico. There would be no increase in the number of LANL employees as a result of this project. An additional 80 peak construction jobs would be filled by the existing employees in the regional work force, which includes mostly Los Alamos, Rio Arriba, and Santa Fe Counties. Because these temporary jobs would be filled by existing regional work force, there would be no effect on area population or increase in the demand for housing or public services in Los Alamos or the region.

3.2.11.3 No Action Alternative

There would be no short- or long-term socioeconomic benefits under the No Action Alternative. Construction of the facilities in and around the Two-Mile Mesa Complex would not occur, and therefore no construction revenue would be generated within the local economy.

3.2.12 Biological Resources

3.2.12.1 Affected Environment

A number of protected and sensitive (rare or declining) species have been documented in the LANL region. These include one Federally listed endangered species (the southwestern willow flycatcher [*Empidonax traillii*]) and two Federally listed threatened species (the bald eagle [*Haliaeetus leucocephalus*] and the Mexican spotted owl [*Strix occidentalis*]). Under the *Endangered Species Act of 1973* (16 USC 1531), government agencies are required to consider the potential effects of all its activities on Federally listed threatened or endangered species and their critical habitat.

The LANL Habitat Management Plan (HMP) (LANL 1998b) establishes Areas of Environmental Interest (AEIs) that are being managed and protected because of their significance to biological or other resources. Habitats of sensitive species that occur or may occur at LANL are designated as AEIs. In general, an AEI consists of a core area that contains important breeding or wintering habitat for a specific species and buffer area around the core area. The buffer protects the area from disturbances that would degrade the value of the core area to the species. The HMP contains guidelines for certain activities, including construction, in core and buffer area. For instance, activities are restricted in core area and buffer during breeding season until it is determined that the habitat is not occupied for that year. LANL personnel perform annual surveys of the AEI early in the breeding season to determine the presence of breeding pairs. If the habitat is occupied, the restrictions remain in place until the completion of breeding season. Any activities that cannot operate within the guidelines of the HMP require consultation with the U.S. Fish and Wildlife Service.

Potential Mexican spotted owl habitat is located in the area of the Proposed Action and in the vicinity of several of the structures proposed for demolition. Certain decontamination and demolition activities would be restricted between March and mid-May when surveys are completed or until August 31 if it is determined that the AEI is occupied.

Terrestrial animals in the LANL area include 57 species of mammals, 200 species of birds, 28 species of reptiles, and 9 species of amphibians. Small mammals and birds typically occupy disturbed and developed areas around the Two-Mile Mesa Complex. The most prevalent big game species at LANL are mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*). Numerous raptors and some carnivores, such as black bear (*Ursus americanus*) and bobcat (*Lynx rufus*) also occur and may migrate through the Two-Mile Mesa Complex area.

3.2.12.2 Proposed Action

There would be no effects to sensitive species or their critical habitat due to construction under the Proposed Action. Several technical areas where demolition activities would occur are within the AEI for the Mexican spotted owl. In these areas, BMPs, such as noise and activity restrictions, would be followed so that there would be no effect to this species. Certain decontamination and demolition activities would be restricted between March and mid-May when surveys are completed or until August 31 if it is determined that the AEI is occupied. Small mammals and birds at the Two-Mile Mesa Complex building sites would be temporarily displaced by construction activities. These would be expected to return to the area after construction was completed. Game animal migration is not likely to be altered.

3.2.12.3 No Action Alternative

Under the No Action Alternative, construction and demolition activities would not occur. There would be no habitat disturbances. Effects on biological resources would be unchanged.

3.2.13 Floodplains and Wetlands

3.2.13.1 Affected Environment

There are no floodplains or wetlands within the area of the proposed action. There are, however, riparian and wetland areas immediately north of the Two-Mile Mesa Complex and a floodplain in Two-Mile Canyon north of Two-Mile Mesa Complex.

In its management of wetlands, LANL is subject to Section 404 of the *Clean Water Act*, DOE regulations, and Executive Order 11990 (EO 11990). Pursuant to EO 11990, Protection of Wetlands, each Federal agency is to avoid, to the extent practicable, the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands if a practicable alternative exists. The Special Environmental Analysis (SEA) (DOE 2000b) discusses issues of cumulative effects due to erosion, contaminant transfer and flooding in wetland areas. About 20 percent (16 acres [6.4 hectares]) of the total wetlands were burned in the Cerro Grande Fire. Wetlands in Mortandad, Pajarito and Water Canyons received increased amounts of ash and runoff as a result of the fire (LANL 2001c).

Pursuant to Executive Order 11988 (EO 11988), Floodplain Management, each Federal agency is required, when conducting activities in a floodplain, to take actions to reduce the risk of flood damage; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The SEA (DOE 2000b) describes the actions taken in response to the fire, particularly for flood water control. As a result of the fire, soil erosion, water flow, and ash and silt transport increased exponentially compared to pre-fire conditions. As burned areas are revegetated and stabilized, these effects are expected to diminish.

3.2.13.2 Proposed Action

The Proposed Action would not entail any direct effects on floodplains or wetlands since there are none within the areas proposed for construction or demolition. BMPs would be established so that there would be no indirect effects from construction or demolition conducted as part of the Proposed Action.

3.2.13.3 No Action Alternative

Under the No Action Alternative, construction and demolition activities would not occur. There would be no effect on floodplains or wetlands under the No Action Alternative.